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Adult Cardiac Aorta

Patient Attitudes to Transfusion of Blood or Blood Products After Aortic Surgery: The RESTORE Study

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Objective

Failure to recruit patients is the leading cause of clinical trials failing to complete or not completing on time. The hypothesis of the RESTORE study is that the use of a novel transfusion algorithm involving autologous platelet rich plasma (PRP) and factor concentrates (4 factor prothrombin concentrate and fibrinogen concentrate) will reduce blood transfusion after aortic surgery involving deep hypothermic circulatory arrest. We sought patients' views on the intervention and on taking part in the study.

Method

An on-line questionnaire was presented to members of the national patient association, Aortic Dissection Awareness UK & Ireland. Respondents were stratified into two groups: Group A, who may need surgery in the future and Group B, who have already had surgery. The survey questions explored attitudes to blood transfusion; the use of novel blood products, even if off label; and participating in the proposed study.

Results

61 patients completed the survey: 15 from Group A and 46 from Group B. There were no differences in responses between groups (chi square $p > 0.05$): 18% (11/61) of patients were concerned about having a blood transfusion (Q1); 79% (48/61) were willing to have the novel regimen even if it was off-label (Q2); 67% (41/61) of patients were willing to be randomized in a clinical trial (Q3); and 87% (53/61) were not concerned about having their data published anonymously (Q4).

Conclusions

Patients who have had or may require aortic surgery demonstrate a high level of engagement with research into new approaches to blood or blood product transfusion, and a willingness to participate in trials such as the RESTORE study. Such patient engagement and involvement in clinical trial design would facilitate design of patient-centred approach to answering clinical research questions.

Cannulation Strategies for Type A Aortic Dissection: Clinical Outcomes Comparing Central Aortic Cannulation Versus Femoral Cannulation

Lopez-Marco, A; Yates, M; Yap, J; Uppal, R; Adams, B; Oo, A

St Bartholomew's Hospital

Objectives

There is no current consensus regarding the best cannulation strategy for type A aortic dissection repair, although the antegrade routes are preferred. We reviewed our experience and compared central aortic cannulation (true lumen of the ascending aorta/arch) vs. femoral cannulation strategies and analysed the outcomes.

Methods

From January 2015 to October 2019, 169 patients underwent type A aortic dissection repair in our institution. We excluded those with different arterial cannulation strategies (i.e. axillary artery, innominate). A total of 156 patients were available for the analysis.

In-hospital mortality and post-operative stroke were analysed as outcomes.

Results

Femoral arterial cannulation was performed in 89 cases (57%) and central aortic cannulation in 67 cases (43%).

Reasons for selecting initial cannulation site include surgeon preference, previous surgery, anatomy of the dissection and hemodynamic instability.

In-hospital mortality was similar between femoral and central cannulation strategies (21% vs. 28%, $p = 0.31$). Postoperative stroke was also similar between femoral and central cannulation strategies (29% vs. 24%, $p = 0.46$).

Conclusions

Femoral and central aortic cannulation strategies for type A aortic dissection repair associate equivalent mortality and stroke rates and can be used with equivalent results in the emergency setting.

Safety and Efficacy of Mini-sternotomy Approach for Proximal Aortic Surgery – Experience from Two UK Aortic Centres

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Objective

Minimally invasive cardiac surgery is expanding in the UK, with mini-sternotomy approach being most commonly used for isolated valve replacement procedures.

Since 2015 we have also applied this approach for elective aortic surgery (root, ascending aorta and total arch replacements) in selected cases.

The aim of this study is to analyse early experience results in two aortic centres in the UK.

Methods

From March 2015 to October 2019, 41 patients underwent Aortic Surgery via mini-sternotomy in the two institutions.

12 cases (29%) had an ascending aorta replacement, 23 cases (56%) a root replacement (3 valve-sparing procedures) and 7 cases (17%) had a total arch replacement and frozen elephant trunk procedure.

We reviewed intra-operative cannulation and cerebral protection strategies, hospital length of stay and post-operative complications.

Results

Mean age was 59 years (18-87 years) and 22% of the patients were female.

Indication for surgery was mainly aortic aneurysms, but 4 cases (10%) were secondary to subacute/chronic limited type A aortic dissections.

Cannulation strategies varied depending on the extension of the repair planned and the accessibility to the right atrium, but central cannulation techniques were favoured (93% of arterial, 58% of venous).

Sixteen cases (39%) required deep hypothermic circulatory arrest and we used antegrade cerebral perfusion in 18 cases (44%).

Mean length of postoperative stay was 15.9 days. 3 patients (7%) were re-operated for bleeding and conversion to full sternotomy was necessary in 2 cases (5%). 3 patients (7%) had a post-operative stroke and 2 patients (5%) died in the post-operative period.

Conclusions

Mini-sternotomy access for aortic surgery is safe and it can be applied for selected cases from the aortic root to zone 2-3 of the aortic arch.

This approach did not alter the operative strategies and/or surgical times and offered equivalent complications to full sternotomy with improved patient satisfaction.

The Addition of Root Replacement in Type A Aortic Dissection Does not Increase In-hospital Mortality

Lopez-Marco, A; Yates, M; Yap, J; Uppal, R; Oo, A

St Bartholomew's Hospital

Objectives

The majority of type A aortic dissections present with an entry tear in the ascending aorta and are most frequently repaired with an interposition graft +/- aortic valve resuspension. Replacing the aortic root in the emergency setting is reserved for root aneurysms or dissection that cannot be repaired due to interference with the coronary and/or aortic valve function.

We aimed to establish if adding aortic root replacement in the emergency setting increased complications compared to ascending aorta replacement.

Methods

From January 2015 to October 2019, 167 type A aortic dissections were operated in our institution. We excluded patients who underwent arch surgery and we used 2 groups for comparison: 1) Aortic root and ascending aorta replacement and 2) Ascending aorta +/- aortic valve replacement.

We compared demographic characteristics, clinical presentation, operative times, in-hospital mortality and post-operative complications.

Results

A total of 114 patients were included in the analysis, distributed as: Group 1, n = 41 (36%); Group 2, n = 93 (64%).

Female sex and presentation with neurological malperfusion was significantly higher in Group 2 (43% vs. 24% and 9% vs. 0%, $p < 0.05$), while abdominal malperfusion was more common in Group 1 (5% vs. 0%, $p = 0.03$)

Patients with significant degree of aortic regurgitation or root dilatation (>50mm) underwent a root replacement preferably.

Surgical times and cerebral protection strategies were equivalent between groups. In-hospital mortality was similar (Group 1, 19%; Group 2, 21%, $p = 0.79$) as well as the rate of post-operative complications.

Conclusions

Addition of aortic root replacement in the type A aortic dissection setting does not increase mortality or postoperative complications.

Management of Acute Type B Aortic Dissection in a Cardiac Centre: Are we Following the Guidelines?

Lopez-Marco, A; Yates, M; Mistirian, A; Oo, A

St Bartholomew's Hospital

Introduction

Current guidelines for management of acute type B aortic dissection (ATBAD) recommend medical therapy, with endovascular repair for those with complicated ATBAD and open surgery only considered as alternative to failed/contraindicated TEVAR.

ATBAD patients follow different referral pathways depending on geographical locations, and those seen in Cardiac units represent just the tip of the iceberg.

We aimed to analyse acute and follow-up management of those referred to our Cardiac unit.

Methods

Between 2015 and October 2019, 26 patients were admitted in our unit for management of ATBAD. We excluded patients with previous and/or retrograde type A aortic dissection and type B intramural haematomas.

We analysed management strategies (endovascular vs. surgical) in the acute setting and during follow-up as well as outcomes for the different modalities.

Results

Mean age was 62 years and 65% were male. Aetiology was hypertension (88%), connective tissue disease (8%) and iatrogenic (4%). Three patients (11%) presented with a stroke and 11% with clinical malperfusion.

All patients were admitted to an intensive care setting and received standard medical management.

TEVAR was offered to 5 patients (19%) and 2 patients (8%) underwent open surgery. Complications (stroke and paraplegia) were exclusive to the TEVAR group. One patient died during the acute setting.

Of the patients initially managed conservatively (73%), 21% underwent TEVAR during follow-up and 2 patients died.

Conclusions

Although we follow the current guidelines for ATBAD, standardisation of referral pathways of ATBAD patients into aortic centres would ensure a more robust follow-up to select uncomplicated cases that could benefit from early TEVAR to favour aortic remodelling.

Haemofiltration Post Open Thoracoabdominal Aortic Surgery: A Single Center Experience

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Liverpool Heart & Chest Hospital

Objectives

We report our experience of identifying factors associated with Haemofiltration in thoracoabdominal aortic surgery (TAAA) patients.

Methods

A retrospective, single center, observational study was performed. A total of 273 consecutive patients underwent open repair of TAAA between October 1998 and December 2019. Pre-operative demographic and post-operative outcomes were analysed in relation to Haemofiltration.

Results

A total of 59 patient required Haemofiltration (HF) post-operatively (22%). Only pre-operative eGFR was found to associate with predicting post-operative HF ($p=0.006$). Post-operatively the rate of HF was directly associated with stroke ($p<0.001$), re-operation ($p<0.001$), mechanical ventilation of >48 hours ($p=0.001$) and prolonged ICU stay ($p<0.001$), table 1.

Conclusions

	No Post-op HF (n = 214)	Post-op HF (n = 59)	P value
In-hospital mortality	30 (14.0)	20 (33.9)	<0.001
CVA	11 (5.1)	12 (20.3)	<0.001
Paraplegia	7 (3.3)	6 (10.2)	0.04
Reoperation	9 (4.2)	14 (23.7)	<0.001
Reoperation for bleeding	5 (2.3)	7 (11.9)	0.005
Ventilation > 48 hours	29 (13.6)	28 (47.5)	<0.001
Reintubation	31 (14.5)	15 (25.4)	0.047
ITU Stay, days (IQR)	7 (4, 17)	24 (12, 35)	<0.001
Post-operative stay (IQR)	16 (11, 29)	31 (19, 46)	<0.001

Haemofiltration requirement during post-operative course of patients that undergo TAAA surgery should be investigated further as it is directly linked to other serious comorbidities.

Changes in Outpatient Care for Aortovascular Patients During the COVID-19 Pandemic: Results From a UK Multicentre Study

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Objective

The COVID-19 pandemic posed a challenge to the provision of surgery services, including the conduct of outpatient services. Aortovascular patients, especially those who survived an aortic dissection, require long-life follow-up, including repeated imaging of their aortas. The aim of this study is to assess the impact of the pandemic in the outpatient care of aortovascular patients.

Methods

A multi-centre study collected prospective data for all patients booked for an outpatient consultation in aortic surgery clinics at the participating centres (n=7) between March and August 2020. Outcomes analysed were the number of new and follow up patients, modality of consultation (face-to-face, telephone or video) and outcomes of each consultation (additions to the waiting list or further diagnostics for new patients; and discharge or surveillance for the follow-up patients).

Results

There were 616 aortic surgery outpatient appointments planned during the study period (79% follow-ups and 21% new referrals) and only 2.6% were cancelled. There was a shift from face-to-face appointments to almost all appointments being conducted over the telephone following lockdown on 23 March 2020 and only re-starting face to face activity after August 2020. During the study period, there were 206 face-to-face consultations (33%), 391 telephone consultations (63%) and 3 video consultations (0.5%). At least 23% of the consultations were not accompanied by relevant imaging diagnostics and had to be rebooked.

Conclusions

As the United Kingdom went into lockdown with the COVID-19 pandemic, there were significant change in practice of outpatient service delivery. The clinic activity was maintained with a very low rate of cancellations. However, 23% of the encounters were without appropriate relevant imaging tests. With appropriate planning, this new model of remote consultations proves to be safe and can be used for remodelling outpatient services to improve efficiency.

A Single Centre Experience with Frozen Elephant Trunk in Acute Type A Aortic Dissections

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Derriford Hospital

Objectives

Acute type A Aortic Dissection (AAAD) is a high-risk surgical emergency. Conventional treatment entails replacement of the ascending aorta. A minority of survivors subsequently present with aneurysmal dilatation of the residual false lumen. The hybrid arch/antegrade stent prosthesis (Frozen Elephant Trunk – FET) has facilitated more aggressive management of the dissected arch and proximal descending aorta in selected individuals. We present Plymouth’s experience with this technique.

Methods

From Aug 2017-Mar 2019, 18 out of 28 patients presenting to our unit with AAAD were treated using the FET technique (11 Males, mean age 63.8). All patients were cooled to 20 degrees and antegrade cerebral perfusion was maintained throughout the corporeal arrest period. Concomitant procedures included aortic valve re- suspension (n = 13), Biological Bentall (n = 1), Sinus of Valsalva Repair (n =1), and valve-sparing root replacement (n =1).

Results

CPB, cardiac arrest and corporeal arrest times were 299 ± 83 , 134 ± 52 , and 33 ± 19 mins, respectively. There was no intra-operative mortality. 1 patient was re- explored for bleeding. Treatment was withdrawn in one patient due to massive stroke. 3 patients developed permanent stroke including the deceased patient and a further 3 suffered from TIAs. Paraplegia occurred in 1 patient. All other patients were discharged from the hospital (n=17). 2 patients (11%) died during the follow up period of unknown causes. 15 patients remain alive (83%) with a follow up period extending to 2 years. None have required a reoperation on the operated segments or on the aorta downstream of the stent element.

Conclusion

FET is a promising approach in patients with AAAD. Despite the added complexity of the technique, total operation times were not dissimilar to conventional emergency dissection surgery and mortality was gratifyingly low in this early series.

The Role Glycosaminoglycans in Thoracic Aortic Aneurysm and Dissection

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University of Liverpool

Objective

Extraction and quantification of total glycosaminoglycans (GAGs) and its subtypes from human aortic tissue with and without TAAD to probe differences in GAG content.

Methods

Biochemical analysis was conducted using specific-enzymatic tissue digestion on control and TAAD tissue to evaluate hyaluronic acid, heparan sulphate and chondroitin sulphate levels. This was supplemented with histological analysis on the same tissue cohorts using alcian blue dye to assess the amount of blue in the tissue (%) with colour thresholding on the software Image J as a quantitative measure of GAG presence.

Results

Total GAG levels were the greatest in control tissue while the levels were similar in aneurysm and dissection cohorts. HA levels in control tissue were also significantly higher than acute ($p < 0.01$) and chronic ($p < 0.001$) dissection tissues while the HS and CS levels remained similar across all cohorts. Both biochemical and histological analysis identified flap tissue having the higher levels of GAG in comparison to false and true lumen. Additionally, significantly higher levels of HA were found in acute FP tissue compared to control ($p < 0.05$).

Conclusion

GAG levels in control aorta were higher than in TAAD which could suggest a role for GAGs in the underlying mechanism of aneurysms and dissections with potential therapeutic targets.

Valve-sparing Aortic Root Replacements – A Single Institution Experience

Purmessur, R; Senanayake, E; Mascaro, J

University Hospitals Birmingham NHS Foundation Trust

Objectives

Valve-sparing aortic root replacement (VSARR) as an alternative to replacing the aortic valve during root replacements has recently risen in popularity. In this study, we sought to evaluate the postoperative outcomes of valve competence and long-term freedom from re-operation using the re-implantation technique.

Methods

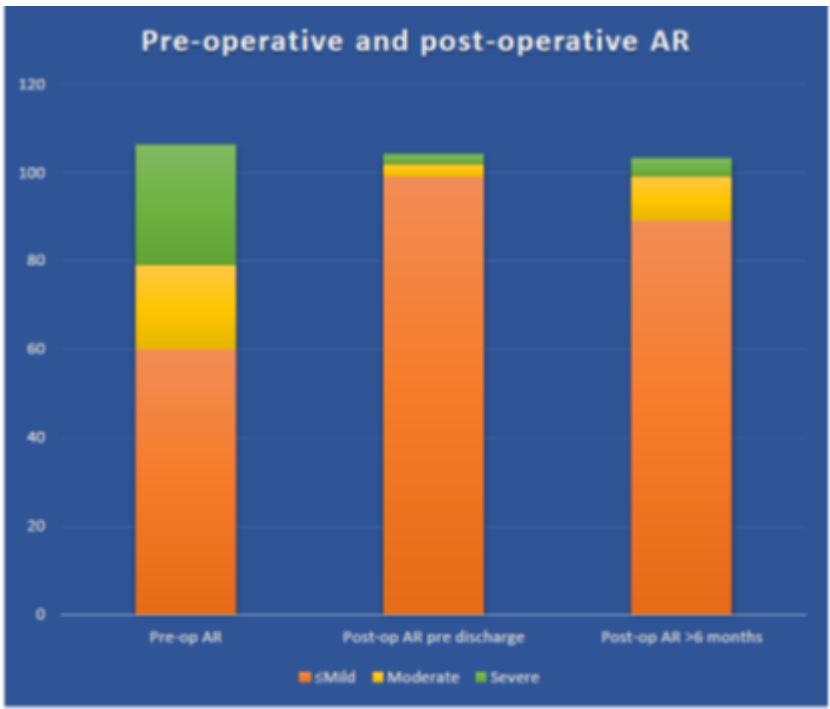
A retrospective analysis of prospectively collected data was performed and all consecutive VSARR between 2003 and 2019 were evaluated. 106 patients were identified to have undergone a VSARR during that period of time. We analysed the severity of aortic regurgitation (AR) at >6 months, as well as the freedom from aortic valve replacement and survival reported at long-term follow-up.

Results

71%(n=75) of patients were male. 45%(n=48) of patients had connective tissue disorders. 57%(n=60) had ≤Mild AR pre-operatively and 83%(n=88) had a tricuspid aortic valve. All patients received a Valsalva graft and 6 required leaflet plication. There was an overall decrease in the severity of AR, with a greater percentage of patients falling within the ≤Mild category post-operatively (Figure 1). The intra-operative failure rate was 3. 10 more patients went on to have an aortic valve replacement in the future. Operative mortality was 0% and all-cause mortality was 9% (n=10), with a median follow-up of 8 years. The mean left ventricular ejection fraction (LVEF) pre-discharge and at >6 months follow-up were 56% (SD=11%) and 59% (SD=9%) respectively.

Conclusion

At our institution, we have shown that VSARR with the re-implantation technique is feasible and safe with good in-hospital and long-term outcomes. A competent aortic valve can be achieved satisfactorily irrespective of the pre-operative severity of AR. However, freedom from re-operation is influenced by the presence of ≥Moderate pre-operative AR.



Root Replacement With a Valve-sparing Reimplantation Technique – A Learning Curve

Purmessur, R; Senanayake, E; Mascaro, J

University Hospitals Birmingham NHS Foundation Trust

Objectives

Valve-sparing aortic root replacement (VSARR), via the reimplantation technique, has increasingly been recognised as a valid method of managing aortic root dilations with healthy aortic leaflets. Despite conferring multiple post-operative benefits to the patients, VSARR is inherently a complex procedure and requires a surgical learning curve. In this study, we present our experience throughout this learning period and our outcomes.

Methods

All patients undergoing a VSARR under the same surgeon from 2013 to 2019 were included in the study. The data was prospectively collected and retrospectively analysed. Individual case notes, pre-operative and post-operative investigations, operative notes and clinic correspondence were reviewed. The severity of pre-operative aortic regurgitation (AR) and post-operative AR at >6 months follow-up was analysed and reported. We also looked at the freedom from re-operation and long-term survival rate.

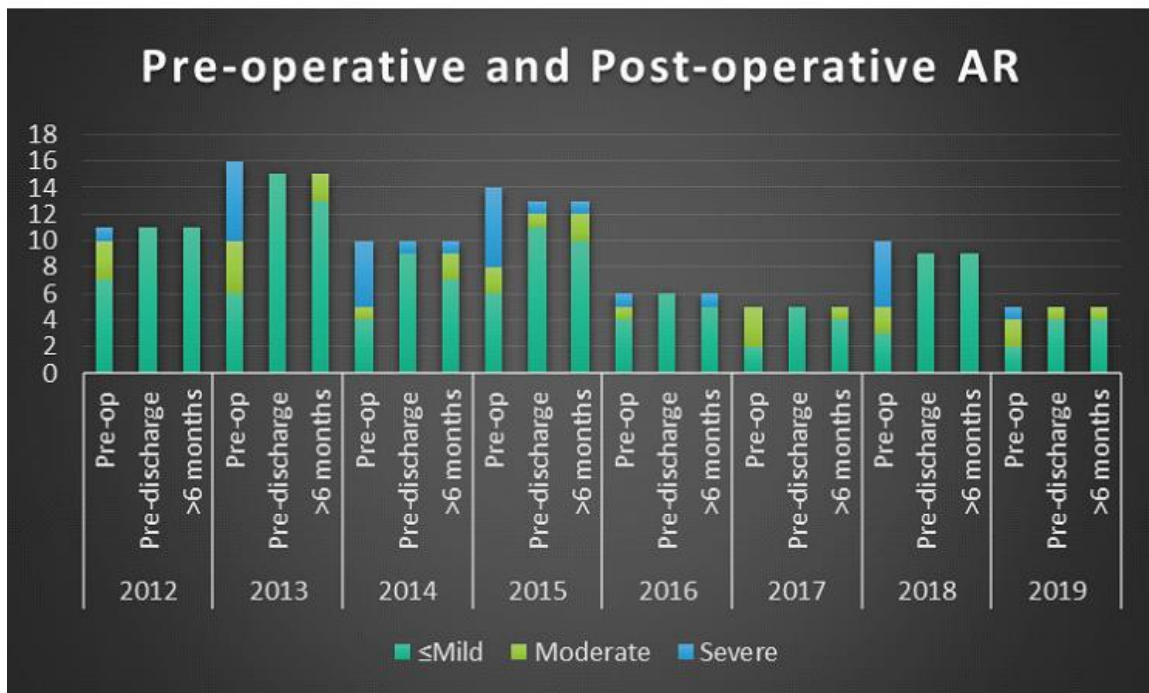
Results

77 patients were included in the study. 73%(n=56) of patients were male. Mean pre-operative left ventricular ejection fraction was 58% (SD=8%). 42%(n=32) of patients had connective tissue disorders. 44%(n=34) of patients had ≤Mild AR pre-operatively. 88%(n=68) had tricuspid aortic valves (AV). In general, there was preservation of LVEF, with the mean pre-discharge LVEF being 55% (SD=9.1) and mean LVEF at >6 months being 55% (SD=10%). The intra-operative failure rate was 3.9% (n=3). 9% (n=7) of patients required an AV replacement post-operatively. The all-cause mortality rate was 7.8% (n=6) with a median follow-up of 6 years.

Conclusion

Despite the technical challenges faced with performing VSARR with the re-implantation technique, safe and reproducible outcomes are achievable. Patient selection should be reserved to the early part of the learning curve. Patients with severe AR represent a big challenge in the initial stages, which accounts for the higher rate of reoperation at the beginning.

Figure 1. Bar chart comparing the pre-operative, pre-discharge and >6 months post-operative severity of AR.



Experience of Explanting an Infected Frozen Elephant Trunk

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Introduction

Graft infection following implantation of a frozen elephant trunk (FET) is rare and rates are poorly recorded. Generally, proximal aortic graft infections are not successfully treated with antibiotics alone. The risk of mortality and morbidity associated with redo aortic graft surgery is high. We report a case describing such a patient requiring FET explantation.

Case report

A 46-year-old patient presented with relapsing mediastinitis which began within the index admission for replacement of aortic arch and FET following acute type A aortic dissection. A right anterior thoracotomy and washout revealed a *Proteus* infection. After 2 years of antibiotic therapy he still exhibited signs of sepsis when treatment was stopped. CT-PET showed a peri-graft collection and the entire arch and FET demonstrated uptake. He was referred to our centre for explant. This was performed under DHCA using ACP for cerebral protection. The FET was explanted from the proximal DTA using a Roberts. Reconstruction was made with an arch homograft, extending from the level of the LSA to the STJ. He was extubated on POD 2 and was returned to theatre (POD 4) for bleeding from the homograft. On POD 15 CT scan showed two pseudoaneurysms from the homograft. On return to theatre, the homograft looked friable and had an appearance of impending rupture. With low confidence around the integrity of the homograft, this was replaced with a branched Dacron graft (Terumo Gelweave™ Siena) under DHCA. He recovered well and is currently awaiting repatriation to his home country.

Discussion

This report describes our experience of explanting a FET for infection and the fact that this procedure is possible through the distal arch. We have identified one other case report describing explant of a FET for infection which was similarly successful. Our experience with replacing the aortic arch with a homograft was concerning and the reason for the fragility unknown but probably multi-factorial.



A) Explanted FET from proximal DTA

B) Good haemostasis of homograft, with left axillary bypass graft, prior to closure

Developing a Valve Sparing Root Replacement Program in a UK Cardiac Centre

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Sheffield Teaching Hospitals

Objectives

Sharing our experience in starting and developing a program of Valve Sparing Root Replacement (VSRR) in a UK cardiac centre.

Methods

A VSRR program was started in 2009 with one surgeon in charge and all the aortic consultants involved in the program. Specialist courses were attended and local proctoring organised. All cases were discussed at the aortic MDT and performed as two consultants operation. Clinical data were prospectively recorded.

Results

A total of 40 patients underwent VSRR (January 2009 to October 2020), with a significant increase in the number of cases over time. The reimplantation technique, using the Valsalva graft, has been performed in all cases. 8 (20%) patients had a bicuspid aortic valve (BAV), 2 had Marfan Syndrome and 1 Loyes-Dietz Syndrome. In 42% of the cases additional leaflet repair techniques were performed including single or multiple plications, shavings and fenestration closures. In 1 patient a second round of CPB was required to optimise the repair. 12% of the patients underwent concomitant procedures; the mean CPB time was 166 ± 26 and cross-clamp time 139 ± 22 min. All patients were discharged alive with no incidence of stroke.

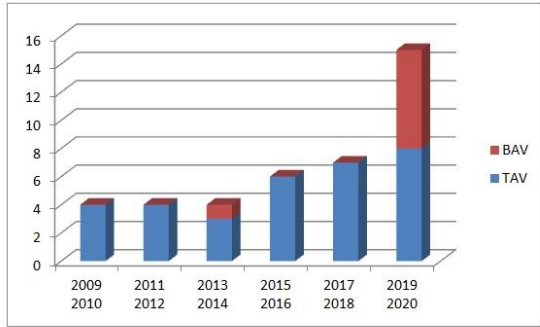
The complexity of the procedures (BAV and leaflets repair) has increased throughout the years.

One patient died at follow-up after 62 days. Yearly transthoracic follow-up echo showed moderate aortic regurgitation in 2 patients, and severe in 1, who required re-operation after 27 months. The overall freedom from moderate AR at 10 years was 86%.

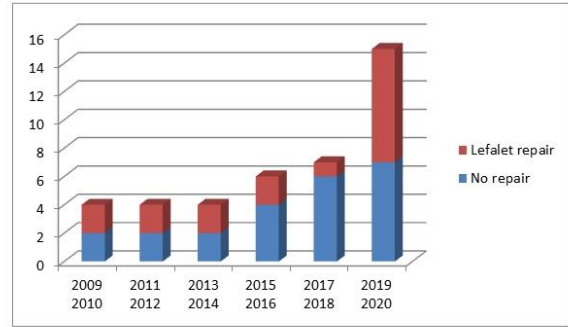
Conclusions

Our experience confirmed that a successful VSRR program can be achieved, although requiring time and team work. We strongly believe that the 2 consultants operation approach was of great help in maximise learning curve and building confidence in undertaking more complex repair also in BAV.

Figure. Number of cases, aortic valve anatomy (A) and repair procedures (B)



A



B

Identifying the Main Delays to Surgery in Patients who Present with an Acute Type A Aortic Dissection

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King's College Hospital

Objectives

Acute aortic dissection (AAD) represents a serious cardiovascular emergency, with an associated mortality of 1-2% per hour immediately after symptom onset. It is known that the relative infrequency of AAD and plausible differentials can negatively impact on a timely diagnosis. Female sex, absence of typical features and high-risk examination findings (hypotension/pulse deficits) have been shown to delay diagnosis. In the UK, services for AAD are centralized, working on established volume/outcome relationships. However, this has the potential to introduce delays in rapidly diagnosing patients in hospitals without on-site specialist support and in the logistics of transferring patients across large distances. This study aims to report on the time taken for patients to receive surgery after first presenting to their local hospital to identify which points on the pathway significantly contribute to delay.

Methods

Retrospective analysis of all operated type A aortic dissections at our hospital in 2019. Hospital database used to identify patients, and local/referring hospital documentation reviewed to establish timepoints for events prior to surgery.

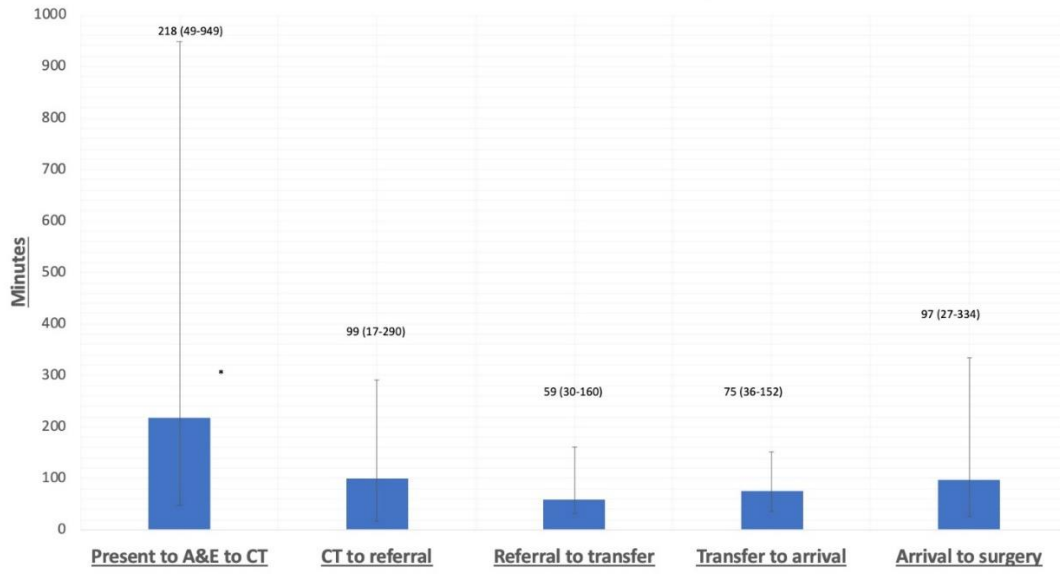
Results

- N:22
- 16 (73%) Male
- Mean age: 58 (29-88)
- Mortality: 1 (4.5%)
- MACE: 4 (18%)
- Mean time from A&E to surgery: 8h 30m (4h 16m - 13h 43m)
- Largest contributor to delay is obtaining CT scan (figure 1)
- No significant impact of sex on outcome

Conclusions

Our findings suggest the greatest impact on improving times from patient presentation to surgery is to increase awareness of AAD in regional, non-specialist hospitals to reduce time to cross-sectional imaging and diagnosis. Despite delays, outcomes from our studied cohort were good and support referral and transfer of patients to specialist units.

Time Points - Presentation to Surgery



Ascending Aortic and Arch Surgery in the Octogenarian and Nonagenarian: Advanced Age is not a Contraindication

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Royal Prince Alfred Hospital, Sydney, Australia

Objectives

Although advances in surgical techniques have improved the outcomes of aortic surgery it remains an invasive and higher-risk operation than standard cardiac surgery. Traditionally, such surgery was avoided or denied to elderly patients because of the high surgical morbidity and mortality thought to be associated with this age group. However, with increasing longevity, an ageing population and the survival benefit conveyed in aneurysmal disease and dissection, aortic surgery is being considered in an increasing number of octogenarians. The aim of this study is to analyse the outcomes of aortic surgery in an octogenarian (or older) population.

Methods

A retrospective cohort study reviewed our cardiac surgery database for patients eighty years or older who underwent aortic surgery (ascending aorta or arch surgery) at Royal Prince Alfred Hospital, Sydney, Australia from January 2010 to December 2019. Baseline patient characteristics and early postoperative outcomes were extracted for analysis.

Results

A total of 31 patients fulfilled the pre-defined selection criteria. The mean age was 83.4 years and 58% were male. The aortic pathology was mainly aneurysmal ascending aortic disease (65%), acute type A dissection (25%) and intramural haematoma (10%). The overall 30-day in hospital mortality was 14%. The majority (64%) of patients were discharged to a rehabilitation centre or local referring hospital and then home, the remaining 22% were discharged directly to home.

Conclusions

Octogenarians and nonagenarians can safely undergo ascending aorta and aortic arch replacement surgery with acceptable perioperative morbidity and mortality. The conventional surgical management for ascending aorta and aortic arch diseases should not be abandoned purely because of the patient's age.

Inflammation in Aortic Surgery: Postoperative Evolution of Biomarkers

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Barts Health NHS Trust

Objectives

Aortic pathologies often present with elevated inflammatory biomarkers due to the nature of the disease. Open aortic surgery causes significant trauma to the body due to often-mandatory ischemic periods, long cardiopulmonary bypass times and polytransfusion. We aim to determine postoperative trends on inflammation biomarkers for different aortic pathologies and anatomical segments of the aorta and type of surgery.

Methods

Retrospective review of prospectively collected data of 80 consecutive patients who underwent aortic surgery in our centre between 2017-2020, grouped according to the type of aortic intervention: 1. Type A aortic dissection (AD) repair with ascending aorta/hemi-arch replacement, 2. Aortic root replacement (ARR), 3. Aortic arch + Frozen elephant trunk (FET), 4. Descending thoracic aorta (DTA)/Thoraco-Abdominal aortic repair (TAA). Primary outcomes were daily values of white blood cells (WBC) and C-Reactive Protein (CRP) during the first 15 postoperative days.

Results

All groups had a similar inflammatory peak in the first 2-4 days (WBC 12-15x10⁹ c/L). AD and FET groups show similar trends with WBC and CRP peaks on days 2 and 10. The ARR group didn't experience the 2nd peak as most patients were already discharged. DTA/TAA patients experienced a more prolonged inflammatory response, reaching a plateau by day 5-10. AD group shows the highest WBC levels and the DTA/TAAA group the highest CRP levels. CRP levels remain elevated (100-200 mg/L) in all groups after 15 postoperative days.

Conclusions

Inflammatory biomarkers show different postoperative trends depending on the clinical presentation (emergency/elective) and complexity of the aortic procedure performed and associated adjuncts (circulatory arrest, left heart bypass). Further understanding of the inflammatory response to different aortic pathologies and surgical procedures will permit reduction on the liberal use of antibiotics that this cohort of patients are usually exposed to.

Establishment of Yorkshire Aortic Regional Network Services

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¹Castle Hill Hospital; ²Sheffield Teaching Hospitals NHS Trust; ³Leeds Teaching Hospitals NHS Trust; ⁴Hull University Teaching Hospitals NHS Trust

Objective

To establish baseline outcomes for patients with type A aortic dissection in the region, prior to the inception of a regional aortic service. To describe the key steps and potential service, training and workforce implications of developing the regional network.

Mortality from aortic dissection in the UK is approximately 25% whilst it has been falling in other countries. As part of national strategy in the UK for improving outcomes, there has been a push to establish regional aortic services. Prior reported success from London and Liverpool regional aortic networks show significantly reduced mortality. Thus this regional service has been established with the aim of similarly improving outcomes in emergency aortic surgery.

Methods

We present this retrospective data from January 2015 to January 2018 from three cardiac centres showing the timeline of the diagnosis to treatment of type A aortic dissection in addition to mortality outcomes.

Results

During this period 98 patients with aortic dissections underwent emergency surgery in three centres in the region. The mean time (mins) from arrival in ED to CT scan were 450, 528 and 540 between the 3 centres respectively. The mean time (mins) from CT diagnosis to surgery were 420, 372 and 420 between the centres respectively. Mortality was 25.5%.

Development of this network required extensive consultation between the various stakeholders including ambulance services, all three hospital trusts, commissioners and NHS England. Establishment of the regional aortic network will have an impact on services requiring transfer of patients across the region, new on-call rotas, training implications for surgical trainees and new referral pathways.

Conclusion

A regional aorto-vascular service aims to improve both short- and long-term outcomes in acute aortic dissections in the region. We believe that a dedicated service will reduce the time from diagnosis to surgery in the hands of experienced surgeons in specialist centres.

Redo Aortic Root and Ascending Aorta Replacement Using a Modified Cabrol's Technique for a Salmonella Graft Infection (Video)

Pumphrey, O¹; Boulemden, A²; Omodara, O²; Greco, R²; Naik, S²

¹Nottingham City Hospital; ²University Hospitals of Nottingham

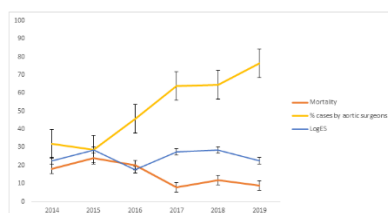
Outcomes of Emergency Type A Aortic Dissection Repair: Experience Does Matter – Institutional Report over 5 years

Di Tommaso, E; Sinha, S; Dimagli, A; Chivasso, P; Ahmed, E; Bryan, A; Rajakaruna, C; Benedetto, U

Bristol Royal Infirmary

Background

Acute aortic dissection (AAD) is a life-threatening emergency. Mortality rate without surgery for these patients is equivalent to 1% per hour. The incidence of AAD in the UK is estimated at 2 to 3 cases per 100,000 population per year. Surgery is the mainstay of treatment for Stanford Type A AAD. Methods and Results: We reviewed our database over a 5-year period between Jan 2014 and March 2019. We identified 154 patients that had emergency surgery for a Type A AAD. The average age was 61years and the average Additive and Logistic EuroSCOREs for the entire period were 10.47+/-2.89 and 25.34+/-17.94 respectively. 70% were male. 12% of patients had cardiogenic shock and nearly 40% had some evidence of malperfusion at the time of presentation. We analysed the annual trends in outcomes and compared these with the risk profile of the patients, method of cannulation and number of different surgeons performing these operations. Despite a fairly steady risk profile of the patients over this 5-year period, we found that with an increase in the number of cases since 2016 we have experienced a steady downward trend in mortality. The mortality for 2019 was 9.1% at 30 days. Over this time period the number of different surgeons performing these operations has decreased. Thereby concentrating the skill set to a core group of surgeons with an interest in aortic disease. There has also been a significant shift towards axillary cannulation with 100% of cases in 2019 being performed with this technique. This has been associated with an acceptably low incidence of stroke and haemofiltration in these patients (around 9%). Conclusions: The present findings support the hypothesis that increased experience within a centre and within the hands a few select surgeons leads to a decrease in overall mortality despite the steady high-risk profile of this patient population.



Establishment of a Personalised External Aortic Root (PEARS) Program, a Single-center Experience

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¹Department of Cardiothoracic Surgery, Royal Victoria Hospital, Belfast; ²Department of Radiology, Royal Victoria Hospital, Belfast

Objectives

Personalised external aortic root support (PEARS) is a novel approach in the management of aortic root aneurysms in those with connective tissue disorders. The procedure uses pre-operative imaging to create a 3D bespoke model of a patients' aortic root which is then implanted intraoperatively around the aortic root and coronary ostia. The objective of this study is to review the initial experience and outcomes from a single centre.

Methods

A PEARS program was established by a single surgeon with a proctor present for the first three cases. A retrospective review of all patients undergoing PEARS from 2016 to present was undertaken.

Results

We have treated 14 patients to date, 12 isolated PEARS and 2 with concomitant procedures. Of the isolated PEARS patients, mean duration of procedure was 196 ± 31 minutes. Median hospital stay was 7 days (range 4-118). There were no mortalities. Complications included atrial fibrillation (n=2), transient ST elevation (n=4) and late-onset pericarditis (n=1). One patient developed intraoperative circumflex ischemia following mitral repair and PEARS requiring emergency CABG and resulting in a prolonged stay. One patient with Loays Dietz developed a right coronary artery dissection one week postoperatively which was managed with reoperation, vessel ligation and CABG using the right internal mammary artery. Mean follow-up is 1.2 ± 1 years and all patients are well with no acute aortic events.

Conclusions

We successfully established a PEARS program. Coronary complications post PEARS can be life-threatening. We recommend a pre-discharge CT aorta for all patients. Longer-term follow of aortic dimensions is required to determine efficacy compared to aortic root replacement.

Diagnosis and Management of Acute Type-A Aortic Dissection in Emergency Departments: Updated Results of a UK National Survey

Hartley, P¹; Salmasi, M²

¹Royal Brompton & Harefield Hospital; ²Imperial College London

Objectives

Type A-aortic dissection (TAAD) is a life-threatening diagnosis made in the emergency department (ED). Many presentations mimic acute coronary syndrome (ACS) and over a third of TAAD patients present with raised cardiac enzymes, many of whom have ACS-like changes on the electrocardiogram. The aim of this study was to assess the current practice in the diagnosis and initial management of TAAD in UK Emergency Departments.

Methods

Between April and October 2018, a structured survey was distributed to ED Consultants across the UK. Questions were divided into two broad categories: i) simulated clinical scenarios in which TAAD was a possible diagnosis; and ii) ED infrastructure for TAAD management.

Results

Responses were received from 175 ED consultants across 70 hospital Trusts. In the context of chest pain and ST elevation, 97% of ED consultants considered this sufficient to diagnose ACS, and over half (54%) agreed with committing to treatment (including the use of thrombolysis) prior to further investigation. Consultants committed to early ACS treatment were statistically less likely to order a CT scan or d-dimer (OR 0.31, 95% CI 0.12-0.83, $p=0.02$). In total, 32% of consultants reported they would ever request a CT chest in the context of chest pain and elevated troponin. The lack of an AD algorithm was the strongest predictor of clinicians avoiding the use of more definitive investigations for TAAD (OR 0.31, 95% CI 0.01-0.64, $p=0.05$).

Conclusions

In TAAD patients presenting with chest pain and elevated cardiac enzymes there is a high probability of ACS treatment being commenced and a significant risk of failing to request the necessary imaging to diagnose TAAD.

Evaluation of the Time Taken Between Aortic Dissection Presentation to the Emergency Department and Definitive Surgical Intervention

Mesri, M¹; Nzenwa, I²; Oo, S³; Duvva, D¹; Field, M¹

¹Liverpool Heart & Chest Hospital; ²University of Liverpool; ³Bristol Royal Infirmary

Objective

Mortality risk from aortic dissection (AD) increases by 1-3% every hour over the first 24 hrs following presentation. However, delays to treatment are common: AD is considered as a differential for only half of the patients that arrive at AED with the condition, while a third receive incorrect treatment based on an alternative diagnosis. Following an initial audit conducted in 2009, the aim of this project was to re-audit the time taken for patients presenting at AED to receive life-saving surgery at a tertiary cardiothoracic centre (TCU).

Methods

We included AD patients treated at a TCU between January 2018 and November 2019. For each patient, we identified the length of three important time periods within the treatment pathway: the diagnostic time (between arriving at AED and receiving a CT scan), the transfer time (between receiving the scan and arriving at TCU), and the onsite intervention time (between arrival at TCU and theatre). We used descriptive statistics to compare the time periods.

Results

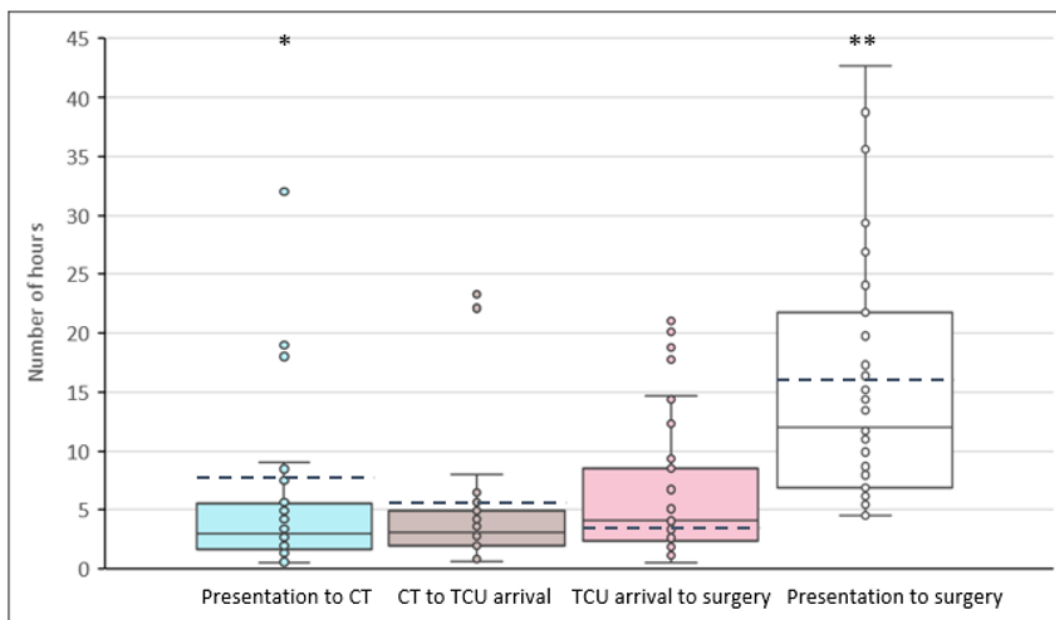


Figure 1. Box and whisker plot showing the time taken for patients to complete each of the three stages of the pathway between presenting at AED with Aortic Dissection (AD) and receiving the definitive surgical intervention. The dotted lines indicate the median times for the equivalent stages as measured during a previous audit conducted in 2009.

* Outlier at 120 hours

** Outlier at 139 hours

In total, 43 patients' treatment pathways were reviewed. The median time between arriving at AED and undergoing surgery was just over 12 hrs, a 4-hr reduction from the previous audit. Greatest reductions were seen in the diagnostic and transfer times. The diagnostic time was the shortest stage (median 2.98 hrs). The transfer time was 3.13 hrs, but the longest stage was the time between arriving at TCU and undergoing surgery (4.02 hrs). However, the diagnostic time was most vulnerable to long delays, with one patient waiting over 120 hrs and a second taking 32 hrs. These far exceeded the longest transfer time (23.32 hrs) and on-site intervention time (21.00 hrs).

Conclusion

The average of 12 hrs from presentation to surgery still represents a greatly increased risk of death. The diagnostic and pre-operative stages may offer the best opportunities for review of procedures and interventions to expedite access to definitive surgical intervention.

i - Knife ("Intelligent Knife"): Potential Point of Care Test Guiding Intra-operative Decision Making in Thoracic Aortic Surgery

Davies, H¹; Nawaytou, O²; Harky, A²; Harrington, D²; Kuduvalli, M²; Akhtar, R¹; Field, M²; Madine, J¹

¹University of Liverpool; ²Liverpool Heart & Chest Hospital NHS Trust

Objectives

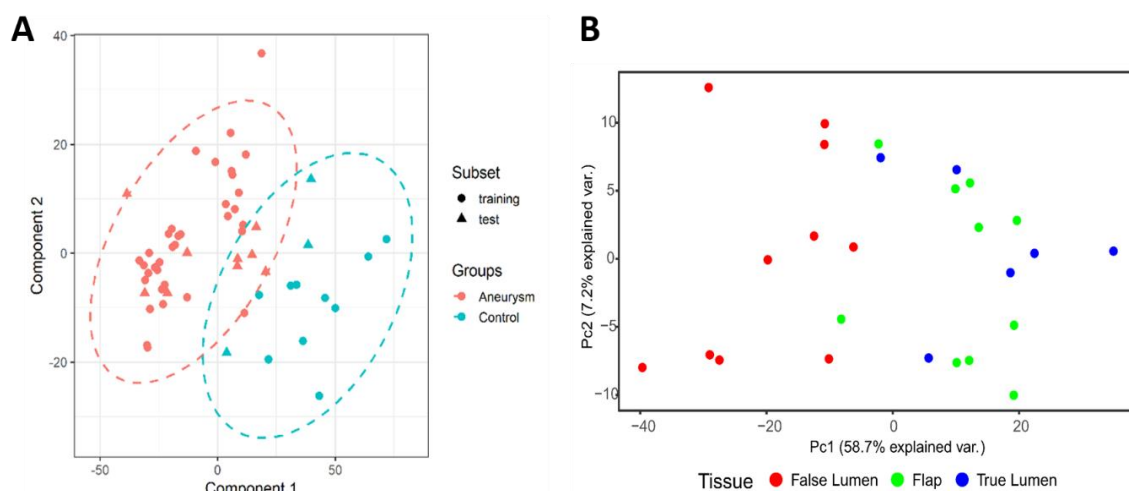
Rapid evaporative ionization mass spectrometry (REIMS) is a technique that enables characterisation of human tissue by analysis of the vapour from a hand-held diathermy with hood and suction system, known as intelligent knife (iKnife). iKnife can be used to obtain a molecular profile within seconds and determine differences within and between samples with no sample preparation. To-date it has been used to delineate tumour margins and this study addresses the issue of whether the technology can distinguish aortic pathology and be used as a Point of Care test guiding intra-operative decision making.

Methods

REIMS analysis was performed on snap frozen punch biopsies of human ascending aortic tissue. Tissue from surgical repair of aneurysms (n= 44) and acute Type A dissections (n=10) were compared to control tissues (disease-free post mortem samples and CABG) (n=13).

Results

iKnife was able to distinguish between control and aneurysmal tissue with accuracy and precision of 88.7% and 85.1% respectively (Fig A). Part B of the Figure demonstrates how true lumen outer wall, false lumen outer wall and dissection flap can be distinguished. Being able to determine the robustness of the outer wall false lumen, and potential for early post-surgical aneurysmal development, may help guide surgeons during surgery for acute Type A repair and whether a total arch and FET is indicated.



Conclusions

iKnife technology has the potential to improve patient care by accurately assessing tissue in real-time and influence intra-operative decisions such as determining the extent of resection, thereby reducing the need for further redo or distal surgery. Further work continues on creating a "bio-signature" library and predictive modelling to guide iKnife use.

Predictors of Outcomes for Open Repair of Thoracic and Thoracoabdominal Aortic Surgery: A Single Centre Experience Over 20 Years

Harky, A; Othman, A; Shaw, M; Nawaytou, O; Harrington, D; Kuduvali, M; Kendall, J; Torella, F; Field, M

Liverpool Heart & Chest Hospital

Objective

We sought to report our outcomes and predicting factors for open repair of descending thoracic aneurysm (DTA) and thoracoabdominal aortic aneurysms (TAAA).

Methods

We retrospectively analysed our consecutively collected data 1998 to 2019 of patients that were operated on for thoracic or thoracoabdominal aortic aneurysms. Multivariate analysis was used to identify predictors of mortality.

Results

We identified a total of 430 patients that underwent DTA (n=157) and TAAA (n=273) repair. 30-day mortality reported in elective cases was 3.1% after DTA repair and 9.9% after TAAA repair; whereas non-elective surgery carried a 30-day mortality of 17.9%. Predictors of in-hospital mortality were: age ≥ 70 (OR 3.36; 95%CI=1.79-6.32, $P < 0.001$); extent II repair (OR 4.39; 95%CI=2.34-8.21), $P < 0.001$); non-elective surgery (OR 2.72; 95%CI=1.44, 5.12), $P = 0.002$); out-of-hours surgery (OR 8.17; 95%CI=2.16-30.95), $P = 0.002$), left ventricular ejection fraction $< 30\%$ (OR 9.86; 95%CI=1.91-50.86, $P < 0.006$) and surgery for degenerative aneurysm (OR=2.20; 95%CI=1.12-4.31, $P = 0.02$). The incidence of stroke and paraplegia was 7.1% and 0% after DTA repair; 9.9% and 3.3% after TAAA repair respectively.

Conclusion

Open surgical repair of TAA and TAAA carries significant risk to life, which is directly associated with advanced age, extent of aortic replacement, timing of surgery and left ventricular function. Understanding these predicting factors is paramount in patient selection and during the consent process, particularly in the elderly cohort.

Outcomes of Acute Type A Aortic Dissection Repair During In-hours and Out-of-hours: A Single Centre Experience

Harky, A; Mason, S; Othman, A; Shaw, M; Harrington, D; Kuduvalli, M; Nawaytou, O; Field, M

Liverpool Heart & Chest Hospital

Objective

We sought to report our experience of repairing acute type A aortic dissection (ATAAD) over the 10 years during in-hours vs out-of-hours since the establishment of specialized aortic service and rota.

Methods

A retrospective analysis of all patients that underwent acute type A aortic dissection repair between 2008 to 2019 in our centre. Within hours were defined as 08:00 to 19:59 hours and out of hours were defined as 20:00 to 07:59 hours.

Results

A total of 203 patients underwent repair of ATAAD. 109 patients were operated on within the in-hours while 94 patients operated on during out-of-hours. Aortic root replacement was higher in out-of-hours (33% vs 49%, $p=0.02$). Total arch replacement was done in 25% vs 23% during in-hours vs out-of-hours respectively ($p=0.82$). Operative times were not significantly different in each cohort (CPB of 341 vs 350 minutes, $p=0.53$; ACx of 196 vs 206 minutes, $p=0.69$). 30-day mortality and stroke rates were similar in both groups (12% vs 12%, $p=0.96$; 13% vs 16%, $p=0.53$ respectively).

Conclusion

Repairing of type A aortic dissection during in-hours and out-of-hours have similar clinical outcomes when operated on in specialized unit with dedicated aortic team.

What is the Influence of Bovine Aortic Arch Anatomy on the Outcome of Patients Undergoing Major Aortic Surgery?

Mustaev, M¹; Salmasi, M²; Holland, L¹; Hasan, M¹; Kew, E¹; Sabetai, M¹

¹Guy's and St. Thomas' NHS Foundation Trust; ²Imperial College London

Objectives

Common origin of the innominate and left common carotid arteries, termed the "bovine" arch, has been associated with increased risk of acute aortic syndrome and cerebrovascular accidents in the literature, purportedly through altered flow rates and aortic biomechanics. This study aimed to assess whether the presence of a bovine arch impacted the outcomes of patients undergoing major aortic surgery.

Methods

The data was retrospectively analysed using parametric and non-parametric statistics in the period from January 2016-July 2018 at a single aortovascular institution. All patients undergoing emergency and elective major aortic surgery for the proximal aorta disease (predominantly, aortic dissections and aneurysms) were included.

Results

In total, 140 patients were included (bovine arch n=31, non-bovine arch n=109). Pre-operative demographics and echocardiographic data were comparable between the groups (bovine vs non-bovine): Age (62.7 ± 13.2 vs 65.3 ± 10.5 , $p=0.157$), aortic regurgitation grade ($p=0.234$), aortic stenosis grade ($p=0.316$) as well as aortic dimensions. Operatively, arch surgery was significantly less in the bovine group (23% vs 32%, $p<0.05$), as was the use of total circulatory arrest ($p<0.05$). The incidence of root surgery and aortic valve prosthetic implantation was comparable, whereas incidence of Type A aortic dissection was higher in the non-bovine group (23% vs 16%, $p<0.0001$). Operative mortality was similar between the two groups (OR 0.49, 95% CI 0.06 – 4.11, $p=0.507$) as were other short-term outcomes (stroke, bleeding, atrial fibrillation, re-operation, pneumonia, hospital stay).

Conclusions

Our results demonstrate no difference in operative outcomes between the groups as well as in the major adverse cardiovascular and cerebrovascular events. There was no supportive evidence that the bovine arch anatomy is associated with adverse events in patients undergoing major aortic surgery for proximal aorta disease.

Variables	Bovine (N=31)	Non-bovine (N=109)	P value
Age	62.7 ±13.2	65.3 ± 10.5	0.157
Hypertension	18	77	0.164
Female	11	41	0.829
TAAD	5	25	0.0001
Operative mortality	1	7	0.507
Stroke	3	7	0.467
Atrial fibrillation	12	45	0.648
Bleeding	4	21	0.382
PPM	2	3	0.334

Type A Aortic Dissection Surgery Performed by Specialist Aortic Surgeons and the Impact on Short- and Long-Term Outcomes

Hussain, A; Khan, H; Chaubey, S; Sameh, M; Salter, I; Deshpande, R; Baghai, M; Wendler, O

Kings College Hospital

Objectives

Acute Aortic Dissection Type-A (AADA) is a life-threatening condition which requires emergency surgery. Surgery is usually performed by cardiac surgeons with various levels of aortic surgical experience. We compared the short-term perioperative outcome and long-term survival of patients operated by specialist aortic surgeons and those who were operated by surgeons without specialist expertise.

Methods

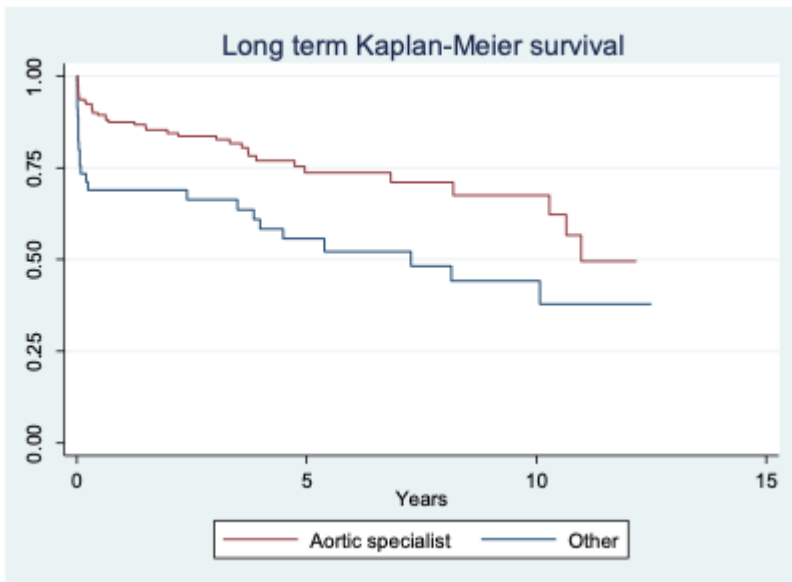
A single center retrospective review of 236 patients who underwent acute surgery for AADA was conducted between 2005 and 2020. The cohort was divided into those operated on by specialist aortic surgeons (Group A, more than 30 aortic procedures/year, n = 186) and those operated on by non-aortic surgeons (Group B, n= 46). Statistical comparison was done using regression modelling. Kaplan Meier comparison was undertaken using STATA14.

Results

Of 236 patients, 186 were operated on by an aortic specialist (Group A) and 46 were operated by a non-aortic specialist (Group B). Overall, 30-day mortality was 10.2% in Group A compared to 26.0% in Group B (p = 0.007). Long-term mortality at 14 years was 26% in Group A compared to 52.0% in Group B (p = 0.001). Aortic surgeons performed a significantly higher number of aortic root procedures (43.0% vs 15.1%, p = 0.001). The cross-clamp time was significantly shorter in Group A patients (89 vs 105mins, p <0.01). Post-operative bleeding was less in Group A (4.0% vs 11.0%, p = 0.05) as was the requirement for renal filtration (19% vs 37%, p = 0.008).

Conclusion

In patients with AADA, surgery performed by aortic specialists results in improved short-and long-term outcomes. Short-term outcomes were improved although more complex procedures were performed by aortic specialists. Aortic specialists also replaced more of the dissected aorta, which may explain improved long-term survival after AADA in this cohort. This study adds further support in establishing a specialist aortic surgical service in cardiac centers.



Comparison of Antegrade and Retrograde Cannulation Strategies on Renal Function in Aortic Dissection Patients

Hussain, A; [Jakaj, G](#); Chaubey, S; Khan, H; Noorani, A; Deshpande, R; Baghai, M; Wendler, O

Kings College Hospital

Objectives

Acute Type A Aortic Dissection (TAAD) is a life threatening condition which requires emergency surgery. Renal dysfunction post- surgical repair are known predictive factors for mortality. Different cannulation strategies exist to establish cardiopulmonary bypass for aortic surgery. We report our experience comparing antegrade aortic cannulation (axillary and direct aortic) vs retrograde (femoral) cannulation in aortic dissection patients and its impact on renal dysfunction, mortality, infection and stroke.

Methods

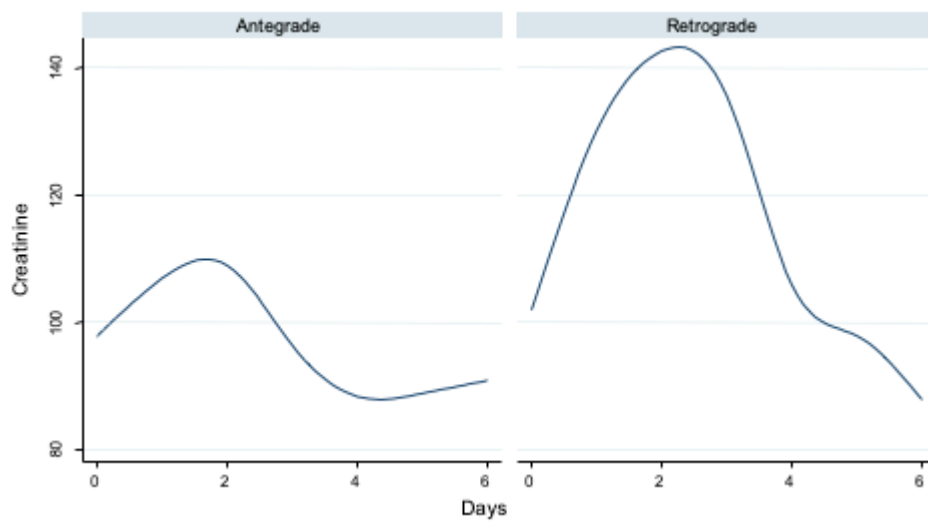
A single center retrospective review of 232 patients who underwent acute surgery for TAAD was conducted between 2005 and 2020. The cohort was divided into those who had antegrade cannulation (Group A, n = 166) vs Retrograde cannulation (Group B, n=66). Statistical comparison was done using regression modelling.

Results

There was a significantly higher incidence of renal dysfunction in patients with retrograde cannulation compared to antegrade cannulation ($p = 0.001$) in the initial post-operative period (as shown in the graph below). There were more cannulation related complications in Group B vs Group A (6% vs 0%, $p = 0.045$). There were no differences in Stroke between Group A and B (11% vs 10%, $p = 0.26$).

Conclusion

Our study suggests that antegrade aortic cannulation reduces the risk of acute renal impairment in the initial post-operative period following aortic dissection surgery. Retrograde (femoral) cannulation had a higher incidence of cannulation site complications. There was no difference in the rate of stroke between the two groups.



Aortovascular Multidisciplinary Team Meetings During the COVID-19 Pandemic: A UK Multicentre Study

Lopez-Marco, A¹; Yates, M¹; Harky, A²; Holland, L³; Verdichizzo, D⁴; Forlani, S⁵; Haqzad, Y⁶; Jahangeer, S⁷; Oo, A¹

¹St Bartholomew's Hospital; ²Liverpool Heart & Chest Hospital; ³Brighton & Sussex County Hospital; ⁴John Radcliffe Hospital; ⁵Sheffield Teaching Hospitals; ⁶Castle Hill Hospital; ⁷Manchester Royal Infirmary

Objective

Patients with aortic pathology are often complex and require multiple interventions throughout their life, hence a multidisciplinary team (MDT) approach is essential to achieve optimal outcomes. The healthcare restructuring that followed the COVID-19 pandemic mandated some changes to the current format of those meetings. We aim to review the activity and effectiveness of the Aortovascular MDTs during that period.

Methods

A multicentre study was designed to assess the quality of the service provision in the Aortovascular surgical units in the country. Retrospective analysis of prospectively collected data of all discussions at the Aortovascular MDT from March to August 2020 in the participating centres (n = 7).

Results

There were 48 MDT meetings recorded during the study period. The modality of meeting moved towards video technology (50% video calls, 29% combination of video and physical meeting, 21% physical meeting). Routine MDT activity was carried out during the pandemic, with only 29% ad-hoc meetings. Attendees varied from 2-16 (median 6), and the duration between 25 – 180 min (median 60 min). Cases were referred from the Cardiac team (50%), Cardiology (25%) or Vascular (22%). Referral pathway of elective cases was maintained (65%).

Outcomes of discussion were achieved in 97% of cases - surgery 44%, surveillance 28%, endovascular 11%, further investigations 8%, not for intervention 5%. Of all the outcomes, 10% were postponed due to the pandemic.

Conclusion

Aortovascular MDTs have been maintained during the pandemic with a change in format towards video technology. This format has proven to be effective and might facilitate better attendance and expansion of the MDTs to more distant geographical areas.

Early Experience of Aortic Surgery During the COVID-19 Pandemic in the UK: Results from a Multicentre Study

Lopez-Marco, A¹; Harky, A²; Verdichizzo, D³; Hope, E⁴; Rosser, B⁵; McPherson, I⁶; Kelly, R⁷; Holland, L⁸; Oo, A¹

¹St Bartholomew's Hospital; ²Liverpool Heart & Chest Hospital; ³John Radcliffe Hospital; ⁴Southampton University Hospital; ⁵Royal Brompton & Harefield; ⁶Freeman Hospital; ⁷Royal Victoria Hospital Belfast; ⁸Brighton & Sussex County Hospital

Objective

Healthcare services were restructured since the declaration of the COVID-19 pandemic, with access to treatment limited to emergency and urgent conditions. We aimed to evaluate the impact of the modified service delivery on outcomes of patients with aortovascular pathologies during this period.

Methods

Multicentre study with 19 participating aortic centres from the UK. Retrospective analysis of prospectively collected data, including patients with aortovascular conditions admitted for aortic surgery (procedures within the root, ascending, arch, descending and/or thoracoabdominal aorta) or specialised conservative treatment in the participating centres from the 1st March to the 20th May 2020.

Results

189 patients were included. Surgery was offered to 182 patients (96%) and 7 patients were turned down due to their complexity (n=5, 71%) or their positive COVID-19 status (n=2, 28%). Aortic pathologies mandating admission included: aneurysms (n=82, 43%), acute aortic syndrome (n=88, 46%), pseudoaneurysm (n=7, 4%), aortic valve endocarditis (n=7, 4%) and other (n=5, 3%). Timing for surgery: emergency (n=78, 41%), urgent (n=75, 40%) or elective (n=36, 19%). Mean age was 63 (26-83) years and male sex predominated (77%). Surgery was performed in the following segments of the aorta: root (n=66, 36%), ascending (n=70, 38%), arch (n=24, 16%), descending thoracic (n=13, 7%), thoracoabdominal aorta (n=6, 3%). Six patients (3%) received endovascular treatment. In-hospital mortality was 12%. Thirteen patients were diagnosed of COVID-19 during the peri-operative period, although this subgroup was not associated with a higher mortality.

Conclusions

The aortovascular service provision changed during the early months of the pandemic with reduction of elective surgical activity while maintaining urgent and emergency activity. Combination of the screening protocols, self-isolation/shielding and PPE measures contributed to our low incidence of COVID as well as acceptable outcomes.

The Fate of Acute Aortic Syndromes During the COVID-19 Pandemic: A UK Multicenter Study

Lopez-Marco, A¹; Rosser, B²; Harky, A³; Verdichizzo, D⁴; McPherson, I⁵; Hope, E⁶; Qadri, S⁷; Kelly, R⁸; Lim, K⁹; Oo, A¹

¹St Bartholomew's Hospital; ²Royal Brompton & Harefield; ³Liverpool Heart & Chest Hospital; ⁴John Radcliffe Hospital; ⁵Freeman Hospital; ⁶Southampton University Hospital; ⁷Blackpool Teaching Hospitals; ⁸Royal Victoria Hospital Belfast; ⁹Royal Infirmary Edinburgh

Objective

The COVID-19 Pandemic posed challenges to healthcare services across the world. There has been a significant restructuring of healthcare resources to protect services for patients with COVID-related illness and to maintain emergency and urgent medical and surgical activity. This study assess access to emergency treatment, logistical challenges and outcomes of patients with acute aortic syndrome during early months of COVID-19 Pandemic in the United Kingdom.

Methods

A multicentre study participated by 19 cardiac centres from 1st March to 20th May 2020. A retrospective analysis of prospectively collected data obtained from individual centres' national cardiac surgical database. Demographic details, choice of treatment, operative details and outcomes were collected. COVID screening, timing of surgery and outcomes of COVID positive and negative patients were also analysed.

Results

88 patients presented with acute aortic syndrome to participating centres from 1st March to 20th May 2020. There were 79 aortic dissections (89.8%), 7 intramural haematomas (7.9%) and 2 penetrating aortic ulcers (2.3%). Seventy-nine patients (89.8%) underwent surgery. In-hospital mortality was 25.3% (n= 20). Postoperative complications included: 13.9% postoperative stroke – 11.4% permanent and 2.3% temporary, 16.5% rate of haemofiltration and 10.1% rate of tracheostomy. 9 patients were treated conservatively with mortality of 60%. 7 patients were diagnosed with COVID and there was no associated mortality.

Conclusion

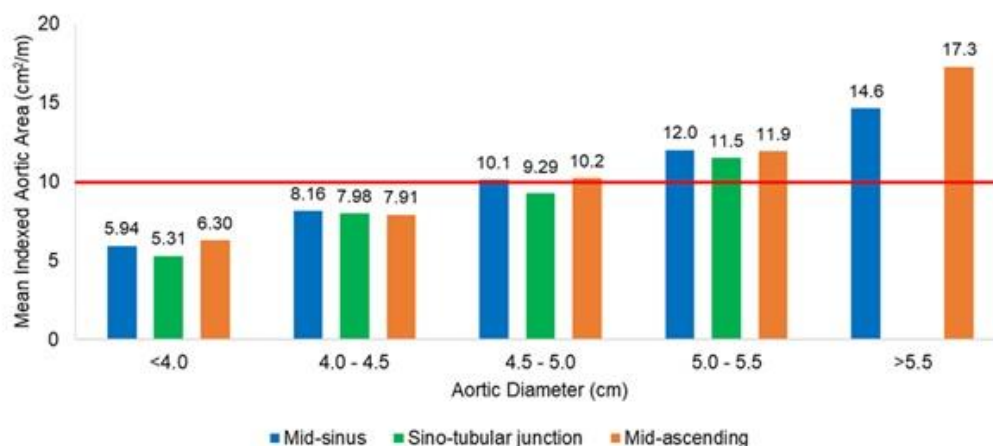
Despite of extensive restructuring of healthcare resources, access to emergency and urgent treatment for acute aortic syndrome patients was maintained in the early months of COVID-19 Pandemic in the UK. Clinical outcomes were similar to pre-pandemic period.

Indexed Aortic Area Identifies Bicuspid Aortic Valve-Associated Aneurysms at Risk of Dissection

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¹Cardiac Surgery - Glenfield Hospital; ²St. George's Hospital

Mean indexed aortic areas corresponding to aortic diameter in BAV-related thoracic aortic aneurysms (red line denotes indexed aortic area cut-off value at 10 cm²/m)



Objectives

Mounting evidence supports the notion that acute dissection may occur in smaller proximal thoracic aortic aneurysms than those recommended to undergo surgical resection according to current aortic guidelines. We sought to identify thoracic aortic aneurysms <5.5 cm at an increased risk of dissection and/or rupture attributable to an abnormal indexed aortic area (IAA) >10 cm²/m, exclusively in patients with a bicuspid aortic valve (BAV).

Methods

We performed a retrospective observational study. IAAs were calculated at three aortic locations in 69 patients with BAV-associated aortic root/ascending aortic aneurysms who underwent surgical repair between 2010-2016 at our tertiary aortic centre. We determined proportions of patients with IAA >10 cm²/m, mean IAAs corresponding to aortic diameters <4.0 cm, 4.0-4.5 cm, 4.5-5.0 cm, 5.0-5.5 cm and >5.5 cm, and mean aortic diameters corresponding to IAAs 10-12 cm²/m, 12-14 cm²/m and >14 cm²/m.

Results

51.9% of patients with aortic diameter 4.5-5.0 cm, and 88.9% with aortic diameter 5.0-5.5 cm had an abnormal IAA. 74.1% of patients with IAA >10 cm²/m at the mid-sinus, 83.3% at the mid-ascending aorta, and 100% at the sino-tubular junction had mean aortic diameters <5.5 cm. Overall, 58/72 (80.6%) separate aneurysms with IAA >10 cm²/m had mean aortic diameter <5.5 cm, in whom current aortic guidelines would not recommend surgical resection. Thus, only 19.4% of at-risk aneurysms in this cohort would be eligible for resection under strict interpretation of current aortic guidelines.

Conclusions

We demonstrate that significant proportions of BAV-associated thoracic aortic aneurysms are at increased risk of aortic complications attending an IAA $>10 \text{ cm}^2/\text{m}$, whilst not fulfilling size criteria indicating aortic surgery proposed in contemporary guidelines. Further analysis of IAA in larger BAV cohorts is necessary to clarify its role in patient selection for, and optimal timing of, prophylactic aortic replacement.

The Chronic Dissection Flap Exhibits Increased Stiffness and Reduced Time-Dependent Deformability

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Objectives

The transition of aortic dissection from acute to chronic dissection is poorly understood. However, the biomechanical behaviour of the flap is key for defining appropriate surgical treatment. This study examines time-dependent mechanical behaviour of the chronic dissection and relates it to biochemical changes within the tissue.

Methods

18 descending thoracic aorta samples were obtained from patients undergoing elective surgery for chronic dissected aneurysms. Time-dependent deformation of false lumen, true lumen and flap tissues were characterised by a custom-indentation technique under constant load, with deformation imaged with a long working distance microscope. Remaining tissues were used to determine collagen, elastin and glycosaminoglycan (GAG) levels with established biochemical assays.

Results

Tissue stiffness was highest in the flap tissues and lowest in the false lumen. Flap tissue exhibited reduced deformation (Figure 1), higher GAG levels and the lowest collagen:elastin ratio relative to the other tissues. A linear relationship was found between the stiffness, deformation and the time from the dissection event to surgical intervention.

Conclusions

The dissection flap exhibits reduced time-dependent deformation and has higher levels of elastin and GAG relative to the non-dissection aortic wall. The relationship between mechanical properties and surgical intervention are key for developing bespoke surgical treatments.

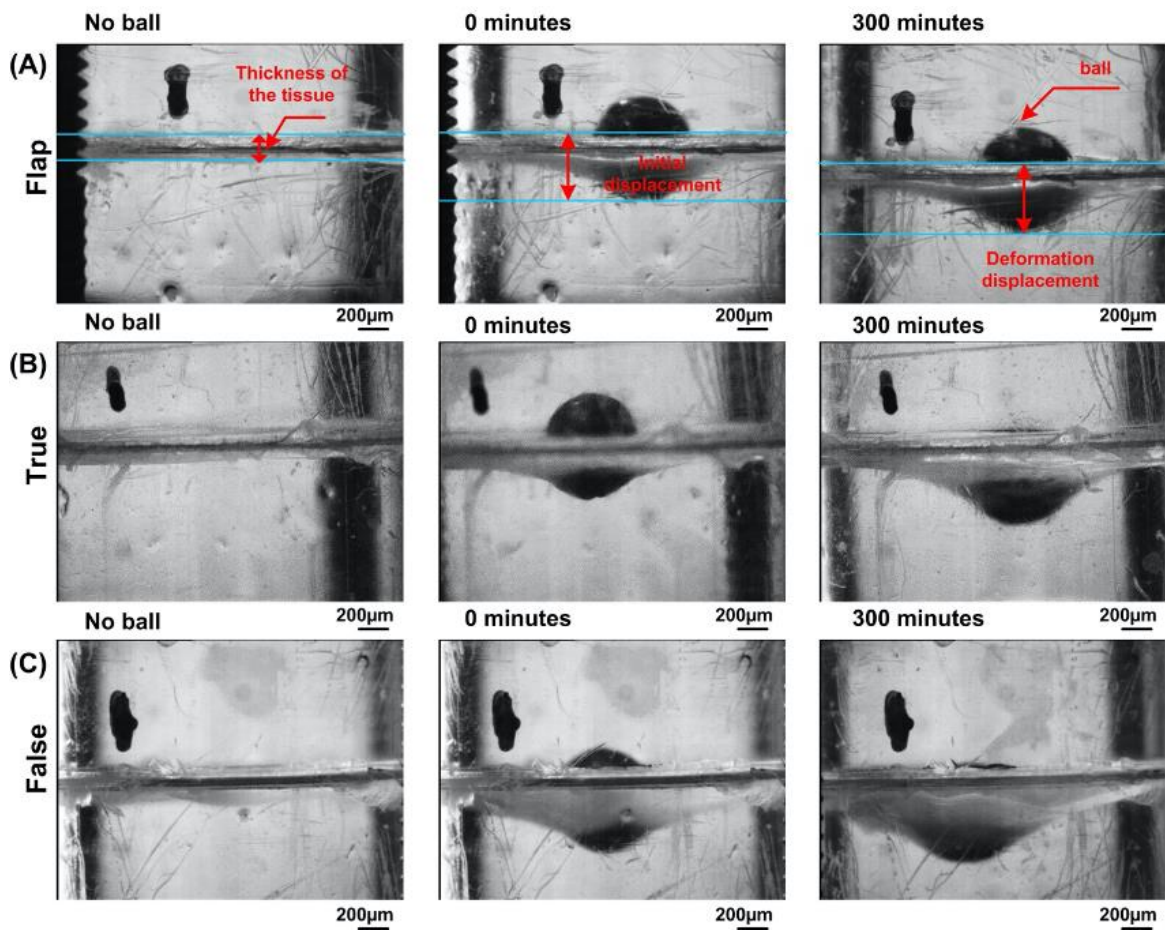


Figure 1 Representative images of deformation for the tissues under a constant load applied with a spherical indenter ball showing no-load (no ball), under load at 0 minute and 300 minutes: (A) Flap - FP, (B) True lumen - TL and (c) False lumen - FL. Scale bar represents 200 µm.

A Study to Evaluate the Feasibility of Screening Relatives of Patients Affected by NonSyndromic Thoracic Aortic Diseases: The ReST Study

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Objective

Diseases of the thoracic aorta are increasing in prevalence and they are characterised by a genetic aetiology in up to 30% of the cases. Non-syndromic thoracic aortic diseases (NSTADs) lack external physical features and can therefore present as an acute aortic syndrome after a period of silent aneurysm formation. In our hypothesis, a tailored genetic and imaging screening of first- (FDRs) and second-degree relatives (SDRs) of patients affected by NS-TADs may warrant early recognition of newly affected individuals and allow appropriate surveillance or prophylaxis.

Methods

We conducted a feasibility study on 16 patients affected by NS-TADs operated in our hospital in the last 3 years, asking them to involve their relatives. Each participant underwent a combined imaging (echocardiogram and/or MRI) and genetic (whole exome sequencing) evaluation, together with a physical examination and a psychological assessment.

Results

70 patients took part in our study. Analysis of the screening data showed a 34% acceptance rate among the patients, and 53% among their relatives. Median age for participants recruited was 48 years (range 18-85), height was 170 cm (155 – 204), and weight was 72 kg (51 – 150); female and male participants were unequally represented (58% and 42%, respectively). Rare comorbidities were recorded, and no syndromic features were documented. Nonetheless, imaging diagnosis of mild/moderate aortic dilation was obtained in 24.1% of the relatives, and a genetic variant requiring further clinical geneticist appointment was identified in 3 families.

Conclusion

The initial results showed an important diagnosis rate with imaging techniques, and a potential role for genetic testing in the management of these forms of thoracic aortic diseases. These data need to be confirmed in a larger population.

Outcomes and Decision Making of a Specialist Aortovascular Multidisciplinary Team

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St Bartholomew's Hospital

Objectives

Patients with major aortic pathology have complex needs and require lifelong surveillance and often multiple interventions. Multidisciplinary teams have been shown to improve care on other specialities but there are no reports of dedicated aortovascular MDT. We aim to review our experience and outcomes of an aortovascular MDT 5 years since its beginning.

Methods

All patients referred to the aortovascular MDT were recorded in a specialised database at the time of discussion. Demographics, imaging and outcome of discussions were recorded contemporaneously and reviewed retrospectively. Outcomes were determined from patient electronic records.

Results

From April 2015 to April 2020, 871 discussions took place at the MDT meeting on 649 unique patients. Mean age was 52 (17-84) years, 414 (64%) were male, 209 (32%) had previous cardiac surgery and 85 (13%) had connective tissue disorder. Final decision from the MDT Meeting was surgery (220, 33.9%), surveillance (240, 36.9%), not for intervention (42, 6.5%), further investigation (53, 8.2%), assess for surgery (30, 4.6%), endovascular therapy (28, 4.3%), other (36, 5.5%).

Of 649 patients discussed, 591 (91%) underwent the management suggested by the meeting. Of the 58 (9%) that were not carried out, the most common reason was patient preference.

Conclusion

Patients with major aortic pathology should expect care from a dedicated multidisciplinary team and we believe this should become a standard of care in such patients.

Management of Moderate to Severe Aortic Regurgitation with Valve-sparing Root Replacement – The Queen Elizabeth Hospital Birmingham Experience

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University Hospitals Birmingham NHS Foundation Trust

Objectives

Over the last decades, there has been an increasing trend to adopt a valve-sparing root replacement (VSRR) approach for managing severe aortic regurgitation. We sought to retrospectively determine the short and long-term outcomes of all patients having undergone VSRR in a single centre.

Methods

A total of 107 patients underwent a valve-sparing root replacement, using the re-implantation technique with a Valsalva graft from December 1998 to October 2019 in a single institution. 46 patients (43%) presented with had moderate to severe aortic regurgitation (Figure 1), which were the subject of our analysis. Within this category, the most common indication for surgery was non-connective tissue disease-related aortic aneurysm (n = 25) (Table 1). The mean pre-operative left ventricular ejection fraction (LVEF) was 56.6 (36-71) and the mean pre-operative LV internal diameter during diastole (LVIDd) was 5.47cm (3.5-8.2). Primary endpoints included all-cause mortality and the need for an aortic valve replacement (AVR). Secondary endpoints included postoperative LV function and size, as well as the degree of post-op aortic regurgitation.

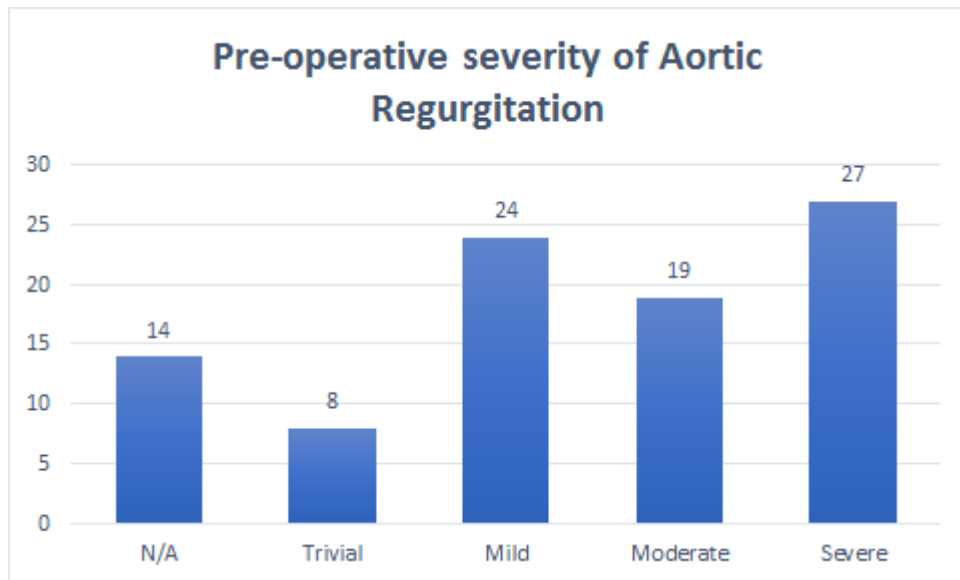
Results

All patients received a Valsalva graft and 6 required leaflet plication. Operative mortality was 0% and all-cause mortality was 8% (4 patients). 8 patients (17%) subsequently required an AVR. The mean postoperative LVEF at discharge and after 1 year were 52 (20-65) and 57 (10-81) respectively. The mean post-operative LVIDd at discharge and after 1 year were 4.6 (2.7-6.0) and 4.92 (2.7-8.0) respectively. Four patients developed moderate to severe AR more than 1 year post-operatively and underwent an AVR.

Conclusions

Our experience has shown that valve-sparing aortic root replacement with the re-implantation technique for moderate to severe aortic regurgitation is a viable option and yields satisfactory results. The valve failure rate is predominantly in the long term and is comparable to the literature.

Aetiology	Number of patients
Non-CTD Aneurysm	25
Marfan's syndrome	10
Aortic Dissection	6
Aortopathy post Ross procedure	3
Loeys-Dietz syndrome	1
Familial aortopathy	1



Neuroprotective Strategies in Acute Aortic Dissection. An Analysis of the UK National Adult Cardiac Surgical Audit

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Objectives

Risk of brain injury following surgery for type A aortic dissection (TAAD) remains substantial and there is still no consensus on which neuroprotective technique should be preferred. Using the UK National Adult Cardiac Surgical Audit, we investigated the impact of neuroprotective strategies on clinical outcomes after TAAD.

Methods

Between 2011 and 2018 1949 patients underwent surgery for TAAD. Deep hypothermic circulatory arrest (DHCA), bilateral (bACP) and unilateral antegrade cerebral perfusion (uACP) and retrograde cerebral perfusion (RCP) were used in 830, 777, 120 and 222 patients, respectively. Generalized linear mixed model (GLMM) was used to investigate the effect of neuroprotective strategies on the primary endpoint, a composite of death and cerebrovascular accident (CVA).

Results

The use of DHCA only was associated with 5-fold (OR 5.35; 95%CI 1.36–21.02;P=0.02) and 2-fold (OR 1.77; 95%CI 1.01–3.09;P=0.04) increased risk of death and CVA when compared to uACP and bACP respectively. No significant difference was observed with RCP (OR 1.92; 95CI 0.77–4.79;P=0.16). There was a significant interaction between circulatory arrest duration and the use of uACP (interaction OR 0.97; 95%CI 0.94–1.00;P=0.04) with a steep increase in the risk of death and CVA for circulatory arrest time >30-40 min.

Conclusions

The use of uACP was associated with a remarkable improvement in clinical outcomes when compared to the traditional approach with DHCA only for short period of circulatory arrest. These findings support a wider adoption of this technique while bACP should be preferred if prolonged circulatory arrest is anticipated.

Haemodynamic Predictors of Aortic Dissection

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Waikato Hospital

Objectives

Type A aortic dissection is seen as a progression of aneurysmal dilation. However, in recent analysis of the iRAD registry, 60% of patients had a maximum aortic diameter (MAD) less than 55mm, suggesting guidelines for intervention would fail to prevent dissection in the majority of patients. We assess if MAD, vessel instability or shear stress is predictive of aortic dissection.

Methods

Retrospective matched cohort analysis of all patients who underwent open ascending aortic intervention at Waikato Hospital between 2014-2019. Dissection patients compared to non-dissection patients in the entire- and propensity-matched cohort (PS) analyses. MAD was measured in mm; vessel instability as a ratio of MAD to Sinus of Valsalva (SoV); shear stress metric as MAD to body height ratios in mm/m. Values with the best receiver-operator characteristics (ROC) used as a cut-off to dichotomise each parameter. Analysis using logistic regression reported as odds ratios (OR) and corresponding 95% confidence intervals (95%CI). The goodness of fit assessed using the area under ROC curves (AUC).

Results

An entire cohort of 215 patients, 78 (36.3%) dissection patients, the median age at intervention 63.3 years, 52 (24.2%) female, 76 patients each in PS cohorts. A MAD greater than 55mm wasn't predictive of aortic dissection (OR 1.95, 95%CI 0.65-5.83; PS OR 2.37, 95%CI 0.72-7.81); in dissection patients, 66.6% patients had MAD <55mm. MAD:SoV ratio was a significant predictor; one-unit increase conferred 40.2 times (95%CI 1.05-1535.50; PS OR 106.97, 95%CI 2.17-5281.47) and a ratio greater than 1.06 conferred 4.6 times (95%CI 1.46-14.68; PS OR 6.85, 95% CI 1.95-24.04) the odds of dissection. Shear stress was not a predictor (OR 1.29, 95% CI 0.75-2.23; PS OR 1.64, 95% CI 0.95-2.85). MAD:SoV ratio models were the only models with AUC>0.90.

Conclusions

MAD:SoV of greater than 1.06 confers 4.6 times the odds of dissection and is a better model of predicting dissection than diameter.

Adult Cardiac Aortic Valve

Reviewing Practice of Surgical vs Transcatheter Aortic Valve Replacement: Experience in Northern Ireland

Bharat, R

Royal Victoria Hospital

Objectives

Evaluate developments in clinical practice of surgical aortic valve replacement (SAVR) since the introduction of transcatheter aortic valve implantation (TAVI) in Northern Ireland.

Methods

SAVR and TAVI data was reviewed from 2008 to 2018. Patient whom underwent emergency or salvage surgery including those undergoing surgery for infective endocarditis were excluded. SAVR and TAVI patients were compared for pre-operative risk profile and short-term outcomes including; in-hospital mortality and post-operative length of stay.

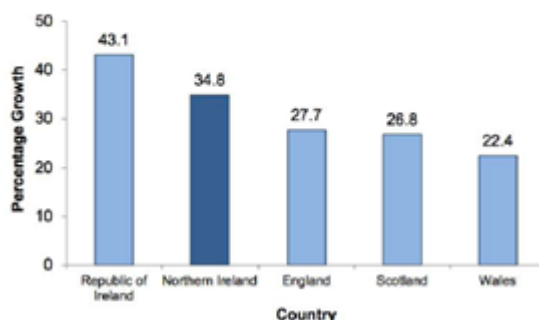
Results

In total 2152 SAVR and 1.033 TAVI patients were reviewed. Patients undergoing SAVR were found to be younger than those undergoing TAVI (mean age 67 ± 12.2 vs 81.7 ± 6.8) The mean age of TAVI patient was found to be relatively constant between 2008 to 2018 (mean age 82 ± 7 years). TAVI patients were also found to have a lower pre-operative mortality (SAVR Logistic EuroSCORE $18.6\% \pm 11.8\%$ vs TAVI $8.4\% \pm 7.9\%$). In octogenarians, SVAR rates were seen to reduce with subsequent rise in TAVI group in the same age group. Post-operative length of stay and mortality was seen to reduce for both TAVI and SAVR groups.

Conclusion

In Northern Ireland, SAVR and TAVI rates has increased since the introduction of TAVI in 2008 with noted improvement in post-operative outcomes. With and increasing aging population, we postulate that TAVI rates will increase whilst maximum age for SVAR with also increase.

>85 years group growing faster in Northern Ireland than rest of UK



Can Very High-risk TAVI Cohort Patients (who are not suitable for open surgery with conventional valve) be Offered Minimal Invasive Surgery with Rapid

Agrawal, S¹; Guha, S¹; Reddy, V²; Chetty, G¹

¹Northern General Hospital; ²Independent Researcher

Objective

Minimal invasive technique coupled with suture less/rapid deployment valves have added a new strategy to the armamentarium of surgeons, especially in the high-risk category. This is a single centre retrospective study comparing outcomes between minimal invasive sutureless/rapid deployment AVR (MI SU/RDAVR) and TAVI in patients who were already on the TAVI waiting list.

Methods

446 patients, not suitable for conventional SAVR, were discussed in TAVI MDTs from 23 January 2017 to 28 October 2019. Exclusion criteria were –calcified aorta (aorta calcification that does not preclude aortic cross-clamp application but prevents a lower aortotomy as required for conventional valves), poor mobility, poor pulmonary function test with predicted transfer factor below 50%, redo surgery, creatinine more than 200umol/L, severe stroke, patients referred for medical management, patients who declined intervention in form of TAVI/surgery and patients who died while on waiting list. Finally, 132 patients were selected. Out of these, 12 patients underwent MI SU/RDAVR via minimal invasive technique and 120 patients underwent TAVI.

Results

Outcomes:	TAVI: (120)	MI SU/RDAVR: (12)	p Value:
30-day mortality (n)	16	0	0.0001
Median length of ICU stay (days)	1	1	
Median total length of stay (days)	4	7	
Stroke (n)	14	0	0.0001
Mild paravalvular leak (n)	47	2	0.083
Moderate paravalvular leak (n)	15	0	0.0001
Cost to Hospital (£)	22,111	Perceval: 7537.92; Edwards Intuity Elite: 9097.92	

Conclusion

In our study, MI SU/RDAVR has proven to be an alternative to TAVI in the very high-risk cohort patients (who are not suitable for open surgery with conventional valves), with non-inferior outcomes, with a much lesser cost to the hospital. Therefore, we emphasize the need for involvement of surgeons able to offer minimal invasive AVR with suture less/rapid deployment valves in TAVI multi-disciplinary team meetings.

Perceval Valves Versus Cor-knot: A tale of Two Technologies

Kenawy, A; Abdelbar, A; Avrova, A; Taylor, R; Zacharias, J

Blackpool Victoria Hospital

Characteristic	Sutured with Corknot device (n=91)	Perceval sutureless valve (n=112)	Test of equivalent group means/proportions
Age median [Q1,Q3]	70 [63.5, 79]	78 [74, 82]	p<0.001
Logistic EuroSCORE median [IQR]	6.3 [3.2, 8.3]	9.0 [6.6, 16.0]	p<0.001
Done by minimally invasive surgery	91(100%)	25(22%)	P<0.0001
Bypass time, mins median [IQR]	146 [127.5, 164]	65.5 [56.8, 82]	p<0.001
Clamp time, mins median [IQR]	99 [87.5, 110.5]	42.5 [35, 55]	p<0.001
Overall length of stay median [IQR]	6 [5, 8.5]	10 [7, 16.3]	p<0.001
Pacemaker required	1 (1.1%)	13 (11.6%)	p=0.003
Stroke	0	2	p=0.50
In hospital mortality	0	3 (2.7%)	p=0.12

Objectives

We reviewed our institutional experience on the use of and the impact on patient outcomes of Perceval valves compared to standard sutured valves using an automated suture fastening system (Cor-Knot) ®.

Methods

Consecutive patients having isolated aortic valve replacement between May 2015 and May 2019 using Perceval valves (n=112) and sutured valves with the use of Cor-Knot were selected.

This was a retrospective audit from a prospectively collected database. Normally distributed continuous variables are presented as a mean and standard deviation. A statistical analysis was carried out to look for significant differences in outcome.

Results

Age and logistic EuroSCORE were significantly higher in the Perceval group. Total cardiopulmonary bypass and aortic cross-clamp times were significantly longer in the Cor-knot group. Heart block requiring pacemaker implantation was significantly higher in the Perceval group. Overall length of hospital stay was significantly lower in the Cor-knot group. All other outcomes were similar between the groups.

Conclusion

Both technologies were introduced to reduce operative times and facilitate minimal access surgery and have a role in selected patients. They appear to have advantages and disadvantages unique to each technology and this audit could help in the consent process.

Single Centre Experience of Rapidly Deployed Aortic Valves: Early and Medium-term Outcomes

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¹Plymouth University Hospitals; ²Royal Victoria Hospital

Objectives

Rapid deployment aortic valve replacement (RDAVR) are more increasingly regarded as an attractive alternative to conventional aortic valve replacement. This single-centre study compares surgical outcomes, valve-related complications, and hemodynamic performance between the only two commercially available rapid deployment valves.

Methods

A total of 120 consecutive patients receiving either a Sorin Perceval S (N=61) or an Edwards INTUITY valve (N=59) between January 2016 and September 2019 were included. This study compared Preoperative characteristics, valve-related adverse events, postoperative complications, trans-valvular gradients and survival rates.

Results

Preoperative variables were not statistically different between the two groups. More Perceval valves were deployed through mini-sternotomy (17 versus 2 P=0.004) but Intuity valves were more used in concomitant double valve procedures (12 versus 2 P=0.003). Thirty-day mortality (Intuity 1.7% versus Perceval 1.6%) were insignificant. However, postoperative pacemaker implantation (Intuity 5% versus Perceval 11.5%) (P<0.05) differed significantly between groups. At follow-up echocardiography, peak or mean pressure gradients were comparable between groups. However, postoperative pacemaker implantation (Intuity 5% versus Perceval 11.5%) (P<0.05) differed significantly between groups. At follow-up echocardiography, peak or mean pressure gradients were comparable between groups. However, statistically significant higher peak gradient were recorded when Perceval S is compared to Intuity 21 and higher mean pressure gradient with Perceval L when compared to Intuity 25.

Conclusion

Both rapid deployment valves are comparable with good early and medium-term surgical outcomes and valve hemodynamics, with relatively low valve-related complication rates. However, Perceval valves carry a higher risk of a need for Permanent pacemaker and Intuity valves are associated with lower pressure gradients.

A Systematic Review: Are Outcomes of Aortic Valve Repair 'A Beneficial alternative for Patients of Aortic Valve Insufficiency?'

Malik, S; Malik, S

Örebro University + MRCS PART A & B OSCE

Aim

The aim of this study was to learn if 'the outcomes of aortic valve repair are beneficial alternative for the patients suffering from aortic valve insufficiency in longer run.'

Material and Methods

Internet search using standard keywords of 'Aortic Valve Repair and Outcomes' was used to find both white literature and grey literature with human, adult, English language and studies published after January 1st 2007 as limitations. Inclusion criteria was adult patients with aortic insufficiency with aortic valve repair as intervention with outcomes at least greater than five (5) years were considered. All the data was extracted using Microsoft excel for windows and was analyzed using GraphPad Prisma.

Results

20 studies comprising of 5369 patients were included in this systemic review, which included 2 randomized control trails, 7 clinical prospective studies, 8 retrospective studies and 3 observational studies.

Conclusion

This study concludes that aortic valve repair is a beneficial alternative available for younger adults suffering from aortic valve insufficiency in longer time.

Reference:

1. Aortic valve repair leads to a low incidence of valve-related complications. Aicher D, Fries R, Rodionychaya S, Schmidt K, Langer F, Schäfers HJ, Eur J Cardiothorac Surg. 2010 Jan; 37(1):127-32
2. A prospective survey of patients with valvular heart disease in Europe: The Euro Heart Survey on Valvular Heart Disease. Jung B, Baron G, Butchart EG, Delahaye F, Gohlke-Bärwolf C, Levang OW, Tornos P, Vanoverschelde JL, Vermeer F, Boersma E, Ravaut P, Vahanian A Eur Heart J. 2003 Jul; 24(13):1231-43
3. Plus 20 more

Implatation Valve and Redo AVR 5 Years Following Transcather Aortic Valve Implataion (Video)

Holmes, C¹; Kendall, S²; Owens, A²; Abbas, A²

¹Freeman Hospital; ²James Cook University Hospital

Case Study and Literature Review of the Removal of a Failed Valve in Valve TAVI and Surgical Redo AVR and CABG 5 Years Post Procedure

Holmes, C¹; Kendall, S²; Owens, A²; Abbas, A²

¹Freeman Hospital; ²James Cook University Hospital

Objective

A case study and literature review of a failed Valve in Valve Transcatheter Aortic Valve implantation (ViV-TAVI) in a 70-year-old requiring surgical removal of a CoreValve Evolut R and Redo Aortic Valve Replacement (AVR) with coronary artery bypass grafting 5 years following the initial ViV-TAVI. Our focus was the outcome of surgical redo compared to ViV-TAVI for degenerative biological prosthesis and the efficacy of angiography in TAVI valves.

Methods

Along with a Case study a literature search of mortality and procedural complications in surgical redo versus ViV-TAVI was done using six electronic databases. Further searches were done to look into angiography after TAVI and previous cases of failed ViV-TAVI.

Results

Two previous cases of surgical removal of TAVI valves and redo AVR were found. One case required same admission surgical explantation and Redo AVR due to malposition and severe Aortic Regurgitation. In the second, the patient presented at 3 months due to incomplete expansion of the ViV-TAVI. Meta-analyses showed ViV-TAVI and redo Surgical AVR mortality rates to be comparable at 30 days and 1 year. ViV-TAVI has a lower risk of permanent pacemaker but a higher risk of paravalvular leak. One study of 46 cases of angiography post TAVI shows 85.7% success in the left coronary and 50% in the right coronary.

Conclusion

Our case is the first reported case of a late presentation of a failed ViV-TAVI due to incomplete expansion. Severe stenosis and Poor epithelization led to early degeneration of the implant. Data for outcomes in ViV-TAVI compared to surgical redo is limited. Mortality is comparable at 1 year but we do not have the longevity of follow up. Rates of Paravalvular leak are higher in ViV-TAVI. Data for angiography post TAVI is also limited initially showing high rates of failure. In our case angiography failed leading to difficult preoperative planning for a redo operation, delayed care and an urgent rather than elective operation.

Reducing the Target Anticoagulation Range for Newer Mechanical Aortic Valves: Is it Time for New Guidance?

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¹Glenfield Hospital; ²Royal Brompton Hospital

Objectives

Current guidelines recommend a target international normalised ratio (INR) range of 2-3 for newer mechanical aortic valves in low-risk patients. A literature search was conducted according to a structured protocol to assess whether a reduced INR range (<2-3) would be as effective in thromboprophylaxis with less bleeding complications.

Methods

Medline was searched (using Ovid SP) from inception to August 2019 with a structured PICO search strategy using a combination of 25 key-phrases. Included only were studies which compared low- and high-INR targets for new-generation mechanical aortic valves in low-risk patients.

Results

Of 922 search results, 4 randomised controlled trials (RCTs) that assessed a total of 4,440 mechanical aortic valve patients, 1 meta-analysis of RCTs, and 1 prospective cohort study were included. Three RCTs found no significant difference in thromboembolism between low and high INR groups with two of the RCTs showing no difference in bleeding and one trial showing significantly less bleeding in the low INR group (OR=0.36, p=0.04). One trial showed significantly lower thromboembolism and bleeding in the low INR group (p=0.002). All studies concluded that it is safer and as effective to reduce the target INR range for these patients. The data quality in several of the RCTs may have been affected by the heterogeneity of outcomes and inadequate blinding.

Conclusions

With some evidence to support the reduction of target INR ranges in low-risk mechanical aortic valve patients and the ongoing improvement in valve haemodynamic properties, further large RCTs could help establish whether updated guidance on anticoagulation targets is needed.

Are DOACs of Clinical Use in Stroke Prevention in Patients with AF After Surgical Aortic Bioprosthetic Valve Implantation?

Smith, H¹; Brazier, A²

¹University Hospital of Wales; ²University Hospital of Coventry and Warwickshire

Objectives

This study aimed to answer the question "In patients who develop post-operative atrial fibrillation following bioprosthetic aortic valve replacement, is a DOAC/NOAC superior to warfarin for achieving effective stroke prevention postoperatively".

Methods

A best evidence topic was written according to the structured protocol. A search was conducted using Pub-Med and Med-line and supplemented with peer recommended papers. The European Society of Cardiology 2020 atrial fibrillation management guidelines were consulted.

Results

77 papers were found using the reported method. From these 5 papers were identified that provided evidence to answer the question. Key pieces of information from the studies were tabulated including, but not limited to, study type, relevant outcomes, results, and study weaknesses.

Conclusion

We concluded that NOACs are as effective if not superior to warfarin in reducing SSE but at the cost of an increased bleeding risk. Apixaban, Edoxaban and Dabigatran show similar efficacy in reducing strokes/systemic emboli (SSE) and the evidence trends towards Edoxaban being associated with less major bleeding than other NOACs. NOACS are safe to use in larger studies to compare the efficacy of NOACs against one another and against current anticoagulation as stipulated by the European Society of Cardiology.

Experience With the Freestyle Valve – A Versatile Option

Iqbal, Y; Senanayake, E; Ashoub, A; Ranasinghe, A; Rooney, S; Pagano, D; Bhabra, M; Mascaro, J

Queen Elizabeth Hospital, Birmingham

Objective

- The Medtronic Freestyle bioprosthesis is a stentless porcine aortic root, used for aortic valve replacement a versatile implantation option either as root replacement or a sub-coronary aortic valve replacement.
- The Freestyle valve has shown to provide better haemodynamic performance with improved orifice areas and gradients up to a FU of 10 years compared to stented bioprosthesis.
- In endocarditis with unpredictable tissue destruction the Freestyle offers flexibility around implantation options.
- This analysis presents our experience with the Freestyle valve in all circumstances over a 10-year period.

Methods

- A retrospective analysis of prospectively collected data was undertaken over a 10 year period.
- Case notes and follow-up correspondence and investigations were reviewed.
- Serial follow-up echocardiography was performed to assess valve function & structural valve deterioration (SVD).
- Echocardiography data was correlated with patient's clinical status during the follow-up period.
- Mortality data was checked with national registries.

Results

- From January 2009 to January 2020 70 patients identified undergoing Freestyle valve implantation.
- In-hospital mortality was 5.7% (n=4), and further 6 deaths during follow-up.
- Surviving patients were followed up during a median period of 2 years (IQR 1-3 years).
- No patients underwent re-intervention for structural valve deterioration.
- At follow up 90% patients symptoms were consistent with NYHA class I-II and were successfully discharged to the care of their primary care physician.

Valve position	Root Replacement	Subcoronary
Number of cases	35	35
Redo	18	16
Infective Endocarditis	12	19
Death (follow up)	3	3
Mean Bypass (cross clamp) times /min	269 (185)	240 (156)
Mean Haemodynamic data MG- mmHg PG- mmHg AVA-Cm2	6.6 /12.5/ 1.6	6.0 /8.0 /0.7
Aortic Regurgitation	nil	nil

Conclusions

- Our experience with the Freestyle valve shows this to be a feasible bioprosthetic valve with good early and late outcomes.
- It remains a versatile option both in the sub-coronary position or as a complete aortic root replacement with low morbidity.
- Our 10-year experience has shown that the Freestyle valve is a preferable option in endocarditis, no evidence of significant SVD and good clinical outcomes.

Are Rapid Deployment Valves a Good Alternative to Conventional Bioprosthetic Aortic Valve Replacement?

Alianadi, E; Moawad, N; Jones, M

Royal Victoria Hospital

Objectives

Rapid deployment valves are being used widely. We wanted to compare outcomes for rapid-deployment valves and conventional bioprosthetic aortic valve replacements in order to assess if their use is justifiable.

Methods

Outcomes of the last 120 patients who received a rapid-deployment AVR (RDAVR) between Sept 2014-Sept 2019 were compared to the last 120 patients who had conventional bioprosthetic aortic valve replacement (Conv AVR).

Results

Age of RDAVR 77.5 ± 4.93 was compared to Conv AVR 67.9 ± 11.9 years ($p = 0.44$). Other baseline characteristics were similar (BMI 29.10 ± 4.63 vs 28.7 ± 5.13 kg/m², concomitant procedure 62 (51.7%) vs 53(44.2%) and Logistic EuroSCORE 10.43 ± 5.97 vs 6.72 ± 7). RDAVR group included more elderly (>80 years; 40 vs 11, $p < 0.01$) and females (83 vs 36, $p < 0.01$).

RDAVR group had shorter cross-clamp time (68 vs 89 min, $p < 0.01$) and cardiopulmonary bypass time (97 vs 110 min, $p = 0.03$) for isolated AVR and for combined AVR (71 vs 101min, $P = 0.16$ and 101.5 vs 125min, $p = 0.12$, respectively).

Mortality was equal in both groups (1.7%). Post-operative pressure gradients were similar (mean gradient 10.4 ± 4.44 vs 11 ± 5.31 mmHg and peak gradient 20.32 ± 8.64 vs 22.95 ± 9.72 mmHg). Additionally, patients were divided into size matched subgroups and post-operative pressure gradients were comparable.

Hospital length of stay and early post-operative results were similar between the two groups. Early permanent pacemaker rate was similar in both groups (9 vs 5, $p = 0.54$). Survival rates in group 1 and 2 were 97.5% vs 99.2% at 1 year, 95.8% vs 96.7% at 2 years. and 95% vs 96.7% at 3 years, respectively.

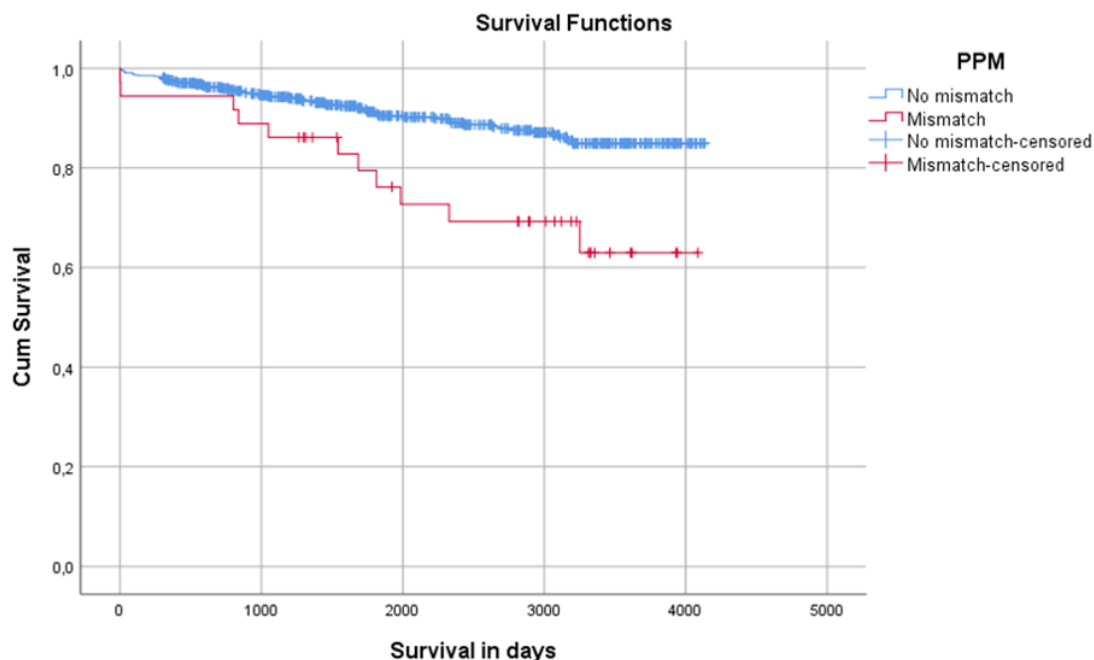
Conclusions

RDAVR had similar haemodynamic outcomes and survival. Where shorter cross-clamp and pump times may be desirable RDAVR may be preferred in older high-risk patients.

Prosthesis-patient Mismatch Increases Mortality in Low-Risk Isolated Aortic Valve Replacement In Patient Aged 50-70 Years

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Objectives

The impact of prosthesis-patient mismatch (PPM) on early and late mortality has been a significant risk factor for early and late cardiac events and deaths. This study sought to evaluate the effects of PPM on postoperative and late all-cause mortality in patients after low-risk isolated AVR in patients aged 50–70 years.

Methods

A retrospective study involving 770 consecutive patients aged 50-70 years, with preserved left ventricular function, who underwent elective first-time isolated aortic valve replacement (AVR) operations from 2008 to 2018. The validated criterion to identify PPM is the effective orifice area of the prosthesis indexed to the patient's body surface area (EOAi). The reference EOA for each given model and size of prosthesis was obtained from the literature and manufacturer reference tables and was divided by the patient's BSA to derive the predicted EOA_i. PPM was defined as effective orifice area index <0.85cm²/m² body surface area. The effect of PPM on survival was evaluated.

Results

Total In-hospital mortality was 0.7% (5.5% in PPM group vs 0.5% in no PPM group; $P=0.005$). PPM was present in 36 patients (4.7%). In the PPM group, 100 % received bio prosthetic valves, compared to 75 % of No-PPM patients ($P<0.001$). Ten-years all-cause mortality was 10.5%. The survival curves separated early and the difference increased significantly for PPM up to 10 years.

Conclusions

PPM increases 30 days and late all-cause mortality after primary isolated low-risk AVR operations in patients aged 50-70 years. There is a rising demand for a well-structured system to preoperatively detect small aortic annulus and predict PPM from EOA reference tables, and explore the available options to prevent PPM in "small aortic annulus multidisciplinary team (MDT)" meetings. PPM avoidance should be implemented in the guidelines.

Does Implantation Technique Effect Reoperation Rates in Patients Undergoing Aortic Valve Replacement?

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Objectives

Surgical aortic valve replacement can be implanted using either an interrupted or semi-continuous technique. There is a lack of consensus regarding the efficacy of the semi-continuous technique with previous studies showing it to be associated with increased rates of paravalvular leak and reoperation. We aim to investigate the difference in outcomes between the two implantation techniques.

Methods

We performed a retrospective review of all first-time isolated aortic valve replacements performed at a single institution. Valves inserted with an interrupted (INT) technique were compared to those using a semi-continuous (SC) technique for the primary outcome of late valve reoperation. Secondary outcomes included in-hospital and 1-year mortality. Statistical analysis was performed using Chi-squared and Fischer's exact tests for categorical variables and the Mann-Whitney U test for continuous variables

Results

Between January 2004 and January 2019, 2127 patients underwent isolated aortic valve implantation. Of these 878 (41.3%) were performed with an interrupted technique and 1249 (58.7%) were performed with a semi-continuous technique. There was no significant difference between the two groups for the primary outcome of late valve reoperation [1.9% SC Vs 1.3% INT; $p = 0.839$]. There were also no significant differences between the groups in either in-hospital mortality [1.4% SC Vs 1.9% INT; $p = 0.299$] or 1-year mortality [6.8% SC Vs 6.5% INT; $p = 0.905$]. The semi-continuous group had a higher median EuroSCORE than the interrupted group [4.40 Vs 3.98; $p = 0.001$] as well as significantly reduced median cardiopulmonary bypass time [77 mins Vs 93 mins; $p < 0.001$] and cross-clamp times [60 mins Vs 74 mins]

Conclusion

In this large single-centre cohort, semi-continuous implantation technique was associated with significantly reduced cross-clamp and cardiopulmonary bypass times and was not associated with increased risk of late valve reoperation or mortality.

Should We Favour Mini-Sternotomy Over Conventional Full-Sternotomy in Aortic Valve Replacement

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Royal Victoria Hospital

Objectives

In view of the increasing interest in mini sternotomy (MS) as an alternative approach to conventional full sternotomy (FS) for aortic valve replacement (AVR), we aimed to compare early and mid-term results of MS and FS AVR.

Methods

This is a retrospective study comparing 231 patients who underwent MS-AVR compared with 231 patients had a FS-AVR. Baseline characteristics, operative and postoperative outcomes were compared. Patients' data are presented as median (interquartile range) or as percentages. Follow-up was 100% complete with mean duration 2.8 ± 2 years.

Results

Preoperative characteristics were similar between MS-AVR and FS-AVR groups. MS-AVR group included more patients older than 80 years old (11.25% vs 8.6%, $p=0.35$), more females (104 vs 66, $p<0.05$) and more patients with a higher BMI (120 vs 89, $p<0.05$).

There was no significant difference in the 30-day mortality (0.43%vs 2.2%, $P=0.21$), cardiopulmonary bypass time (109 vs 103 min, $p=0.44$), aortic cross-clamping time (82 vs 83 min, $p=0.87$) or total duration of operation (218 vs 213, $p=0.18$) between the two groups. There was a higher incidence of postoperative pneumonia in the FS-AVR group (2.1% vs 10.4 %, $p<0.05$). Otherwise, there was no significant difference in the incidence of other major and minor postoperative complications.

Conclusion

Our results show that MS-AVR is a safe alternative approach for aortic valve surgery, demonstrating comparable early and midterm results compared to conventional FS AVR.

A Single Centre Experience with Sutureless Aortic Valve Replacement in Octogenarians

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Barts Health NHS Trust

Objectives

Analysis of our experience and results with the use of sutureless aortic bioprostheses in octogenarians.

Methods

We retrospectively analysed records from February 2014 till January 2020. Data was extracted from electronic case notes and local PATS database, including pre-operative demographics, EuroSCORE, operative details, post-operative haemodynamic profiles on echocardiography, and major adverse cardiovascular and cerebrovascular events.

Results

99 patients aged 79 years and above at the time of surgery underwent aortic valve replacement using a sutureless aortic valve as an isolated or combined cardiac procedure. The mean logistic EuroSCORE was 10.9 +/- 6.3 and the mean EuroSCORE II was 4.9 +/- 3.2. 54 cases underwent isolated AVR, 35.2% (19/54) were via a minimally invasive approach; 16.6% (9/54) underwent right anterior thoracotomy (RAT), 18.5% (10/54) underwent mini-sternotomy, and one case was after a redo-sternotomy. The Perceval valve was preferred when using the RAT approach with equal preference for either Perceval or Intuity valves when using a mini-sternotomy approach. The mortality rate in the overall cohort was 3% (3/99) and postoperative stroke was 4% (4/99). After isolated AVR; there were no mortalities, 3.7% (2/54) had a stroke, 9.2% (5/54) needed a permanent pacemaker and the length of hospital stay was 8.7 +/- 3.1 days in this age group. The mean cardiopulmonary bypass and aortic cross clamp times were 68.6 +/- 12.7 and 47.2 +/- 8.1 minutes respectively via sternotomy and 81 +/- 20.8 and 48 +/- 18 minutes respectively via minimally invasive approaches. 97% of cases (96/99) had no significant paravalvular leak (PVL), 2% (2/99) of cases had mild PVL, and 1% (1/99) displayed moderate-severe PVL.

Conclusion

Our results demonstrate the safety of sutureless bioprostheses in this age group as an alternative to conventional surgical aortic valve replacement. Longer term follow up is needed to establish their efficacy over the years.

Sutureless Valve and Rapid Deployment Valves: A Systematic Review and Meta-analysis of Comparative Studies

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Objectives

The treatment of aortic valve disease is the most common valvular surgery in industrialised nations. As transcatheter aortic valve replacement (TAVR) has become more established, newer surgical prostheses have been developed with a variety of anchoring systems that do not rely solely on sutures to hold the valve in an appropriate position. This meta-analysis compares the outcomes of comparative studies of these two valve systems.

Methods

Six electronic databases were searched for articles comparing outcomes of rapid-deployment valves (RDV) and sutureless valves (SURD). Outcomes measured included all-cause mortality, stroke, cross-clamp and cardiopulmonary bypass (CPB) times, pacemaker implantation rates, paravalvular leak and post-operative transvalvular gradient

Results

The search strategy identified 407 unique papers for initial assessment with seven studies qualifying for inclusion in the analysis. The outcomes of 4,076 patients (1,650 RDV, 2,426 SURD) were included. There was no difference in mortality, stroke or moderate or worse paravalvular regurgitation between the two groups. SURD had significantly shorter CPB time by 15.7 minutes [95% confidence interval (CI): 4.2–27.1; P=0.007] and a shorter cross-clamp time by 11.3 minutes (95% CI: 6.3–16.3; P<0.001) compared to RDV. RDV had a lower post-operative transvalvular gradient by 2.5 mmHg (95% CI: 1.2–3.8; P<0.001) and a lower rate of mild paravalvular regurgitation (OR 2.51; 95% CI: 1.435–4.768; P=0.004).

Conclusions

Both valve types have an adequate safety profile and are comparable to conventional sutured prostheses. There was a significant reduction in cross-clamp and CPB times associated with SURD. This may be of benefit for patients requiring multiple concomitant procedures and increases the utility of minimally invasive valve replacement. However, SURD was associated with higher postoperative transvalvular gradients and a higher incidence of paravalvular regurgitation.

Predictors of Outcome After Isolated Aortic Valve Replacement

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Objectives

Aortic valve replacement (AVR) is one of the most common cardiac operations performed in contemporary cardiac surgery. Several factors affect the outcome of the surgery. Many studies discussed the risk factors for poor outcome after AVR. The aim of our study is to evaluate the predictors of mortality after isolated aortic valve replacement.

Methods

Data on 2600 patients undergone isolated primary AVR with median survival 4 years [IQR 2-7]. The Median age was 74 [IQR 66-80], AV stenosis = 2054 (79%), AV regurgitation = 139 (5%), mixed AV disease = 407 (16%). The Median Hospital stay was 7 days. The number of Male=1389(53%) and Female = 1211(47%). The Mean bypass time was 70.1 min +/- 25 (Median = 69 min). The Mean cross clamp time was 52 min +/- 17 (Median=52). The Median EuroSCORE =7 [IQR 5-8]. The Median Eurologistic 6 [IQR 3-10].

All patients demographic data was collected. Pre-operative risk factors and post-operative complications were also documented. Survival was calculated for all patients using Kaplan – Meyer curve. Univariate and multivariate analysis were used to find out the predictors of mortality for the studied group.

Results

Early mortality was associated with the use of valves smaller than 23mm, but this was not an independent factor. In multivariate model the following remain important independent predictors of mortality: Presence of persistent AF HR 1.25 [95% CI 1.11-1.39], P <0.001; Advanced age HR 1.04 [95% CI 1.02-1.06], P <0.001 ; Diabetes HR 1.44 [95% CI 1.16-1.77], P = 0.001 ; High baseline creatinine HR 1.004 [95% CI 1.003-1.005], P <0.001 and Patient prosthesis mismatch, P <0.001.

Conclusions

The use of small valves is associated with poor outcome. Patient prosthesis mismatch should be avoided as they are associated with mortality. Persistent atrial fibrillation should be considered as a predictor of mortality. We recommend adding atrial fibrillation to the pre-operative risk calculators.

Managing the Small Aortic Annulus: Which Valve Type Offers Superior Haemodynamic Performance in the Current Era?

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Objectives

The presence of a small aortic annulus (SAA) poses a clinical challenge in patients with aortic stenosis (AS). SAA has been associated with poorer outcomes after aortic valve replacement (AVR), with increased risk of suboptimal valve haemodynamics, prosthesis–patient mismatch (PPM), mortality and cardiovascular events. Recent TAVI trials have demonstrated superior haemodynamic performance compared to conventional SAVR valves.

Methods

A retrospective review of the hemodynamic performance as assessed by echocardiography of size 19 Edward’s Intuity rapid deployment (RVD) and CE Perimount Magna Ease (SAVR) surgical aortic valves implanted by a single surgeon was performed. The performance of small sized trans-catheter aortic valves (TAVR) (Edwards Sapien 3 Size 20, Medtronic CoreValve size 23) was also analysed.

Results

Edwards Intuity size 19 showed statistically superior haemodynamic performance than equivalent sized SAVR ($p < 0.02$; mean 10.6 vs 19.7 mmHg; peak 20 vs 37mmHg). RDV showed equivalent haemodynamic to TAVR valves (mean 10.6 vs 19.8 {Sapien $p = 0.11$ } vs 11 {CoreValve $p = 0.7$ }; peak 20 vs 36 {Sapien $p = 0.08$ } vs 20 {CoreValve $p = 0.9$ }). RDV significantly reduces cardiopulmonary bypass (CPB) and aortic X-clamp times compared to conventional SAVR ($p = 0.001$).

Conclusions

Among patients with SAA undergoing surgical AVR, Edward’s Intuity Size 19 offers superior haemodynamic performance with the added benefit of reduced CPB and X-clamp times.

Transcatheter Aortic Valve Implantation (TAVI) for all? The "Vorsprung Durch Technik" Approach

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Objective

Transcatheter Aortic Valve Implantation (TAVI) is an increasingly utilised intervention for severe aortic stenosis (AS). It is currently recommended in those unfit for surgical aortic valve replacement (SAVR) but recent trials are evaluating its utility in low and intermediate risk patients. It is however an expensive intervention that is not appropriate for all and therefore determining who will benefit and who will not is essential.

Methods

Data was analysed from a prospectively collected electronic database that began in April '08 when the TAVI program was launched until Oct '19. All patients referred for consideration of TAVI at a single tertiary referral hospital were included. Statistical analysis was performed using SPSS.

Results

During this 11-year period 1,868 patients were referred for consideration of TAVI. Following review by the Heart Team 578 (31%) patients were managed medically, 200 (10%) accepted for SAVR and 783 (42%) for TAVI. Median age 83 years (IQR 10 years), median follow-up 23 months (IQR 40 months). Survival analysis demonstrated a significant benefit of TAVI & SAVR over medical therapy. In addition, a divergence in cumulative hazard function is noted between TAVI and SAVR at 1460 days (4 years), log-rank (Mantel-Cox $p = 0.077$). Incidence of permanent pacemaker insertion, acute kidney injury, stroke, readmission, vascular complications and paravalvular leak are also reported.

Conclusion

The benefit of intervention for severe AS where SAVR or TAVI are appropriate is clearly demonstrated in these results. This highlights the importance of thorough and diligent assessment of each individual referred for TAVI by the Heart Team and the necessity to have proactive surgical interest. The divergence in outcome at 4 years in favour of SAVR further reiterates the caution necessitated in evaluating TAVI in low and intermediate risk patients particularly in light of the selective conclusions of recently published data.

The Impact of Patient-prosthesis Mismatch on Early and Long-term Survival After Aortic Replacement with the Edwards Perimount Prosthetic Valve

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Objectives

Investigate the impact of severe patient-prosthesis mismatch (PPM) using Edwards Lifesciences Perimount (EP) bioprosthesis in the aortic position on early health outcomes and long-term survival.

Methods

We report a single unit experience between 1998 and 2014. 5964 consecutive patients underwent aortic valve replacement, of those 2667, representing the cohort of this study, had EP. PPM was defined as EOAI >0.65 cm²/m². To minimize bias, propensity score matching was conducted and two groups A and B (without and with severe PPM) of 320 patients with similar preoperative characteristics were matched. We assessed early outcomes including CVA, re-exploration for bleeding, low cardiac output, deep sternal wound infection, acute renal injury, length of hospital stay and long-term survival for both groups in unmatched and matched populations.

Results

In the unmatched analysis, 18.3% of patients had severe PPM. Severe PPM was not associated with increased in-hospital mortality (4.5 % vs 2.9% respectively, $p = 0.09$) or any other early adverse outcomes except increased length of stay in hospital (10.57 ± 8.2 vs 11.7 ± 9.4 respectively, $p=0.01$). Long-term survival differed significantly between group A compared to group B at 2 and 8 years (91.8% vs 91.4% and 60.5% vs 55.7% respectively, $p=0.02$). Matched analysis showed no differences between the groups in early health outcomes. Furthermore; overall survival at 2 and 8 years was also similar between group A and group B (89.7% vs 91% and 57.3% vs 58%, $p=0.9$).

Conclusion

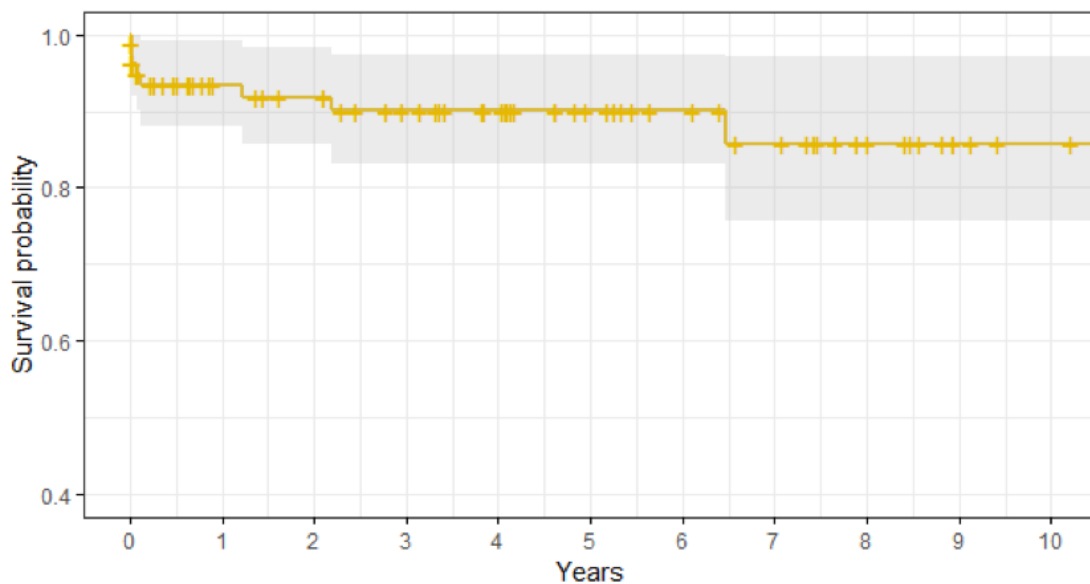
Presence of severe PPM does not affect early or late survival when using EP in the aortic position.

Ten-year Results After Implementation of an Aortic Valve Repair Program in a Tertiary Non-university Center

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Post-operative outcomes	N=82
In Hospital Mortality (30 days)	2 (2.4%)
Stroke	1 (1.2%)
CVVH	1 (1.2%)
Pacemaker insertion	1 (1.2%)
IABP insertion	1 (1.2%)
Hospital stay (days)	9 (7 to 12)
Long term freedom from AI (>2+)	89.1%
Long term occurrence of infective endocarditis	1.2%



Number at risk

All	82	56	52	45	37	28	23	19	13	7	4
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Cumulative number of events

All	0	5	6	7	7	7	7	8	8	8	8
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Background

In the last two decades, pioneer centres demonstrated excellent results with reconstructive aortic valve (AV) surgery. After standardisation of aortic valve repair techniques, more centres initiated "aortic valve sparing" programs.

Reproducibility of the results from reference centres are still not well known. We aim to report our experience of aortic valve repair program in a tertiary non-university hospital.

Patients and methods

Between 2008 and 2018, 82 patients had AV repair. Mean age: 54.4 years. A proctor supervised the first 15 procedures at the initial phase of the program. Two surgeons were then actively involved in sustaining the program. Primary outcomes were survival, cumulative incidence of NYHA class, recurrence of aortic regurgitation and reoperation rate.

Results

We performed David procedure in 41.5% of the patients, the ventriculo-arterial junction was corrected using an external annuloplasty (2.4%) or a subcommisural annuloplasty (25.6%). We repaired the leaflets using central plication (89.9%), shaving (25.6%) or with a free margin reinforcement (6.1%).

Thirty-day mortality was 2.4%. Other post-operative outcomes are summarised in table 1. At Ten-year survival was 85.7% (Figure 1) with cumulative incidence of more than moderate aortic regurgitation (> 2+) was 10.9%, No patients were in NYHA class IV. Reoperation on the AV was necessary in 3 cases. 10-year cumulative incidence of reoperation was 3.6%.

Conclusions

Aortic valve repair is feasible in a tertiary non-university hospital with satisfactory results.

Team approach and proctorship were paramount to achieve these results.

Continuous auditing of AV repair results is essential to measure outcomes and to identify areas of improvement.

Initial Experience of the Ozaki Procedure in a Paediatric and Young Adult Population in Glasgow

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Objectives

The Ozaki procedure has recently been introduced as a novel aortic valve replacement/reconstruction that may have advantages over bioprosthetic equivalents. This study aimed to evaluate initial clinical outcomes, haemodynamics and durability of the Ozaki procedure in the Glasgow Congenital Cardiac Program.

Methods

A retrospective analysis of all patients undergoing the Ozaki procedure between October 2016 and September 2019 was performed (n=21). Operative, echocardiographic and early follow-up data was evaluated.

Results

Patient age was 29.95±13.48 years, range 2-51 years, M:F 14:7. Cardiopulmonary bypass and aortic cross-clamp times were 236.70±63.30 and 202.80±47.60 minutes respectively. Mean leaflet size was 23.33±4.38mm, range 13-31mm. There was no mortality. Echocardiographic data identified significant reductions in peak transvalvular pressure gradients in patients with aortic stenosis, mean change: 53.10mmHg (CI:39.31-66.89; $p<0.001$). 9/21 had mild post-operative residual aortic regurgitation. A positive correlation between leaflet size and mean transvalvular gradient reduction was found ($r=0.460$; $p=0.047$). One patient required reintervention for valve failure at 13 months post-operatively.

Conclusions

This study has identified promising early outcomes for the Ozaki procedure in this paediatric and young-adult cohort. Post-operative haemodynamics are excellent and reintervention rates have been low. The significance of post-procedural residual aortic regurgitation on valve durability remains to be determined.

Table 1 - Description of Surgical and Post-Operative Parameters. Median Follow-Up: 21 months (IQR=18.25)

Variables	N (%)
Leaflet Material	
<i>Autologous Pericardium</i>	18/21 (85.71%)
<i>Bovine Pericardium</i>	3/21 (14.29%)
Root Enlargement Procedure	3/21 (14.29%)
Requirement for 2nd CPB Run	3/21 (14.29%)
Mortality	0/21 (0.00%)
CVA	1/21 (4.76%)
Re-operation for Bleeding	1/21 (4.76%)
Late Valve Re-intervention	1/21 (4.76%)

Choice of valve in patients >75 years. A comparison between Conventional Aortic valves Vs rapidly deployed valves. Single centre experience.

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Royal Victoria Hospital

Background

Current recommendations suggest consideration of TAVI as an option for patients aged >75 years. However, many patients in this group receive aortic valve replacement (AVR). We assessed the outcomes in rapid deployment and conventional prostheses in this cohort.

Methods

Patients aged >75 years undergoing AVR with or without any concomitant procedure were included between January 2014 and January 2020 (total: 597). Group A (495 patients) had conventional AVR and Group 2 (102 patients) had rapidly deployed valves.

Results

Preoperative variables including mean age, EuroSCORE II, and body mass index were similar between the two groups. More females and octogenarians were in the rapidly deployed valve group.

Bypass time and cross-clamp times were shorter in rapidly deployed group. However, the length of ICU and hospital stay was not significant between the two groups.

Early post-operative pacemaker implantation (Conventional 2% Vs RDV 7%) ($P < 0.05$) differed significantly between groups. At follow-up echocardiography, pressure gradients were comparable between groups.

Thirty-day mortality and valve-related complications were low in each group.

Conclusion

RDVs show comparable early and medium-term outcomes and valve hemodynamics.

RDVs are associated with shortened operative time and cross-clamp time but may carry an increased risk of need for permanent pacing.

Variable	Conventional AVR	Rapidly deployed valves	P- value
Age>80	138 (27.9%)	58 (56.9%)	<0.001
Male	299 (60.4%)	30 (29.4%)	<0.001
CPB time (min)	142 (43-427)	111 (40-336)	<0.001
X-clamp time (min)	107 (33-343)	83 (29-251)	<0.001
Total operative time (min)	273 (89-975)	226 (120-603)	<0.001
PPM <30 days after surgery	10 (2%)	8 (7%)	<0.007
Peak valvular gradient (mmHg)	24.7 (3-75)	22.4 (7-51)	0.187
Mean valvular gradient (mmHg)	13.3 (3-41)	11.6 (5-26)	0.134
Valvular area (EOA) (cm ²)	1.5 (0.6-3.5)	1.4 (0.8-2.6)	0.375

Pushing the Boundaries and Advanced Techniques Using Sutureless Aortic Valves in Complex Cases: A Single Centre Experience

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Objective

This series describes our short-term outcomes using the sutureless Aortic Valve Replacements (AVRs) for technically challenging aortic root reconstructions including re-operations, failing homografts and infective endocarditis (IE).

Methods

We retrospectively analysed clinical and echo data from November 2014 to October 2018. Primary outcomes included in-hospital and post-discharge mortality, strokes, re-operation, re-infection and para-valvular regurgitation.

Results

Twenty-one patients with complex AVRs (M:F 13:8) were included. Median age was 61 years (34-78). Nineteen (90.5%) underwent re-operation (8 for prosthetic valve endocarditis and 11 for SVD) and two (9.5%) underwent first-time AVR for infective endocarditis. Complex re-sternotomies included 3rd and 2nd time re-dos and twelve underwent first-time re-sternotomy. Median EuroSCORE II was 5.0 (range 1.6 – 46.5). Core temperature on CPB 24-32°C. Ante- and retro-grade cold blood cardioplegia was instilled. Average CPB and cross-clamp times were 181 and 99 minutes respectively. Aortic annulus or root reconstruction was achieved with multiple pledgeted sutures +/- pericardial or Dacron patches. Four Small (19-21mm), thirteen Medium (21-23mm), two Large (23-25mm) and two Extra Large (25-27mm) sized sutureless valves were implanted. There was one (4.7%) hospital death (EuroSCORE II 46.5) with late endocarditis, one (4.7%) re-operation for bleeding and two (9.4%) post-operative strokes. One (4.7%) patient required a PPM. Pre-discharge echocardiography demonstrated two (9.4%) cases of mild para-valvular regurgitation. Mean trans-valvular mean gradient was 16.4mmHg. Average post-operative length of hospital stay was 18.1 days. Two (9.4%) patients required late aortic valve re-intervention. None of the endocarditis patients became re-infected.

Conclusion

Clinical outcomes are satisfactory for this high-risk population in the context of complex aortic surgery. Long-term follow-up is on-going.

Minimally Invasive Aortic Valve Replacement Using a Single-incision Approach Through Right Minithoracotomy: Our Early Outcomes

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Objective

Minimally invasive aortic valve replacement (mini-AVR) might improve clinical outcomes, particularly in high-risk and elderly patients. Sutureless/rapid deployment bioprosthesis can offer advantage of decreasing the cross-clamp time (XCT) and easing the procedure. We evaluated the safety and early clinical outcomes of mini-AVR using a single-incision approach through right minithoracotomy.

Methods

We performed a single-centre retrospective analysis of 203 patients consecutively undergoing mini-AVR with the right minithoracotomy approach and completely central cannulation. Aortic valve diseases were stenosis (89.9%), regurgitation (1.6%) and mixed valve disease (8.5%). Patients with concomitant procedures were excluded. The primary endpoint was 30-day mortality.

Results

Mean age was 76±6.2 years, 63 (31%) patients were 80 years or older. Cardiopulmonary bypass (CPB) and XCT were 35 (24 – 76) and 60.5 (39 – 153) minutes, respectively. 30-day mortality was 1% (2 patients). Mean mechanical ventilation was 7.4±9 hours. Mean postoperative chest drainage in the first 24 hours was only 353±272 ml. Early postoperative echocardiographic findings showed mean aortic valve (AV) gradient of 14.6±8.8 mmHg, mean left ventricle ejection fraction (LVEF) of 65.5±10.8 %, and systolic volume index (SVI) of 41.56 ml/m². We have observed minor paravalvular leak (PVL) which occurred in 7 patients (3.4%), and no moderate or severe PVL was found. There was no structural valve degeneration. Two (1%) patients needed conversion to full sternotomy, and two (1%) patients to ministernotomy.

Conclusions

Mini-AVR using the single-incision approach through right minithoracotomy approach is an effective and safe procedure and demonstrates excellent early clinical outcomes. This approach can be particularly valuable in higher risk and elderly patients.

Emergency Valve-in-valve Transcatheter Aortic Valve Implantation for Endocarditis Degeneration

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Royal Papworth Hospital NHS Foundation Trust

Objectives

Valve-in-valve transcatheter aortic valve implantation (ViV-TAVI) is becoming an established treatment option for prosthetic valve degeneration. Use of TAVI in the emergency setting has not been widely reported, and TAVI is generally contraindicated in the context of endocarditis. Here we describe a patient developing acute cardiogenic shock due to prosthetic aortic valve degeneration 8 months after receiving treatment for confirmed infective endocarditis necessitating salvage ViV-TAVI.

Methods

This 72-year-old male had undergone bioprosthetic aortic valve replacement for infective endocarditis 4 years before presentation. Eight months before presentation he received further treatment for vegetation-negative *Streptococcus Sanguinis* endocarditis. On transfer he was in a low cardiac output state with lactaemia and anuria. An echocardiogram revealed severe left-ventricular impairment, severe aortic regurgitation and a suspected bioprosthetic valve vegetation (Fig. 1). Despite inotropic support and haemofiltration in ITU he rapidly deteriorated with early signs of multi-organ failure. He was now unfit for surgery. After a comprehensive review of his microbiology it was decided to attempt a salvage transfemoral ViV-TAVI.

Results

Following successful deployment of the valve (Fig. 2), the patient's clinical condition improved immediately. He was later transferred to the ward for 6-weeks of intravenous antibiotics. 1-month post-discharge he was feeling very well, walking at least 1-mile a day and gradually returning back to work. He remains well with no complications or evidence of re-infection at 18-months follow-up.

Conclusions

This case may demonstrate that for selected patients with degenerative prosthetic aortic valve disease, despite a history of infective endocarditis, ViV-TAVI may be considered an alternative to redo surgery in the emergency setting.

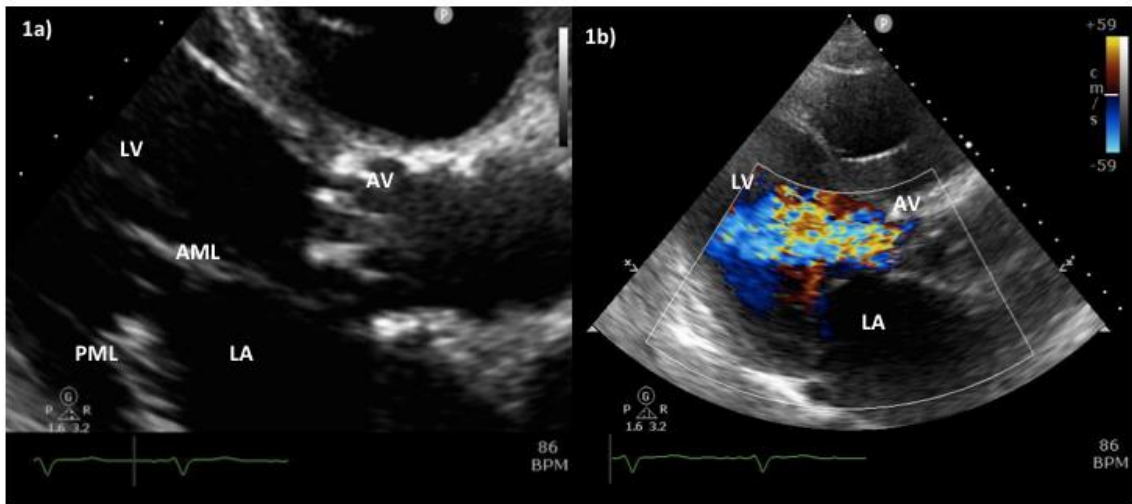


Figure 1a, b: Transthoracic echocardiogram showing the left atrium (LA), anterior mitral leaflet (AML), posterior mitral leaflet (PML), left ventricle (LV) and aortic valve (AV). **a** Shows abnormal AV. **b** Colour flow mapping shows turbulent flow indicative of aortic regurgitation.

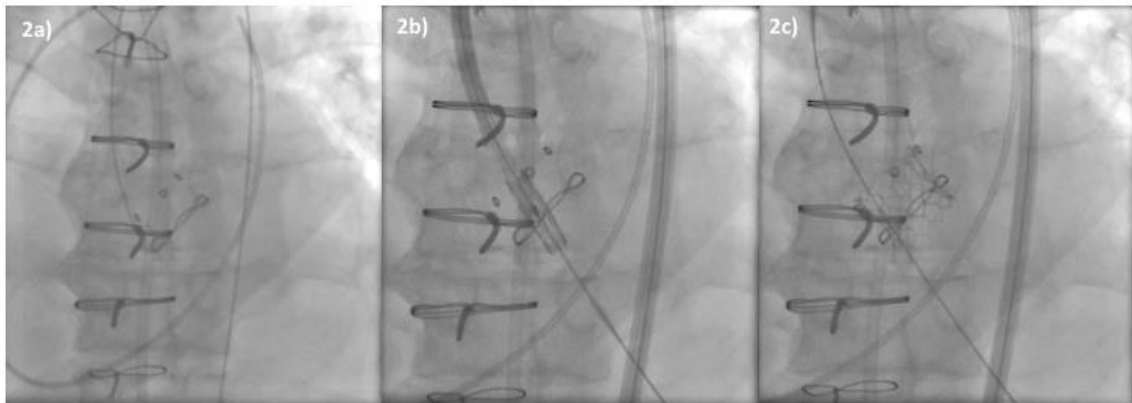


Figure 2a, b, c: Shows valve in valve insertion of a Sapien 3 transcatheter heart valve . **a** Shows previous Magna Ease bioprosthetic valve (25mm) in situ. **b** Shows the collapsed stent over a guidewire, positioned in relation to bioprosthetic valve. **c** Shows the expanded Sapien 3 valve (23mm) in place.

Does Obesity Have an Impact on the Outcomes of Isolated Aortic Valve Replacement?

Omodara, O; Abdulaziz, B; Shanmuganathan, S; Naik, S; Szafranek, A; Greco, R

Nottingham University Hospital NHS Trust

Objectives

To investigate the role of obesity in isolated surgical aortic valve replacement (SAVR) over a 25-year period.

Method

Retrospective analysis of 1,640 consecutive patients who underwent isolated SAVR (October 1995-October 2019). 497 patients had a BMI>30 and were classified as obese.

Results

Based on their BMI, 0.9% of the patients were underweight, 28.8% of normal weight, 40% overweight, 19.6% obese and 10.7% morbidly obese. The incidence of obesity increased significantly over time, from 23.1% in the period 1995-2007 to 33.3% in 2008-2019 (p<0.000). Patients with obesity were younger but less healthy, with higher incidence of COPD, diabetes and smoking history. Non-obese patients had higher EuroSCORE. There were no significant differences between obese and non-obese patients in terms of in-hospital mortality, postoperative outcomes and length of stay. In-hospital mortality in the obese group was 0.8%. A higher incidence of re-exploration for bleeding was observed in the non-obese patients (4.0% vs 1.8%, p<0.003).

Conclusions

Over 30% of the patients who underwent isolated SAVR were obese and their prevalence increased in contemporary practice. Obesity should not be considered a contraindication for SAVR. In the selected population of patients who were accepted for surgery, obesity was not associated with inferior postoperative outcomes.

PRE-OPERATIVE DATA	Group 1 - BMI<30 (1143)	Group 2 - BMI>30 (497)	P
Age	67.73 ± 12.22	66.09 ± 11.15	0.011
Gender (F)	411 (36)	198 (39.8)	0.135
Smoking History	614 (54.3)	294 (59.9)	0.037
Diabetes	129 (11.3)	108 (21.7)	0.000
COPD	157 (13.7)	93 (18.7)	0.010
PVD	58 (5.1)	25 (5.0)	0.970
CKD	17 (1.5)	9 (1.8)	0.886
Elective Urgent Emergency	191 (16.7) 934 (81.7) 18 (1.6)	82 (16.5) 411 (82.7) 4 (0.8)	0.454
Cardiogenic shock	5 (0.4)	2 (0.4)	0.920
EF Function Good Moderate Poor	865 (75.7) 203 (17.8) 75 (6.6)	401 (80.8) 75 (15.1) 20 (4.0)	0.091
CCS 3/4	120 (10.5)	69 (13.9)	0.042

NYHA 3/4	505 (45.8)	236 (48.7)	0.290
EuroSCORE	7.31 ± 6.75	6.08 ± 5.07	0.000
POST-OPERATIVE DATA	Group 1 - BMI<30 (1143)	Group 2 - BMI>30 (497)	P
IH Mortality	23 (2.0)	4 (0.8)	0.078
Sternal wound infection	9 (0.8)	6 (1.2)	0.412
Post-op infections	72 (6.3)	24 (4.9)	0.250
Re-exploration for bleeding	46 (4.0)	9 (1.8)	0.003
HDF	16 (1.4)	8 (1.6)	0.746
CVA	17 (1.5)	7 (1.4)	0.810
Post-op LOS (days)	9.93 ± 9.94	9.78 ± 7.99	0.756

Long-term Outcomes of Sutureless and Rapid-deployment Aortic Valve Replacement: A Systematic Review and Meta-analysis

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Objectives

Sutureless and rapid-deployment aortic valve replacement (SURD-AVR) has become a prominent area of research as the medical community evaluate its place amongst other aortic valve interventions. This current systematic review and meta-analysis, to our knowledge, is the first focusing on long-term outcomes regarding safety, efficacy and durability of SURD-AVR from available current literature.

Methods

A literature search was performed via six electronic databases from their inception to November 2019. Inclusion criteria for this systematic review included survival and postoperative echocardiographic outcomes greater than 5 years in patients who underwent SURD-AVR. Studies were identified and data extracted by two independent reviewers. Long-term survival outcomes were aggregated using digitized Kaplan-Meier curves where available.

Results

After applying predefined inclusion and exclusion criteria, four studies were identified for review. All four studies were observational and in total reported data for 2,164 patients. The majority (64.9%) of patients underwent SURD-AVR via full sternotomy, with a quarter (25.4%) also undergoing concomitant cardiac procedures. Aggregate overall survival rates at 1, 2, 3, and 5-year follow-up were 94.3%, 90.6%, 88.1%, and 83.0%, respectively. Incidence of strokes (4.2%), severe paravalvular leaks (1.2%) and permanent pacemaker insertion (7.4%) at up to 5-year follow-up were acceptable. At 5-year follow-up haemodynamic outcomes were also acceptable for mean pressure gradient (range 7.4-13.6mmHg), peak pressure gradient (range 15.5-21.1mmHg) and effective orifice area (range 1.5-1.8cm²).

Conclusion

Evaluation of the evidence reporting long-term outcomes of SURD-AVR suggests that it is a safe procedure for AVR with low rates of complications. Long-term outcomes presented in this review show that not only does SURD-AVR have acceptable survival rates, but also good haemodynamic performance at 5-year follow-up.

Treatment for Aortic Valve Patient-prosthesis Mismatch in Adults. Should Further Surgical Intervention be Undertaken?

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Leeds General Infirmary

Objectives

Patient-prosthetic mismatch (PPM) following aortic valve replacement (AVR) is associated with morbidity and excess mortality. However, redo-AVR is often perceived as technically impossible or too high a risk, even in young adults who have much to gain. We reviewed our experience in this population.

Methods

Between 2014-2020, 18 consecutive pts (median age: 34 [range: 17-67] yrs, 6 males) underwent redo-AVR for PPM in our Unit at 8.5 [3-34] yrs following index AVR. Pre-operative aortic gradient 93 [64-124] mmHg. 15 Pts (83%) had symptoms, incl. 5 with NYHA >3. Aortic prosthesis size was < 21 in all pts. Two also had a mitral prosthesis, and 5 had >2 prior sternotomies. Pre-operative cross-sectional imaging and intra-operative TOE were standard.

Results

Surgical techniques included resection of subvalvar pannus (17 pts), aortic root enlargement (11), and Bentall procedure (3). The choice of new AVR was guided by patient preference and intra-operative findings. 15 Pts received a new aortic prosthesis, all with better haemodynamic profile, and all but one a larger size (Figure). One pt had a Freestyle and two a Ross operation. 7 Pts had additional cardiac procedures. Cardiopulmonary bypass was 249 [127-570] min. and cross-clamp 174 [94-456] min. There were no operative deaths. Complications were exploration for bleeding (3), permanent pacemaker (1), transient neurological deficit (1) and re-operation for root dehiscence (1). Median follow-up was 714 [42-2322] days. One pt suffered late endocarditis, had successful redo-surgery, but died at 6 mts due to anticoagulant-related stroke. In all pts post-operative aortic gradient (median: 23 [13-49]) was significantly reduced (70 [33-110] mmHg, (p<0.001) and maintained at latest follow-up.

Conclusion

Successful redo-AVR for PPM can be achieved using a planned, patient tailored surgical approach. These surgical principles should be considered in any pt with a small root undergoing AVR.

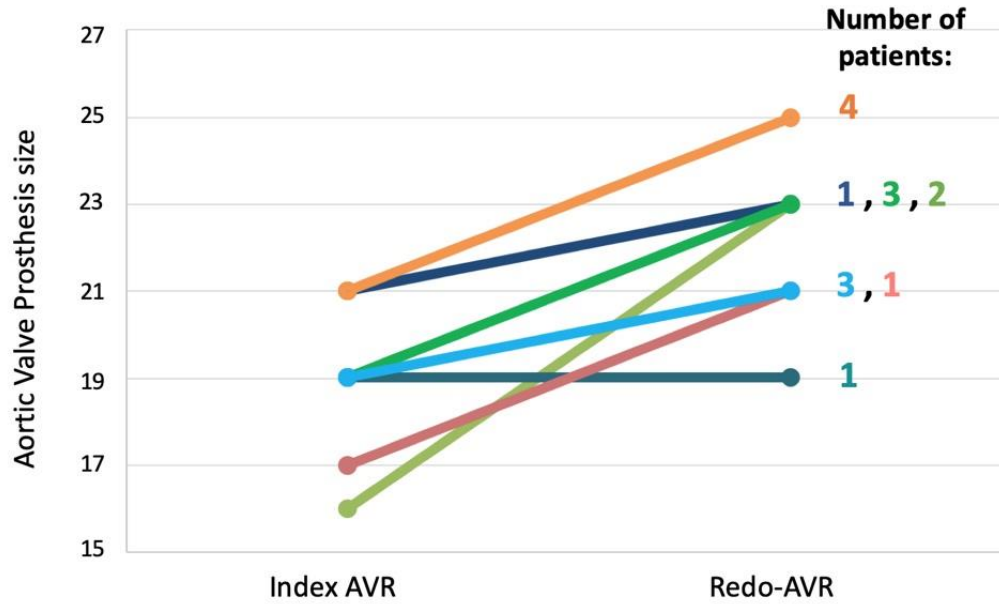


Figure: Change in prosthesis size between index and redo-AVR.

Aortic Valve Neocuspidization (Ozaki) in Adult Patients – First UK Experience

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¹Bristol Royal Infirmary; ²Royal Brompton Hospital; ³University Hospitals Coventry and Warwickshire

Objectives

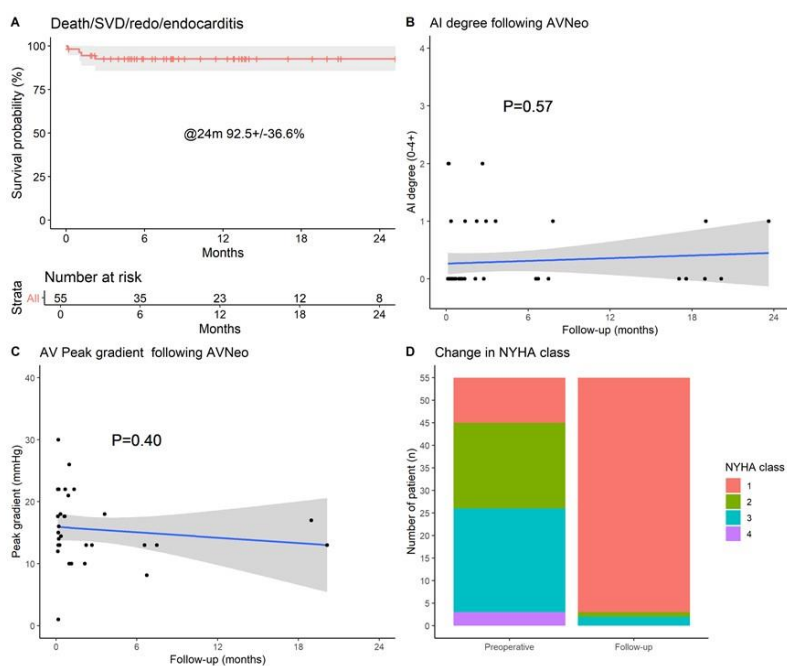
We sought to provide further evidence on the safety and efficacy of Aortic Valve Neocuspidization (AVNeo) using autologous pericardium in adult patients with aortic valve (AV) disease by reporting clinical and echocardiographic results from the first UK experience.

Methods

We reported on prospectively collected clinical and echocardiographic outcomes of 55 patients (mean age 58±15 years) undergoing AVNeo with autologous pericardium in two UK centres from 2018-2020.

Results

In the present series, no patients required intraoperative conversion. After mean follow-up of 12.5±0.9 months. 3 patients presented with endocarditis, 2 of these were recurrences of endocarditis and required reintervention. At echocardiographic follow-up, no patient presented with SVD and with the exclusion of the above, the patients had absent or at most mild aortic valve insufficiency with very low peak and mean transvalvular gradients (16±3.7 and 9±2.2 mmHg respectively). Overall, freedom from death, endocarditis, reintervention and SVD was 92.5%±3.6%. There was a significant improvement in NYHA class compared to baseline.



Conclusions

AVNeo procedure is safe and effective and should be considered as part of the armamentarium when performing aortic valve replacement in adult patients.

The 19mm Aortic Prosthesis – Does Size Really Matter?

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Freeman Hospital

Objectives

Many surgeons are very reluctant or even refuse to use a 19mm aortic prosthesis through fear of inevitable patient prosthesis mismatch (PPM). PPM is defined if the effective orifice area (EOA) indexed to patient's body surface area is under 0.85 cm²/m². We sought to interrogate the real-world outcomes following implantation of size 19 aortic valve replacements.

Methods

Retrospective analysis of prospectively collected data on all the patients undergoing size 19 aortic valve replacement (AVR) in a single centre was performed. Demographics, operative details and short and long-term outcomes were analysed.

Results

118 patients (96% females, mean age 72 years) underwent AVR with a size 19 prosthesis between 1st April 2011 and 1st November 2019. 93 (78.8%) had aortic stenosis, 16 (13.5%) had aortic regurgitation, 9 (7.6%) mixed. Mean logistic EuroSCORE 11.6, Cross clamp time was 78 min, and bypass time was 117 min. Concomitant procedures were carried out in 55(47%) patients. Of those, who underwent isolated AVR, mortality was 5%. The average height, weight and body surface area were 154 cm (range 72 to 186 cm) 66 kg (range 16 to 100 kg) and 1.66 cm² (range 0.56 to 2.14 cm²) respectively. 102 (86%) had biological AVR. Of the patients (n=91) whose indexed EOA (iEOA) was known based on the make of the prosthesis, only 2 patients had iEOA greater than the minimum estimated to prevent PPM. Only 4 patients (3.4%) developed shortness of breath attributed to PPM over a mean follow-up of 5.14 years (range 1 to 9.5 years).

Conclusions

Despite reluctance to use 19mm prosthesis amongst many surgeons our real-world experience shows that only a very small minority of patients developed clinically significant symptoms of shortness of breath attributed to the PPM after its implantation. Whilst all the attempts must be made to avoid PPM, the intraoperative risks of more invasive surgery need to be weighed against the perceived benefit.

Sutureless Aortic Valve vs Stented Aortic Valve Performed via Mini-sternotomy. A Single Surgeon Experience.

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King's College Hospital

Objective

Recent advances in valve prosthesis have led to the development of sutureless valves. We present a single surgeon experience of isolated sutureless Perceval valve performed via mini sternotomy compared to the Edwards Perimount MagnaEase bioprosthetic valve.

Methods

A total of 138 patients were identified and data was collected retrospectively. They were divided into two groups, Group A (Sorin Perceval (SP), n=72) and Group B (Edward Magna Ease (EM), n=66). The mean age in Group A was 74.09 +/- 8.9 and 65.5 +/- 10.35. Hemodynamic parameters and clinical outcomes were monitored until discharge with analysis of the early post-operative results.

Results

The cardiopulmonary bypass (CPB) and aortic cross-clamp (ACC) times with the SP valves were significantly shorter than with EM valves. The mean CPB time for SP valve replacement without concomitant procedures was 69.8 +/- 11.0 min, compared to 91.8 +/- 11.3 min in the EM group ($p = 0.015$), while the mean ACC times were 47.3 +/- 6.8 and 71.1 +/- 11.2 min, respectively ($p = 0.006$). Permanent pacemaker implantation was required in four patients after SP valve replacement, but in only two patients after EM valve replacement ($p = 0.326$). The mean transvalvular gradients were 7.3 +/- 3.3 mmHg, in the SP group and 8.13 +/- 3.0 mmHg, in the EM group ($p = 0.087$). The mean valve size was 24.7 +/- 1.3 mm and 24.9 +/- 1.5 mm in the SP and EM groups, respectively. There were no stroke/TIA in the SP group and 2 strokes (3.0%) in the EM group. There were no in hospital mortalities in either group.

Conclusion

The sutureless SP bioprosthesis offers comparable short-term outcomes with reduced clamp and bypass times, to the conventional stented bioprosthesis. This can be particularly advantageous in higher-risk groups (such as elderly patients) and if concomitant surgical procedures are planned.

Transcatheter Aortic Valve Implantation to Expedite Non-Cardiac Surgery in Patients with Severe Aortic Stenosis

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¹St Bartholomew's Hospital; ²Queen Mary University London

Objectives

Current guidelines recommend TAVI in symptomatic severe aortic stenosis (SSAS) before non-cardiac surgery (NCS) if the patient is of high-risk for surgical aortic valve replacement. TAVI is not currently recommended for treatment of asymptomatic severe aortic stenosis (ASAS) patients. We investigated the outcomes of TAVI in asymptomatic and symptomatic aortic stenosis patients requiring non-cardiac surgery (NCS).

Methods

Retrospective analysis of patients undergoing TAVI between January 2015 and June 2020, at our hospital. The outcomes of patients undergoing TAVI to facilitate NCS were analysed including patient demographics, all-cause mortality and complications.

Results

1866 patients underwent TAVI, and 99 (5.3%) were to facilitate NCS (study cohort); 63 (63.6%) patients were symptomatic and 36 (36.4%) completely asymptomatic. Table 1 shows patient characteristics and outcomes in SSAS versus ASAS patients undergoing TAVI. 35 (35.4%) patients were referred to facilitate hip/ knee replacement, 11 (11.1%) required surgery for colorectal cancer and 9 (9.1%) for bladder cancer. At a mean follow-up of 22.2±16.2 months, only 31 (31.3%) of patients went on to have planned NCS. 17 (17.2%) patients died before they could have NCS, and 28 (28.3%) were subsequently deemed too frail to undergo further surgery. The mean interval between TAVI and NCS was 5.9±6.2months.

Conclusion

Less than one-third of patients undergoing TAVI to facilitate NCS undergo planned NCS and those who do go on to have NCS wait an average of 6 months. TAVI to facilitate NCS is associated with low mortality and complication rates. Survival is better in asymptomatic versus symptomatic patients. TAVI to facilitate NCS should be reserved for highly selected patients.

OUTCOME	COHORT (n=99)	SSAS (n=63)	ASAS (n=36)	P-VALUE
AGE (YEARS)	80.6±8.2	80.3±7.6	81.2±9.5	0.47
GENDER MALE FEMALE	47(47.4%) 52(52.6%)	29(29.2%) 35(35.4%)	18(18.2%) 17(17.2%)	
EUROSCORE II	3±3.7	2.6±1.8	3.6±5.7	0.7
ALL-CAUSE MORTALITY 30-DAY 1-YEAR 5-YEARS	2 (2%) 14 (14.1%) 29 (29.3%)	0 10 (10.1%) 22 (22.2%)	2 (2%) 4 (4%) 7 (7.1%)	0.53 0.03 0.03
MEAN SURVIVAL (MONTHS)	40	36	45	0.01
HOSPITAL STAY (DAYS)	2.8±3.1	3.1±3.3	2.1±2.7	0.13
MEAN TAVI TO NCS INTERVAL (MONTHS)	5.9±6.2	5.8±3.9	6.4±8.3	0.7
STROKE	2(2%)	2 (2%)	0	0.53
PARAPROSTHETIC LEAK	7 (7.1%)	4(4%)	3(3.1%)	>0.05

Long-term Outcomes of the Trifecta Pericardial Valve for Aortic Valve Replacement

Lee, M; Balmforth, D; Lopez-Marco, A; Lall, K

Barts Heart Centre, St Bartholomew's Hospital

Objectives

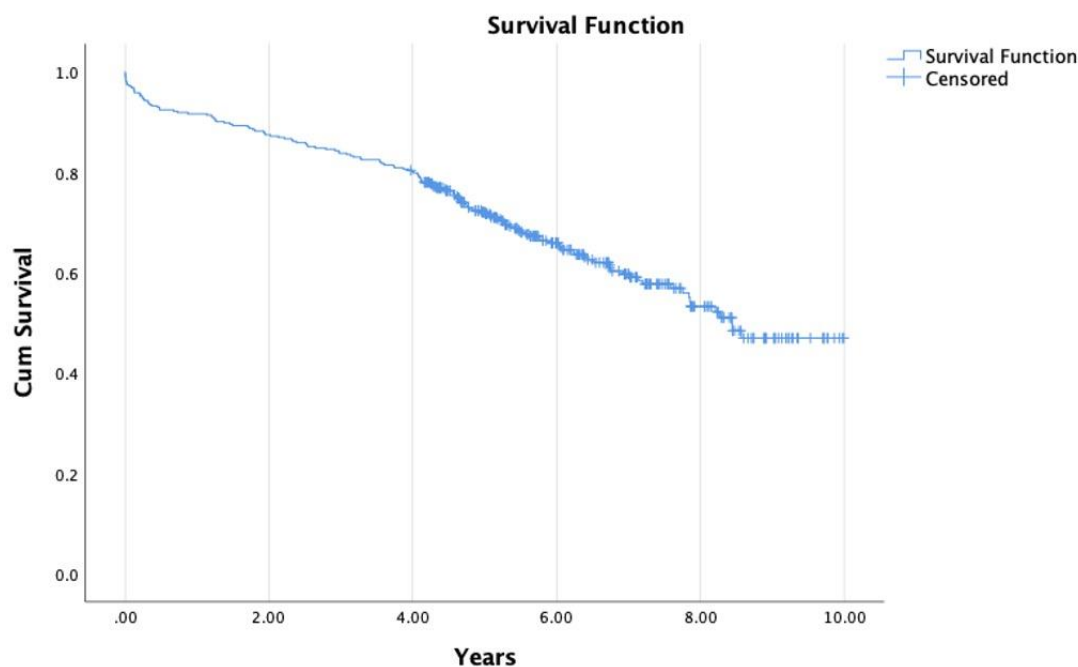
To investigate the long-term outcomes of patients undergoing surgical aortic valve replacement (AVR) with the 1st Generation Trifecta bovine pericardial valve.

Methods

Prospectively collected data of all patients undergoing AVR with a 1st generation Trifecta Valve at a single institution were analysed. 100% follow-up for mortality was achieved and survival curves were generated using SPSS version 25. Maximum duration of follow-up was 10 years (mean of 5.28 years +/- 2.43).

Results

Between February 2010 and November 2016, 383 patients underwent AVR with a Trifecta pericardial valve. Mean patient age was 72 +/- 10 and 59% were male (n=227). Actual all-cause mortality was 2.9% (n=11) at 30 days, 8.4% (n= 32) at 1 year, and 16.2% (n= 62) at 3 years. The Kaplan Meier estimate of survival out to 10 years follow-up is shown in Figure 1.



There were in total 15 re-operations in 11 patients; 1 early re-operation at 3 months for aortic regurgitation and 14 late re-operations (mean 3 years), giving a total 10-year re-operation rate of 2.6%. Of these patients 5 were for infective endocarditis, 4 were for aortic regurgitation, 3 were for restenosis and 2 were for paravalvular leak.

Conclusion

Long term results from the 1st generation trileaflet valve shows good long-term mortality with low levels of re-intervention for structural valve degeneration out to 10 years of follow-up.

Adult Cardiac Coronary

Establishing the Safety of Training in Off-pump CABG: A Retrospective Comparison of Outcomes Between Trainees and a Consultant Surgeon

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Royal Brompton & Harefield Hospital

Objectives

Off-pump coronary artery bypass (OPCAB) is an established alternative to conventional grafting using cardiopulmonary bypass. The safety of training in OPCAB surgery and the stage at which trainees should be exposed to this technique remains controversial. This single centre retrospective study aimed to compare outcomes of OPCAB surgery in consultant and trainee cases.

Methods

Between 2014 and 2018 all isolated OPCAB operations performed under the care of a consultant surgeon were analysed. Cases where a surgeon below consultant grade performed at least 70% of the distal anastomoses were designated as 'trainee cases' with the remaining cases designated as 'consultant cases'. The baseline characteristics of patients, perioperative data and short-term outcomes were collated and analysed.

Results

During the study period 245 OPCAB cases were identified: 142 (58%) consultant and 103 (42%) trainee cases. The trainee cases were performed exclusively by trainees in the final two years of the UK National Cardiothoracic Training Programme. The baseline characteristics of the two groups were closely aligned, including with respect to preoperative risk. Both trainee and consultant groups had low mortality with two perioperative deaths occurring in either group. The rates of serious postoperative complications including stroke, resternotomy for bleeding and mediastinal infection were low and not statistically significant different between the two groups. Patients operated on by trainees had a slightly longer hospital stay than those operated on by the consultant surgeon although this did not reach statistical significance.

Outcome Variable	Trainee Cases (N=103)	Consultant Cases (N=142)	P Value
Hospital Stay (days)	9.94	7.94	0.889
Post op IABP	0	4	0.086
Post op AF	15	29	0.238
Resternotomy for bleeding	3	7	0.431
Post op stroke	1	2	0.759
Mediastinal infection	2	3	0.926
30-day mortality	2	2	0.745

Conclusions

These results demonstrate comparable outcomes in OPCAB surgery between a consultant surgeon and trainees. This study supports the conclusion that training surgeons in OPCAB is appropriate for trainees in the final years of cardiac surgery.

Salvage and Emergency Coronary Bypass Surgery: Early and Mid-term Outcome

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University Hospital Southampton

Objectives

To evaluate the short- and the mid-term results of emergency coronary bypass surgery in a single institution in the United Kingdom.

Methods

This retrospective study included all patients that underwent emergency or salvage coronary bypass surgery in our institution between June 2009 and June 2019. Patients' characteristics, preoperative status, in-hospital stays and mortality data were analysed.

Results

69 patients underwent salvage or emergency coronary bypass surgery during this period. The mean age was 69 ± 11 years. The logistic EuroSCORE was 23.0 ± 16.6 .

53 (77%) patients had unstable angina, 6 (9%) patients had cardiogenic shock and 6 (9%) had VF arrest. 16 patients (23%) had acute dissection of the coronary arteries. The mean in-hospital stay was 14.5 ± 12.9 days.

The mean postoperative follow-up was 6.3 ± 3.5 years (1 to 12years). The 30-day mortality was 4%. The mortality at the end of follow-up was 21.7%.

Conclusion

Despite the patients' critical conditions, the short and mid-term outcomes of salvage and emergency coronary bypass surgery are satisfactory.

Successful Robot-assisted Minimal Access Bypass Graft in a Patient with Situs Inversus Totalis

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Royal Brompton & Harefield NHS Foundation Trust

Objectives

Situs inversus totalis is a rare congenital anomaly with complete mirror image rotation of the abdominal organs and the heart. The incidence of coronary artery disease is similar to the general population. Due to its rarity, very few reports of coronary revascularisation on these patients exist. We successfully performed coronary revascularisation with robot-assisted minimal access off-pump (EndoACAB) right internal mammary artery (RIMA) to right sided-anterior descending coronary artery bypass graft.

Methods

An 83-year-old man with known situs inversus totalis presented with 1-year history of exertional angina. Coronary angiography revealed severe right sided-anterior descending coronary artery disease.

A robotic-assisted minimal access off-pump RIMA to LAD bypass graft was proposed.

On right lung isolation, 3-port access thoracoscopic approach was employed to harvest the RIMA with robotic arm (AESOP) and harmonic scalpel. This was a good size conduit (~3mm) with excellent flow. Right minithoracotomy was performed via the 4th intercostal space and using a small soft tissue retractor the right-sided anterior descending artery, 1.75mm vessel, was identified and exposed. The pedicled RIMA was anastomosed to it with 7/0 polypropylene suture using 1.5mm shunt. Post-operative the patient suffered mild renal dysfunction and was discharged on the 6th post-operative day.

Results

Few months after discharge a contrast gated CT scan demonstrate a patent anastomosis of the RIMA to right-sided LAD.

Conclusions

Situs inversus totalis is a rare congenital anomaly, with overall frequency estimated at 1/10,000 births, the heart is structurally normal in 90-95% of cases and patients have similar life expectancy with the general population. Due to its rarity, few reports of surgical revascularisation in patients with dextrocardia with situs inversus exist in the literature. In our case, we demonstrate that robotic-assisted EndoACAB can be performed safely in these patients.

Does Obesity Affect Contemporary Practice in Coronary Artery Bypass Surgery?

Omodara, O; Boulemden, A; Shanmuganathan, S; Naik, S; Szafranek, A; Greco, R

Nottingham University Hospital NHS Trust

Objectives

To assess the impact of obesity in patients undergoing coronary artery bypass grafting (CABG) over a 25-year period.

Methods

Retrospective analysis of 4900 consecutive isolated CABG procedures (October 1995-2019). 1740 patients had a BMI>30 (obese group).

Results

Based on BMI, 0.4% of the patients were underweight, 20.5% of normal weight, 43.6% overweight, 26% obese and 9.5% morbidly obese. The incidence of obesity increased significantly over time, from 29.7% in the period 1995-2007 to 37.8% in 2008-2019 (p<0.000). Risk factors (COPD, DM, smoking history, female gender) and severe symptoms were more common in the obese patients. More urgent procedures were performed in the non-obese patients, with a significantly higher EuroSCORE. In-hospital mortality for the obese patients was 1.7%. There were no significant differences in postoperative outcomes except for a higher incidence of infections in the obese patients and re-exploration for bleeding in the non-obese patients.

Conclusions

Over 35% of the patients who underwent isolated CABG were obese and their prevalence increased in contemporary practice. Obesity was not associated with inferior postoperative outcomes, except for an increased risk of infections. Obesity should not be considered a contraindication for CABG, patients' selection should be based on clinical judgment.

PRE-OPERATIVE DATA	Group 1 - BMI<30 (3160)	Group 2 - BMI>30 (1740)	P
Age	67.01 ± 9.81	64.10 ± 9.78	0.000
Smoking	566 (17.9)	370 (21.3)	0.004
Gender (F)	2056 (65.7)	1228 (71.4)	0.000
Diabetes	656 (20.8)	592 (34.1)	0.000
COPD	362 (11.5)	238 (13.7)	0.023
PVD	373 (11.8)	203 (11.7)	0.887
Elective Urgent Emergency	1986 (62.8) 1131 (35.8) 43 (1.4)	1225 (70.4) 493 (28.3) 22 (1.3)	0.000
Cardiogenic Shock	6 (0.2)	4 (0.2)	0.766
IABP	225 (7.1)	100 (5.7)	0.065
Recent MI (<30 days)	664 (13.6)	287 (10)	0.000
EF Function Good Moderate Poor	2042 (64.6) 880 (27.8) 238 (7.6)	1099 (63.2) 514 (29.5) 127 (7.3)	0.662

CCS 3/4	1380 (44.4)	844 (49)	0.022
NYHA 3/4	1102 (35.8)	726 (42.4)	0.000
EuroSCORE	5.80 ± 7.41	4.76 ± 5.97	0.000
POST-OPERATIVE DATA	Group 1 - BMI<30 (3160)	Group 2 - BMI>30 (1740)	P
IH Mortality	78 (2.5)	30 (1.7)	0.089
Sternal wound infection	51 (1.6)	60 (3.4)	0.000
Donor site infections	49 (1.6)	39 (2.2)	0.082
Post-op infections	212 (6.7)	181 (10.4)	0.000
Re-exploration for bleeding	65 (2.1)	17 (1.0)	0.058
HDF	60 (1.9)	33 (1.9)	0.999
CVA	20 (0.6)	12 (0.7)	0.561
Post-op LOS (days)	8.38 ± 9.40	8.88 ± 11.53	0.101

Evaluation of a Simplified Method of Radial Artery Harvesting Using vessel-sealing Bipolar Diathermy Device

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Introduction

The radial artery (RA) has a significantly lower risk of occlusion and incidence of adverse cardiac events than saphenous vein graft (SVG) [1,2]. RA patency rates at 10 years were 90% and at 20years > 80% [3]. Current guidelines on myocardial revascularisation support the use of RA over SVG in patients with high-grade coronary artery stenosis (class I, level B) [4].

Background

We evaluate LigaSure™ Exact Dissector –Medtronic, Minneapolis, MN, USA (LigaSure), for harvesting RA in coronary artery bypass grafting (CABG). LigaSure utilizes bipolar diathermy and pressure to liquefy and reform collagen and elastin in vessel walls and tissues up to 7mm in diameter to provide haemostasis [5].

Methods

We included patients that underwent cardiac surgery using RA, harvested with LigaSure. All patients were examined preoperatively and had modified Allen’s test performed by the operating team. All patients were followed-up for the incidence of complications at discharge and 6-8weeks.

Results

60 patients identified between March 2019 to May 2020; 52 (87%) male; mean age was 64.55 ± 9.387 (36-80). 55 (91.67%) patients underwent isolated CABG [including CABG + atrial fibrillation ablation (n=2)]; 52 had total arterial revascularisation; 5 underwent CABG + valve surgery. Average number of grafts was 2.88 (2-5). Median time for RA harvesting was 29.27minutes. Trainees achieved competence with LigaSure in one session. There was no incidence of radial graft spasm, side-branch bleeding, no need for additional haemostasis of side-branches, no tamponade or re-exploration for bleeding. There were no symptoms of ischaemia, motor dysfunction or wound infection in the arm post-operatively. 4 (6.6%) patients at follow-up reported mild numbness at the incision site.

Conclusions

This study demonstrates that LigaSure is safe for RA harvesting. Complications are rare, training curve is short.

Early Postoperative Bleeding Impacts Long-Term Survival Following Coronary Artery Bypass Grafting

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Royal Papworth Hospital NHS Foundation Trust

Objective

Bleeding following cardiac surgery is a recognised complication with associated morbidity. The aim of this study was to examine the impact of early postoperative bleeding on long-term survival for patients undergoing coronary artery bypass grafting (CABG)

Methods

A retrospective analysis was performed of patients undergoing CABG between Jan 2003 and April 2013, with 30-day conditional survival. Analysis of long-term survival and multivariate analysis was performed

Results

6270 patients were analysed, with a mean Logistic EuroSCORE of 4.9%. The mean age was 67.8 years. Median follow-up was 11.5 years. Blood loss in the first 12 hours was below 500ml in 71.2% (n=4462), between 500 and 1000ml in 22.4% (n=1403) and more than 1L in 6.4% (n=400). Following surgery, 4.6% (n=291) required return to theatre for re-exploration, and 43.6% (n=2733) received at least one red cell transfusion. In multivariable analysis, the strongest correlates of mortality were age, smoking history, BMI, COPD, renal impairment, preoperative left ventricular function, and preoperative haemoglobin level. 12-hour blood loss was an additional predictor of inferior long-term survival with an increased risk of death of 1.13 (P=0.03) and 1.34 (P<0.01) if the blood loss was above 500 and 1000ml respectively. 5-year survival was 89.6% for patients with <500ml blood loss, 86.8% for 500-1000ml and 83.8% for >1000ml. More significant bleeding was associated with male gender, increasing age, operative urgency, increasing logistic EuroSCORE, an increased number of grafts, CPB time and the type of conduit harvested

Re-exploration and receiving blood transfusion were not associated with reduced long-term survival

Conclusions

We demonstrate that significant 12-hour blood loss is associated with inferior long-term survival following CABG. This observation supports efforts aimed at improving intra-operative haemostasis and aggressive management of patients with early signs of bleeding.

Second Conduit Choice Impacts Long-Term Survival Following Isolated Multiple Coronary Artery Bypass Grafting

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Objectives

Despite many trials, the optimal conduit choice for coronary artery bypass grafting (CABG) remains hotly debated. We assessed our practice in this study by examining the impact of arterial conduit on long-term survival following a first isolated multiple CABG procedure.

Methods

A retrospective analysis was performed of all patients undergoing first-time multiple CABG using cardiopulmonary bypass at a single specialist centre between January 2003 and April 2013. Analysis of long-term survival was performed using the Kaplan-Meier estimation method, and multivariate analysis was performed.

Results

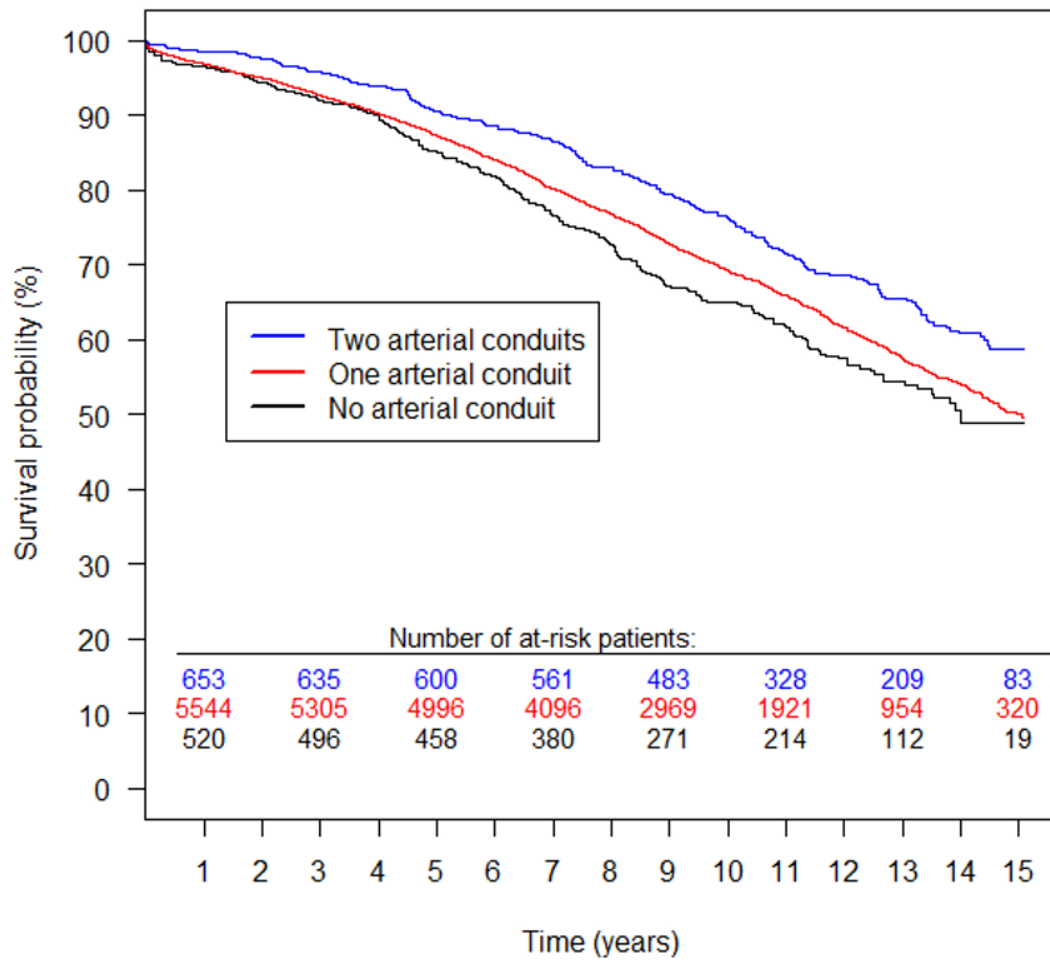
6925 patients were analysed, with a mean Logistic EuroSCORE of 4.9%. The mean age was 67.8 years. The median follow-up was 11.4 years (ranging from 0.1 to 16.0) after surgery. The overall 10-year and 15-year survival rates were 69.7% (95% CI, 68.5–70.8) and 51.2% (95% CI, 49.4–53.0) respectively. In multivariable analysis, the strongest correlates of long-term mortality were age, smoking history, female gender, body mass index, chronic pulmonary disease, diabetes, renal function, preoperative left ventricular ejection fraction, blood loss within the first 12 hours, and preoperative haemoglobin level.

Second conduit choice was independently associated on multivariate analysis with long-term survival. Specifically, use of arterial conduit – right internal mammary artery or radial artery, in addition to the left internal mammary artery (LIMA), was associated with a reduced risk of death by 0.84 (P=0.003) compared to the standard LIMA to left anterior descending artery and saphenous vein graft (SVG). 10-year survival was 69.2% [67.9 - 70.5] for LIMA + SVG (n=5723), 65.1% [61.0 - 69.5] for patients with no arterial conduit (n=539), but 76.4% [73.2 - 79.8] for patients with a second arterial conduit (n=663).

Conclusion

We have been able to demonstrate that use of a second arterial conduit is associated with significantly superior long-term survival following CABG.

Isolated multiple CABG



The Impact of Ethnicity on Access to Intervention in Patients Treated for Coronary Heart Disease – A Systematic Review and Meta-analysis

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Objective

Optimal management in patients presenting with CAD is based on guidelines that consider clinical presentation, the degree of ischaemic substrate and the anatomical severity of the disease. However, guidelines and risk scoring systems don't consider ethnic background as a factor. Literature suggests that there may be disparities in access to appropriate diagnostic and interventional procedures based on race. We aimed therefore to perform a qualitative and quantitative systematic review of the evidence to describe these potential disparities.

Methods

Searches were conducted using the Cochrane Central Register of Controlled Trials, MEDLINE and EMBASE up to July 2020. Reports from randomised and non-randomised studies evaluating diagnosis and treatment for CAD among different ethnic groups were included. The quantitative outcomes were access to the different revascularisation options. Treatment effect estimates were expressed as Odds Ratio (95% Confidence Interval). The qualitative analysis was conducted according to the GRADE-CERQual approach.

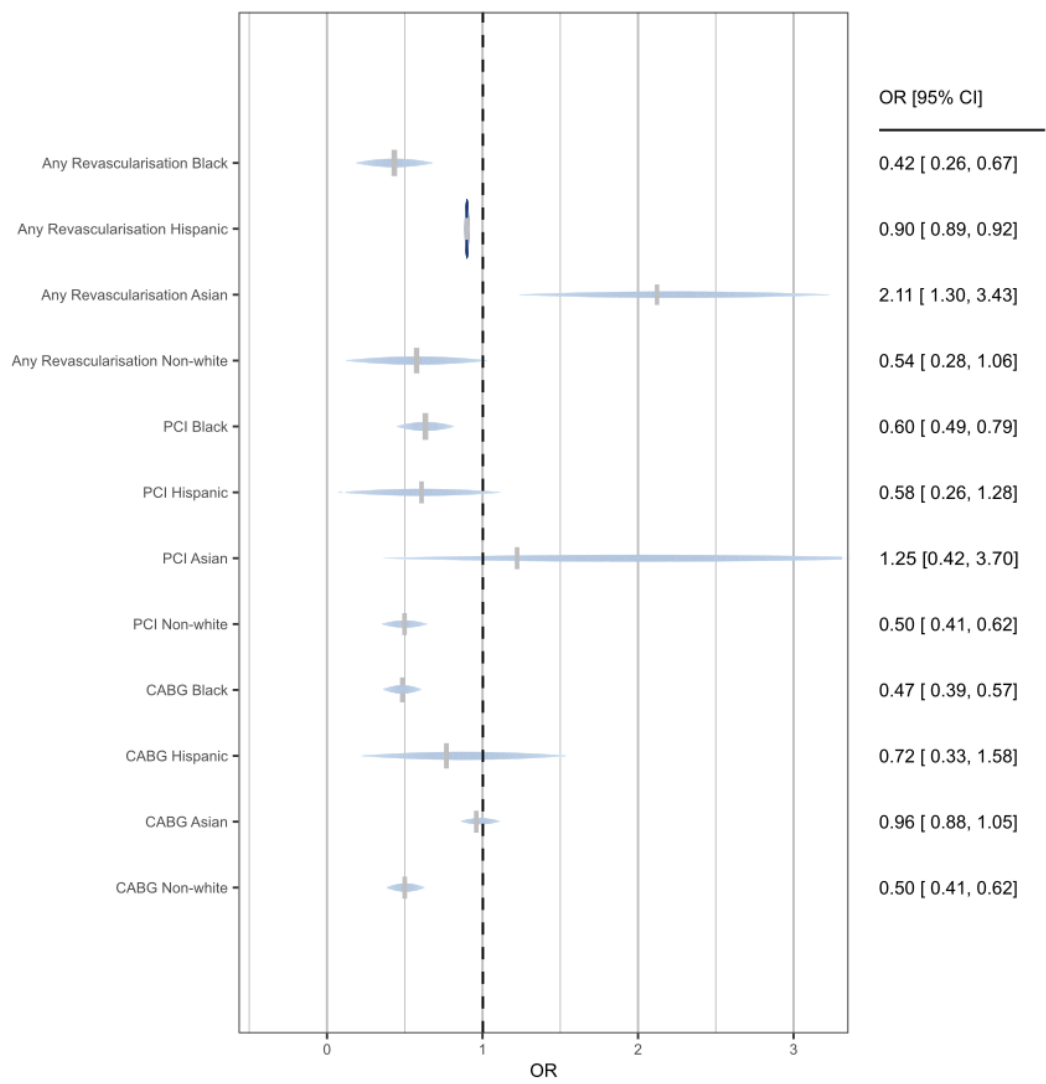
Results

17 papers were eligible in this analysis, comprising a total of 1408323 patients (1205468 white, 106882 black, 88933 Hispanic, 6962 Asian and 78 Others). Pooled unadjusted ORs in Figure 1 shows differences in revascularisation ORs between white and non-white patients.

Adjusted OR confirmed that black patients are less likely to undergo any revascularisation compared to white (OR: 0.52; CI, 0.43-64) including PCI (OR: 0.73; CI,0.63-0.84) or CABG (OR:0.57; CI, 0.5-0.64).

Conclusion

Although the assessment of confidence in the results is at best moderate and further research is needed, our analysis confirms the presence of a potential impact of ethnicity in diagnosis and treatment for CADs.



Evaluating the Joint Association of Body Mass Index and Diabetes with Late-mortality After Coronary Artery Bypass Grafting

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Background

Several studies have evaluated the independent effects of body mass index (BMI) and diabetes on late-mortality after coronary artery bypass grafting (CABG). However, BMI and diabetes are highly correlated, and the combined effect of these characteristics should be considered.

Objective

To examine the joint association of BMI and diabetes with late-mortality after CABG.

Methods

A total of 15129 patients undergoing isolated CABG between 1996 and 2017 were analysed. The BMI categories were defined as: normal-weight (NW; ≥ 18 to < 25 kg/m²; n=3783), overweight (OW; ≥ 25 to < 30 kg/m²; n=7103), class-i-obese (CIO; ≥ 30 to < 35 kg/m²; n=3247), and class-ii-obese (CIIO; ≥ 35 kg/m²; n=996). Overall, 3203 patients were diabetic.

Results

During follow-up, 3140 deaths occurred. Compared to NW individuals, the multivariable-adjusted hazard ratios (HR) [95% confidence interval (CI)] were 0.89 [0.82-0.96], 0.95 [0.86-1.1], and 1.3 [1.1-1.5] for OW, CIO, and CIIO patients respectively. Diabetes was an independent predictor for reduced long-term survival (multivariable-adjusted HR 1.5, 95% CI 1.4-1.7). In the joint analysis, compared to NW non-diabetic individuals, the multivariable-adjusted HR [95% CI] were: NW diabetic 1.3 [1.1-1.5], OW non-diabetic 0.86 [0.78-0.94] vs OW diabetic 1.3 [1.2-1.5], CIO non-diabetic 0.87 [0.77-0.99] vs CIO diabetic 1.6 [1.4-1.8], and CIIO non-diabetic 1.1 [0.90-1.4] vs CIIO diabetic 2.1 [1.7-2.6]. The reduction in multivariable-adjusted 10-year survival rates for diabetics versus non-diabetics was 4%, 6%, 9%, and 14% for NW, OW, CIO, and C2O individuals respectively.

Conclusion

Our study demonstrates considerable differences in survival after CABG for non-diabetic and diabetic patients for all BMI categories, with a progressively stronger effect of diabetes on higher obesity classes.

Short and Long-term Impact of Diagnosed and Undiagnosed Chronic Obstructive Pulmonary Disease on Coronary Artery Bypass Surgery

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Objectives

This study sought to compare clinical outcomes between three categories of patients: non-COPD, diagnosed COPD, and undiagnosed COPD, in Coronary Artery Bypass Grafting Surgery.

Methods

A single-centred retrospective study, from January 2010 to December 2019 was conducted. Primary outcomes were post-operative complications, length of ITU admission and in-hospital staying. Secondary outcomes were re-intervention rate, in-hospital and long-term mortality.

Results

4020 patients were analysed and divided into three cohorts: non-COPD – Group A (74.55% n=2997), diagnosed COPD – Group B (14.78% n=594), and undiagnosed COPD – Group C (10.67% n=429). The rate of respiratory complications was noted in this order: Group B > Group C > Group A (p 0.00000002). Peri-operative Acute Kidney Injury and wound complications were higher in Group B (p 0.0004 and p 0.03, respectively). Prolonged in-hospital staying (days) resulted in Group B (p 0.0009). Finally, long-term mortality was statistically higher in Group B and C compared to Group A (p 0.0004). No difference in long-term mortality was noted in relation to the FEV1% in Group B (p 0.29) and Group C (p 0.82).

Conclusions

In CABG surgery, patients with diagnosed COPD carry a prolonged in-hospital staying and greater peri-operative complications. Both patients with diagnosed and undiagnosed COPD develop more respiratory complications and result in higher long-term mortality compared with non-COPD patients. As a result of that, undiagnosed COPD should be included in the EuroSCORE. Finally, the FEV1% appear not be a predictor for long-term survival.

On Pump vs Off-pump Coronary Artery Bypass Grafting - Bleeding, Products and Cost

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Objective

There has been a long-standing debate between on and off-pump coronary artery bypass surgery (CABG). One of the potential benefits of off-pump surgery is a possible reduction in postoperative bleeding and subsequent use of blood products. We present our experience in bleeding and transfusions requirements between on and off-pump surgery over a 3-year period.

Methods

This was a retrospective, observational cohort study of prospectively collected data from 2194 consecutive patients who underwent CABG via sternotomy. Perioperative data relating to blood products used, rates of bleeding and costs were obtained between January 2016 to January 2019.

Results

1174 patients had On-pump CABG and 1020 had off-pump CABG. Both groups were well matched. The use of intra-operative blood products was significantly less in the off-pump CABG group; Red blood cells 1.1 vs 2 units, p:0.0001, Platelets 0.49 vs 0.63 units, p:0.001, cryoprecipitate 0.04 vs 0.15, p:0.001, Fresh frozen plasma 0.4 vs 0.6, p:0.004, Fibrinogen 0.0075 vs 0.01 p:0.91, Prothrombin complex concentrate 0.004 vs 0.013, p:0.06. There was a significant reduction in average cost of products used in the off-pump group £376 vs £586 p:0.008. This equates to an extra £210 per patient in the on-pump group which translates to an extra £82,180 per year. This excludes shorter in-hospital stay 7.1 vs 8.4 days, p:0.0001.

Conclusion

Off-pump surgery in our institution was associated with less use of blood products which translates to a potential saving of £82,180 per year.

Urgent Cardiac Surgery Performed in Personal Protective Equipment (PPE) During the COVID-19 Pandemic – an Analysis of Operative and Anaesthetic Times

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Objectives

The COVID-19 pandemic affected the ability to provide surgery requiring intensive care unit beds. Coronary artery bypass graft surgery (CABG) is the most common cardiac procedure and therefore provision was made to maintain this service through the pandemic. CABG is a complex operation involving multiple vascular anastomoses using fine sutures. In order to protect the surgical team from potentially infected patients and patients from asymptomatic staff members, the operating team were required to wear full personal protective equipment (PPE). We aim to assess the effect on operative times for cardiac surgery performed in PPE.

Methods

We compared 42 urgent CABG from 2020 with teams wearing PPE to 50 similar cases from the previous year without PPE. Our study was carried out during the peak of the pandemic in United Kingdom in 2020, with our control population the similar time period in 2019.

Results

In 2020 wearing PPE, Mean time from arrival in the theatre complex to start of surgery was 64 mins, mean bypass and cross-clamp times were 86 and 65 mins respectively, average total procedure time was 224 mins and average total time in the operating room was 304 mins.

In control group the previous year, mean time from arrival in the theatre complex to start of surgery was 62mins, mean bypass and cross-clamp times were 91 and 59 mins respectively, average total procedure time was 236 mins and average total time in the operating theatre 310 mins

Surgical times were similar in both time periods.

Conclusion

Cardiac surgery can be performed wearing PPE with essentially the same intraoperative times as without PPE. This supports our decision to continue to perform time-critical cardiac surgery through the COVID-19 pandemic.

	2019	2020	p value
Operation	CABG	CABG	
Urgent	50	42	
Cardiopulmonary Bypass Time(mins)	91	86	0.278
Cross-clamp Time(mins)	59	65	0.34
Procedure Time(mins)	236	224	0.2
Anaesthetic Time(mins)	310	304	0.48

Dual Antiplatelet Therapy Guidelines for Emergency CABG: Review of Compliance and Impact on Risk of Post-operative Cardiac Tamponade

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Castle Hill Hospital

Objectives

The American College of Cardiology and American Heart Association joint guidelines recommend dual antiplatelet therapy (DAPT) in patients undergoing coronary artery bypass grafting (CABG) as an urgent or emergency case (1). Bleeding post-cardiac surgery can be significant and re-sternotomy for cardiac tamponade or persistent mediastinal bleeding significantly affects in-hospital mortality (2). The objectives of this study were to determine bleeding risk of DAPT in urgent and emergency CABG patients compared with aspirin monotherapy (AMT) and review current departmental compliance with these guidelines.

Methods

A retrospective review of all patients having emergency or urgent CABG over 3 time periods was conducted; January to December 2015 on AMT, December 2016 to January 2018 on DAPT and review of compliance from August 2019 to August 2020. The primary outcome was re-exploration for bleeding. Secondary outcomes were compliance with DAPT guidelines, length of hospitalisation, 30 day and 1 year mortality. Data was analysed using SPSS v26.

Results

In total 123 patients on AMT and 123 patients on DAPT were analysed. There was no statistically significant difference in incidence of cardiac tamponade, intensive care stay, length of hospital stay, 30 day mortality or 1-year mortality between the 2 groups. Review of compliance included 163 patients with 94% of patients receiving DAPT in accordance with guidelines.

Conclusion

This study demonstrates high departmental compliance with guidelines. There is no increased risk of bleeding in urgent and emergency CABG patients in AMT or DAPT and both early and long-term mortality were the same in both cohorts.

References

1. 2016 ACC/AHA Guideline Focused Update on Duration of Dual Antiplatelet Therapy in Patients With Coronary Artery Disease. GN Levine et al, *Circulation*. 2016;134:e123–e15
2. Re-exploration for bleeding or tamponade after cardiac operation, Čanádiová et al, *Interact Cardiovasc Thorac Surg*. 2012 Jun; 14(6):70

Factors Determining Perfect Vein Graft Patency at 2 Years After Coronary Artery Bypass Grafting

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Objective

The VEST III trial (NCT02511834) was a prospective within-patient randomized controlled multi-center trial investigating the performance of the VEST™ external stent at 2 years after CABG. However, early vein graft failure due to technical failure may mask the effect of the external stent on mitigating late failure caused by intimal hyperplasia.

Methods

In this *post hoc* analysis participating sites were stratified by early patency as assessed by CT angiography at 6 months into superior early patency (SEP, 200/213 vein grafts, 93.9%) and inferior early patency (IEP, 94/118 vein grafts, 79.7%) sites. Overall early patency was 88.8% and the cut-off for stratification was therefore set at 88%. Fitzgibbon I patency and intimal hyperplasia thickness were assessed by coronary angiography and intravascular ultrasound at 2 years.

Results

Endoscopic vein harvest and use of above-knee origin vein grafts and greater diameter VEST stent was higher in IEP sites. In SEP sites, early patency in VEST vs. control grafts was 93.4% vs. 94.4%, and in IEP sites, 74.6% vs. 84.7%, respectively. Late patency in VEST vs. control grafts was 92.8% vs. 90.2% in SEP sites and 67.4% vs. 78.3% in IEP sites. Correspondingly, in SEP sites, VEST vs. control grafts demonstrated higher Fitzgibbon I patency (72.7% vs. 54.7%; $P=0.004$), and lower intimal hyperplasia thickness (0.23 ± 0.01 vs. 0.32 ± 0.02 , $P<0.001$) while in IEP sites, VEST vs. control grafts demonstrated comparable Fitzgibbon I patency (51.6% vs. 55.6%; $P=0.58$), and intimal hyperplasia thickness (0.32 ± 0.03 vs. 0.37 ± 0.03 , $P=0.11$).

Conclusions

In the VEST III trial there were clear differences in early and late vein graft patency in different centers and according to method of harvest, site of vein graft origin and diameter of VEST stents. In sites with lower early vein graft failure, external stents produced superior perfect patency by significantly reduced intimal hyperplasia at 2 years.

Impact of Off-pump and On-pump Coronary Artery Bypass Grafting on In-hospital Mortality and Mid-term Survival of Octogenarians

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Objective

Octogenarians are being increasingly referred for coronary artery bypass grafting (CABG). However, there is a paucity of studies reporting impact of choice of surgical revascularization strategy on in-hospital mortality and mid-term survival of octogenarians. We evaluated our institutional experience to determine the impact of off-pump and on-pump CABG on in-hospital mortality and mid-term survival of octogenarians.

Methods

We retrospectively analysed prospectively collected data from the Patients Analysis and Tracking System database (Dendrite Clinical Systems, Oxford, UK) for all isolated first-time CABG procedures with at least 2 grafts performed at our institution from January 2000 to September 2017. Over the study period, 566 octogenarians underwent off-pump CABG (N = 374) and on-pump CABG (N = 192). Short-term outcomes including in-hospital mortality as well as mid-term survival was compared for the two groups.

Results

The two groups had similar preoperative demographics and mean number of distal anastomoses (off-pump: 2.7 ± 0.6 (median 3) vs on-pump: 2.7 ± 0.3 (median 3); $P = 0.6$). However, more bilateral internal mammary artery grafts were performed in the off-pump cohort compared to on-pump cohort (117 (31.3%) vs 22 (11.5%); $P < 0.001$). In-hospital mortality for the entire cohort was 5.7% with significantly fewer deaths in the off-pump cohort (4.3% vs 8.3%; $P = 0.04$). The remaining in-hospital outcomes were similar. Kaplan-Meier survival at 1 year (89.7% vs 82.9%; $P = 0.04$) and 5 year (71.1% vs 61.3%; $P = 0.03$) was significantly better for the off-pump cohort.

Conclusion

Octogenarians experience lower in-hospital mortality and improved mid-term survival after off-pump CABG compared to on-pump CABG.

Variable	Off pump (N=374) (%)	On pump (N=192) (%)	P value
Age	82.3±2.3	82.1±1.9	0.331
Gender (female)	104 (27.8)	52 (27.1)	0.855
Previous MI	203 (54.3)	105 (54.7)	0.493
Diabetes	90 (24.1)	40 (20.8)	0.547
Hypercholesterolemia	246 (65.8)	122 (63.5)	0.586
Hypertension	235 (62.8)	129 (67.2)	0.685
Renal disease	12 (3)	4 (2)	0.452
Respiratory disease	45 (12)	18 (9)	0.738

Cerebrovascular disease	39 (10)	20 (10.4)	0.262
Peripheral arterial disease	46 (12.3)	22 (11.5)	0.682
Atrial fibrillation pre op	8 (2.1)	8 (4.2)	0.435
Three vessel disease	259 (69.3)	139 (72.4)	0.782
Left main disease	133 (35.6)	67 (34.9)	0.794
Poor LVEF	20 (5.3)	8 (4.2)	0.351
Elective procedure	210 (56.1)	102 (53.1)	0.218
30 Day mortality	16 (4.3)	16 (8.3)	0.048
1 y KM estimated	89.7%	82.9%	0.038
5y KM estimated 71.1% 61.3%	71.1%	61.3%	0.038

Skeletonized or Pedicled Harvesting of Left Internal Mammary Artery: A Systematic Review and Meta-analysis

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Objectives

We sought to compare clinical outcomes in skeletonized versus pedicled left internal mammary artery (LIMA) grafts in elective coronary artery bypass grafting through a systematic review and meta-analysis.

Methods

A comprehensive electronic literature search of PubMed, Ovid, Embase, and Scopus was conducted from inception to January 2020. Only short-term (30 days) studies which compared both techniques have been included in our analysis. Primary outcomes were post anastomosis flow rate and sternal wound infection rate (SWI); secondary outcomes were conduit length, acute myocardial infarction and 30-day mortality.

Results

Thirteen articles with a total of 6222 patients met the inclusion criteria. Except for the prevalence of diabetes mellitus being significantly lower in the skeletonized cohort (odds ratio [OR] 0.77 95% confidence interval [CI] [0.61, 0.97], $P = 0.03$), there were no differences in the preoperative demographics between the 2 groups. The skeletonized LIMA conduit was significantly longer when compared to the pedicled conduit (weighted mean difference -2.64 cm 95% CI [-3.71, -1.56], $P < 0.0001$). SWI rates were not significantly different in the skeletonized versus pedicled LIMA group (OR 0.71 95% CI [0.47, 1.06], $P = 0.10$). New onset of acute myocardial infarction and 30-day mortality rate was similar in the 2 groups (OR 1.04 and 0.97, respectively, $P > 0.05$ in both). The post anastomoses flow rate was higher in skeletonized LIMA (Weighted Mean Difference -11.51 mL/min 95% CI [-20.54, -2.49], $P < 0.01$).

Conclusions

Harvesting the LIMA using the skeletonized technique is associated with higher post anastomosis flow rates and longer conduit lengths; with no difference in SWI and mortality rates when compared to the pedicled technique. We suggest that this technique should be adopted, particularly for BITA harvesting. However, further research is needed to provide clearer indications for both methods.

In-hospital Outcome and 20-year Survival in Patients with Impaired LV Function Undergoing Isolated Coronary Artery Bypass Grafting

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Objectives

Reduced left ventricular ejection fraction (LVEF) is a risk factor for patients undergoing Coronary Artery Bypass Grafting (CABG), with limited data on survival beyond the 5-year period. We assessed in-hospital outcome and 20-year survival in patients with reduced LVEF undergoing isolated CABG.

Methods

Between 1996 and 2015, 5016 patients with reduced LVEF underwent isolated CABG: 1024 (20.4%) had poor LVEF (< 30%) and 3992 (79.6%) had moderate LVEF (30-49%). After excluding reoperations and combined procedures, the final sample consisted of 3867 patients. We assessed 30-day health outcome and long-term survival, including the impact of incomplete revascularization (IC) and off-pump coronary artery bypass (OPCAB) surgery, independent predictors of poor in-hospital and late outcome and reliability of EuroSCORE in predicting mortality in the selected population.

Results

Average age was 68 year, with 83% of male, 40% of NYHA Class IV, 12.5% of IC and 44% of OPCAB surgery. Hospital mortality was 4.4%, stroke 1.4% and renal failure 2.9%. Survival at 1, 5, 10 and 20 years was 91.1%, 76.7%, 55.1% and 22.1% respectively. Incomplete revascularization but not off-pump surgery was associated with worse long-term survival (HR: 0.85). Additive EuroSCORE and Logistic EuroSCORE (AUC 0.78) appeared to overestimate mortality in this patient population.

Conclusions

CABG is safe and effective in patients with reduced LVEF, with low rates of hospital mortality and postoperative complications. Incomplete revascularization but not off-pump coronary surgery is associated with worse long-term survival. EuroSCORE appear to overestimate the risk of mortality in this population.

Effect of P2Y12R Receptor Inhibition on Bleeding During Urgent/emergent CABG

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Objectives

To evaluate the effect of P2Y12 receptor inhibitor type and withdrawal time on CABG related bleeding.

Methods

Calculated red blood cell loss and BARC type-4 bleeding was evaluated in 299 consecutive patients undergoing CABG within <7 days of last drug intake at a European tertiary care center.

Results

Indication for emergent/urgent surgery was acute coronary syndrome in 95%. Withdrawal time was <48hrs in 83% of patients. Calculated red blood cell loss was lower after clopidogrel intake as compared to prasugrel or ticagrelor [1063 (690-1394) vs. 1351 (876-1829) vs. 1330 (994-1691) ml, p<0.001]. 45% of patients sustained BARC type-4 bleeding with significant differences between groups. Extending the withdrawal period beyond 48hrs substantially reduced calculated red blood cell loss as well as BARC type-4 bleeding by 37-48% and 58-71% respectively.

Conclusions

CABG during dual anti-platelet therapy was frequent in our analysis and mainly driven by acute coronary syndrome as indication for surgery. Withdrawal times of <24hrs of both prasugrel and ticagrelor increases calculated red blood cell loss and BARC type-4 bleeding as compared to clopidogrel. Our findings strongly support strict adherence to current guidelines and appropriate withdrawal times whenever possible.

Management of Prognostic Coronary Artery Disease During the COVID-19 Pandemic – A Single Centre Experience

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Introduction

Measures to deal with the increase in COVID-19 caseload led to changes in the provision of cardiac care. We aim to investigate the impact of COVID-19 on the interventional strategies in patients with prognostic coronary artery disease (CAD).

Methods

All patients having coronary angiography from 23rd March to 30th June 2020 at our centre were identified. Patients with prognostic CAD were studied further, after exclusion of patients presenting with a STEMI. PCI and CABG outcomes were compared.

Results

A total of 813 patients underwent angiography, 154(18.9%) had STEMI and were excluded. 141(17.3%) had prognostic CAD. 74/141(52.5%) patients (mean age 61.2±12.2) underwent PCI, 30/141(21.3%) patients (mean age 61.3±10.9) underwent CABG, 25/141(17.7%) placed on the waiting list and 12/141(8.5%) treated medically. 104/141(73.8%) patients underwent in-hospital intervention; 70(67.3%) presented with NSTEMI, 13(12.5%) with unstable angina and 21(20.2%) with stable angina. In the PCI group, 18/74(24.3%) were elective, 55/74(74.3%) urgent and 1/74(1.4%) an emergency. One patient was COVID-19 positive. 19/74(25.7%) patients had PCI (12 after MDT recommendations, 4 declined surgery, 3 had extensive co-morbidities). In the CABG group, 1/30(3.3%) was elective, 27/30(90%) urgent and 2/30(6.7%) emergencies. 3(10%) patients had PCI prior to CABG during their admission and 1 had PCI one month after emergency CABG. There were no in-hospital deaths in the primary PCI group and 2/30(6.7%) in the CABG group, p=0.161. No patients developed neurological complications.

Conclusions

Significant numbers of patients with prognostic CAD have undergone PCI during the COVID-19 period. Long-term follow-up is needed to assess the impact of guideline changes on outcomes. In the meantime, patients with prognostic disease should continue to be discussed in an MDT setting and PCI should be considered if surgical intervention would result in treatment delays and in selected patients.

Conduit Choice in Coronary Artery Bypass Graft Surgery (CABG): UK National Survey to Evaluate Cardiac Surgeons Perspective

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Objectives

Conduits choice in CABG continues to have significant impact on outcomes; however, the evidence is mixed, and there is considerable variation in practice. We aim in this survey to explore the current practice in the UK when considering conduits.

Methods

An anonymised online survey was circulated to all registered cardiac surgeons with SCTS. The data was collected over two weeks and explored the participants experience in arterial and venous conduits. Also, the perception of how demanding and safe to harvest different conduits, long-term patency and the various factors influencing individual surgeon choice.

Results

We received responses from 39 cardiac surgeons from across the UK with equally distributed experience (less than 10, 11-20 and more than 20 years) each group represents around a third. The different conduits used by surgeons included Internal Mammary Arteries (Left 100%, Right 95%), radial artery 95%, Long saphenous vein in 87%, short saphenous 59%, Gastro-epiploic artery 18% and Cephalic vein 5%. Fifty-six percent thought venous conduits are easier to harvest. Conduit-associated complication was reported predominantly in the venous conduit during post-operative phase 74% and in the arterial conduit mainly in perioperative phase 51%. There was undoubtedly an agreement that arterial conduits have better long-term patency rate; however, 62% of participants preferred the use of venous conduit. The main factors influencing the decision were coronary anatomy, patient co-morbidities, personal experience. Whereas, the least impacted factors were training juniors, time pressure in theatre and whether surgery was performed on or off-pump.

Conclusion

There is still significant variation in practice when considering conduits in coronary surgery. Patient-specific characteristics and operator experience continue to play an important role when determining a suitable conduit. There is a need for a better model to guide conduit choice.

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Objectives

Off-pump coronary artery bypass (OPCAB) grafting is an established strategy to treat high-risk patients referred for surgical myocardial revascularization. Progressively increasing number of high-risk patients are being referred for coronary artery bypass grafting. Cardiac surgical trainees of today will be confronted with this high-risk cohort of patients in the coming years and it will be logical for them to get training in this innovative approach to coronary artery bypass grafting. We conducted a survey to understand the perceptions of cardiothoracic trainee surgeons in the United Kingdom of Great Britain & Ireland regarding OPCAB & their interest in potential training in OPCAB.

Methods

An online survey questionnaire, comprising of 10 questions, was sent to all cardiothoracic surgery national trainees (n = 141) in 14 training programs in the United Kingdom & Ireland. The questionnaire was generated using the Google forms platform. Responses were tabulated and analysed.

Results

The overall response rate was 75%. Twenty-seven percent of respondents reported that none of the consultant cardiac surgeons in their training programmes performed OPCAB. Formal training in OPCAB was only available to 23.1% respondents. Nearly 39% of trainees performed OPCAB in their training programme. Whereas 86.5% of trainees regarded OPCAB as an effective surgical strategy only 30.8% of trainees felt encouraged to train in OPCAB. Regarding career aspirations, 88.2% of the residents indicated that OPCAB will be beneficial for them in their future clinical practice, and 67.3% of them were interested in pursuing out of programme training in OPCAB.

Conclusion

This survey suggests that the majority of cardiothoracic trainee surgeons in the United Kingdom & Ireland perceive proficiency in OPCAB as beneficial for their future clinical practice. However, training in OPCAB is variable across training programs, and there is a need for formal structured training.

Routine Use of Epicardial Pacing Wires Leads to Longer Hospital Stay in Patients Undergoing Isolated CABG Surgery

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Objectives

Temporary epicardial pacing wires are frequently used in cardiac surgery. We investigate whether the use of epicardial pacing wires in cardiac surgery influences patient outcomes.

Methods

A retrospective study of 2,111 patients, who underwent cardiac surgery during January to December 2018. Four groups of patients were investigated depending on the procedure undertaken: isolated CABG, isolated valve, CABG+valve and other. Within each group, patients were divided into those who had pacing wires inserted and those who did not at the initial procedure. In-hospital mortality, complication rates, length of ITU and total post-operative hospital stay, were compared between the groups and within each group.

Results

1,822/2111 (86.3%) patients undergoing cardiac surgery had epicardial pacing wires inserted: isolated CABG in 777/954 (81.4%) patients, isolated valve in 576/579 (99.5%), CABG+valve in 234/234 (100%) and other procedures in 235/344 (68.3%). Overall mortality rate was similar in patients who had pacing wires versus those without (3.1% vs 4.5%, $p=0.23$) as was re-sternotomy (3.9% vs 4.2%, $p=0.78$), stroke (2.1% vs 1.7%, $p=0.70$) and renal dysfunction (4.6% vs 5.5%, $p=0.46$). Mortality and complication rates were also similar within all 4 operation groups between patients with and without pacing wires. However, total postoperative length of stay was longer in patients who had epicardial pacing wires in the isolated CABG group (8.4 ± 8.1 vs 7.4 ± 7.5 days, $p=0.02$) and isolated valve group (13.4 ± 13.0 vs 4.7 ± 3.2 days, $p=0.02$), although ITU length of stay was similar, as were total post-operative and ITU stay in the remaining groups.

Conclusions

The routine use of epicardial pacing wires appears not to influence survival or complication rates. In isolated CABG cases only, insertion of pacing wires prolongs post-operative hospital stays. The use of epicardial pacing wires in isolated CABG procedures should be reserved for selected patients.

Adult Cardiac Miscellaneous

Pre-operative Anaemia Causes Worse Outcomes After CABG: Fact or Fiction

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¹University of Manchester; ²Manchester Foundation Trust NHS

Objectives

Anaemia is a frequent pre-operative complication that has caused debate over its effects on post-operative patient outcomes in cardiac surgery. Low pre-operative haemoglobin has been associated with worse mortality and morbidity, although these have been argued to be due to related blood transfusions. This study aims to investigate the effect of preoperative anaemia on mortality and morbidity.

Methods

Data was collated from patients undergoing elective isolated CABG from April 2011 to December 2017. Patients were categorised as moderately anaemic (Hb <110g/L) Group I, mildly anaemic (Hb 110-119g/L for females, 110-129g/L for males) Group II or non-anaemic (≥ 120 g/L for females, ≥ 130 g/L for males) Group III. The primary endpoint was early mortality, with reoperation, transfusion, reintubation, tracheostomy, ITU readmission, deep sternal wound infection, AF, total stay, time ventilated and ITU time as secondary outcomes.

Results

Among 2259 patients, 634 (28.1%) were anaemic. Mortality (in months) was significantly higher in patients with lower haemoglobin levels (44.37 moderately anaemic, 51.59 mildly anaemic, 51.92 non-anaemic; Group I vs Group II (OR 7.2, CI 1.96-12.49, $p < 0.07$); Group I vs Group III (OR 7.6, CI 2.99-12.11, $p < 0.01$), and Group I vs Group II and III (OR 3.3, CI 2.147-5.219; $p < 0.001$). Group I showed significantly greater risk of secondary outcomes compared to group II and III, including longer hospital stay (OR 3.3, CI 1.255-5.258; $p < 0.002$), transfusion requirement (OR 2.4, CI 1.171-4.491; $p < 0.014$), reintubation rates (OR 3.252, CI 1.133-9.329; $p < 0.021$) and ITU readmission (OR 2.543, CI 1.173-5.510; $p < 0.016$).

Conclusions

Our study reveals pre-operative anaemia may cause poorer outcomes in patients undergoing CABG, with an association between severity of anaemia and severity of outcomes. Pre-operative haemoglobin should be optimised prior to surgery.

Variation in Practice of Interventions to Prevent Surgical Site Infection (SSI) in UK & Ireland Cardiac Surgery Centres

Rogers, L⁴; Vaja, R⁴; Talukder, S⁴; Ali, J⁴; Rochon, M⁴; Tanner, J⁵; Miles, R²; Green, S²; Harrington, P³; Lamagni, T³; Bleetman, D⁴; Quijano-Campos, J⁴; Rizzo, V⁴; Akturk, D⁴; Zientara, A⁴; Casey, L⁴; Olivieri, G⁴; Harky, A⁴; Garner, M⁴; Cartwright, J⁴; Brown, C³; Kew, E⁴; Chiwera, L⁴; Mohamed, S⁴; Moawad, N⁴; Loubani, M⁶; Sanders, J⁷; Murphy, G⁸

¹Leicester Clinical Trials Unit; ²National Cardiac Benchmarking Collaborative; ³Public Health England; ⁴Cardiothoracic Interdisciplinary Research Network; ⁵University of Nottingham; ⁶Hull and East Yorkshire Hospitals NHS Trust; ⁷Barts Health NHS Trust; ⁸University of Leicester

Introduction

Currently no national standards exist for the prevention of surgical site infection (SSI) in cardiac surgery. SSI rates range from 1% to 8% between centres. The aim of this study was to explore and characterise variation in approaches to SSI prevention in United Kingdom (UK) and Republic of Ireland (ROI).

Methods

Cardiac surgery centres were surveyed using electronic web-based questionnaires to identify variation in SSI prevention at the level of both institution and consultant teams. Surveys were developed and undertaken through collaboration between the Cardiothoracic Interdisciplinary Research Network (CIRN), Public Health England (PHE) and the National Cardiac Benchmarking Collaborative (NCBC) to encompass routine pre-, intra- and postoperative practice.

Results

Nineteen of 38 centres who were approached provided data and included responses from 139 consultant teams. There was no missing data from those centres that responded. The results demonstrated substantial variation in over 40 aspects of SSI prevention. These included variation in SSI surveillance, reporting of SSI infection rates to external bodies, utilisation of SSI risk prediction tools, and the use of interventions such as sternal support devices and gentamicin impregnated sponges.

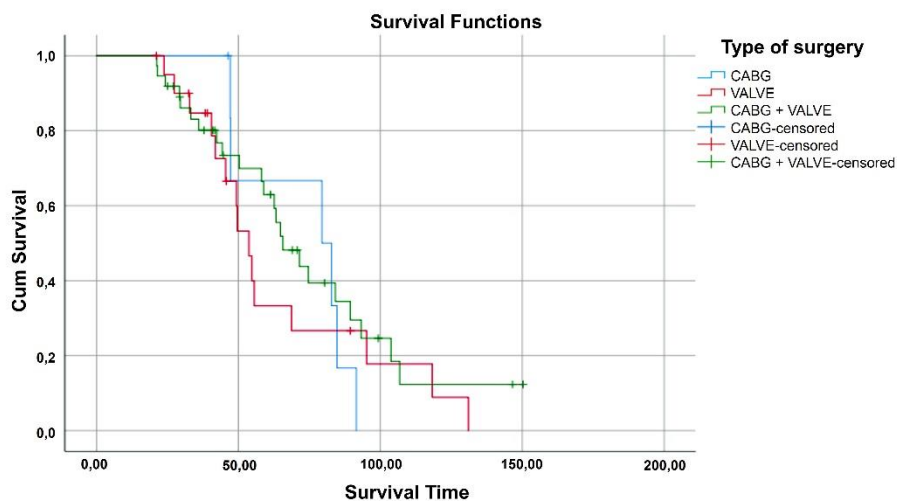
Conclusion

Measured variation in SSI prevention in cardiac centres across the UK and ROI is evidence of clinical uncertainty as to best practice, and has identified areas for quality improvement as well as knowledge gaps to be addressed by future research.

Cardiac Surgery in Nonagenarians: An Institutional 20-year Experience

Ripoll, B¹; Mwaura, L²; Valchanov, K²; Nashef, S²

¹Castle Hill; ²Royal Papworth Hospital



	Cardiac patients < 90 years
Total Number	19710
Mean age	68.7 years
Surgery type: CABG	8374
CABG and VALVE	7020
VALVE	7020
Mean Logistic EUROSCORE	9.14
Complications: Return to theatre (Bleeding)	5.5%
Post - operative Tracheostomy	1.6%
Hospital Length of Stay (Days)	10

Objectives

Few studies have reported on the long-term survival of nonagenarian patients following cardiac surgery. We conducted a retrospective analysis of 95 patients above 90 years of age, who had cardiac surgery performed over the past 20 years in our institution. We compared their survival and post-operative complication rates to that of patients less than 90 years who underwent surgery in our institution during the same time period.

Methods

We performed a retrospective analysis from a prospectively collected database of all nonagenarians who underwent open heart surgery over the past 20 years (1998-2018), stratified by the type of surgery performed. Survival analysis was done using SPSS and Kaplan Meier test. Comparison of survival was done by log rank statistics to detect a difference in probability of survival among the three groups.

Results

During the study period 95 nonagenarians had open heart surgery performed in our institution (Mean age 91.2yrs, range 90-96yrs). These patients made up 0.5% of our cardiac surgical population, with a higher mean logistic EuroSCORE 22.8 vs 9.14 for the younger patients.

Overall 8 patients died while in hospital, with a hospital mortality rate of 8.4% vs a mortality rate of 2.4% among the younger patients. Nonagenarians had a longer hospital length of stay and a higher rate of post-operative complications.

Among the 87 patients who were discharged, the 3-year survival rate was 32.3%. There was no statistically significant difference in survival depending on the type of surgery performed.

Conclusions

On the basis of symptomatic improvement, cardiac surgery among nonagenarians should continue to be performed. However, during decision making and resource allocation, it should be recognised that this patient group has a higher rate of peri-operative morbidity and mortality, with a low three-year survival rate.

Sternal Wound Microcirculation in Patients Undergoing Coronary Artery Graft and Aortic Valve Replacement Surgeries

Bhaskaran, P¹; Bhaskaran, I²; Aslam, M¹; Standfield, N¹; Gourlay, T³

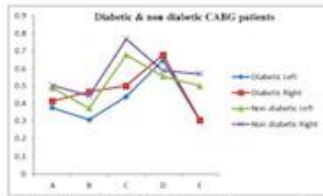
¹Hammersmith Hospital, Imperial College, London; ²Imperial College, London; ³Department of Biomedical Engineering, University of Strathclyde, Glasgow

Objectives

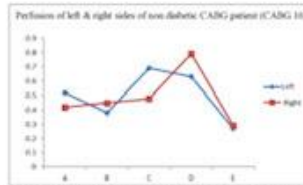
The vast majority of studies and clinical evidence proved the factors affecting sternal perfusion has a significant influence in managing delay in sternal wound healing and sternal wound infection with its complications. This study is based on the concept to deal with the complications affecting the sternal wound healing. We can manage and control the consequences of sternal wound complications by dealing with common risk factors. Diabetic Mellitus is a major systemic disease affecting microvasculature, peripheral neurons and immune system.

Method

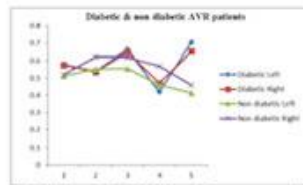
30 coronary artery bypass graft and 30 aortic valve replacement patients were recruited and divided equally into diabetic and non-diabetic groups. The moorLDI2 laser doppler cutaneous blood flow images of the sternum were taken 24 hours before the surgery, 2 hours after the surgery, 24 hours after the surgery, 48 hours after the surgery and 72 hours after the surgery. The demographics of participants include age, sex, smoker, hypertension and cholesterol level.



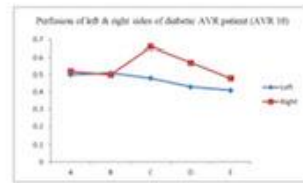
Graph 1. Mean of right & left side of sternum in diabetic & non-diabetic coronary artery bypass graft patients.



Graph 2. Perfusion of left and right sides of non-diabetic coronary artery bypass graft patient with sternal wound infection.



Graph 3. Mean of right & left side of sternum in diabetic & non-diabetic aortic valve replacement patients.



Graph 4. Perfusion of left and right sides of sternum in a diabetic aortic valve replacement patient with sternal wound infection.

Results

In coronary bypass patients, the trend in the perfusion showed the same pattern and the rate of perfusion was slower on the left side secondary to insufficient blood supply from left IMA. There was a statistically significant difference ($P < 0.05$) in skin perfusion in both diabetic and non-diabetic patients. There was no difference as expected between the left and right side in diabetic and non-diabetic patients undergone valvular heart surgery due to the absence of left an internal mammary artery harvest. One non-diabetic patient from coronary bypass and one diabetic patient from aortic valve replacement showed delayed perfusion throughout study period, complicated with SWI and treated with surgical debridement, VAC pump and antibiotics. This was caused by other risk factors and left IMA harvesting.

Conclusions

LDF laser doppler scanner can be used as a diagnostic and prognostic tool in the management of sternal wound care and its management.

The Development of Aortic Regurgitation during Continuous-Flow Left Ventricular Assist Device and the Impact on Right Ventricular Function

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¹Oxford University Hospitals Trust; ²Cambridge University Hospital; ³Papworth Hospital

We reviewed the development of aortic regurgitation (AR) following HeartWare left-ventricular-assist-device (HVAD) implant. We also evaluated the effects of HVAD on pulmonary capillary wedge pressure (PCWP), pulmonary arterial pressure (PAP), right atrial pressure (RAP) and cardiac index (CI).

All patients undergoing HVAD implant from October 2009 to March 2015 were included. Use of the Lavare cycle and optimisation of HVAD speed allowed left-ventricular unloading, aortic valve (AV) opening, and reduction of aortic root stasis. Echocardiography was performed pre-implant, within 6- and 12-months post-implant and then annually.

56 patients underwent HVAD implant (mean support duration of 560 days). 2 patients required bioprosthetic AV replacement at HVAD implant and 12 patients had mild AR but did not require AV replacement at LVAD implant. During support, 18 patients remained without AR or had resolution of mild AR. De novo AR developed in 33 patients (mild in 22 patients, moderate in 10 patients, severe in 1 patient). 3 patients progressed from mild to moderate AR and 1 from mild to severe.

Within 6 months post-HVAD, mean PAP decreased from 40.70mmHg to 22.73mmHg, PCWP from 27.98mmHg to 14.82mmHg, RAP from 12.85mmHg to 10.04mmHg and CI increased from 1.55 to 2.23L/min/m². These improvements were maintained at 12 months post-LVAD.

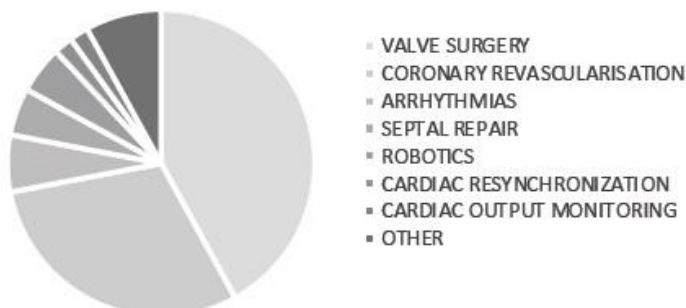
The incidence of AR during LVAD support is consistent with published literature and progresses with time. Despite the theoretical concern of this AR leading to raised PCWP, PAP and RAP, our results show that these pressures decrease whilst concurrently improving cardiac index post LVAD.

The 100 Most Influential Manuscripts in Minimally-Invasive Cardiac Surgery: A Bibliometric Analysis. A Potential New Tool for Research & Training

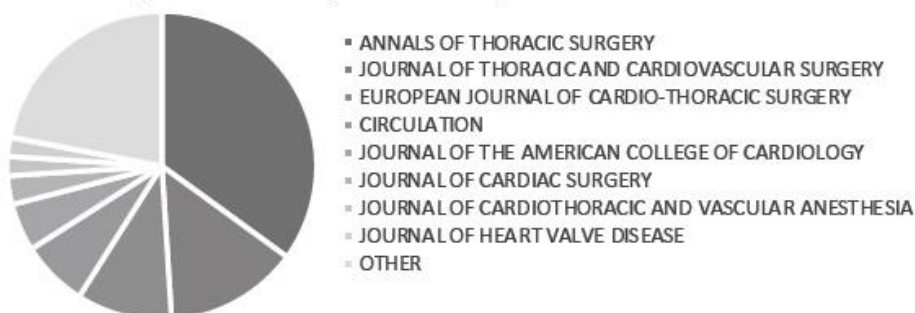
Karsan, R¹; Allen, R²; Powell, A³

¹Royal Victoria Hospital; ²Morrison Hospital; ³University Hospital Wales

Graph 1. Number of manuscripts relating to each topic



Graph 2. Journals from which the Top 100 Manuscripts are obtained.



Citations an article receives is considered a marker of influence. Cardiac Surgery has seen advances in approach to increasingly complex cases with a shift towards minimally invasive surgery. We conducted a bibliometric analysis of the top 100 sited manuscripts in Minimally-invasive Cardiac Surgery aiming to identify key topics and potential for future research.

Materials and Methods

The Thompson Reuters Web of Science database was searched using terms: [Minimal*AND Invasive*AND Cardiac*AND Surg*]. Identified papers were ranked by citation and reviewed by a panel of Cardiac Surgeons to recognise the 100 most relevant manuscripts. Further analysis was performed looking at subject, journal, institution and country.

Results

The search identified 2613 manuscripts. Of the top 100 papers, median citation number was 101(414-51). The most cited paper (414) by Lichtenstein et al. (2006) focused on transapical aortic valve implantation as an alternative to surgical aortic valve replacement in aortic stenosis patients. Annals of Thoracic Surgery published most papers, (n=35;3036 citations). Minimally-invasive valve and coronary artery bypass surgeries were the most frequented topics (n=42&30).

Conclusions

Valve and coronary artery bypass surgeries were the main area of focus within minimally-invasive cardiac surgery. This bibliometric analysis of the most influential publications and outlines what constitutes a citable article in minimally-invasive cardiac surgery.

Changes in Cardiac Surgery Outpatient Practice During the COVID-19 Pandemic - UK Experience

Adams, B¹; Kirmani, B²; Jagnathan, R³; Deglurkar, I⁴; Ngaage, D⁵; Kanani, M⁶; Acharya, M⁷; Ahmed, Y⁸; Oo, A¹; Sanders, J¹

¹St Bartholomew's Hospital; ²Liverpool Heart & Chest Hospital; ³Royal Victoria Hospital, Belfast; ⁴University Hospital of Wales; ⁵Hull Royal Infirmary; ⁶James Cook Hospital; ⁷University Hospitals of Leicester; ⁸Morrison Hospital, Swansea

Introduction

The COVID-19 pandemic posed a unique challenge to the provision of all cardiac surgery services in the UK, including the conduct of outpatient services. The pandemic offered an opportunity to both review current cardiac surgery outpatient pathways and examine the trends in management of cardiac surgery patients across the UK during this period.

Methods

Data was collected as part of a multi-centre prospective study for all patients booked for an outpatient consultation in cardiac surgery at eight units across the UK between 1 March 2020 and 26 July 2020. A prospective database of total outpatient visits was kept during this time period, including the number of new and follow-up patients, conduct of the consultation (for example face-to-face, telephone or video clinic) and the outcome of each consultation.

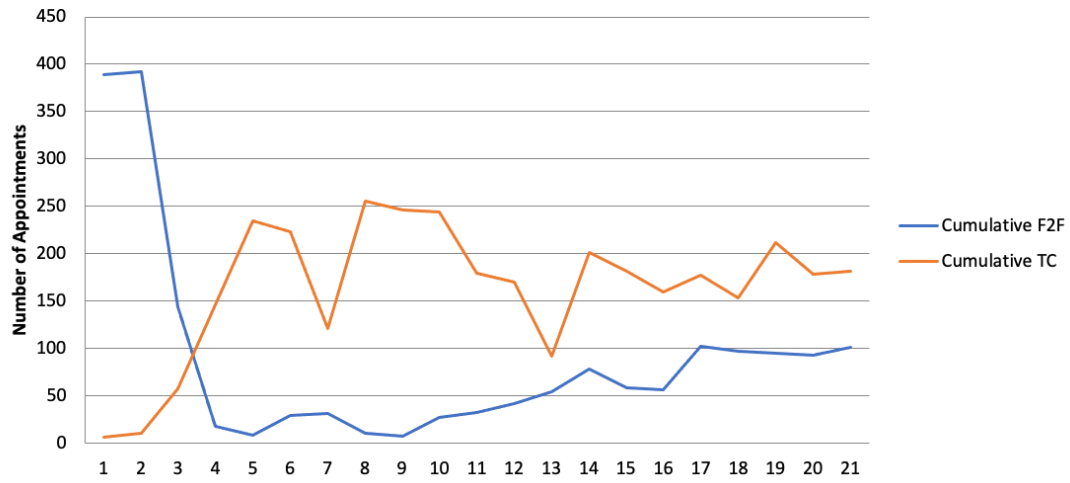
Results

Between 1 March 2020 and 26 July 2020, there were 4632 cardiac surgery outpatient appointments scheduled across the study centres, of which 3095 were completed (20% cancellation rate). During the study period, there were 1324 face-to-face consultations (28.6%), 2641 telephone consultations (57%) and 31 video consultations (0.7%). At the inflection point of lockdown, there was a dramatic shift from 93% face-to-face consultations to 92% of consultations being conducted via telephone in the seven weeks that followed lockdown on 23 March 2020 (See Figure 1). There was then a steady rise in face-to-face consultations as the UK eased out of lockdown in phases, plateauing at around 25% of pre-pandemic levels with telephone clinics maintained.

Conclusions

As the UK went into lockdown with the COVID-19 pandemic, face-to-face outpatient consultations were effectively converted to telephone consultations which was maintained for the first seven weeks of lockdown. As the UK eased out of restrictions, face-to-face consultations began rising again reaching 25% of pre-pandemic levels.

Trends of Cumulative Face-to-Face (F2F) and Telephone Clinic (TC) Appointments During the COVID-19 Pandemic in the UK (X-Axis = weeks from 1 March 2020 with week 3 = 23 March 2020)



Predicting AKI in Cardiac Surgery Patients Using [TIMP2]*[IGFBP7] -- Novel Biomarkers (NephroCheck Study)

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¹Department of Cardiac Surgery, St. George's University Hospital.; ²Cardiac Intensive Care Unit, St. George's University Hospital

Background

Acute kidney injury (AKI) is a known complication after cardiac surgery which occurs in up to 35% of patients, from which, approximately 2% to 5% require renal replacement therapy. The NephroCheck (NC) test uses tissue inhibitor of metalloproteinases-2 and insulin-like growth factor-binding protein 7 [TIMP-2]*[IGFBP7] to predict AKI at the asymptomatic phase. We aimed to use NephroCheck test to detect early AKI in cardiac surgery patients.

Methods

This is a single centred prospective cohort observational study, which was carried out over an 8-week period. Patients with pre-existing CKD were excluded. Patients who underwent onpump cardiac surgery, received NC test, at 0,6 and after 18 hours of admission to cardiac ITU. NC test done at 18 hours accurately predicted AKI and other significant clinical events. NC 'Assute 140' point of care testing system was used in this study. During the 8 weeks study period, a total of 51 patients were included. The results were interpreted as high (>0.3), low (<0.3) and managed accordingly to local AKI management protocol.

Results

46 out of 51 patients had valid NC test results (high >0.3 n=19 and 9, low <0.3 n=27) and invalid n=5). AKI was diagnosed in 9 patients with high NC results and 1 patient with low NC result developed AKI. Two (4%) of our AKI patients (within this cohort with AKI and high NC) received temporary haemofiltration. 4 out of 46 patients (with high >0.3 NC results) required re-admission to CITU with sepsis. Three patients with high NC developed chest infection. Other two (4%) high NC test patients required re-opening for bleeding. Asymptomatic AKI patients with high NC results were closely monitored in the ward, until AKI was resolved.

Conclusion

NephroCheck is a useful test to identify patients at risk of AKI and sepsis. This can be used to triage and fast track the patients after cardiac surgery. Incorporating NC test into the local AKI management protocol, will help to enhance the patient's recovery.

A Successful Model for Urgent Adult Cardiac Surgery: Improving Efficiency in Referral Throughout the COVID-19 Pandemic

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Freeman Hospital

Introduction

All major cardiothoracic centres in the United Kingdom provide tertiary care to a number of major regional hospitals in their proximity. The time between referral and surgery is often long leaving the patients frustrated and puts pressure on NHS resources. The referral process is made even more complex by the COVID 19 Pandemic. We assessed the influence of a consultant-led urgent cardiac surgery service on the efficiency of referral process.

Method

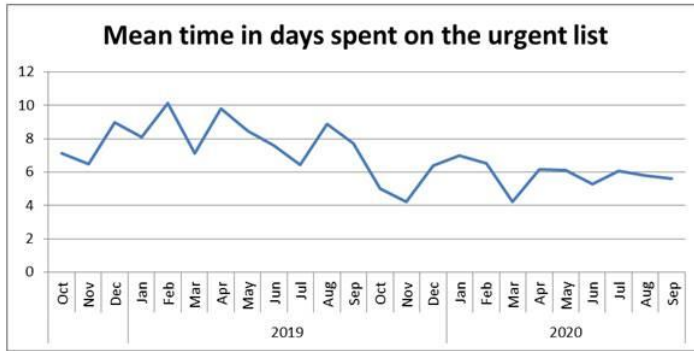
This is a single institution part prospective observational study as part of a service evaluation and sustainability assessment. Consecutive urgently referred adult cardiac surgical patients were studied before and after the national lockdown in March 2020 and simultaneous introduction of a new consultant-led service. A designated consultant surgeon took the lead as part of a team of nursing and clerical staff. The efficiency of the service was measured by calculating the days between the formal referral and date of cardiac surgery. The patterns of referrals were also studied.

Results

604 urgent patients were treated in the two-year period between October 2018 and October 2020. The graph shows the mean time in days spent on the urgent list. As a result of the change in the organisational infrastructure there was an improvement in the process of referral which in turn significantly reduced the time taken for the patient to wait for surgery from an average of 7.5 days (SD = 3.3) before to 5.5 days (SD = 3.0) after, despite the COVID-19 Pandemic and a steep increase in the number of urgent referrals.

Conclusion

This model of urgent cardiac surgery service allows prompt assessment and a decision as to the need for urgent transfer for cardiac surgery. This system proved successful during the COVID-19 pandemic by maintaining throughput of patients.



Rates of Complications Post Cardiothoracic Surgery in Octogenarians

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University Hospital of Wales

The population within the UK continues to age, bringing with it the challenges of treating and rehabilitating potentially frail and medically complex patients.

Cardiothoracic services are evolving to manage these demands, but relatively little is known about octogenarian rehabilitative capacities nor the physiological strains they experience post cardiac surgery.

Here we describe the experience of our unit in managing our older cohort. Those octogenarians who had undergone cardiothoracic procedures between January 2017 and 2018 had their notes examined to determine post-operative complications. All patients had been through an extensive MDT discussion prior to being listed for surgery.

34% of these patients went into acute kidney injury (AKI) postoperatively (as defined by RIFLE criteria), 9% of patients 80 years and over required renal replacement postoperatively and 14% of patients had impaired creatinine clearance at 25 days (creatinine at 1.5x or above compared to their preoperative baseline). These results appear to peak at day 2 (29% AKI) and later again around day 25.

Other post-operative complications included: atrial fibrillation 28%; chest infection 15%; wound infection (leg and sternum combined) 15%; and pacemaker insertion 6%.

As expected for this group of patients, there were also cases of urinary tract infections, reopening of sternal sutures, pericardial effusions and delirium.

Average length of stay in the Cardiac Intensive Care for the entire cohort was 17.9 days. For single valve replacements this was 17.2 days, for CABG alone 19.1 days and for combined CABG and valve replacement 18.6 days. 30-day mortality was 4.65%.

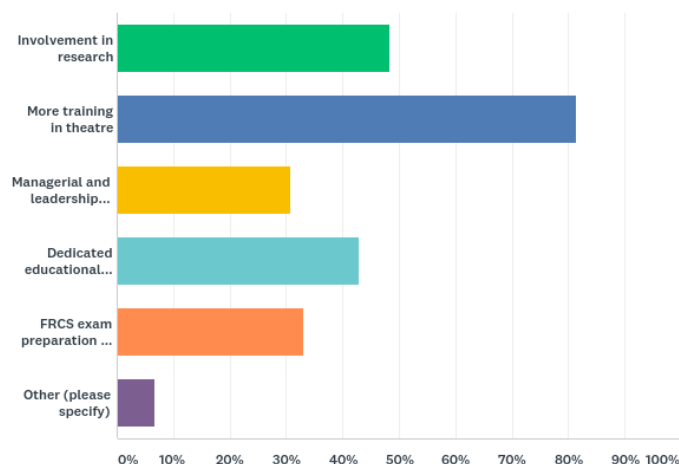
The majority of patients were back at their baseline or better at 1 year follow up, suggesting that with careful evaluation, octogenarians can still be considered for cardiothoracic intervention, but are likely to have protracted recovery phases and an increased rate of complications which should be discussed as part of the consent process.

SAS Doctors and Clinical Fellows Satisfaction with Cardiothoracic Training and Career Progression in the UK

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Q9 What aspect(s) of training would you like to improve on further in your current placement?
(You are allowed up to 3 choices)



Background

There are over 250 Cardiothoracic Specialist doctors and associate specialists (SAS) and clinical fellow doctors who are not enrolled into a UK national training program, however, their contribution to patient care and the speciality is crucial. The SCTS initiated courses, scholarships and support for non-NTN fellows over the past few years, a well-received initiative. This survey aims to assess fellows views on their training and career progression within the speciality and to underpin any shortcomings in the process of supporting non-NTN fellows.

Methods

The survey was powered by SurveyMonkey and was open for about 4 months (July 2019 – October 2019). It consisted of 10 questions encompassing four main domains: operating theatre training, research and teaching, Certificate of eligibility for specialist registration (CESR) application and career progression, and access to professional development. Likert scale was used to rate the respondent answers, ranging from 'strongly disagree' to 'strongly agree' (1 to 5).

Results

There were 91 responses in total (approximately 36% response rate).

Over 70% of the respondents are SCTS members and have an ISCP account. 64% applied or plan to apply for CESR and 40% think they have enough support to achieve specialist through the CESR pathway. Approximately a third of the respondents were satisfied or very satisfied while 40% were dissatisfied or very dissatisfied with overall training opportunities in their current placement. 70% had access to funding for study leaves. Other findings are summarised in figure 1.

Conclusion

We showed that there are many areas of improvement in the training and career progression of cardiothoracic fellows (non-NTN's). It needs a sustained effort to implement changes.

Cardiothoracic Surgery in the Midst of a Pandemic: Operative Outcomes and Maintaining a COVID-19-free Environment

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St Bartholomew's Hospital

Objective

In the United Kingdom, the COVID-19 pandemic has led to the cessation of elective surgery. However, there remains a need to provide urgent and emergency cardiac and thoracic surgery as well as to continue time-critical thoracic cancer surgery. This study describes our early experience of implementing a protocol to safely deliver major cardiac and thoracic surgery in the midst of the pandemic.

Methods

Data on all patients undergoing cardiothoracic surgery at a single tertiary referral centre in London was prospectively collated during the first 7 weeks of lockdown in the United Kingdom. A comprehensive protocol was implemented to maintain a COVID-19 free environment including the pre-operative screening of all patients, the use of full personal protective equipment in areas with aerosol generating procedures, and separate treatment pathways for patients with and without the virus.

Results

A total of 156 patients underwent major cardiac and thoracic surgery over the study period. Operative mortality was 9% in the cardiac patients and 1.4% in thoracic patients. The pre-operative COVID-19 protocol implemented resulted in 18 patients testing positive for COVID-19 infection and 13 patients having their surgery delayed. No patients who were negative for COVID-19 infection on pre-operative screening tested positive post-operatively. However, one thoracic patient tested positive on intra-operative broncho-alveolar lavage.

Conclusion

Our early experience demonstrates that it is possible to perform major cardiac and thoracic surgery with low operative mortality and zero development of post-operative COVID-19 infection.

Median Sternotomy – Is it Really That Bad in the Era of Minimally Invasive Surgery

Diyab, Y; Chilvers, N; Birla, R; Clark, S

Freeman Hospital

Introduction

With modern standards of analgesia, early mobilisation/discharge and rehabilitation we studied patient outcome from the median sternotomy incision in contemporary practice.

Results

170 patients who had conventional sternotomy were evaluated 6 weeks following discharge. 3 patients (1.7%) had developed wound sinuses. There were no deep sternal wound infections. 1.2% had GP prescribed antibiotics for wound inflammation but no positive cultures. 89% (151) were taking no analgesia at review. 9% (15) took Paracetamol at night before retiring. 2% required ongoing regular Paracetamol. No patients took stronger analgesics.

Median distance walked per day was 2.2 miles (0.5-5.2). 90% (153) of patients had attended a mean of 3 local rehabilitation classes by 6 weeks. 100% were active on both treadmill and exercise bike. 50% were swimming. 85% were at least very satisfied with the cosmetic outcome.

Conclusions

Sternotomy is viewed with horror by cardiologists and minimally invasive surgeons. But sternotomy in the modern era is associated with very high levels of acceptability. and the vast majority take no analgesia by 6 weeks. Complication rates are low and physical activity is high within a short time frame. Perhaps it really is not as bad as many believe.

Please Note that this abstract has been accepted as a poster presentation on 2020 SCTS meeting which has been cancelled. It has been presented on EACTS 2020 as an international presentation and is allowed to be presented at a national meeting.

Pulmonary Function Tests in Patients Undergoing Cardiac Surgery: A Pointless Exercise?

Diyab, Y; Bayliss, C; Chilvers, N; Booth, K

Freeman Hospital

Introduction

Performing pulmonary function tests (PFTs) is a common practice in preassessment prior to cardiac surgery. However, recent NICE guidelines do not recommend performing PFTs routinely for cardiac surgery.

Method

Data from 100 patients undergoing cardiac surgery was retrospectively reviewed. History of respiratory disease, PFTs and outcomes after surgery were reviewed.

Results

9 patients had pre-existing respiratory disease. Only four patients had an FEV1/FVC ratio <0.7 , all of which were extubated within 24 hours. 96 patients had an FEV1/FVC >0.7 , five of which were ventilated for more than 24 hours.

There were two deaths in the study (one with normal lung function and one with an FEV1/FVC ratio <0.7). Both deaths were from multi-organ failure, neither of which were attributable to respiratory disease.

Conclusion

This study has identified that performing PFTs is common prior to cardiac surgery. However, the majority of patients undergoing surgery have good lung function. PFTs were not predictive of prolonged ventilation or mortality post-operatively in this sample of patients.

It appears that, in line with current NICE guidance, routine PFTs prior to cardiac surgery are not worthwhile and routine use of this resource should be avoided.

**Please note this abstract was accepted for poster presentation on 2020 SCTS which was cancelled

First Reported Series Comparing Single Wire vs Double Wire Closure of Sternotomy After Cardiac Surgery

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Background

The sternum can be closed following sternotomy with either Single wire (SW) or Double wire (DW) steel loops. The aim of this study was to compare clinical outcomes between SW or DW closure of sternotomy wound after cardiac surgery.

Methods

Data was collected from two cohorts; SW group between January 2009-December 2011 and a DW group between January 2016-June 2018. Study endpoints included superficial wound infections (SSWI) and deep sternal wound infections (DSWI). Chi-square test and logistic regression analysis was done using SPSS 25.

Results

Among 4233 adult patients, SW group had 2357 patients and DW group had 1965 patients. The SW group had a 1.5% rate for SSWI and 1.3% for DSWI whereas the DW group had more infections, with 2.7% for SSWI and 3.1% for DSWI ($p=0.001$, OR=2.4 C.I. 1.5-3.8). Logistic regression analysis for SSWI depicted that DW Group ($p<0.0001$, OR=2.75 C.I. 1.7-4.6) and Diabetes ($p=0.002$, OR=1.4 C.I. 1.1-1.8) were independent risk factors and DSWI showed that DW Group ($p=0.007$, OR=2.2 C.I. 1.2-3.8), EuroSCORE ($p=0.008$, OR=2.75 C.I. 1.0-1.1) and Hospital stay ($p=0.001$, OR=1.0 C.I. 1.01-1.03) were independent risk factors. The DSWI group carried an increase 1-year mortality (9.1% vs 3.7%, $p=0.009$), longer hospital stay (22 vs 8 days, $p<0.0001$) and longer ITU time (5.4 vs 3.0 hours, $p<0.0001$).

Conclusion

This is the first reported series comparing SW with DW for sternal closure. Our results suggest that using DW may lead to more infection rates compared to SW. A randomized control trial is required to validate our findings.

Role of Preoperative Steroids in Reducing Postoperative Atrial Fibrillation After Cardiac Surgery

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¹Good Hope Hospital, University Hospitals Birmingham; ²Royal Papworth Hospital NHS Foundation Trust

Introduction

Atrial fibrillation (AF) is the most common postoperative arrhythmia in cardiac surgery. The current guidelines do not recommend prophylactic corticosteroids, despite evidence from numerous trials supporting its use.

Aim

To determine the effect of prophylactic steroids on postoperative atrial fibrillation (POAF) in a single specialist cardiac surgical centre.

Methods

Electronic records of all cardiac surgeries performed between 1st April 2018 and 31st March 2019 were retrospectively analysed. Those with chronic AF were excluded. Information on steroid use was blinded until collection had been completed. Chi² testing and multivariate regression models were constructed to determine the impact of POAF on hospital stay and variation according to surgeon.

Results

1674 cardiac surgeries performed by fifteen surgeons were perused and 1392 were included in the analysis. The rate of POAF was 30.1%. Those with POAF were significantly older, had higher logistic EuroSCORE and a significantly longer hospital stay ($p < 0.0001$). Of the fifteen surgeons, only one routinely used prophylactic steroids and recorded the lowest rate of POAF (23.3%). Despite the significant associations of higher age and EuroSCOREs with POAF, the surgeon in question reported the oldest median age (72.9 years) and highest median EuroSCORE (7). The absolute risk reduction was 8.1%, with a number needed to treat of 12.3.

Conclusions

There is a possible role for the routine use of corticosteroids to reduce the risk of POAF, potentially able to overcome the effect of its predisposing risk factors.

Objective Outcomes of Simulation in Coronary Anastomosis

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Objectives

Simulation-based vascular training is employed by surgical training bodies, but its effectiveness remain unclear. A systematic review and meta-analysis were performed to analyse objective outcomes of simulation in coronary anastomosis proficiency as regards time and skills score.

Methods

EMBASE and PUBMED were searched for articles published prior to October 10th 2020, using the terms "coronary anastomosis simulation," "vascular anastomosis simulation" and "anastomosis simulation." All studies in which end-to-side coronary anastomosis simulation in comparison to no intervention (i.e. prior simulation training) were included. Study selection and data abstraction were performed independently and in duplicate. Meta-analysis was performed using RevMan, version 5.3 (Cochrane Library).

Results

From an initial pool of 4972 articles, twenty articles evaluating the use of simulation in teaching coronary anastomosis were identified, analysing 141 subjects performing coronary anastomosis on high and low-fidelity models. Eleven trials evaluated improvement in time and eighteen trials evaluated performance using an objective surgical evaluation score. In comparison with no formal simulation training, simulation was associated with improved skill and time. Certain skills improved significantly while others did not.

Conclusion

Simulation improves competency in anastomosis performance (1). Further studies to assess when trainees should progress to live operating from simulation would be beneficial.

References:

1. Fann JI, Calhoon JH, Carpenter AJ, Merrill WH, Brown JW, Poston RS, Kalani M, Murray GF, Hicks Jr GL, Feins RH. Simulation in coronary artery anastomosis early in cardiothoracic surgical residency training: the Boot Camp experience. *The Journal of thoracic and cardiovascular surgery*. 2010 May 1;139(5):1275-81.

Are Central Venous Catheters Adequately Being Removed Post Cardiac Surgery?

Surendran, A

UHCW

Objective

Complications with Central Venous Catheters (CVC) post cardiac surgery is a reported phenomenon. One of them being CVC associated bloodstream infections (CVCABI). In the US, 250,000 CVC associated bloodstream infections (CVCABI) have been reported per year with 18% increase in mortality, 13 day increase in ICU length of stay and costing \$45,000 in care.

At Kings College Hospital (KCH), three CVCABI has been reported since 2019 due to the CVC staying insitu for too long. Currently, no formal UK guidelines exist for CVC removal post cardiac surgery to avoid such issue. We devised a study at King's College Hospital (KCH) that could allow us to create a protocol in reducing/preventing CVC complications.

Methods

Prospective study undertaken in CRU, HDU & ward. All cardiac patients undergoing elective, urgent and emergency surgery were included. All patients with CVC line were analysed to see how long the CVC were left in situ, if they are being kept in and used for the right reasons. We also noted patients' inflammatory markers and temperature to determine if any patents had suffered with CVCABI.

Results

Study showed 46% of patients still had their CVC in situ 3.4 days (mean) post-operatively. For 27% of these patients, the CVC were being used appropriately. For others, they were no indications as to why CVC should stay in. 18% of patients, no documentation or care-plan had been put in place for safe removal of CVC. Statical analysis further showed 6.8 % of patients suffered with an inflammatory response as a result. This is statistically significant in determining if CVC associated complications affect patient safety.

Conclusion

Study revealed scope for improvement in practice that could lead to better patient care. We devised a CVC bundle and protocol to implement standard guidelines for Doctors and Nurse at KCH that been clinically successful. We aim to publish these guidelines nationally to improve CVC related complications.

Use of Novel Oral Anticoagulants After Cardiac Surgery: A Retrospective Study

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¹Guy's and St. Thomas' NHS Foundation Trust; ²Basildon and Thurrock University Hospital

Objectives

Aim of this study is to compare the incidence of re-admission and/or re-exploration for significant pericardial effusion, in a cohort of patients underwent cardiac surgery and commenced on warfarin versus those patients for which a novel oral anticoagulant (NOAC) was used.

Methods

From July 2016 to July 2018, all the patients discharged on oral anticoagulant medications (Warfarin or NOAC) were rolled, retrospectively, in the study. The cohort was constituted by 382 patients (mean age 70±11.2 years, female 119.3%); 260 (68.1%) were discharged on Warfarin and 122 (31.9%) were discharged on NOAC. All the patients did not have any pre-operatively bleeding disorders.

Results

The overall rate of in-hospital re-exploration was 4.4% (n=17); seven of those patients underwent surgical drainage for cardiac tamponade (1.8%, mean postoperative day: 13±4.5). In this group, only one patient was commenced on NOAC and the remnant six patients were on warfarin with a median value of international normalized ratio (INR) of 1.4 (IQR: 1.2-2.6, range: 1.1-4.4), at the time of re-exploration: a greater value of INR correlated with the amount of effusion drained (median: 800 ml, IQR: 400-1250), but this was not statistically significant. The incidence of re-admission, after discharge, for significant pericardial effusion was 1.8% (n=7, median postoperative day 11, IQR: 7.5-99): all the patients, except one, underwent surgical re-exploration. Three of those patients were on NOAC (Apixaban=2, Rivaroxaban=1) and the remnant four patients were on Warfarin (median INR 2.2, IQR: 1.7-3.4, range 1.3-5.6); the peak of INR coincided with the admission date and it correlated to the amount of effusion drained (median: 800 ml, IQR: 750-1100).

Conclusions

The use of a NOAC, after cardiac surgery, does not correlate with a greater incidence of haemorrhagic events and it seems to be a safe and valid alternative to warfarin. Further research is required to evaluate the long-term outcomes.

Failure to Rescue – A New Measure of Quality in Cardiothoracic Surgery?

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¹University Hospital Coventry and Warwickshire; ²Milton Keynes University Hospital

Objective

Failure to rescue (FTR) is defined as mortality amongst hospitalised patients who develop an adverse outcome, such as postoperative complications. This study aims to systematically review literature discussing FTR in cardiothoracic surgery (CTS) to discern if there is a consensual correlation between hospital or patient characteristics and an increased FTR rate in CTS.

Methods

An electronic database search using keywords was conducted through PubMed, Ovid, Cochrane, and Elsevier, to identify articles that discuss FTR in adult cardiac and thoracic surgery.

Results

Of the 123 citations yielded in the database search, 14 studies met our criteria. 10 of these are cohort studies, one is a prospective study, and two are retrospective studies. Three studies regarding cardiac surgery and five on thoracic surgery agreed that FTR rates varied significantly between high and low mortality centres, whilst complication rates did not. There were discrepancies regarding hospital volume and FTR; two studies found an inverse relationship, and one did not. Some quality improvement initiatives did not affect FTR, despite decreasing mortality, whilst perioperative physiotherapy, and thoracic residency programs, demonstrated a lowered risk of FTR.

Conclusion

FTR has been suggested as a universal indicator for quality of care, however, patient-dependent and procedural factors within a unit appear to influence it. Hence, FTR should not be used as a sole measure in assessing hospital performance. Further large-scale studies and randomised control trials are required to identify more factors in guiding interventions to improve FTR.

Permanent Pacemaker Implantation Following Cardiac Surgery: Risk Factors and Trends Over 20 Years

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Castle Hill Hospital, Cottingham

Background

The risk of permanent pacemaker implantation (PPMI) following cardiac surgery is debatable. We report our experience over 20 years to the current era.

Methods

We performed a retrospective review of 17650 patients who underwent cardiac-surgery between 1999 and 2020, excluding patients with preoperative complete heart block and sutureless valves, and identified those who had PPM in hospital. Mean age was 66 +/- 10 years, 73% were male. CABG was performed in 10397 (59%), isolated aortic valve replacement (AVR) in 1863 (11%), and isolated mitral surgery in 318 (2%).

Results

328 patients (1.9%) required PPMI after surgery. The rates following isolated CABG, AVR and Mitral valve surgery were 0.8%, 3.5% and 3.1% respectively. The overall rate was 1.5% in 1999-2006, 2.3% in 2007-2013 and 1.8% in 2014-2020. Predictors for PPMI included; age above 65 years (OR 1.4, P=0.01), Chronic Kidney disease (OR 2.4,P<0.01), AVR (OR 2.0, P<0.01).

Conclusions

The risk of PPMI following cardiac surgery has not changed remarkably over the past two decades; remains low after CABG but not insignificant after valvular surgery.

	No PPMI	PPMI	P Value		No PPMI	PPMI	P Value
Number of patients	17322	328		Number of procedures			
Age >65	58.00%	65.90%	0.01	CABG only	10850	84	
Mean Body mass index (kg/m ²)	28.4 ± 4.8	27.7 ± 4.7	0.003	AVR	1802	63	1.64E-37
COPD (%)	11.9	10.3	0.4	CABG + AVR	1598	60	
Hypertension (%)	66.4	59.5	0.004	Others	3400	121	
Diabetes (%)	21.3	18	0.15	Logistic Euroscore	5.94 ± 8.85	10.54 ± 11.74	1.52E-20
CKD (%)	2.1	4.9	0.0007	Preoperative Sinus Rhythm (%)	86	62.8	
Bypass time (Minutes)	79.6 ± 39.6	92.1 ± 42.9	1.11E-08	Preoperative Atrial fibrillation / flutter (%)	12.6	24.4	0.0006963
Cross clamp time (Minutes)	43.3 ± 33.7	61.6 ± 38.4	3.33E-15	Preoperative VT/VF (%)	0.6	8.8	

Table 1: Patients' Characteristics: COPD = Chronic obstructive pulmonary disease, CKD = Chronic kidney disease, LVEF = left ventricular ejection fraction, VT/VF = ventricular tachycardia/fibrillation CABG = coronary artery bypass grafts, AVR = aortic valve replacement.

The Impact of the Covid-19 Pandemic on Operative Experience for Cardiothoracic Surgery Trainees

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Manchester University NHS Foundation Trust, Wythenshawe Hospital

Background

The Covid pandemic has led to a reduction in elective operating as well as the introduction of skin-to-skin consultant operating in some units to minimise time spent in restrictive protective personal equipment (PPE). Our aim was to analyse the impact of these events on trainee operative experience.

Methods

A single-centre retrospective review of all major cardiac and thoracic cases performed between April and September 2020 was undertaken. Mean risk prediction scores, in-hospital mortality and post-operative length of stay (PLOS) for consultant vs trainee first operator (FO) cases were compared using appropriate statistical tests.

Results

475 major cases were performed during the study period (cardiac n=292, thoracic n=183). 11.6% (n=55) were trainee FO cases (cardiac 12.7% [n=37], thoracic 9.8% [n=18]). A further 14.1% (n=67) were non-consultant non-trainee clinicians FO cases (cardiac 2.1% [n=6] and thoracic 33.3% [n=61]). For consultant vs trainee FO in cardiac surgery, mean (\pm standard deviation [SD]) logistic EuroSCORE was 7.4% (\pm 9.5%) vs 4.7% (\pm 4.0%) ($p=0.003$), in-hospital mortality was 1.3% (n=3) vs 0% (n=0) ($p=0.492$) and median (\pm interquartile range [IQR]) PLOS was 7.0 days (\pm 5.0-10.0 days) vs 6.0 days (\pm 5.0-9.0 days) ($p=0.099$). For consultant vs trainee FO in thoracic surgery, mean (\pm SD) Thoracoscore was 2.6% (\pm 1.7%) vs 2.4% (\pm 1.4%) ($p=0.602$) and median (\pm IQR) PLOS was 4.0 days (\pm 2.8-5.5 days) vs 4.0 days (\pm 3.0-6.0 days) ($p=0.536$). There were no in-hospital deaths.

Conclusion

As expected, the total number of cases, as well as the proportion performed by trainees, was reduced during this period. Nevertheless, trainees were still able to perform cases and indeed the overall number of non-consultant FO cases was in excess of 25%. There was no significant difference in short-term mortality and PLOS for consultant and trainee FO cases, demonstrating that trainees are still able to safely perform cases despite the current circumstances.

Direct Axillary Artery Cannulation for Aortic and Redo Surgery: Operative Aspects (Video)

Shahjahan, S; Page, A; DeSilva, R

Royal Papworth Hospital

Concomitant AF Ablation During Cardiac Surgery: Are we Doing Enough and are we Selecting the Right Patients?

Mistirian, A; Shafi, A; Jasionowska, S; Rory Fergus Louis, H; Awad, W

Barts Health NHS Trust

Objective

Guidelines recommend concomitant atrial fibrillation (AF) surgery to restore sinus rhythm, improve symptoms and outcomes. We determined to what extent patients with AF undergoing cardiac surgery at our Institute received a concomitant AF procedure, procedures undertaken, and if early patient outcomes were improved.

Methods

Retrospective review of 2984 patients undergoing cardiac surgery at our Institute between June 2017 and Jan 2019. Patients who were in pre-operative AF were identified and those undergoing a concomitant AF procedure (Group 1) were compared with those who did not (Group 2), with respect to patient characteristics, surgical procedure performed, post-operative complications, hospital stay and early outcomes.

Results

313 (10.5%) patients had pre-operative AF; paroxysmal (19.5%), persistent (11.8%), longstanding (14.3%), permanent (48.6%), unknown (5.8%). 116/313 (37.1%) had a concomitant AF procedure: 92 (79.3%) LAA occlusion, 22 (19%) ≥ 2 procedures and 2 (1.7%) PV isolation. Group 2 patients were higher risk vs Group 1 with CRF (18.8% vs 8.6%), pulmonary hypertension (17.3% vs 7.3%), poor LV function (6.1% vs 1.9%) and redo surgery (8.9% vs 0.6%). Procedures performed with concomitant AF surgery: isolated valve replacement/repair (39.7%), double/triple valve surgery (26.7%), isolated CABG (10.3%) and mixed procedures (23.3%). Only 11.4% patients with paroxysmal/persistent AF (of which 38.9% had a LA < 55 mm) underwent concomitant AF procedures. Group 2 vs Group 1 in-hospital mortality was 10.6% vs 2.6%, and mean hospital LOS 16.6 ± 19 vs 11.9 ± 6 days ($p=0.01$). Readmissions, PPM insertion, cerebral events, AF at discharge or follow-up were similar.

Conclusions

Higher in-hospital mortality and longer hospital LOS in Group 2 is probably related to a higher risk patient cohort than not undergoing concomitant AF ablation. Better patient selection and a more complete AF treatment strategy may allow concomitant AF surgery to be offered to those patients most likely to benefit.

Informed Consent: Documentation of Patient's Preference of Type of Valve Used During Cardiac Surgery – Adequate or Inadequate?

Shafi, A; Mujahid, K; Savarimuthu, S; Usman, H; Ali, H; Gupta, P; Saleki, M; Rossi, A; Roberts, N

St Bartholomew's Hospital

Objectives

Valvular heart surgery requires the implantation of either a tissue or mechanical valve when valve replacement is undertaken. Both have their benefits and risks respective to the patient. However, patients may choose a different valve to what is the recommended choice due to either ethical/religious or occupational reasons. We aimed to assess if clear documentation of patient's preference was performed.

Methods

A completed audit cycle was performed looking at all patients consented for any cardiac procedure where a valve replacement was mentioned on the consent form. Only patients that had signed a consent form 1 were included. We looked at two time periods (October 2018 – January 2019) and (April – July 2019) with the initial results presented at the local audit meeting as an educational tool to raise awareness of the need for clear documentation.

Results

A total of 181 consent forms were analysed (111 during the first and 70 in the second time-period). Of which 54/111 (48.6%) had documented patients preference with 44 (39.6%) documented on the consent form with a further 10 (9%) documented online, in the first period. In the second period, a total of 34/70 (48.6%) had it documented on the consent form.

Conclusions

Despite discussion of the types of valve's available for valvular cardiac surgery, it is often not clearly documented the patient's preference following the discussion, whether this be on the clinic letter, online documentation or consent forms. Patient autonomy should be clearly documented and the patient explained that in the case that their preference is not possible intra-operatively due to technical issues then the surgeon will act in the patient's best interest. Education among surgical trainees is needed to ensure adequate documentation and that the appropriate conversation take place during the consultation to explain that if the patient's choice is not possible, that the understand alternative valve will be used.

Informed Consent: Documentation of the Risk of Mycobacterium Chimaera Following Cardiac Surgery – Adequate or Inadequate?

Shafi, A; Mujahid, K; Savarimuthu, S; Usman, H; Ali, H; Gupta, P; Saleki, M; Rossi, A; Roberts, N

St Bartholomew's Hospital

Objectives

Cardiac surgery is a major operative procedure that provides prognostic benefit to patients. However, it is associated with risks that should be clearly discussed with the patient and documented. Public Health England has reported the estimated risk of developing mycobacterium chimaera in the highest risk group being valvular procedures, as 1 case per 5,000 procedures. We aimed to assess if the risks are clearly explained to the patient and documented.

Methods

A completed audit cycle was performed looking at all patients consented for any cardiac procedure where a valve replacement was mentioned on the consent form. Only patients that had signed a consent form 1 were included. We looked at two time periods (October 2018-January 2019) and (April–July 2019) with the initial results presented at the local audit meeting as an educational tool to raise awareness of the need for clear documentation.

Results

A total of 181 consent forms were analysed (111 during the first and 70 in the second time period). Of which 56/111 (50%) had documented mycobacterium chimaera as a risk of surgery on the consent form, in the first period and 42/70 (60%) in the second period. Other complications discussed included death 111/111 (100%) vs 70/70 (100%), stroke 111/111 (100%) vs 68/70 (97.1%), infection 102/111 (90.1%) vs 60/70 (85.7%), bleeding 102/111 (90.1%) vs 65/70 (92.9%) and arrhythmia 77/111 (69.4%) vs 52/70 (74.3%). Patients were also consented for possible further intervention including permanent pacemaker 95/111(85.6%) vs 61/70 (87.1%), and the need for resternotomy 66/111 (59.5%) vs 53/70 (75.7%).

Conclusions

Despite the risk of developing mycobacterium chimaera being low, the associated mortality with developing this infection has been reported to be 50% of patients requiring redo cardiac surgery. It is therefore important that risks are clearly explained to the patient. Furthermore, trainee education is needed and standardised consent forms may ensure risks are clearly explained.

Prolonged Pre-Operative Length of Hospital Stay for Cardiac Surgery – Inefficiency or Necessity?

Shafi, A; Atieh, A; Awad, W

St Bartholomew's Hospital

Objectives

Length of hospital stay is mainly determined by patient-related factors, complexity of surgery, development of post-operative complications and various reasons delaying patient discharge. The pre-operative length of stay is rarely examined as another reason for a prolonged hospital stay. We investigated the reasons for a prolonged pre-operative hospital stay.

Methods

A retrospective study of all patients undergoing cardiac surgery at our Centre from November 2017 to November 2018, with a pre-operative length of hospital stay greater than two days. The route of referral, patient characteristics, urgency, type of operation and the reason for delay were analysed.

Results

A total of 2316 patients underwent cardiac surgery, of whom 354/2316 (15.3%) patients had a pre-operative length of stay of >2 days (mean 8 days, range 3-52). 35/354 (9.9%) patients were elective admissions for surgery, 194/354(54.8%) were in-patient referrals from within our Trust and 125/354 (35.3%) were inter-hospital transfers. 9/354 (2.5%) cases were emergencies. Patient characteristics: mean age was 62 years, 269/354 (76%) were male, 25/354 (7.1%) had LVEF <30% and 26/354 (7.3%) previous cardiac surgery. The operations performed were isolated CABG 203/354 (57.3%), isolated valve replacement/repair 79/354 (22.3%), CABG + Valve 44/354 (12.4%) and other in 28/354 (7.9%). Reasons for delay were needed for further pre-operative investigations 175/354 (49.4%) patients, cancellation due to medical issues 14/354 (4%), delay in image transfers 6/354 (1.7%), unavailability of ITU beds/nurses 45/354 (12.7%), awaiting operation slot 66/354 (18.6%) and medical optimization in 48/354 (13.6%).

Conclusions

Prolonged pre-operative hospital stay is due to a combination of patient-related factors, incomplete investigations of patients prior to admission or transfer to hospital and system failure. These areas need to be addressed in order to improve patient flow, increase activity and mitigate

Lower Hemisternotomy – Infrequently Used but Versatile

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Objectives

A lower hemisternotomy is an infrequently used approach in cardiac surgery. This single center report evaluates applicability and clinical outcomes of procedures performed through a lower hemisternotomy.

Methods

The institutional database was reviewed. From 2014 to 2019, 55 consecutive patients had undergone minimally invasive procedures through a lower hemisternotomy (median follow-up 34 months). Demographic as well as outcome data were retrieved from our prospectively maintained institutional database.

Results

Performed procedures included mitral and tricuspid repairs, aortic valve replacement as well as coronary artery bypass grafting. The median patient age was 72 years. Out of the 55 patients, 55% were male. Predominantly mitral valve procedures (11 isolated, 30 combined) had been performed. Mitral valve procedures (n=41) consisted of 36 repairs and 5 replacements. Repair rate for degenerative mitral insufficiency was 97.6%. Median EuroSCORE II was 3.4 % [2.1-6.0]. Median cross-clamp time was 67 [44-99] min. Median procedural length was 169 [138-201] min. Reoperation rate for bleeding was 1.8%. Major vascular complications occurred in two patients. Freedom from valve-related reoperation was 96.1% during follow-up. 30-day mortality and overall mortality during follow-up was 3.6% and 10.9%.

Conclusions

In properly selected cases the lower hemisternotomy allows for a variety of cardiac procedures. It permits central aortic cannulation and a direct vision of intracardiac structures and therefore should be kept in mind as an alternative minimally invasive approach.

Do we Need Post-operative Protamine Infusion After Cardiac Surgery?

Osman, M¹; Singh, A²; Leatherby, R²; Ripoll, B³; Ali, J¹; Bhusari, S²

¹Royal Papworth Hospital; ²Basildon University Hospital; ³Castle Hill

	Non Protamine	Protamine	
Total Drainage (mean (SD))	413.14 (239.08)	418.86 (262.41)	
Blood (mean (sd))	0.67 (1.24)	0.87 (2.06)	
FFP (mean (sd))	0.69 (1.44)	0.44 (1.20)	
Platelets (mean (sd))	0.23 (0.59)	0.16 (0.48)	
Age (mean (sd))	67.41 (9.19)	67.60 (9.81)	
Sex = M (%)	191 (83.0)	382 (80.9)	
Indexed.blood.loss (mean (sd))	15.00 (9.20)	14.69 (9.76)	
MULTI_SYSTEM_FAILURE = Yes (%)	1 (0.4)	6 (1.3)	

Objectives

Significant postoperative bleeding following open-heart surgery is often ascribed to the so-called heparin 'rebound' phenomenon and as such is treated with additional empiric doses of protamine sulphate.

Heparin rebound, the reappearance of anticoagulant activity after adequate neutralization with protamine, is thought to contribute to excessive postoperative bleeding after cardiac surgery. However, inappropriate protamine administration has been reported to be associated with acute pulmonary hypertension. Extra protamine administration is also reported to cause excessive bleeding.

There are only few studies which reported the effect of postoperative extra protamine administration on the clinical outcome of cardiac patients. The aim of this study to evaluate the effect of protamine infusion after CABG.

Methods

The study included 703 patients who underwent CABG from April 2015 to January 2018. Emergency CABG patients were excluded from this study. Antiplatelet were stopped 5 days prior to surgery. Blood transfusion was done for patients with Hb. < 80 grams / L. 473 patients had post-operative protamine infusion (Group A) while 230 patient didn't have the infusion (Group B). After having a satisfactory ACT in theatre, 100 mg of protamine sulphate in 100 ml of normal saline are given as an infusion over 4 hours in ITU for Group A. The outcome includes: 1. Post-operative total blood loss, 2. Use of post-operative blood products, 3. Post-operative ITU and hospital stay, 4. Rate of re-exploration for bleeding or tamponade

Results

Post-operative protamine infusion was associated with less use of FFP but not with other blood products. No difference in post-operative blood loss. No difference in stroke or MI rates.

Conclusions

Post-operative protamine infusion is safe. It doesn't decrease the post-operative bleeding, re-exploration or blood loss.

Lung Function Tests, a Necessity or a Hazardous Exposure? Their Role in Predicting Postoperative Pulmonary Complications, During COVID-19 Pandemic

Popescu, F; Duvva, D; Niranjana, G; Pullan, M

Liverpool Heart & Chest Hospital

Objectives

The aim of the study is to analyse the cost-effectiveness and clinical impact of the lung function tests on predicting possible pulmonary complications post-cardiac surgery, bearing in mind the hazardous exposure during the COVID-19 pandemic

Methods

Retrospective study of all patients that underwent elective and urgent cardiac surgery between April 2018 and March 2019.

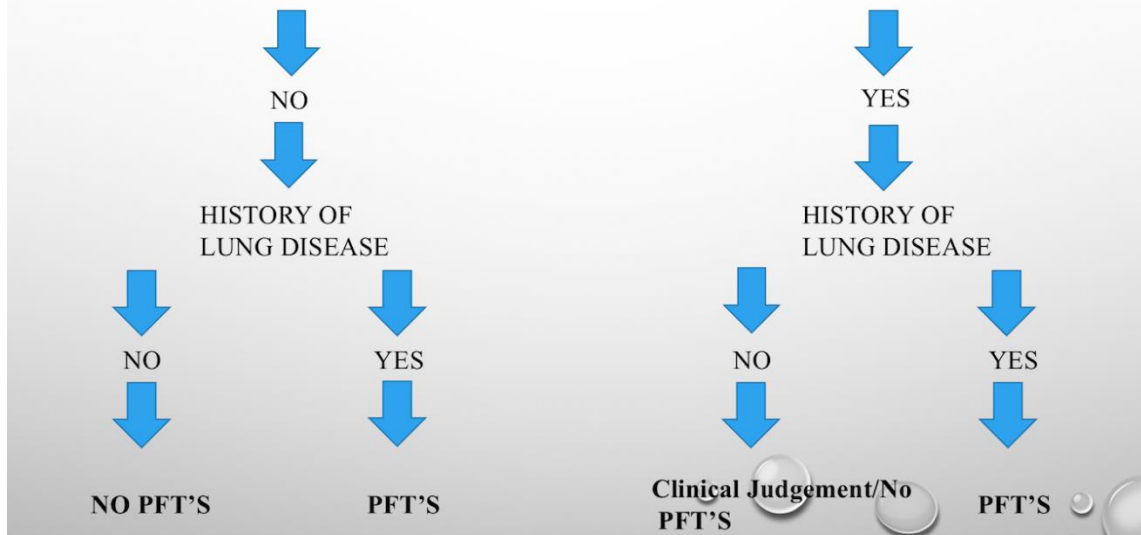
Results

- Non-smokers had significantly higher FEV1 compared to smokers BUT this was not the case with smokers with no history of lung disease where there was no significant difference
- FVC was not significantly different between non-smokers and smokers irrespective of having lung disease or not
- FEV1 was significantly higher in non-smokers compared with smokers with history of lung disease especially those with a history of COPD
- FVC was significantly higher in non-smokers compared with smokers with history of lung disease, namely COPD but not Asthma
- The FEV1 was significantly lower in non-smoking asthmatics compared to non-smokers in general but FVC was not different
- Smokers with no history of LD had significantly higher FEV1 compared to smokers in general and smokers with lung disease, COPD and smoking and non-smoking asthmatics
- Pulmonary complications were significantly lower in the non-smokers group compared to all smokers, smokers with no LD, smokers with LD and COPD but not with Asthmatics irrespective of smoking status
- Mortality was significantly less in the non-smokers group compared with smokers with a history of lung disease especially those with COPD but was not significantly different compared to all smokers or smokers with no history of LD, or asthmatics irrespective of smoking status.

Conclusions

ALGORITHM FOR PRE-OPERATIVE PFT'S

SMOKER



Patient Handover Template Improves the Cardiac Surgery Ward Round Efficiency

Khan, H; Morris, A

Liverpool Heart & Chest Hospital

Objectives

With the onset of the COVID-19 pandemic, policies were introduced which helped to cope with infection rates. This included ward classification into GREEN, ORANGE and RED areas, according to the patient's COVID status or having symptoms suspicious of COVID. This helped reduce COVID-19 infection rates amongst admitted patients (pre-op, post-op). However, it was noticed that ward round handovers, for Cardiac Surgery, could be made more efficient, as each ward had different handover documents. For this project, our objective was to look at how we could make ward handovers more productive; reduce the time taken and improve the quality of information given.

Methodology

A survey was conducted to gauge how handover documentation could be improved. A ward round handover template was introduced accordingly. A second survey was conducted after implementation of the newly designed handover document.

Results

The initial survey showed that staff (advanced nurse practitioners, pharmacists, staff nurses, physiotherapists and doctors) found multiple handovers for each ward inefficient. It also revealed that the majority were in favour of a newly designed single handover template. A new template was introduced and a second survey was then conducted. The results clearly showed that patients on different wards were easier to find. Furthermore, jobs were easier to organise, as each member of staff could document them (e.g. chest x-ray, bloods, microbiology discussion, transfer/discharge letter) on their own handover rather than on a single jobs book.

Conclusion

The results clearly showed that the improved template had a positive impact on ward round efficiency. Making the organisation and prioritisation of jobs more productive, as all members of staff could document these individually, rather than on a single jobs book.

Is There a National Variation in Cardiothoracic Trainees' Satisfaction?

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¹University of Bristol Medical School; ²Bristol Royal Infirmary

Objectives

The national training surveys was first started in 2006, with an aim to determine the quality of the national training standard. All trainees working in a General Medical Council approved training post are required to complete the survey. We aimed to evaluate cardiothoracic trainees' satisfaction and determine whether there is variation in the United Kingdom.

Method

The national training survey report in cardiothoracic surgery from 2012 to 2019 was obtained from the General Medical Council website. The cardiothoracic centers were divided based on their geographic locations. Comparisons in all 18 indicators in the national training surveys report were made between the four counties (national) and four local education training boards (LETBs) in England (Regional). Centers with less than 4 years of data were excluded from this study.

Results

Thirty-three cardiothoracic centers are included in this study. The top three areas that trainees are most satisfied are clinical supervision (out of hours) (91.65), clinical supervision (90.65), and educational supervision (88.27). On the other hand, trainees are less satisfying with the handover (62.63), rota design (61.91), and workload (45.07). It is worth noting that workload is the only area of less than 60%. In addition, there is no national variation in all 18 indicators.

Conclusion

Our data suggested that there is no difference in overall trainee satisfaction in the United Kingdom. However, there are differences in various indicators between England and the three other nations. Individual hospital should reflect on trainees' evaluation on the national training surveys report and improve on specific areas if deemed unsatisfactory.

Adult Cardiac Myxoma: What are we Missing?

Yasin, M; Clark, S; Ledingham, S

Freeman Hospital, Newcastle

Introduction

Nonfamilial adult cardiac myxoma has an incidence of 0.5% per million hospital admissions and is the most frequent primary cardiac tumour; accounting for 40-50% of all benign cardiac tumours. Presentation is either incidental or emergent due to valvular outflow obstruction, heart failure, and systemic embolization. Notably, these tumours have constitutive production of interleukin-6 (IL-6). Despite the 5820 publications since 1934, there are no published management guidelines.

Methods

Interrogation of the adult cardiac PATS database over a 4-year period (2017-2020) identified 17 patients referred for resection of cardiac myxoma. Incidental presentation occurred in 47% and 53% presented either in heart failure or with cerebral embolization. The mean age was 65.1±3.1 yrs. (range 38-85 yrs.) with 65% being female.

Surgical management

Despite emergent presentations (53%) the mean referral to resection time was 41.8±12.1 (range 0-155) days. The majority of cardiac myxomas were not resected as an emergent procedure; emergency myxoma resection took place in only 18%. Pre-operative coronary angiogram was evident in only 53% of cases, thus running the risk of inadequate cardioprotection and concomitant revascularization. The inflammatory cytokine IL-6 was not checked in any case pre or post-operatively despite an elevated CRP (mean 22.2±10.6). The opportunity of using IL-6 as a potential indicator for myxoma recurrence was therefore lost.

Concluding recommendations

Cardiac myxoma resection should be carried out as an emergent procedure due to the risk of haemodynamic compromise or embolic phenomena. IL-6 should be used as a potential biomarker for recurrence. Pre-operative coronary angiography should be mandatory and annual post myxoma resection recurrence surveillance by TTE imaging is necessary in the decade post myxoma resection. Our study demonstrates that management in reality falls far short of what should be the standard.

Seizing an Opportunity: Setting up a Virtual Wetlab During the COVID-19 Pandemic.

Holland, L; Ahmed, I

Royal Sussex County Hospital

Objectives

The COVID-19 pandemic has negatively impacted surgical training across the globe. In the UK, educational events and training days were cancelled for trainees at all levels. However, these unusual times provide opportunity to develop novel teaching methods. The objective was to design a “virtual cardiac surgery wetlab” that allows real-time skills training.

Methods

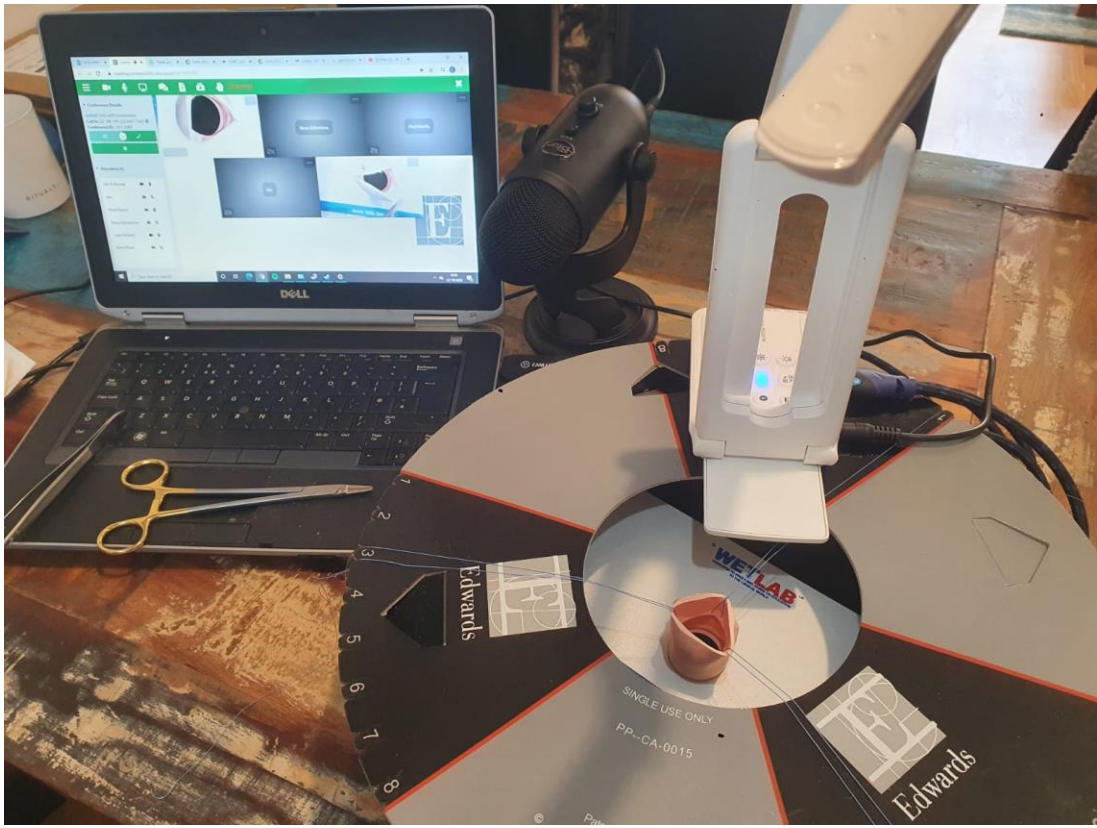
With support from industry partners Edwards Lifesciences, Wetlab and Connexion365 (Webinar Hosting Platform) all the necessary materials were distributed. A pre-prepared box was sent to trainer and trainee. This included micro-instruments, suture material, synthetic vessels and valve models, high-definition camera, along with printed instructions and video to outline set-up of the rig. The only thing the trainees needed to provide is a computer. A consultant surgeon demonstrated how to perform a coronary anastomosis and aortic valve replacement and was then able to supervise trainees and provide real-time feedback using the online platform.

Results

Feedback from trainer and trainees has shown that the system is an easy-to-set-up, effective training tool for teaching cardiac surgery skills including coronary anastomosis and valve surgery. The online platform enabled good vision and engagement between trainer and trainee and also enabled recording of the session. Distributing all of the materials nationwide means the virtual wetlab can take place anywhere, including in the comfort of home, for both trainee and trainer (see image 1).

Conclusions

Surgical skills training can still take place effectively in the absence of “real life” wetlabs. Given the current COVID-19 pandemic continues to interrupt traditional surgical teaching, this method has potential to be adopted nationwide to minimise the disruption to surgical education.



Sternal Wound Infections in the Midst of a Pandemic: An Unexpected Benefit

Ike, D; Durand-Hill, M; Hussain, A; Roberts, N

St Bartholomew's Hospital

Introduction

Sternal wound infections (SWI) are typically associated with a high morbidity and mortality. Rigorous guidelines were instituted during the COVID-19 pandemic to mitigate the risk of viral transmission peri-operatively. The impact of these measures on SWI was investigated.

Methods

We performed a retrospective analysis of all patients who underwent cardiac surgery at our institution since March 2020 at the onset of the COVID-19 pandemic. A retrospective analysis of all patients who underwent cardiac surgery in the 12 months preceding the national lockdown was also performed as a baseline cohort group.

Results

A total of 2,600 patients (493 during the COVID-19 pandemic) were included in this study. Urgent/emergency procedures accounted for more than 60% of procedures performed during the lockdown compared to 39% previously. 67 (2.6%) surgical wound infections occurred in the study population. During the COVID pandemic, there were 4 SWIs with an overall incidence rate of 0.8%. Patients who underwent cardiac surgery during the COVID pandemic had a lower-than-expected rate of surgical wound infections ($P=0.006$). Other significant predictors of surgical wound infections included a diagnosis of diabetes ($P<0.001$) and being a smoker ($P<0.05$).

Conclusion

This report suggests a significant role of iatrogenic causes for SWI's prior to the pandemic. The strict implementation of guidelines in the peri-operative period suggests that SWI's can be prevented. We propose that the now widespread COVID-19 guidelines, instituted to reduce transmission risk, be adapted to help reduce the incidence of SWI's.

Post-Operative Length of Stay in Cardiac Surgical Patients: Why So Long?

Asemota, N; Ike, D; Durand-Hill, M; Awad, W

St Bartholomew's Hospital

Introduction

Prolonged post-operative length of stay (PLOS) after cardiac surgery may be due to medical and non-medical causes. PLOS risks patient safety, including risk of hospital acquired infections and impedes patient flows. We examined the cause for patients spending PLOS following cardiac surgery, at our hospital.

Methods

Patients identified as having stayed >10 days after cardiac surgery between July and December 2019 at our centre were studied. Causes of PLOS were categorised into 3 groups; medical, social and administrative delays.

Results

325 patients underwent surgery over this period of whom 156 (48%) had a PLOS. In patients with PLOS the mean age was 63 years (SD 13.6), 56% were male, 31% had impaired LVEF and the mean Logistic EuroSCORE was 13. (SD 15.8). 43 patients had CABG, 60 had isolated valve surgery, 22 had valve+CABG and 31 had other cardiac procedures. 82 (53%) were urgent/emergency cases, and 7 (4.4%) were redos. 107 patients (68.6%, 95% CI 61.3-75.8%) had delayed discharge due to ongoing medical therapy, with 8/107 patients (7.5%) developing neurological dysfunction, 7 (6.5%) with deep sternal wound infections, 6 (5.6%) requiring return to theatre and 24 (22.4%) requiring dialysis. 14 (9%) patients had PLOS due to social reasons and 6 (3.9%) due to administrative delays, mostly concerning repatriation. Median LOS was 25 days for major aortic surgery, 23 days for CABG, 19.5 days for isolated valve patients, 16.5 days for valve+CABG, mostly due to medical delays, particularly pending investigations (INR monitoring and echocardiogram) and management of arrhythmias. 99/156 (63.5%) patients were eventually discharged home whilst 31% were transferred to a local hospital.

Discussion

PLOS is mostly due to ongoing medical therapy, with social and administrative issues also contributing. Early management of predictable delays, including investigation requests and social/administrative needs may eliminate these factors and help to reduce PLOS.

Patient Profile and Outcome following Reoperation for Bleeding/Tamponade after Cardiac Surgery

George, J; Ahmed, Y; Sharma, S; Bhatti, F; Ashraf, S; Zaidi, A; Youhana, A; Kumar, P

Morrison Hospital, Swansea

Objective

Unplanned return to theatre after cardiac surgery ranges from 2.5 to 6.0% in the UK. We reviewed our database for last 7 years (Jan 2013 to Dec 2019) in order to define the patient population, risk factors and the outcomes for the patient returning to theatre.

Methods

All patients who underwent re-operation for bleeding or tamponade after cardiac surgery between Jan 2013 to Dec 2019 were included. The prospectively collected data from our database for the surgical patients was reviewed and analysed the factors affecting the re-operation and survival following re-intervention.

Results

Of 4429 patients, 189 patients (4.26%) returned to theatre for bleeding or tamponade. Pre-operative factors were compared in the re-operation (Group A) and remaining 4,240 patients (Group B). Patients mean age of 71.4 vs 69.52 years in Group A and B respectively. There was higher proportion of patients who had impaired left ventricular function (47% vs 35%), higher impaired renal function (59% vs 51%) as defined by GFR, more non elective cases (66% vs 49%) respectively in Group A. Significantly high logistic EuroSCORE (14.63 vs 8.56) was also identified in the re-operation group.

Among the Group A patients, a surgical bleeding source was identified in only 59.7% (113) patients. Therefore, 40.3% (76) of the patients were noted to be coagulopathic with no surgical bleeding source. Most patients (60%) were re-operated within 12 hours post-cardiac surgery. 81% patients were alive at discharge but these patients were noted to have lower EuroSCORE (12.35 vs 24.67). #Impact of timings of return to theatre is being explored in further detail and will be presented.

Conclusion

Re-operation for bleeding/tamponade in high-risk patients is associated with adverse mortality and morbidity. A significant proportion have a non-surgical cause.

Semi-Skeletonized versus Pedicled Internal Mammary Artery Harvesting: A systematic review

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Objectives

To compare semi-skeletonized with pedicled harvesting technique of the internal mammary artery for coronary artery bypass surgery.

Methods

A comprehensive literature search was performed on PubMed, Cochrane database, Embase, Google Scholar and Ovid identifying articles that compared semi-skeletonised to pedicled internal mammary artery in the use of coronary artery bypass surgery. Databases were evaluated and assessed from inception to July 2020.

Results

Only five studies fulfilled the criteria for this review. There was no reported incidence of sternal wound infection, myocardial infarction or mortality. The length of the IMA graft was longer in the semi-skeletonized group compared to the pedicled group, 16.06cm versus 14.63cm respectively ($p < 0.001$). The intraoperative diastolic flow was significantly greater in the semi-skeletonized grafts than in the pedicled grafts during ($p=0.003$) and after ($p=0.005$) cardiopulmonary bypass. The incidence of pleural effusion (pedicled, 52.6%; semi-skeletonized, 23.6%; $p=0.002$) and atelectasis (pedicled, 42.1%; semi-skeletonized, 20.0%, $p=0.015$) were significantly higher in pedicled group. Post-operative chest tube drainage was significantly higher in the pedicled group (608 ± 58 mL compared to 470 ± 48 mL; $p=0.027$). Additionally, FEV1 was significantly decreased in the pedicled group 6 days after surgery (pedicled: $76.0\% \pm 1.6\%$; semi-skeletonized: $83.2\% \pm 1.6\%$; $p=0.020$).

Conclusion

These results demonstrate that the semi-skeletonized preparation technique is associated with satisfactory outcomes during harvesting the internal mammary artery. Yet, due to limited numbers of studies, there is need for larger comparative studies to assess post-operative outcomes with a longer period of follow up.

Cardiac Surgery Simulation – A low-cost Feasible Option in an Australasian Setting

Sharma, V; Page, S; Pirone, F; Patel, N; El Gamel, A; McCormack, D; Meikle, F

Waikato Hospital

Objectives

Cardiac simulation is an adjunct to surgical training yet training opportunities in Australasia are rare due to high cost and limited training faculty, time, assessment tools or structured curricula. We describe our experience in establishing a low-cost cardiac simulation program.

Methods

We created low-cost models using hospital facilities, hardware stores, abattoirs and donations from industry. Three workshops were conducted on Coronary Anastomoses, Aortic and Mitral Valve Replacement.

Results

Porcine hearts were sourced from local farms. Industry donations of obsolete stock were used for suture and valve material-stations constructed using ironing board, 2-litre buckets and kebab-skewers. Suture Ring holders were fashioned from recycled cardboard or donated. All participants were asked to complete pre and post-workshop self-assessment forms. Across 3 workshops, 45 participants (57.8% female) with a median age 27 (IQR 24-31) attended. Training level consisted of Nurses (8, 17.8%), Medical Students (17, 37.8%), House Officers (6, 13.3%), and Registrars (14, 31.1%). There were improvements in knowledge of anatomy (mean difference 18%), imaging (16%) and procedural components (34%); and practical ability to describe steps (30%), partially (32%) or fully complete (32%) the procedure.

Measure (out of 5)	Pre-Workshop (95% CI)	Post-Workshop (95%CI)	Mean Difference (95%CI)
Anatomy	2.6 (2.3-2.8)	3.4 (3.1-3.7)	0.9 (0.6-1.2)
Imaging	1.9 (1.7-2.2)	2.7 (2.4-3.0)	0.8 (0.5-1.1)
Theoretical Knowledge	1.7 (1.4-1.9)	3.4 (3.1-3.7)	1.7 (1.4-2.1)
Description of Steps	1.8 (1.4-2.1)	3.3 (3.0-3.6)	1.5 (1.2-1.9)
Performing Steps	1.4 (1.1-1.6)	2.9 (2.7-3.2)	1.6 (1.3-1.9)
Performing Operation	1.2 (1.0-1.5)	2.9 (2.6-3.1)	1.6 (1.4-1.9)

Conclusions

Simulation-based training in cardiac surgery is feasible in a hospital setting with low overhead costs. It can benefit participants at all training levels.

Description of Peri-and Intra-operative Characteristics Precluding the Convergent Atrial Fibrillation Ablation and a Strategy for Their Avoidance

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¹Department of Cardiothoracic Surgery, St Bartholomew's Hospital, London; ²Department of Cardiology, St Bartholomew's Hospital, London

Objectives

Convergent is a two-step atrial fibrillation ablation for the treatment of refractory chronic atrial fibrillation. It requires a combination of minimally invasive epicardial ablation of the posterior left atrial wall carried out surgically with catheter based endocardial ablation as the second stage. The purpose of this study was to describe lessons learned from our single center experience which could be of assistance to other centers.

Methods

A convergent program was established in 2013 with subsequent establishment of an atrial fibrillation MDT to facilitate patient management. A retrospective review of patients undergoing was carried out.

Results

We have carried out 45 convergent procedures to date. Mean age 70 ± 7 years. All patients had experienced failure of either DCCV, catheter ablation or both prior to the procedure. The initial 38 procedures were carried out using a transdiaphragmatic approach, the latter using a subxiphoid direct pericardial approach to avoid iatrogenic diaphragmatic hernias. All patients had chronic atrial fibrillation for a mean duration of 52 months (range 11-290). The procedure was abandoned in four cases; one due to the presence of pericardial adhesions precluding safe completion. We felt this was unavoidable. Three were abandoned due to the presence of clot in the left atrial appendage. In two cases contrast enhanced CT proved the presence of clot, in the third CT out ruled the presence of clot and the ablation was subsequently undertaken.

Conclusions

The presence of left atrial clot precludes the safe completion of a Convergent ablation due to the requirement for cardioversion intraoperatively. As a result of our experience, we have altered our practice and now continue all patients on their preoperative anticoagulation. Patients preparing for a Convergent operation should be counselled regarding these factors which may preclude safe completion of the operation.

Surgical Management of Infective Endocarditis in Intravenous Drug Users – A Clean Start?

Chilvers, N; Diyab, Y; McPherson, I; Clark, S

Freeman Hospital

Objectives

Infective endocarditis continues to be challenging to manage, particularly in the intravenous drug user (IVDU) population. Despite the ongoing difficulties, this population is relatively poorly researched. We sought to examine the outcomes in our institution.

Methods

A database search was performed to detect patients in our institution who had undergone surgical management of infective endocarditis from January 2009 to the present day. Case note review then allowed identification of those who were known to be IVDUs.

Results

257 patients underwent surgical management of infective endocarditis, of which 16 (6.2%) were IVDUs. The average age was 36.3 (non-IVDU 60.6, $p < 0.00001$) with the tricuspid valve most commonly affected. Average length of stay post operatively was 17.2 days, with average ITU stay of 3.6 days (4.9 in the non-IVDU group). No patients suffered a perioperative stroke or required haemofiltration / dialysis. All patients were alive at discharge (91.7% in the non-IVDU group), however 31.3% died during the overall follow-up period (35.7% in the non-IVDU group, $p = 0.794$). 40% of the IVDU deaths were due to recurrence of infective endocarditis causing heart failure.

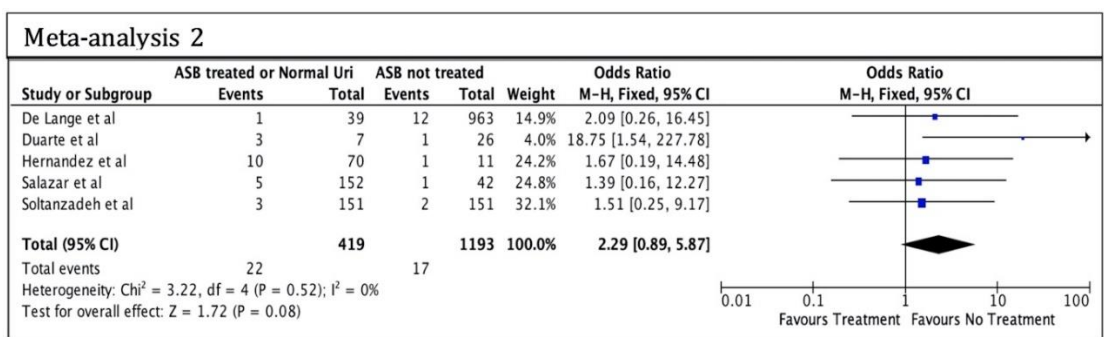
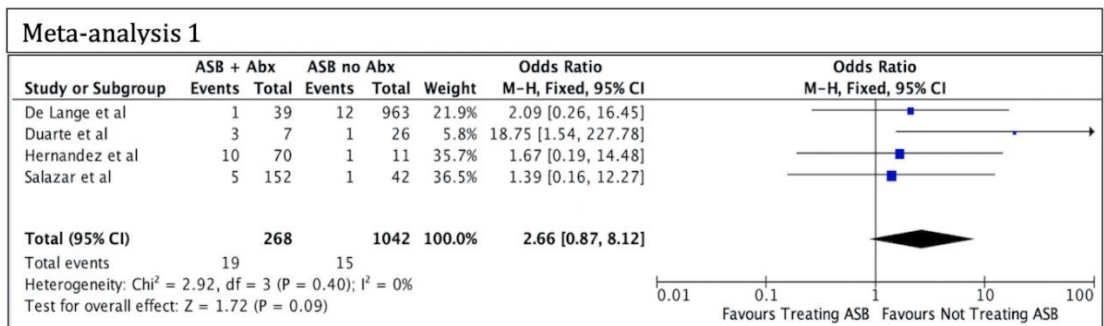
Conclusions

Although this cohort forms only a small proportion of the patients treated surgically for endocarditis at our institution, in comparison to the non-IVDU cohort, they demonstrate equivalent mortality despite being significantly younger in age and enduring an uneventful immediate post-operative course. Furthermore, there is a worrying incidence of recurrent endocarditis due to ongoing drug use. These findings are particularly concerning and further efforts should be devoted to closely following up these patients, with appropriate rehabilitation and support, in order to improve their long-term outcomes.

Cardiac Surgery: Should we Treat Pre-operative Asymptomatic Bacteriuria. A Meta-Analysis and Critical Appraisal.

Singh, S; Hussain, A; Lewis, M

Royal Sussex County Hospital



Objective

Asymptomatic bacteriuria (ASB) is common in preoperative cardiac surgical patients. It is prevalent in the elderly, diabetics and those with long-term indwelling catheters. Despite recommendation from the Infectious Diseases Society of America, asymptomatic bacteriuria is frequently the cause of inappropriate antibiotic use and delay in cardiac surgery. This meta-analysis aims to critically review the current available literature and determine whether cardiac surgical patients with pre-operative ASB require treatment.

Methods

Cochrane, UpToDate, NICE, EMBASE, MEDLINE, PubMed databases found five-studies that met the inclusion criteria for critical review and meta-analysis. Primary outcome was postoperative surgical site infection. Independent variables were antibiotic treated and untreated ASB pre-cardiac surgery. Normal urine was surrogated for ASB in one study. Odds ratios and confidence intervals were calculated using Review Manager 5.4.

Results

The first meta-analysis included four studies. Seven percent ($n=19/268$) of patients who were treated pre-operatively suffered from post-operative SSI compared to the 1% ($n=15/1042$) untreated (OR 2.66; 95% CI 0.87 – 8.12).

The second meta-analysis included five studies. Five percent ($n=22/419$) patients treated for ASB developed post-operative SSI compared to 1% ($n=17/1193$) untreated (OR 2.29; 95% CI 0.89 – 5.87).

Conclusion

Treatment of asymptomatic bacteriuria unnecessarily delays open-heart surgery. There were no statistically significant differences in post-operative SSI's between patients who were treated or left untreated for ASB.

BMI Dependence of Metabolic Signalling Pathways in Myocardial Biopsies from Cardiac Surgery Patients

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Objectives

Patients with increased body mass index have better survival chances after cardiac surgery as compared with normal-weight patients, despite obesity being a risk factor for cardiovascular complications. We test the hypothesis that mitochondrial dysfunction is underlying the observed paradox.

Methods

Sixty-seven adult cardiac surgery patients undergoing coronary artery bypass grafting with or without valve surgery were recruited. Atrial biopsies were collected during cardiopulmonary bypass. Transcriptome data was acquired for samples from 53 patients, and a panel of targeted metabolites was analysed in samples from 57 patients.

Results

Sixteen patients had a BMI below 25, 31 had a BMI between 25 – 30 and 19 above 30. The weight groups significantly differed with age and haematocrit levels. Normal-weight patients were most diverse in their metabolite expression, while overweight and obese patients appeared more homogeneous. Statistical analysis identified more differentially expressed (DE) transcripts in overweight vs normal-weight comparison than other comparisons. The DE genes enriched epigenetic regulation functions in overweight vs normal-weight patients, and energy production functions in comparisons of obese with either normal-weight or overweight patients. Metabolite analysis identified 9 compounds statistically different between normal-weight and overweight patients, 29 between obese and normal-weight, and four between obese and overweight groups. Out of these, specific carnitines correlated with most of DE transcripts on obese vs normal-weight comparison and ribose and ribulose-phosphate with transcripts in obese vs overweight comparison.

Conclusions

The results support our hypothesis that mitochondrial metabolism differ between obese and other weight groups of cardiac surgery patients with a role of carnitines in fatty acids delivery to mitochondria. Epigenetic regulation appears to distinguish overweight and normal-weight groups.

Phenotyping Frailty Through a Multiomics Approach: A Feasibility Study in the Ob-CARD Clinical Trial

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Background

Frailty is characterised by vulnerability to poor outcomes in individuals exposed to an apparently innocuous stressor, and is an independent predictor of organ injury, increase use of healthcare resources and death following cardiac surgery. The Priority Setting Partnership in Cardiac Surgery has identified frailty and organ injury as research priorities. Phenotyping baseline metabolic state may inform accurate risk stratification and be an indicator of frailty.

Methods

The metabolic state was assessed in a consecutive cohort of 30 adult cardiac surgery patients enrolled in the Ob-CARD study (NCT02908009).

The mitochondrial function was quantified through the oxygen consumption rate (basal, maximal, non-mitochondrial respirations and proton leak). Targeted Metabolomics were measured in myocardial biopsies and plasma by using LC-MS on Waters Synapt G2Si mass spectrometer. Breathomic metabolites were assessed using two-dimensional gas chromatography-mass spectrometry (GCxGC). Clinical parameters included: low cardiac output, MODS multi-organ failure score, acute kidney injury, acute lung injury, and troponin.

Results

The majority of the patients were class II NYHA (80%), class II angina (70%), diabetic (50%), while only 10% had CKD. 550 cardiac and lipidic specific metabolites were measured in the myocardium and plasma, while 700 metabolites were measured in breath samples. The metabolites measured in breath were significantly different from the air sample or ambient air. The mitochondrial function correlated between leucocytes (systemic) and myocardial biopsies (target organ). The metabolic status was assessed in all the patients and reflected the clinical outcomes.

Conclusion

This pilot study demonstrates that the metabolic status of patients undergoing cardiac surgery can be measured reliably. This will lay the foundation of a larger cohort study. This will allow the risk stratification of patients based on their frailty phenotype.

Interventions to Prevent Surgical Site Infection (SSI) in Adults Undergoing Cardiac Surgery (Cochrane Review)

Rogers, L²; Vaja, R³; Rochon, D⁴; Ali, J⁵; Talukder, S⁵; Rochon, M⁴; Quijano-Campos, J⁵; Lamagni, T⁶; Lai, F⁷; Sanders, J⁸; Loubani, M⁹; Tanner, J¹⁰; Murphy, G⁷

¹Leicester Clinical Trials Unit; ²University Hospitals Plymouth NHS Trust; ³Imperial College London; ⁴Royal Brompton & Harefield NHS Foundation Trust; ⁵Royal Papworth NHS Foundation Trust; ⁶Public Health England; ⁷University of Leicester; ⁸Barts Health NHS Trust; ⁹Hull and East Yorkshire Hospitals NHS Trust; ¹⁰University of Nottingham

Objective

Surgical site infection (SSI) affects 3.8% of patients undergoing CABG and 1.7% of non-CABG operations. This is associated with a 10-fold increase in mortality¹, increased readmission and reoperation costing an additional £30 million. Although generic surgical guidelines to reduce SSI exist no there is currently no standard of care for cardiac surgery ^{2,3}. This Cochrane review was undertaken to highlight areas of uncertainty and illustrate the knowledge gap that may exist.

Methods

A steering committee involving members of the Cardiothoracic Interdisciplinary Research Network (CIRN), Public Health England and the National Cardiac Benchmarking Collaboration (NCBC) including experts in SSI were convened to deliver this review. A systematic search guided by the Royal College of Surgeons and Cochrane was performed to identify randomised control trials assessing the impact of an intervention to reduce SSI in adult patients.

Results

Three thousand two hundred and ninety-three papers were identified. Following screening of title 2970 were excluded and a further 142 on review of the full paper. One hundred and eighty-one papers were included. Twenty-two areas of intervention throughout the pre-, intra- and postoperative period were identified.

Conclusion

Significant heterogeneity exists both in the manner in which interventions are implemented and the outcome measures utilised in the majority of included studies. Evidence for interventions to prevent SSI is poor and at a high risk of bias. This highlights the importance of performing a high-quality, multicentered, randomised control trial to assess those interventions thought to be beneficial in a cardiac surgery care bundle to reduce SSI.

Pharmacological Interventions for the Prevention of Renal Injury in Surgical Patients: A Systematic Literature Review and Meta-analysis

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¹Cardiac Surgery - Glenfield Hospital; ²Glenfield Hospital

Objectives

The aim of this systematic review was to summarise the results of randomised controlled trials (RCTs) that have evaluated pharmacological interventions for renoprotection in people undergoing surgery.

Methods

Searches were conducted to update a previous review, using the Cochrane Central Register of Controlled Trials, MEDLINE, and EMBASE to August 23, 2019. RCTs evaluating the use of pharmacological interventions for renal protection in the perioperative period were included. The co-primary outcome measures were 30-day mortality and acute kidney injury (AKI). Pooled effect estimates were expressed as risk ratios (RRs) (95% confidence intervals).

Results

We included 228 trials enrolling 56, 047 patients. Twenty-three trials were considered to be at low risk of bias across all domains. Atrial natriuretic peptides (14 trials; n = 2207) reduced 30-day mortality (RR: 0.63 [0.41, 0.97]) and AKI events (RR: 0.43 [0.33, 0.56]) without heterogeneity. These effects were consistent across cardiac surgery and vascular surgery subgroups, and in sensitivity analyses restricted to studies at low risk of bias. Inodilators (13 trials; n = 2941) reduced mortality (RR: 0.71 [0.53, 0.94]) and AKI events (RR: 0.65 [0.50, 0.85]) in the primary analysis and in cardiac surgery cohorts. Vasopressors (4 trials; n = 1047) reduced AKI (RR: 0.56 [0.36, 0.86]). Nitric oxide donors, alpha-2-agonists, and calcium channel blockers reduced AKI in primary analyses, but not after exclusion of studies at risk of bias. Overall, assessment of the certainty of the effect estimates was low.

Conclusions

There are multiple effective pharmacological renoprotective interventions for people undergoing surgery.

Publication Impact and Force in Cardiac Surgery: Altmetrics vs Bibliometric Analysis. A New Tool to Guide Future Research and Training.

Karsan, R

Royal Victoria Hospital

Objectives

Bibliometric analysis has been used to highlight key influential publications in various fields and recently suggested as a tool to guide research and training in Cardiac Surgery. With newer platforms available to disseminate research, Altmetrics analysis provides a new way to look at publication impact. The objective of this study was to investigate whether higher citation correlated with higher impact, and secondly whether altmetric data would reflect citation data on impact papers impact in research and surgical training.

Methods

The search terms Cardiac AND surg* was entered into Thomas Reuter's Web of Science to identify all full English language articles these were ranked by number of citations and a team of cardiac surgeons reviewed the search to identify the top 100 articles in cardiac surgery. The 100 most cited articles were identified and analysed by topic, journal, author, year, institution and altmetric score. Evidence quality was assessed according to the Sackett system.

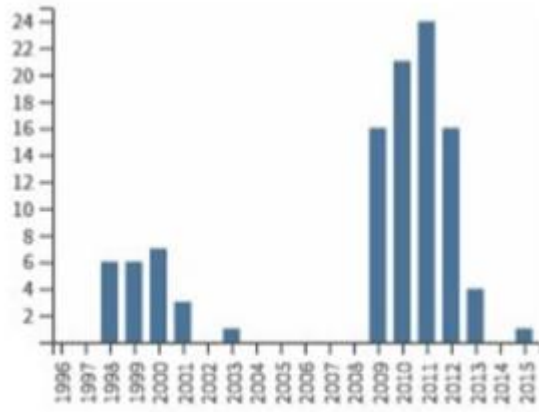
Results

3685 eligible articles were found. Of the top 100 cited papers, the median (range) citation number was 96 (79-574). The most cited article (Shahian et al) assessed risk models for CABG mortality (574 citations), it was also found to have the highest altmetric score (130). With respect to altmetrics, the platform most adopted was 'patents' (86), followed by twitter (43) and blog posts (26). There was no association between evidence level and citation number (SCC 0.132 p=0.456). Post year 2000, Altmetric score was found to be associated with citation ($r=0.466$, $p=0.002$).

Conclusions

Altmetric analysis provides a new and potentially useful tool to evaluate publications with cardiac surgery, whilst this is a relatively new form of research and article dissemination. With the growth of new social media platforms, this analytic method could provide a potent tool to guide research and training within cardiac surgery.

Total publications in cardiac surgery per year based on the top 100 cited papers.



The North East Frailty Score (NEFS) – A New Comprehensive Frailty Tool for Elective Cardiac Surgery Patients – Results of the Pilot Study

Wang, L¹; Wood, G²; Chen, C²; Barabas, M¹; Ivanyi, M¹; Bertram, K¹; White, V¹; Laidler, S¹; Clark, S¹; Ozalp, B¹; Booth, K¹

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Objectives

Frailty has been recognised as a risk factor of mortality and morbidity post-surgery. The currently available frailty scores only assess one or selected few of its components. For example, the Rockwood clinical frailty scale only reflects fatigue and patients' daily activity levels. This pilot study aims to assess the feasibility of comprehensively measuring frailty of elective cardiac surgery patients.

Methods

From December 2018, all cardiac surgery patients ≥ 70 years underwent a comprehensive frailty assessment, during their pre-assessment clinic. 1 point each was assigned for slow gait speed, upper and lower extremity weakness, weight loss, exhaustion, anaemia, hypoalbuminaemia, malnutrition, cognitive impairment, and activities of daily living and instrumental activities of daily living disability. Patients with a score ≥ 4 out of 11 points were deemed as frail. Collectively, they underwent a wide range of elective operations, including redo sternotomy and aortic arch procedures. Multivariable logistic regression was used to study whether the frailty score predicts outcomes.

Results

95 of the 110 (86.4%) consecutively recruited patients completed the full assessment and underwent their planned cardiac surgeries before end of September 2019. Among them, the 33 (34.7%) frail patients had increased risk of developing major complications, staying in hospital for longer and being discharged to a rehabilitation unit (table 1). Moreover, frailty is associated with major complications (odds ratio (OR) 2.78, 95% confidence interval (CI) 1.03-7.51, $p=0.044$) and longer hospital stay (OR 5.01, 95% CI 1.77-8.27, $p=0.003$), independent of age, sex and EuroSCORE II.

	Frail (n=33)	Non-frail (n=62)	p-value
Age	77.2 \pm 4.1	76.1 \pm 3.5	0.19
Female	14 (42.4%)	19 (30.6%)	0.25
BMI	29.2 \pm 4.5	27.7 \pm 3.9	0.086
EuroSCORE II	3.0 [1.3-8.1]	1.6 [1.3-2.4]	0.016
In-hospital Mortality	2 (6.1%)	0 (0%)	0.12
Major Complications	0 [0-1.5]	0 [0-0]	0.010
Hospital Stay	8 [6-15]	5 [5-7.3]	<0.001
Discharge to Rehabilitation Unit	5 (15.6%)	2 (3.2%)	0.043

Conclusions

It is feasible to comprehensively evaluate cardiac surgery patients' frailty in the pre-assessment clinic using this new frailty score. Although further validation is required, this scoring tool has the potential to facilitate the heart team to better risk-stratify patients.

Are we Helping you to get Your Kidney? Outcomes of Patients Awaiting Kidney Transplant Requiring Valve Replacement Surgery.

Holmes, C; Birla, R; Clark, S

Freeman Hospital

Objective

Patients with valvular pathologies awaiting renal transplantation are often referred for valve surgery prior to their planned transplant to facilitate active transplant listing. Weighing the risk/ benefit ratio becomes paramount. We sought to analyse the outcomes of these patients who are in end-stage renal failure and the ultimate success in achieving successful kidney transplantation following surgery.

Methods

In this single centre retrospective analysis of prospectively collected data we reviewed all patients awaiting renal transplant requiring valve replacement from 2009-2020. The primary outcome was successful renal transplantation. Secondary outcomes included 30-day mortality, length of stay (LOS), post-operative complications and death whilst awaiting transplantation.

Results

Of the cohort (n=20), 45% had aortic stenosis and 20% had endocarditis. Mean age 57 years (70% male). 50% were elective. 55 % required concomitant procedures. 65% required post-operative inotropic support. 3 (15%) patients were re-explored for bleeding while 1 needed redo surgery. 2 patients developed mediastinitis, 1 requiring wound debridement. Mean hospital stay= 36 days. In-house mortality was 15%. Follow-up was from 0.5 - 9 years (median=5 years). 8 (40%) died postoperatively whilst awaiting renal transplantation. Only 1 was removed from the waiting list after cardiac surgery. 6 (30%) are still on the transplant waiting list. Only 2 (10%) were actually successfully transplanted, of which, 1 is alive and 1 required redo valve replacement 4 years later but died postoperatively.

Conclusion

Patients undergoing valve replacement prior to planned renal transplantation represent a very high-risk cohort with a guarded prognosis. Multidisciplinary decision making is important. Although many patients are referred for cardiac surgery to facilitate renal transplantation only 10% actually achieved this goal. Careful patient selection and realism are important in this challenging cohort.

A Comparison of Cardiothoracic Surgical Training Before and During the COVID Pandemic – A UK Cardiothoracic Trainee Evaluation and Future Perspective

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Objectives

During the COVID-19 pandemic surgical training witnessed a dramatic change in the UK, with changes in surgical provisions, centralisation of services and reduced surgical volume. The aim of this study is to assess the impact COVID-19 has had on cardiothoracic training and the future role of surgical simulation in the UK.

Methods

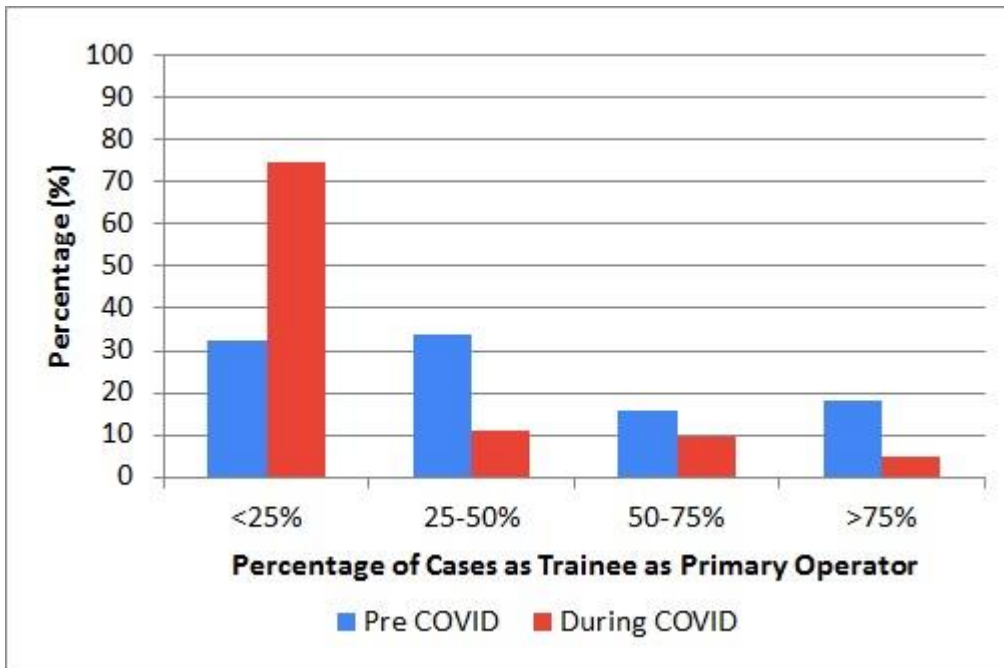
A cross-sectional survey was designed and distributed to cardiothoracic national and non-national trainees in the UK. The survey consisted of 31 questions that were split into four sections; Demographics, Service Provision, Training and Simulation Training.

Results

A total of 83 trainees completed the survey (44 national trainees (NTN) and 39 non-national trainees (non-NTN)); the mean NTN age was 34.8 years and non-NTN 41 years, $p < 0.001$. The male:female distribution was 72:11 (39:5 NTN and 33:6 non-NTN). 38/83 (45.8%) trainees had their job role changed during COVID with 25/83 (30.1%) redeployed to other specialities. The mean number of theatre sessions allocated to trainees before COVID was 3.1/week down to 1.7 during COVID, $p < 0.001$. Trainees also showed a drop in the number of cases in which they were the primary operator, $p < 0.001$, (Fig.1). 67 (80.1%) trainees agreed that COVID negatively impacted cardiothoracic training, $p < 0.001$. Additionally, only 10 (12%) agreed that adequate resources were available to learning/practice of technical skills. 72 (86.7%) trainees agreed that simulation had a role in Cardiothoracic training, 67 (80.7%) recognised simulation training as an important tool in improving their surgical skills and 66 (79.5%) agreed simulation should be used to meet the increasing need in training/education in future.

Conclusions

COVID-19 has had a significant impact on surgical training, with concerns that these effects would have further implications downstream. Simulation may represent one of the solutions to the challenges of safe and effective cardiothoracic surgical training.



The Effect of Intravenous Sildenafil Citrate on Post Cardiac Surgery AKI: A Double Blinded, Randomised, Placebo-controlled, Clinical Trial

Aujla, H¹; Kumar, T²; Wozniak, M²; Dott, W²; Sullo, N³; Joel-David, L⁴; Suazo Di Paola, A²; Barber, S²; Brookes, C²; Murphy, G²

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Objectives

We assessed whether intravenous sildenafil citrate would reduce acute kidney injury in at-risk patients undergoing cardiac surgery with cardiopulmonary bypass.

Methods

In a double-blinded randomised controlled trial adult patients at increased risk of acute kidney injury undergoing cardiac surgery in a single UK tertiary centre were randomised with concealed allocation to receive sildenafil citrate; 12.5mg kg⁻¹ administered intravenously over 150 minutes, or placebo; 5% dextrose solution, at the commencement of surgery. The primary outcome for the trial was serum creatinine measured at 6 post-randomisation time points. The primary analysis used a Linear Mixed Effects model adjusted for the stratification variables, baseline eGFR and surgical procedure. Secondary outcomes considered clinical events and potential disease mechanisms. Effect estimates were expressed as mean differences (MD) or odds ratios (OR) with (95% confidence intervals).

Results

The analysis population comprised eligible randomised patients that underwent valve or combined valve surgery and coronary artery bypass grafts using cardiopulmonary bypass between May 2015 and June 2018 (n=60 Sildenafil; N=69 Placebo). There was no difference between the groups for primary outcome; MD 0.88µmol L⁻¹ (-5.82, 7.59), p=0.797. There was a statistically significant increase in Multiple Organ Dysfunction Scores in the Sildenafil group, MD 0.54 (0.02, 1.07), p=0.044. Secondary outcomes, as well as biomarkers of kidney injury, endothelial function, and inflammatory cell activation, were not statistically different between the groups.

Conclusions

These results do not support the use of sildenafil citrate for kidney protection in adult cardiac surgery.

Enhanced Recovery After Surgery (ERAS) in Coronary Artery Bypass Graft Patients: Outcomes in Day Of Surgery Admission (DOSA) Patients

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Liverpool Heart & Chest Hospital NHS Foundation Trust

Objectives

Enhanced Recovery After Surgery (ERAS) has gained popularity in the last decade, aiming to improve clinical outcomes, minimise complications and reduce the cost for the health system. This study aims to evaluate the benefit of implementing ERAS Society recommendations in cardiac surgical patients undergoing coronary surgery.

Methods

Between August 2018 and August 2019, 816 patients underwent Coronary Artery Bypass Graft (CABG) surgery in our institution. We excluded from our study patients who underwent urgent, emergency CABG and those who required admission prior to their elective surgery. The 144 patient who were admitted as Day Of Surgery Admission (DOSA) cases to have their elective surgery, were included in the analysis.

Results

Out of the 144 patients, 11% were females (16), mean (\pm SD) age of 66 ± 8 and Body Mass Index (BMI) of 27.7 ± 5.6 . Left ventricular (LV) function was moderate or poor in 26% (38), and Off-Pump revascularisation was performed in 55% (79) of the cases. We evaluated the compliance against ERAS preoperative, intraoperative, and postoperative recommendations. Overall compliance with perioperative protocols was more than 80% with the lowest adherence in the areas of rigid fixation of the sternum in high-risk patients, goal-directed fluid therapy, and extubation within six-hours of Intensive Care Unit (ICU) admission. Comparing off-pump and on-pump groups, there was no significant difference in outcomes, including ICU and hospital stay of (2.7 vs 2.4; $p=0.5$) and (8.3 vs 7.5; $p=0.4$), respectively. More extended postoperative hospital stay was noted in impaired LV group (9.9 vs 7.7; $p<0.05$).

Conclusions

ERAS in cardiac surgery is a safe strategy and can play an important role in optimising outcomes, reduce complications and cost. Off-pump and On-pump coronary patients benefit equally from implementing ERAS protocols. Impaired LV function is a limiting factor of the enhanced recovery strategy.

Pulsatile Flow Used During Cardiopulmonary Bypass as a Positive Impact on Inflammatory Markers and Haemodynamics

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¹Imperial College, London, United Kingdom; ²Department of Bioengineering, University of Strathclyde, Glasgow, United Kingdom

Objectives

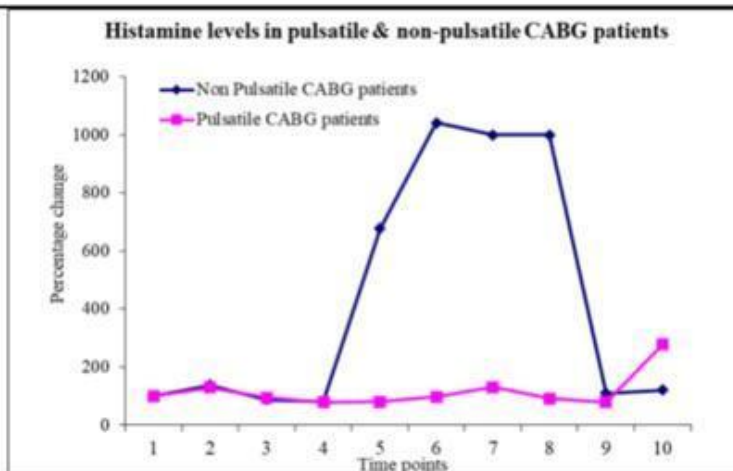
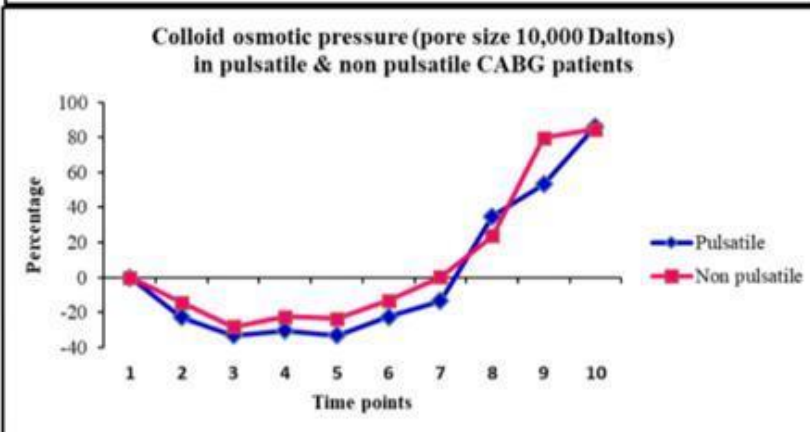
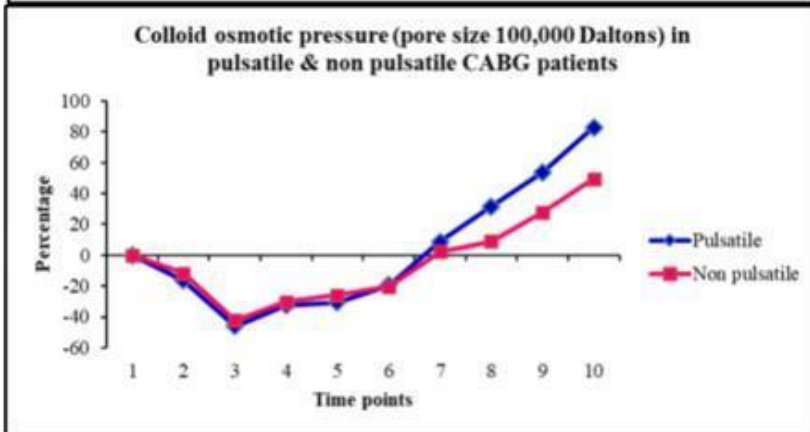
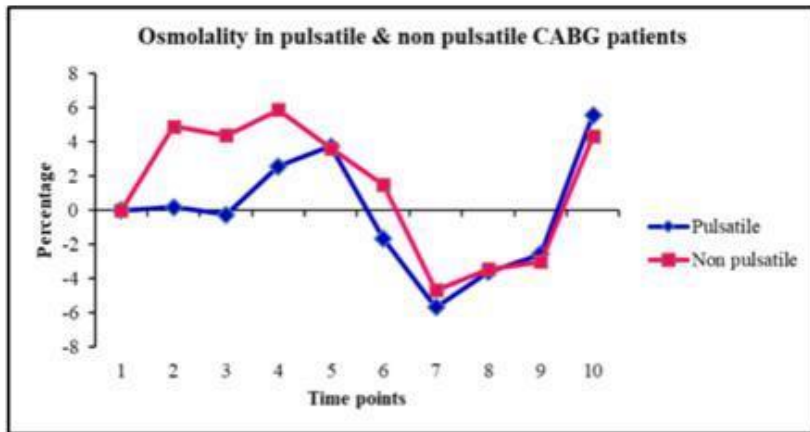
A systemic inflammatory response largely determined by the blood exposure with foreign surface and the activation of the complement in the cardiopulmonary bypass (CPB). The pulsatile CPB is associated with a reduced inflammatory response, higher rate of oxygen consumption and a reduction in the level of metabolic acidosis, compared with non-pulsatile patients. Architecture characterizes the pulse is determined by the mechanism of blood flow generation and its interaction with the environment in which it operates.

Methods

We have selected 100 patients from pulsatile and non-pulsatile type of coronary artery bypass graft patients and measured osmolality, colloid osmotic pressures at 10,000 & 100,000 Daltons pore sizes and histamine levels at ten-time points, starting from pre-operative to post-operative period.

Results

Having measured colloid osmotic pressure in groups of CPB patients undergoing coronary artery bypass surgery (both pulsatile and non-pulsatile), we found that both groups of patients exhibited a similar colloid osmotic pressure profile with a fall in colloid osmotic pressure on the initiation of bypass followed by a gradual rise in colloid osmotic pressure up to the 5th day post operatively. There was a slight variation in the plasma osmolality but overall this parameter appeared to remain relatively stable throughout the period in both groups. In the pulsatile group plasma histamine barely altered throughout the clinical course. In the non pulsatile group of patients plasma histamine was found to increase by an excess of 1200% during the perfusion phase.



Conclusion

In general, all patients in the present study exhibited a similar osmolality & colloid osmotic pressure profiles throughout their clinical course. The difference between pulsatile and non-pulsatile groups of patients in terms of plasma histamine was highly statistically significant ($p < 0.0001$) and clearly demonstrates that flow modality has an effect on histamine activity.

Fourteen Years of Litigation Claims in Cardiothoracic Surgery in the United Kingdom National Health Service

Oo, S¹; Chan, J²

¹University Hospitals of Bristol and Weston NHS Foundation Trust; ²University of Bristol

Objectives

Approximately 36,400 cardiac and 23,100 thoracic operations are carried out in the United Kingdom between 2006 and 2015. National Health Service (NHS) resolution, as known as the NHS litigation authority, is one of the essential bodies of the Department of Health. Its purpose is to provide NHS expertise to resolve concerns fair and square share learning for improvement. We aim to evaluate and increase awareness of medicolegal cases in cardiothoracic surgery.

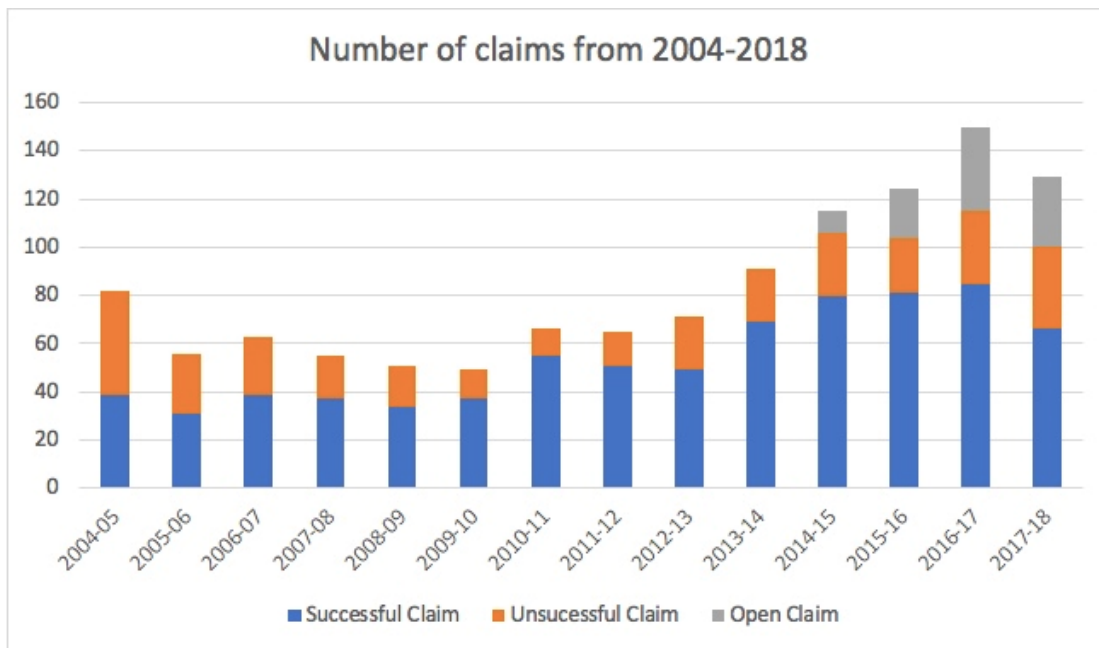
Methods

Total numbers and details of claims coded by NHS resolution in cardiothoracic surgery from 2004 to 2017 were requested under the Freedom of Information Act 2000. The data provided in successful claims is further breakdown into damages paid to the claimant, defence cost, claimant cost paid and the sum of the three. In contrast, unsuccessful claims only include the defence cost. Moreover, data provided also includes further analysis of primary causes and primary injuries for Claims Closed/Settled with damages paid.

1. Total number of claims in Cardiothoracic Surgery from 2004-2017
2. Total number of Successful Claims in Cardiothoracic Surgery from 2004-2017
3. Total number of Unsuccessful Claims in Cardiothoracic Surgery from 2004-2017
4. Claims currently open in Cardiothoracic Surgery from 2004-2017
5. Sum of damages paid to the claimant in Cardiothoracic Surgery from 2004-2017
6. Sum of defence in Cardiothoracic Surgery from 2004-2017
7. Claimant costs paid in Cardiothoracic Surgery from 2004-2017
8. Claim Type in Cardiothoracic Surgery from 2004-2017
9. Time to settlement in Cardiothoracic Surgery from 2004-2017
10. Summary of the claim in Cardiothoracic Surgery from 2004-2017 (e.g. Wrong-site surgery, Retained foreign body, Wrong implant)

Results

There were 753 claims recorded from 2004 to 2017, of which 415 (55.11%) were successful. The number of claims has been steadily increasing since 2004, with two significant raises from 2009/10 to 2010/11 (37-55, 48.64% raise) and 2012/13 to 2013/14 (49-69, 40.82% raise). The mean successful claim ratio was 69.58% (range, 47.56%- 83.33%) There is also a steady increase in the successful ratio from 2004 to 2017. Total amount of £114 669 490 were paid (£113,037,018 in successful and £1 662 472 in unsuccessful claims). The leading primary causes of successful claims are intraoperative problem (£19 427 038) and fail/delay in treatment (£4,818,128). Even though there is only 12 cases coded as "Failed to warn informed consent", £7,744,648 was paid.



Conclusion

In summary, this is the first study published in relation to litigation claims on cardiothoracic surgery in the United Kingdom. The results have provided insight on claims made against cardiothoracic surgery.

Effectiveness of Cardiac Surgery Video Clinics

Adams, B; Yates, M; Balmforth, D; Lopez-Marco, A; Das, D; Oo, A

St Bartholomew's Hospital

Objectives

Follow-up clinics are routinely conducted at six weeks following cardiac surgery. Historically, these clinics are busy, often with long wait times and patients travelling great distances to be reviewed. Pre-pandemic, our trust set a target to reduce outpatient clinic visits by a third. Virtual clinic using a video link is an innovative solution to reduce footfall which has even more importance now. We aim to assess patient satisfaction with the introduction of virtual clinic follow-up following cardiac surgery, including during the COVID-19 pandemic.

Methods

Virtual clinics in cardiac surgery were first introduced in May 2019. Patients were recruited prior to discharge from hospital. They completed a questionnaire one week before clinic on symptoms, levels of activity, complications since discharge and medications. Virtual clinic was carried out using the OrtusiHealth app. Patients receive their clinic letter immediately. Feedback was provided by the patient using an app based questionnaire.

Results

From May 2019 to October 2020, we obtained feedback from 60 patients following virtual clinic follow-up. Mean age was 60 (31-80) years and 17 (81%) were male. Mean distance from hospital was 260 (4-1810) miles. 83% of patients were satisfied or very satisfied with the overall experience. 95% were satisfied or very satisfied with the overall quality. 33% saved a day of annual leave from work and 63% saved more than £10 in travel costs. Time saved for patients was more than 3 hours in 57% of cases. One patient was converted to face-to-face for examination of sternal wound following review of the questionnaire. No patients seen in video clinic had to be converted to face-to-face clinic.

Conclusion

We present the process and patient experience of virtual clinic follow-up for cardiac surgical patients. Routine follow-up clinics following cardiac surgery can safely be provided using telemedicine with high levels of both patient and clinician satisfaction.

Have Disruptions in Dental Services During the COVID-19 Pandemic Increased the Incidence of Severe Bacterial Infective Endocarditis?

Khoshbin, E; Samuel, J; Shah, A; Ledingham, S; Clark, S

Freeman Hospital

Introduction

The oral cavity and its pathogenic organisms are commonly associated with bacterial infective endocarditis. Poor dental hygiene is an obvious potential culprit. We reviewed the frequency of referrals with severe bacterial infective endocarditis for cardiac surgery to a Tertiary care unit and the potential association with disruptions in dental services during the COVID pandemic.

Method

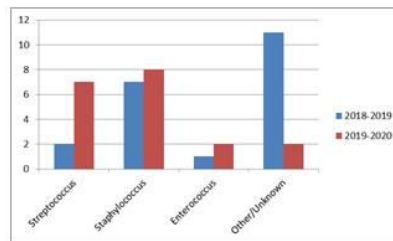
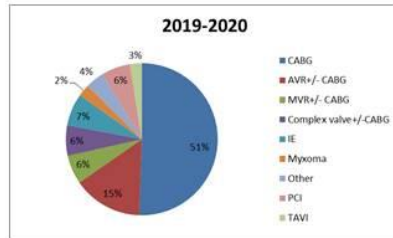
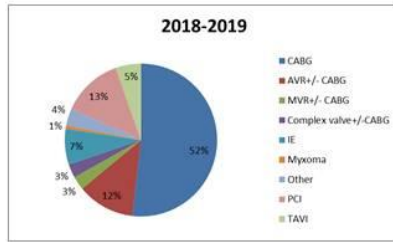
This single-institution, part prospective observational study reviewed consecutive urgently referred adult cardiac surgical patients before and after the national lockdown for COVID-19 in March 2020. The pie charts illustrate all urgently referred patients with bacterial endocarditis in the last two-year period (Oct 2018 to Oct 2020). The data regarding the causal organisms were studied.

Results

A total of 604 urgent patients were treated for endocarditis in this two-year period. The proportion of patients referred for cardiac surgery for severe infective endocarditis of native or prosthetic valves remained unchanged before and after the COVID lockdown. There were 19 patients (7%) this year compared to 21 patients (an equal 7% of the urgent referrals) in the previous year. The Bar chart summarises the causal organisms involved. The incidence of severe bacterial infective endocarditis caused by Streptococcus species has risen from 2 to 7 in the studied periods.

Conclusion

There was no rise in the incidence of severe infective endocarditis. However, the incidence of severe IE with a confirmed Streptococcal organism has risen. This may be a result of oral transmission secondary to major national disruption in dental services by COVID-19 pandemic.



Impact of Peri-operative Blood Testing Bundle on Blood-letting and Transfusion in Cardiac Surgery

Sharma, S; Ahmed, Y; George, J; Suhail, M; Aslam, U; Bhatti, F; Zaidi, A; Ashraf, S; Youhana, A; Kumar, P

Morrison Hospital Swansea, Wales

Objectives

Post-operative cardiac surgical patients undergo intensive monitoring, including serial blood testing for arterial blood gas monitoring and routine blood panels. There is increasing recognition of the total blood utilised to undertake these blood tests. We investigated the effects of a peri-operative blood conservation bundle on the volume of blood-letting for tests, rates of blood transfusion and its financial implications.

Methods

Based on a 6-month review of prospectively-collected data for cardiac surgical patients, we evaluated blood-testing data, blood volume used for tests and transfusion requirements (Group A). This identified to select factors to reduce the blood-letting burden. A peri-operative blood testing bundle including guidelines for blood sampling and closed blood sampling device and education of clinical staff was implemented. Further analysis repeated over a 10-month period (Group B).

Results

306 and 300 patients were analysed in groups A and B respectively. Coronary bypass grafts and Valve replacements comprised 62% of our unit's workload. Following the implementation of the bundle, there were fewer number of samples (23,572 vs 19,147), and less volume of blood (125.5L vs 87.9L) drawn for testing in Groups A vs B respectively. This resulted in a reduction of 29% of blood drawn per patient (451ml vs 293ml). Fewer units of blood were also transfused (2.8 vs 2.1) per patient, resulting in a significant decrease in cost (per patient (GBP 420 vs 329) per patient.

Conclusion

Our study is the first to demonstrate that a peri-operative blood testing bundle can significantly reduce the blood testing burden post cardiac surgery. Blood drawn for tests may have an impact on the patients haemoglobin concentration resulting in anaemia and need for blood transfusion, thus adversely affecting the patient, blood stocks and finances.

Kinetics, Transcription Factor and Protein Expression of Human Right Sided Engineered Heart Tissue Supersedes the Left Side

Khalil, A¹; Owen, T²; Punjabi, P²; Harding, S²

¹Royal Brompton Hospital; ²Imperial College London

Objective

3D engineered heart tissue (EHT) is constructed using cardiomyocytes differentiated from human induced pluripotent stem cells (hiPSC-CM). Addition of human foetal cardiac fibroblasts to EHT constructs not only provided structural support, but enhanced force output, improved calcium handling and induced expression of more mature sarcomeric proteins. This project investigated the mechanism of this effect in terms of their kinetics, transcription factor (TF) expression and protein secretion profile. The potential role of adult human cardiac fibroblasts from different chambers of the human heart is used to find out if one chamber is better than other in generating EHTs.

Methods

EHTs were constructed as per Samata's protocol. Each construct contained a pre-tested ratio of cardiomyocytes and fibroblasts mixed with fibrin and thrombin. The incubation setting, bathing medium, change of medium, temperature and environmental conditions during the kinetics recordings of EHTs were standardised. The kinetic recordings were measured simultaneously, 2-3 hours after changing the medium. Temperature was optimised at 37°C, maintaining 33% humidity with 5% CO₂. Continuous video-optic recordings were monitored for accuracy. TF expression and protein secretions were noted in a predefined manner.

Conclusions

1. Chamber specific EHTs exhibited variations in their kinetics (chronotropy, inotropy and T1-20% and T2-20%).
2. Variation of kinetics between left and right sided chambers were more prominent than upper and lower chambers.
3. Comparison of characteristics of EHTs from both atria didn't show any noteworthy differences. Contrasting factors were more obvious among ventricles.
4. TF expression was variable between right and left sided EHTs. Variation of protein expression followed the same pattern as TF expression.

A Systematic Review of the Quality of Abstracts Reporting on Randomised Controlled Trials Presented at Major International Cardiothoracic Conferences

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¹University Hospitals of Derby and Burton; ²Nottingham University Hospitals NHS Trust; ³University Hospitals of Leicester NHS Trust

Objectives

Conference proceedings are widely available and may represent the only accessible report of given research. Poor reporting of randomised controlled trials (RCTs) in conference abstracts may impede interpretability. In 2008, the Consolidating Standards of Reporting Trials (CONSORT) group published guidance on the minimum standards for reporting of RCTs in conference abstracts. We sought to evaluate the reporting quality of abstracts presented at major international cardiothoracic annual meetings.

Methods

Published abstracts were retrieved for annual cardiothoracic meetings held between 2016 and 2018. Two of seven international Societies did not make their abstracts available. Abstracts were screened for inclusion, and those for RCTs were scored by two independent reviewers against the 17-item CONSORT checklist. Conflict was resolved by a senior reviewer. The primary endpoint was the total number of checklist criteria reported in an individual abstract. Statistical analysis was performed using Stata SE v16.

Results

3323 abstracts were screened, revealing 103 (3.1%) RCTs [Table 1]. On average, 35% (median 6, range 2 to 15) of checklist items were reported in individual abstracts. Funding disclosures (n=3, 2.9%), details of the randomisation process (n=5, 4.8%) and comprehensive results (n=8, 7.8%) were the least-frequently reported. There was no difference between conferences (p=0.07) or subsequent years (p=0.06) in terms of reporting quality; or between oral and poster sessions (p=0.76). Multicentre trials (MD 1.44, p=0.03), and registered trials (MD 1.5, p<0.001) scored better. A well-structured conference abstract was not associated with successful publication of a full-text journal article (p=0.33).

Annual Meeting	Abstracts (n)	RCTs (n, %)	CONSORT Checklist Score (mean±SD)
AATS	546	25 (4.6%)	6.48±1.90
ANZSCTS	602	8 (1.3%)	4.60±1.02
ESTS	800	41 (5.1%)	6.41±2.28
STS	656	15 (2.3%)	6.06±1.77
WSCTS	719	14 (1.9%)	4.86±2.32

Conclusions

The reporting quality of RCT abstracts accepted for presentation at international cardiothoracic annual meetings remains poor when benchmarked against the CONSORT standards. This highlights an area for targeted quality improvement.

Vitamin-D Induced Cardio-protection by Modulating Mitochondrial Respiration After Simulated Ischaemia and Reperfusion in Cardiomyocytes

Haqzad, Y¹; Hobkirk, J²; Burska, A³; Chaudhry, M¹; Carroll, S³; Loubani, M¹

¹Castle Hill Hospital; ²University of Hull; ³University of Leeds

Objective

Mitochondria play a critical role in cardiac function and cardioprotective pathways: Respiration is inhibited during ischaemia and re-established during reperfusion Results in reactive oxygen species (ROS) generation and mitochondrial Ca²⁺ overload Leads to myocardial cell death and dysfunction.

Aim

Establish if therapeutic doses of vitamin D impact mitochondrial respiration during reperfusion after exposing cardiomyocytes to simulated ischaemia.

Methods

iCell cardiomyocytes were grown for seven-days in standard culture conditions. Cells were dosed with either 50 nmol (corresponds to insufficiency) or 100 nmol (sufficiency) of vitamin D for 12 hours prior to simulated ischaemia and reperfusion. Oxygen consumption rates (OCR) and extra-cellular acidification rate (ECAR) were measured on a XFe96 Extracellular Flux Analyzer (SEAHORSE).

Results

Basal, maximal mitochondrial respiration and non-mitochondrial respiration were analysed in cardiomyocytes exposed to 50 and 100 nmol of vitamin D after simulated ischaemia and reperfusion. Mito Stress test and its respiration parameters upon administration of ETC agonist and antagonists according to vitamin D doses Yellow bars (50 nmol) and purple (100 nmol)

Conclusion

Vitamin D treated cardiomyocytes basal respiration during simulated reperfusion was reduced by 46% (50 nmol) and 67% (100nmol) compared to control untreated cardiomyocytes. Stimulating the cardiomyocytes with FCCP to elicit maximal respiration resulted in a 60-70% reduction in oxygen consumption. Non-mitochondrial respiration (glycolysis) was reduced by 20% and 60% in 50 and 100 nmol of vitamin D, respectively. This observed decrease in mitochondrial and non-mitochondrial respiration may be a physiological mechanism to aid cell survival. Vitamin D may therefore be a protective agent to limit ischaemia/reperfusion cardiac damage during cardiac surgery.

Re-Exploration for Bleeding or Tamponade – Is Timing Everything?

Ahmed, Y; Sharma, S; George, J; Rind, T; Aslam, U; Ashraf, S; Zaidi, A; Youhana, A; Kumar, P; Bhatti, F

Morrison Hospital, Swansea

Objectives

To compare outcomes following re-exploration for bleeding and tamponade based on timing post cardiac surgery.

Methods

Prospectively collected patient data was reviewed over a 7 years period (2013-2019) in our unit. We identified patients who returned to theatre for re-exploration for bleeding or suspected tamponade. Patients were divided into early reopening (<6 hours) or late reopening (6-48 hours). Delayed tamponade patients were excluded.

Results

4429 patients were operated during the period of study. Of these, 156 (3.5%) patients were re-explored for bleeding or cardiac tamponade. 67 patients were explored early (Group A) and 89 late (Group B).

Patients explored later (Group B) tended to be older in Age 73.7 vs 67.8 years ($p=0.19$), more likely to be non-elective 75.28% vs 56.71% ($p=0.054$) and with a higher logistic EuroSCORE 16.45 vs 11.29 ($p=0.048$).

Post-operative complications were also higher in the group re-explored late (Group B vs Group A). Deep sternal infection rate was 6.74% vs 1.49% ($p=0.037$), pulmonary complications 28% vs 19% ($p=0.056$), new haemofiltration 24.72% vs 16.42% ($p=0.10$), postoperative ITU stay 13.46 vs 8.11 days ($p=0.15$) and hospital stay 22.5 vs 19.22 days ($p=0.15$). Mortality was 21.35% vs 10.45% ($p=0.038$) respectively.

Conclusion

Early re-exploration for bleeding or tamponade leads to better postoperative outcomes. The decision on timing of re-exploration can, however, be a complex one where an individual patient's comorbidities, risks and potential benefits need to be balanced.

Machine Learning Improves Mortality Risk Prediction After Cardiac Surgery: Systematic Review and Meta-analysis

Sinha, S¹; Dimagli, A¹; Cocomello, L¹; Gibbison, B¹; Caputo, M¹; Gaunt, T²; Lyon, M²; Holmes, C³; Angelini, G¹; Benedetto, U¹

¹Bristol Royal Infirmary; ²University of Bristol; ³University of Oxford

Background

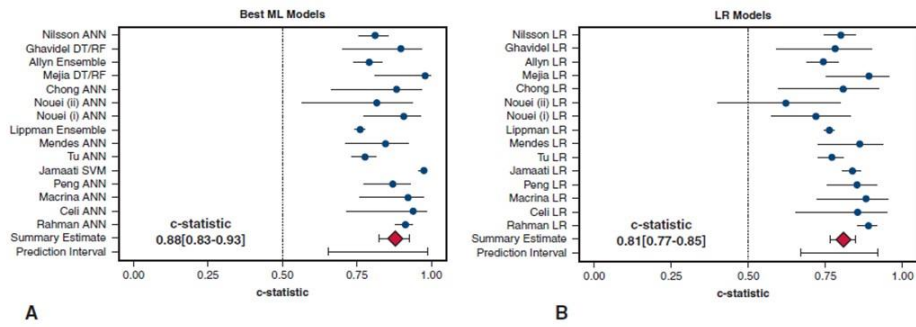
Interest in the usefulness of machine learning (ML) methods for outcomes prediction has continued to increase in recent years. However, the advantage of advanced ML model over traditional logistic regression (LR) remains controversial. We performed a systematic review and meta-analysis of studies comparing the discrimination accuracy between ML models versus LR in predicting operative mortality following cardiac surgery.

Methods

The present systematic review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analysis statement. Discrimination ability was assessed using the C-statistic. Pooled C-statistics and its 95% credibility interval for ML models and LR were obtained using a Bayesian framework. Pooled estimates for ML models and LR were compared to inform on difference between the 2 approaches.

Results

We identified 459 published citations of which 15 studies met inclusion criteria and were used for the quantitative and qualitative analysis. When the best ML model from individual study was used, meta-analytic estimates showed that ML were associated with a significantly higher C-statistic (ML, 0.88; 95%credibility interval, 0.83-0.93 vs LR, 0.81; 95% credibility interval, 0.77-0.85; P0.03). When individual ML algorithms were instead selected, we found a nonsignificant trend toward better prediction with each of ML algorithms. We found no evidence of publication bias (P0.70).



Conclusions

The present findings suggest that when compared with LR, ML models provide better discrimination in mortality prediction after cardiac surgery. However, the magnitude and clinical influence of such an improvement remains uncertain.

Minimal Proteomic Expression of Right Ventricular Fibroblasts Based EHTs Defines the Rationale of Better Kinetics Than Other Chambers

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¹Royal Brompton Hospital; ²Imperial College London

Objectives

- Paracrine communication between cells is mediated via extracellular signalling proteins molecules such as growth factors, cytokines, and chemokines.
- Fibroblasts under physiological and pathological conditions can modify myocyte size, electrophysiological properties, excitation-contraction coupling and calcium transit time both at cellular and tissue levels.
- EHTs are constructed with a pre-calculated number of cardiomyocytes and non-cardiomyocytes.
- The paracrine effect mediated by RV fibroblasts based EHTs is better demonstrated and understood.

Methods

- Proteomic profile analysis of EHT bathing medium was carried out at pre-determined intervals using Human XL Cytokine Antibody Array kit (ARY022B).
- Each membrane contains 102 proteins different capture and control antibodies imprinted in duplicates and can detect multiple cytokines, chemokines, growth factors and other soluble proteins in the cell culture supernates.
- The membrane was exposed to the extracellular proteins followed by incubation with cocktail of biotinylated detection antibodies.
- Subsequent exposure to Streptavidin-HRP and chemiluminescent detection agents produced a signal at each spot.
- The individual spots were then analysed against the control and mean pixel density was noted for expression of individual proteins.
- A comparison was made between all four chamber fibroblasts based EHTs.

Conclusions

- Protein expression from EHTs with all four chamber fibroblasts showed systematic parity and variance between artia and ventricles.
- Proteins expression declined at 16 days, particularly for ventricle groups.
- Proteins included angiogenic factors, cytokines, growth factors & homing factors. Proteomic expression of atrial EHTs was stronger than ventricular FB-EHTs.
- Right ventricular fibroblasts secreted least amount of proteins. Decreased inhibitory effect of proteins and fewer interactions led to better kinetics.

Does Wearing Enhanced Personal Protective Equipment (PPE) in Theatre Increase Cardiothoracic Surgeon Workload and Patient Morbidity?

Gysling, S¹; Maresca, G²; Brooks, A³; Patel, A⁴; Caruana, E⁵

¹University Hospitals of Derby and Burton; ²Aberdeen Royal Infirmary; ³Nottingham University Hospitals NHS Trust; ⁴University of Birmingham; ⁵University Hospitals of Leicester NHS Trust

Objective

Delivery of surgical services during the COVID-19 pandemic has required the use of enhanced PPE (ePPE) in the operating theatre. We sought to evaluate the impact of this change on cardiothoracic surgeon workload and intraoperative patient outcomes.

Methods

Cardiothoracic surgeons performing as primary operator completed an online procedure-specific questionnaire on workload ratings for each operative case, using an extension of the validated Surgeon Task Load Index (SURG-TLX) tool (reported as an average of seven 20-point subscales), together with operative details. Local approval was obtained at individual sites. Data was analysed in Stata SE v16.

Results

80 complete responses (58% thoracic (n=46), 42% cardiac (n=34)) were collected from June to October 2020. ePPE was used in 83% (n = 66) of cases.

ePPE use was associated with higher surgeon workload (mean±SD 10.6±3.6 vs 8.4±3.3, p=0.03) as measured by the original SURG-TLX tool. On analysis of individual subscales, distraction (10.1±3.18 vs 6.57±3.18, p=0.002) and communication (15.7±3.6 vs 6.9±3.5, p<0.001) were rated significantly worse when using ePPE.

There was no association between ePPE used and subjectively-increased operative challenge (p=0.385) or longer operative time than anticipated (p=1.000).

Conclusion

The use of enhanced PPE in the cardiothoracic surgeon cohort is associated with increased surgeon workload, distraction and communication difficulties, as assessed by SURG-TLX.

Durand-Hill, M; Ike, D; Shipolini, A; Wald, D

Barts NHS Trust

Objectives

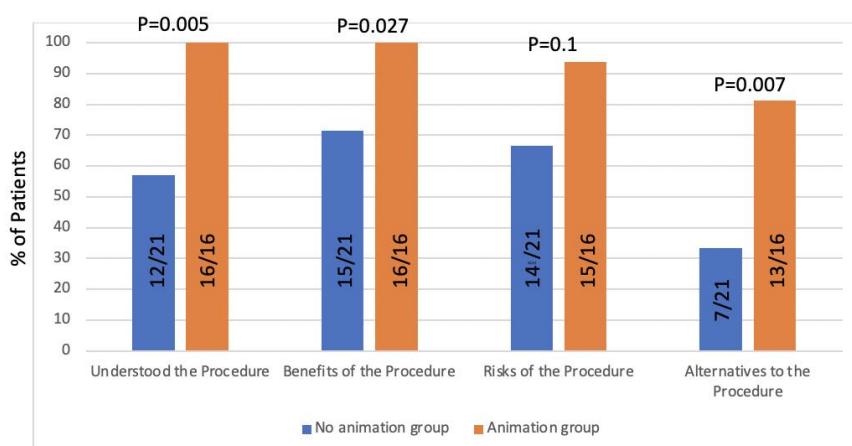
Patient understanding before consent to elective surgery is often incomplete. Language barriers and time constraints have been identified as significant obstacles. We introduced digital animations to support consent and assessed the effect on patient understanding.

Methods

Animations explaining Coronary Artery Bypass Graft and Aortic Valve Replacement surgery (www.explainmyprocedure.com) were introduced at a tertiary cardiac centre and made available online and using tablets in 6 different languages (English, Bengali, Hindi, Polish, Turkish and Arabic). Reported understanding of the procedure, its benefits, risks and alternatives were recorded in 21 consecutive patients before introduction of the animations (no animation group) and 16 patients after their introduction (animation group). Patients were asked to answer using one of three responses (understand completely, understand partly, don't understand) and responses were analysed categorically (complete understanding versus partial or no understanding) and compared.

Results

The proportions of patients who reported they understood the procedure, its benefits, risks and alternatives in the no animation group were, 57.1%, 71.4%, 66.7% and 33.3% and in the animation group were 100%, 100%, 93.8% and 81.3% respectively. The relative improvement (ratio of proportions) was 1.75 (95% CI: 1.31, 2.63; P=0.005), 1.40 (95% CI: 1.11, 1.91; P=0.027), 1.41 (95% CI: 0.95, 2.10; P=0.1) and 2.44 (95% CI: 1.19, 7.0; P=0.007) respectively (Table 1).



Conclusion

The use of multi-language animations explaining elective cardiac surgical procedures was associated with substantial improvement in reported understanding before consent.

Mitigating the Negative Impact of COVID-19 on National Cardiothoracic Surgical Skills and Training: The London School of Cardiothoracics' Experience

Ike, D; Asemota, N; Durand-Hill, M; Shipolini, A; Oo, A; Stamenkovic, S

St Bartholomew's Hospital

Objectives

The COVID-19 pandemic has significantly reduced access to quality national surgical skills and simulation training. Lockdown restrictions, social distancing guidelines and the clear difficulties in sustaining surgical training have contributed to this emerging landscape.

Method

The SHO group set up an unincorporated association with consultant support of the cardiothoracic department at a large London hospital to tackle this challenge. To date, we have organized a national training course in essential surgical skills in cardiothoracic surgery (accredited by SCTS) for ST1/3 preparation, and an advanced robotics technical skills course (accredited by SCTS and ISMICS). These courses were taught while adhering to strict COVID-19 guidelines and hospital protocols.

Results

Participants reported low pre-course knowledge of the topics covered in both courses (study mean= 2.04 SD= 0.54). Conversely, high satisfaction was reported for knowledge acquired, course content, organization, logistics, and COVID-19 protocols instituted during both courses. A two-week follow-up of candidates revealed a zero incidence of COVID-19 related to both courses. Participants were highly likely to recommend both and future courses by the department to their colleagues.

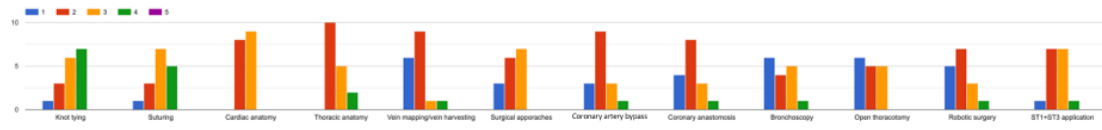
Conclusion

Given the unique nature of this crisis and its potential to persist for an extended time period, it is imperative that suitable interventions are made to maintain and improve surgical training. This should produce better-skilled surgeons and lead to improved patient outcomes. We encourage more NHS trusts to deliver more national teaching courses as a potential solution to this problem while adhering to COVID-19 guidelines and ensuring the safety of trainee participants. Our experience suggests that this is possible within the current pandemic and provides a blueprint for other surgical specialties to follow.

Essential Surgical Skills in Cardiothoracic Surgery – 29/8/2020

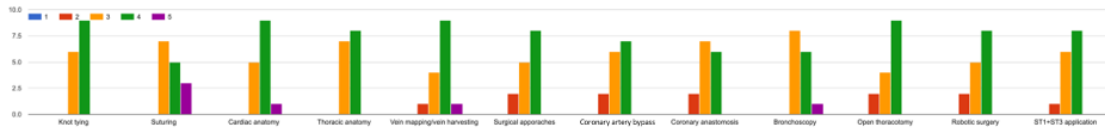
Pre-Course Questionnaire

How Confident are you with the following Basic Cardiothoracic skills? 1 (not confident at all) to 5 (Extremely confident)



Post-Course Questionnaire

How Confident are you with the following Basic Cardiothoracic skills? 1 (not confident at all) to 5 (Extremely confident)



Utilization of Extracorporeal Life Support: A 5-year Single-centre Experience

Oyebanji, O; Revilla-Martin, C; Crockett, J; Awad, W

Barts NHS Trust

Objectives

The use of extracorporeal life support (ECLS) has increased worldwide over the past years due to improved technology, ease of management, growing familiarity with its capability and decreased costs. We analysed use and outcomes of ECLS at our Centre.

Methods

A retrospective cohort study of adults treated with ECLS for cardiogenic shock between January 2015 and October 2020 in a large London teaching hospital. We investigated patient characteristics, indications, and management to determine factors affecting outcomes.

Results

77 patients underwent veno-arterial extra-corporeal life support (V-A ECLS) over this period. The mean age of this cohort was 52.6 years (range, 17-79 years), and 63.6% were male. Indications for ECLS included post-cardiotomy (PC) in 37/77 (48.1%), myocarditis in 10/77 (13.0%), post MI in 12/77 (15.6%) and other in 18/77 (23.4%). The median duration of ECLS support was 5 days (range 0–24 days), and 32 (41.6%) of patients survived to discharge. Pre-ECLS procedures in PC patients in cardiogenic shock were isolated CABG in 4/37 (10.8%), isolated valve surgery in 18/37 (48.6%), thoracic aorta surgery in 10/37 (27%), CABG + valve in 4/37 (10.8%) or other surgery in 2.7%. The mean age of this subset was 57 years (range 24 -79 years), and 56.8% were men. The median duration of ECLS support was 5 days (range 0-24 days) and 10/37 (27.0%) of patients survived to discharge. Weaning from ECLS was achieved in 14 (37.8%) of patients, and 9/14 (64.3%) survived to discharge.

Conclusions

Our experience confirms satisfactory survival rates may be achieved in such a challenging ECLS setting. PC patients had lower survival rates. Strategies to improve outcomes of PC-ECLS and intervention in this high-risk population are needed. Nevertheless, PC-ECLS remains a valuable resource for temporary cardiocirculatory and respiratory support in patients who would otherwise most likely die.

Fit for Surgery (F4S) – Repurposing an App-Based Personalised Rehabilitation Programme to Help Patients Prepare and Recover from Major Cardiac Surgery

Budacan, A; Payton, C; Tarrant, A; Moffit, D; Gee, K; Ranasinghe, A; Naidu, B

University Hospital Birmingham

Background

Despite being essential following cardiac surgery, cardiac rehabilitation (CR) uptake is variable and it is likely to decrease, given the social distancing measures imposed due to COVID-19. Having proven that F4S app can deliver rehabilitation before and after lung surgery from the comfort of one's home, we aimed to re-purpose this app to deliver CR before and after cardiac surgery, to increase the adherence to CR and improve outcomes.

Methods

The project team will use the UK Design Council's Double Diamond method (Figure 1) to re-purpose the F4S lung app to deliver cardiac rehabilitation. This process has four phases (discover, define, develop, deliver) and ideas are created (divergent thinking) and then narrowed down to the best concept or solution (convergent thinking). Agile methodology is being used in the development phase and ideas are created, prototyped, tested and iterated in sprints, with input from key stakeholders.

Results

The above process has enabled the creation of a cardiac rehabilitation app which offers the option to benefit from all aspects of cardiac rehabilitation to both patients undergoing elective cardiac surgery and the healthcare professionals (HCPs) supporting them. Patient and HCPs focus groups were used to define and discover the key elements and develop and test the prototype, to deliver a product that includes all relevant aspects of CR.

Conclusion

This app supports the delivery of a personalised CR programme in the comfort of one's home. Once the intervention development is finalised, we will assess its feasibility to determine if it is appropriate to proceed to a substantive randomised clinical trial study.

Adult Cardiac Mitral Valve

Management Options for Mitral Valve Pathology in the Setting of Severe Mitral Annular Calcification

Imran Hamid, U; Gregg, A; Spence, M; Manoharan, G; Jeganathan, R

Royal Victoria Hospital, Belfast

Objective

The objective of this study was to evaluate the outcomes of patients with symptomatic mitral valve pathology with severe MAC referred at the high-risk valve MDT.

Methods

Retrospective analysis of patients between 2017 to 2019 who were discussed at the high-risk valve MDT for mitral intervention with underlying MAC were considered in the study. Demographic details, intervention, peri-operative complications, hospital stay - 30 day and one-year mortality, symptoms post discharge were analyzed at 12 months follow-up.

Results

10 patients were discussed at the high-risk MDT with severe MAC with symptomatic mitral valve pathology. All patients were females. Seven patients underwent trans-atrial trans-catheter mitral valve implantation (TMVI) by a single surgeon (table 1). The mean age was 71 years with a mean EuroSCOREII of 4.9%. Five patients had concomitant valve procedures. Thirty-day in hospital mortality was 14% (1 patient) whereas one-year mortality was 29% (2 patients). There was marked symptomatic improvement with downgrade of NYHA class from III/IV to I/II. The three patients that were turned down had a mean age of 73, mean EuroSCORE II of 5.72 %. They were alive at 12 months follow up from the date of assessment however with NYHA-III/IV symptoms.

Conclusion

A careful selection of patients with MAC should be carried out after heart team discussion, who are likely to benefit on prognostic and symptomatic grounds.

Patient	Age	Sex	ES II %	LV function	RV function	PA Pressure mmhg	NYHA	Procedure	Post-op Renal replacement therapy	ICU stay in days	CVA	Hospital stay in days	30 day Mortality	1 year Mortality
1	76	F	4.9	Mild impairment	Mild to moderate impairment	61	IV	TMVI	Yes	11	No	30	No	No
2	68	F	3.2	Normal	Normal	50	IV	TMVI + TVr	No	6	Yes	13	No	No
3	76	F	5.7	mild	Mild impairment	25	III	TMVI + AVR	No	2	No	2	Yes	-
4	78	F	10.1	Normal	Normal	105	III	TMVI + TVr	No	5	No	30	No	Yes
5	57	F	2.7	Normal	Normal	53	II	TMVI + AVR	Yes	14	No	31	No	No
6	80	F	5.5	Normal	Normal	37	III	TMVI	No	14	No	29	No	No
7	67	F	2	Normal	Normal	29	II	TMVI + AVR	No	19	No	24	No	No

Table 1: Patient characteristics and in hospital outcomes.

Left Atrial or Transeptal Approach for Mitral Valve Surgery: A Systematic Review and Meta-analysis

Kusu-Orkar, T¹; Harky, A²; Chan, J³; Norishwani, A²; Savarimuthu, S⁴; Pousios, D²; Muir, A²

¹Nottingham University Hospital Trust; ²Liverpool Heart and Chest; ³Division of Cardiology, Department of Medicine and Therapeutics, Prince of Wales Hospital, Hong Kong; Faculty of Medicine, The C; ⁴Department of medicine, Chelmsford

Objective

To compare outcomes of mitral valve surgery through conventional left atriotomy and transeptal approach (TS).

Methods

Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines were followed. Primary outcomes were operative mortality and permanent pacemaker (PPM) implantation; secondary outcomes were new onset of atrial fibrillation (AF), stroke and operative times.

Results

Sixteen articles met the inclusion criteria with 4537 patients. Cardiopulmonary bypass was longer with TS (weighted mean differences - 16.44 minutes [-29.53, -3.36], P = 0.01). Rates of PPM implantation (risk ratio 0.65 [0.47, 0.89], P = 0.007) and new onset AF (risk ratio 0.87 [0.78, 0.97], P = 0.02) were higher with TS. Subgroup analysis of isolated mitral valve surgery cohort showed no difference in operative times, mortality, new onset of AF, stroke, and PPM implantation.

Conclusions

There is equal outcomes between both approaches during isolated mitral valve surgery; however, TS was associated with longer operative times and higher postoperative AF and PPM rates when pooling combined procedures. A large randomized controlled trial is required to confirm those findings.

Endoscopic Beating Mitral Valve Surgery

Abbas, S; Elhassan, H; Abdelbar, A; Zacharias, J

Blackpool Victoria Hospital

Objectives

To investigate the outcome of endoscopic mitral valve (±other procedures) surgery performed in our institution.

Method

Cases performed between 2014-2020 were retrospectively collected from our database. Data was expressed in mean ± standard deviation, categorical data was expressed in frequencies as there is no control to compare to.

Results

A total of 36 cases of mitral valve procedure were performed. In 15 cases, one or more of other procedure (i.e. tricuspid valve repair, AF ablation or PFO closure) were performed. Total bypass time was 139.0±21.30 minutes with one patient requiring cross-clamp due to difficult procedure. Conversion to sternotomy was performed in one patient. Two patients required re-exploration for bleeding. Drainage in the first 24 hour was 391.0±342.38 ml with two patients required blood transfusion. Permanent stroke occurred in one patient. One patient died due to myocardial infarction. Total ICU stay was 2.60±5.85 days while total post-operative stay was 8.36±9.74 days. First-time isolated mitral valve procedures (21 patients) had the least frequency of complications.

Conclusion

Totally endoscopic beating mitral valve surgery is safe to be performed by experienced teams in endoscopic cardiac surgery. It is an adjunct tool for myocardial protection when cross-clamp utilization is difficult.

Category	Number	Mean or Percentage
Age (mean±SD)	37-85 years	69.10±11.09
Male gender	23 patients	63.8%
Dyspnea (NYHA 3-4)	24 patients	66.6%
Preoperative sinus rhythm	25 patients	69.4%
Previous sternotomy	12 patients	33.3%
Total Cardiopulmonary bypass time (mean±SD)	101-207 minutes	139.0±21.30
Conversion	1 patient	2.7%
Post-operative cerebrovascular accident	3 patients	8.3%
Total post-op stay (mean±SD)	3-60 days	8.36±9.74

Comparison of Outcomes Between Minimally Invasive and Median Sternotomy for Double and Triple Valve Surgery: A Meta-analysis

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¹University of Bristol Medical School; ²Imperial College London; ³Bristol Heart Institute

Background

Limited data exists demonstrating the efficacy of minimally invasive surgery (MIS) compared to median sternotomy (MS) for multi-valvular disease (MVD). This systematic review and meta-analysis aims to compare operative and peri-operative outcomes of MIS versus MS in MVD.

Methods

PubMed, Ovid and Embase were searched from inception until August 2019 for randomised and observational studies comparing MIS and MS in patients with MVD. Clinical outcomes of intra- and post-operative times, re-operation for bleeding and surgical site infection were evaluated.

Results

Five observational studies comparing 340 MIS versus 414 MS patients were eligible for qualitative and quantitative review. The quality of evidence assessed using the Newcastle-Ottawa scale was good for all included studies.

Meta-analysis demonstrated increased cardiopulmonary bypass time for MIS patients (weighted mean difference [WMD] 0.487, 95% confidence interval [CI] 0.365 – 0.608, $P < 0.0001$). Similarly, aortic cross-clamp (AoX) time was longer in patients undergoing MIS (WMD 0.632 95% CI 0.509 - 0.755, $P < 0.0001$). No differences were found in operative mortality, reoperation for bleeding, surgical site infection or hospital stay.

Conclusions

MIS for MVD have similar short-term outcomes compared to MS. This adds value to the use of minimally invasive methods for multi-valvular surgery, despite conferring longer operative times. However, the paucity in literature and learning curve associated with MIS warrants further evidence, ideally randomised control trials, to support these findings.

Early Hemodynamic Performance After Repair for Degenerative Mitral Valve Disease: A Comparison Between Leaflet Resection and Preservation Techniques

Wierup, P; Javorski, M; Chemtob, R; Griffin, B; Cremer, P; Jaber, W; Desai, M; Serge, H; Svensson, L; Burns, D; Gillinov, M

Cleveland Clinic

Objectives

This study compares non-resection techniques using artificial neochords with traditional resection techniques in patients with degenerative mitral valve disease.

Methods

We identified patients undergoing mitral valve repair between January 2014 and April 2019 at our institution. In total 1138 received a partial flexible annuloplasty band size 35#, along with either leaflet resection or neochord reconstruction, and these constituted our study group. Concomitant procedures, except for tricuspid valve operations and maze, were excluded. Peri- and postoperative outcomes of patients undergoing leaflet resection vs neochord reconstruction were compared.

Results

Out of 1138 patients, 878 (77%) patients underwent mitral leaflet resection and 260 (23%) patients had leaflet preservation with neochords only. Hospital mortality was 1/878 (0.1%) in the leaflet resection group and zero in the neochord group. The rate of stroke (0.7% vs 0.8%), renal failure (0% vs 0%), and atrial fibrillation (24% vs 25%) were similar in the leaflet resection group and neochord group, respectively. Reoperation for valve dysfunction occurred in 4 (0.5%) patients in the resection group and 2 (0.8%) patients in the neochord group ($p=.54$). On pre-discharge transthoracic echocardiography, mitral regurgitation >1+ was 2% vs 3% and SAM was present in 1.3% vs 1.5% in the resection vs neochord groups, respectively. The mean mitral valve gradient was 3.6 ± 1.4 mmHg in the resection group and 2.8 ± 1.0 mmHg in the neochord group ($p<.0001$). The amount of patients with mean mitral valve gradient >5 mmHg was 14% in the resection group compared to 3% in the neochord group ($p<.0001$)

Conclusions

Mitral valve repair with either resection or preservation techniques results in early excellent results. Leaflet preservation with the neochord technique resulted in significantly lower mean gradients across the valve.

Robotic Trans Mitral Septal Myectomy and Mitral Valve Repair for Hypertrophic Cardiomyopathy and Degenerative Mitral Valve Disease (Video)

Hodges, K¹; Chemtob, R¹; CJ, A²; Lever, H¹; Desai, M¹; Burns, D¹; Svensson, L¹; Smedira, N¹; Gillinov, M¹; Wierup, P¹

¹Cleveland Clinic; ²University of Mississippi Medical Center

Endoscopic Mitral Valve Replacement Following Failed Mitraclip Procedures in a High-risk Patient

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¹Hammersmith Hospital, Imperial College, London; ²Kings College Hospital

Mitral valve surgery has improved over the last few decades with excellent outcomes. In high-risk patients, there is a move towards less invasive catheter-based techniques such as the Mitraclip.

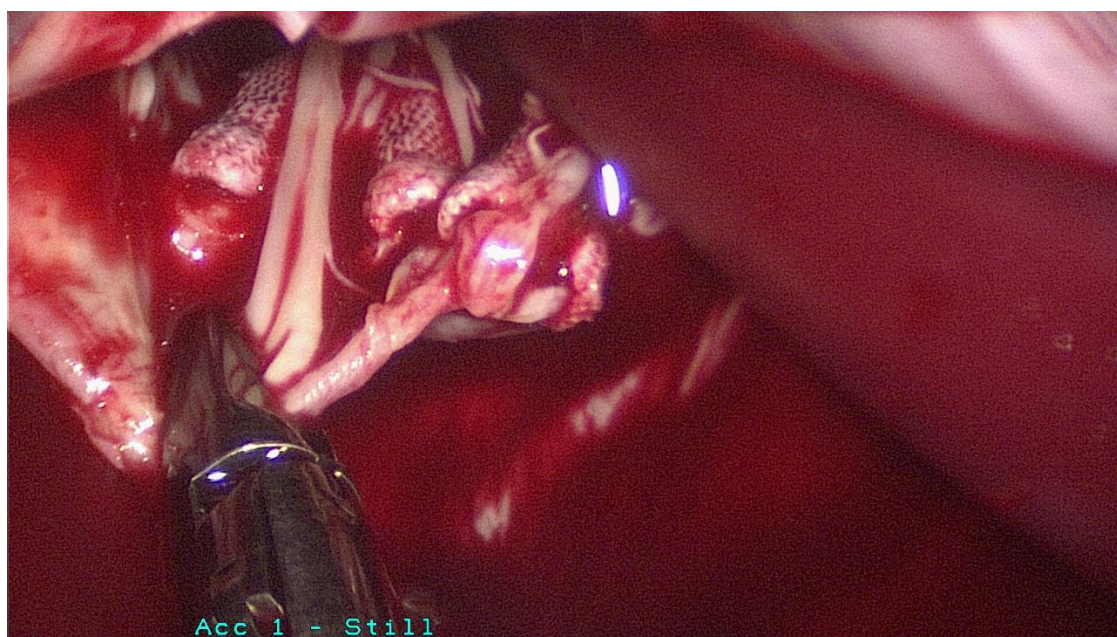
We describe a patient, with extensive cardiac history and comorbidities, who underwent 2 consecutive MitraClip procedures for severe mitral regurgitation without any improvement. A transthoracic echocardiogram showed moderate to severe mitral regurgitation, with 3 clips in situ, a large iatrogenic atrial septum defect (ASD) and LV ejection fraction of 50%. Patient suffered a PEA arrest and continued to have cardiogenic shock and resistant heart failure, requiring renal replacement therapy. He was discussed with the cardiothoracic surgeons for further management.

Patient underwent an endoscopic mitral valve replacement with ASD closure via a right anterior minithoracotomy, using a non-aortic cross-clamp fibrillatory technique. The 3 Mitraclips were removed (figure 1) and a 31 mm SJM Epic bioprosthesis was implanted.

A post-operative transthoracic echocardiogram showed a well-seated mitral valve with no obvious regurgitation and no residual ASD. Patient achieved good recovery and was discharged home.

Minimally invasive mitral valve surgery should be considered for high-risk patients and a careful selection for MitraClip is critical.

Figure 1 - MitraClips viewed during endoscopic mitral valve replacement



Surgical Management of Hypertrophic Cardiomyopathy as Part of a High Volume Specialist Multidisciplinary Team

Yates, M; Savvatis, K; Rathwell, C; Shipolini, A

St Bartholomew's Hospital

Objectives

Left ventricular outflow tract obstruction can lead to significant symptoms in patients with hypertrophic cardiomyopathy. Treatment options include pacemaker insertion, alcohol septal ablation or surgical myectomy, with or without mitral valve intervention. We believe a successful surgical program should be embedded in a high-volume specialist multidisciplinary team, able to offer patients the most appropriate care tailored to their individual needs. We review the first 4 years surgical experience of a septal myectomy program in the United Kingdom.

Methods

Single centre experience of septal myectomy as part of a specialist hypertrophic cardiomyopathy team. All patients are discussed in MDT preoperatively and managed in theatre by a specialist surgeon, anaesthetist and cardiologist. Data from a prospective database was reviewed retrospectively for physiological and clinical outcomes.

Results

From September 2016 to October 2020, a total of 112 patients underwent septal myectomy by a single surgeon. Mean age was 51 years and 75 (67%) were male. Surgical procedures were Septal Myectomy alone 16, Septal Myectomy + Mitral Valve Repair 88, Septal Myectomy + Other 8. Fifty-nine patients had left atrial appendage occlusion. Mean bypass and cross clamp times were 138 and 106 minutes respectively. Mean weight of muscle resection was 6g (1.5-15). Twenty-eight (25%) patients had a second bypass run. There was, on average, a 96% reduction in directly measured, provoked LVOT gradient after surgery. There were no deaths. Symptomatic improvement was seen in more than 90% of patients.

Conclusion

Surgical management of hypertrophic cardiomyopathy can be performed safely with good outcomes as part of a high-volume specialist multidisciplinary team.

Minimally Invasive Access for Redo Isolated and Concomitant Mitral Valve Surgery: Safe Approach in the New Millennium

Bin Saeid, J; Harky, A; Pullan, M; Modi, P

Liverpool Heart & Chest Hospital NHS Foundation Trust

Objectives

Cardiac redo surgery after a full sternotomy represents a challenge due to higher perioperative morbidity and mortality. This study evaluates the right anterolateral mini-thoracotomy for intermediate and high-risk patients undergoing single and double valve redo procedures.

Methods

We identified twenty-four patients who underwent redo isolated or combined mitral valve surgery using the right anterolateral mini-thoracotomy between 2012 and 2019. There was one conversion to median sternotomy due to dense right chest adhesion. Right anterolateral mini-thoracotomy was the access of choice in all patients. We analysed prospectively collected data at baseline and follow-up.

Results

There were seven female patients in this group with mean (\pm SD) age of 64.2 ± 12 years, Body Mass Index (BMI) 27.5 ± 4.5 , EuroSCORE II 7.3 ± 6 and mean time to redo 12.6 ± 8.5 years. Femoral arterial cannulation was used in this group except for four patients who had axillary cannulation due to abdominal aorta grade IV atheroma. Endoaortic Balloon occlusion was used in 5 patients, one of whom had ineffective occlusion due to previous ascending aorta replacement who was converted to non-clamp VF technique and cooling to 25°C . Cardiopulmonary bypass time was 205 ± 59 minutes. The atrioventricular valve was repaired in eight cases. Postoperative median Creatine Kinase-MB was 34 on the first day, Intensive care and total postoperative hospital stay were 2.6 and 8 days, respectively. No stroke was reported and 30-days mortality was 4.1%. At a mean follow-up of 2.0 ± 1.8 years, patients had normal valve function and Survival rate of 91.6%

Conclusions

Redo isolated or concomitant mitral valve surgery can be safely performed using a minimally invasive approach in patients with previous sternotomy. By minimising the need for cardiac dissection and potential risk for injury, the right anterolateral thoracotomy can be the access of choice in intermediate and high-risk patients undergoing redo surgery.

Sternotomy or Mini Thoracotomy in Reoperative Mitral Valve Surgery? A Multi-center Retrospective Analysis

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¹King's College Hospital, London; ²Blackpool Victoria Hospital; ³Liverpool Heart & Chest Hospital

Objectives

An increasing number of patients are being considered for mitral valve intervention following previous cardiac surgery. Some of these patients are often of advanced age and significant comorbidities. Traditionally redo mitral valve intervention was performed through a redo median sternotomy (MS); other options include mini-thoracotomy (MT) and percutaneous options. We present a retrospective review from three institutions analyzing the results of MT versus MS.

Methods

A retrospective review of a prospectively collected database from three institutions was performed to include all patients undergoing redo cardiac surgery for the mitral valve between January 2010 – December 2019. 363 consecutive patients were included. 91 and 272 in the MT and MS groups respectively. Intra-operative outcomes and short-term clinical outcomes were reviewed.

Results

The in-hospital mortality in the MT group was 9.9% (n=9) and 11.4% (n=31) in the MS group. Both groups had a similar distribution of age, gender, BMI and logistic EuroSCORE. There was an increased proportion of patients with heart failure (NYHA III/IV) in the MT group (63.7% (n=58) vs. 61.3 (n=167)). Cardiopulmonary bypass times were longer in the MT group (182.9±56.2 vs. 154.5±75). Postoperative neurological dysfunction was 7.6% (n=7) MT group and 5.1% (n=14) in the MS group.

Conclusion

This large retrospective review demonstrates a trend towards lower in-hospital mortality rate and length of stay in patients undergoing redo mitral intervention through a MT approach. There was a slightly increased rate of postoperative neurological dysfunction and cardiopulmonary bypass times in the MT group MT is an option for redo mitral intervention and this should be a consideration for heart teams offering complex mitral procedures.

	Mini Thoracotomy (MT)	Median Sternotomy (MS)
n	91	272
Mean Age (years)	66±14.0	64.7±13.7
Female	34(37.4%)	120(44.1%)
Heart Failure (NYHA III/IV)	58(63.7%)	167(61.3%)
Cardiopulmonary bypass time (min)	182.9±56.2	154.5±75
Post-operative neurological dysfunction	7(7.6%)	14 (5.1%)
Post-operative length of stay (days)	10.9±9.1	18.6±26.7
Logistic EuroSCORE (%)	21.5±15.5	22.1±18.9
In-hospital mortality	9(9.9%)	31(11.4%)

Minimally Invasive Surgical Approach for Primary Benign Cardiac Tumors: Our Experience With Cryoablation to Optimise Recurrence-Free Survival

Bin Saeid, J; Al-Rawi, O; Palmer, K; Modi, P

Liverpool Heart & Chest Hospital NHS Foundation Trust

Objectives

Myxomas are the most common benign cardiac tumours and can be resected using both conventional and minimally invasive surgical approaches. Using septal cryoablation reduces the need for patching the atrial septum and potentially allows more patients to benefit from less invasive surgical approaches.

Methods

From August 2013 to September 2019, ten patients underwent resection of Left Atrial myxomas and cryoablation of the resection site. All patients were treated using a 4cm right mini-thoracotomy.

Results

There were seven female and three male patients in this group with a mean age of 60.1 ± 9.7 years and Body Mass Index (BMI) of 27.8 ± 7.3 . The tumour was left atrial in all cases with a mean (\pm SD) tumour size of 27.9 ± 13.9 mm. The Carney complex was diagnosed in two patients in this group, one of whom had the procedure as a redo after previous myxoma resection where endo-aortic balloon occlusion device was used. Two patients had concomitant atrioventricular valve repair. Cardiopulmonary bypass was established using right internal jugular / femoral venous drainage and femoral arterial return in all except one patient, who had axillary artery cannulation due to abdominal aortic grade IV atheroma. The mean cardiopulmonary bypass and aortic cross-clamp times were 107.5 ± 30.3 and 66.3 ± 27.8 , respectively. An Argon Cryoablation probe was applied to the septal resection site for a mean of 3.4 ± 1.1 minutes, aiming to cover the area with a 1cm ablation margin. One patient had a complete heart block that required a permanent pacemaker likely related to a TV repair. There was no mortality or strokes, and mean hospital stay was 7.2 ± 4.2 days. All patients were alive and free from recurrence at a mean follow up 2.4 ± 2.0 years.

Conclusions

Cryoablation is a simple strategy to facilitate a minimally invasive approach in cardiac myxomas to avoid the need for patching atrial septum and prevent local recurrence.

AF Surgery in the Context of Multiple Other Cardiac Procedures in the Elderly Patients. Risk or Benefit?

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New Cross Hospital

Objectives

Surgical AF ablation at time of other cardiac surgery offers major clinical benefit: a) reduced stroke risk b) fewer symptoms and c) improved cardiac function. Despite this, only a minority receive concomitant AF ablation. Surveys identified surgeon-perceived increase in risk as a reason for not undertaking AF ablation especially in elderly population. As a result, we evaluated outcomes of concurrent Cox-Maze procedures in elderly patients undergoing high-risk cardiac surgery.

Methods

We retrospectively identified patients aged >70 years with Atrial Fibrillation (AF) from 2011 to 2017 who had two or more non-AF cardiac procedures. They were subdivided into two-groups:

1. Cox-Maze IV
2. No-Surgical AF treatment

Patients who had Left Atrial Appendage Occlusion only or Pulmonary Vein Isolation were excluded. All patients in the Cox-Maze IV group had exclusion of left atrial appendage. Heart rhythm was assessed from Holter reports or 12-lead ECGs. Follow-up data collected through telephone consultations and medical records.

Results

There were 265 patients. Median follow-up 61 months. 70 cases had Cox-Maze IV (26.4%). Demographic, intra- and post-operative outcomes similar between groups. One (1.4%) patient in maze group with 30-day mortality compared to 14 (7.2%) in No-AF treatment group (P=0.07). Sinus rhythm at first, annual and latest follow-up was 80.8%, 84.9% and 80.0% respectively in Maze group - significantly better than No-Surgical AF treatment group (15.3%, 8.4%, 11.7%) (P<0.001). 181 patients (68.3%) alive at follow-up with better survival curves (p=0.02) and improved NYHA 1 status (p=0.009) in Maze group. No differences observed in freedom from stroke (p=0.80) or permanent pacemaker (p=0.33).

Conclusions

Surgical ablation is beneficial in elderly patients undergoing high-risk surgery - promoting excellent long-term freedom from AF and symptomatic/prognostic benefits. Therefore, surgical risk is not valid reason to deny benefits of concomitant AF ablation.

**Adult Cardiac
Scientific &
Experimental**

Simulation of Aerosolisation in Robotic Thoracic Surgery during the Covid-19 Pandemic

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Guy's and St. Thomas' NHS Foundation Trust

Objectives

The SARS-CoV-2 is transmitted via direct contact with respiratory droplets and/or inhalation of droplet nuclei. The aim of the study was to assess presence and degree of aerosolisation during robotic thoracic surgery, in a simulated environment.

Methods

This novel simulation model was designed to generate aerosolised particles inside and outside an artificial chest cavity containing four access points and an artificial lung. A fluorescent fluid was sprayed over the lung and chest cavity. The simulation included insufflation of the CO₂ into the chest cavity at 6 L/min, usage of instruments (staplers, graspers, cautery) and removal of a piece of the lung. Registration of the aerosolised particles was conducted using the UV light at wavelength 365 nm.

Results

Upon completion of the simulation, there was no evidence of aerosol droplets escaping the chest cavity. There were a number of aerosol droplets on the removed instruments, particularly staplers. The use of cautery did not generate aerosols; neither did insertion of the instruments. Removing the instruments created a potential for contamination of the operation theatre.

Conclusions

In this experimental study, robotic surgery was relatively safe in terms of spread of aerosols outside the chest cavity; however, further studies of infectious aerosolisation are needed.

Identification of Frailty Biomarkers in Silico

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University of Leicester

Background

Frailty have been previously characterised based on the physical symptoms of this syndrome. However, the molecular pathways underlying frailty have not been uncovered yet. Therefore, we aimed to identify the molecular pathways which are differentially regulated in frailty compared to healthy aging.

Methods

Gene expression data were gathered through an online search on the NCBI GEO database, using the searched term “frail*”. These datasets were screened against pre-specified inclusion/ exclusion criteria. Included datasets were annotated with Entrez gene IDs, batch effects were removed, the data was quantile normalised and regression analysis was used to gain the fold changes of the expression of the examined genes.

Results:

In total, 609 gene expression profiles were included and 16611 genes were examined. The results showed that 960 genes differed significantly between frail and non-frail individuals. A pathway analysis showed that 20 pathways were significantly affected by the dysregulation of these genes in frail subjects. Majority of these pathways was linked to protein synthesis, including translation initiation, translation elongation, co-translational targeting to the membrane and translation termination. Three targeted analyses were also preformed, examining genes specifically involved in 1) mitochondrial function, 2) iron metabolism and 3) epigenetic regulation. These analyses uncovered possible deregulation of respiratory electron transport and iron-sulphur cluster biogenesis.

Conclusions:

This work identified protein synthesis as a major pathway dysregulated in frailty. The results of targeted analyses also suggest that mitochondrial respiratory chain function and iron-sulphur cluster biogenesis might play a role in this syndrome.

Comorbidity Impact on Myocardium Links Peptide Turnover to Mitochondrial Function in Surgery Patients

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¹University of Leicester; ²Department of Biochemistry and Cambridge Systems Biology Centre; ³Biomolecular Medicine, Department of Metabolism, Digestion and Reproduction, Imperial College London;

Background

Patients with comorbidities may have worse outcomes post-cardiac surgery as compares with normal-weight patients. We examined the hypothesis that for myocardial tissues, such outcomes are the result of stress-related gene response.

Methods

Sixty-seven adult cardiac surgery patients undergoing coronary artery bypass grafting with or without valve surgery were recruited. Atrial biopsies were collected during cardiopulmonary bypass. Transcriptome data was acquired for samples from 53 patients, and a panel of metabolites involved in mitochondrial metabolism was analysed in samples from 57 patients.

Results

Ten individuals had two or more comorbidities (liver disease, renal disease, chronic pulmonary disease, CVA/TIA, diabetes and arteriopathy). A large proportion of differential genes were non-coding genes (FDR<0.05), and three metabolites were differential (VIP>1, p<0.05). In ROC analysis, ratios of 5 carnitines with two Krebs cycle metabolites had highest accuracies (AUC= 0.89-0.91). The significant genes enriched protein modification, epigenetic mechanisms, electron transport chain, beta-Alanine metabolism, histidine metabolism and glycolysis pathways. Interaction network and gene-set analysis linked specific ion transport and peptide modification genes to lower mitochondrial function in comorbid patients.

Conclusions

Using a limited sample size, we show that in comorbid patients attending cardiac surgery, the myocardium exhibits changes in regulatory mechanisms as well as peptide processing and proteolysis with a potential impact on energy generation in the mitochondrion.

Obesity-driven Differences in Gene Expression – A Machine Learning Approach

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¹Informatics Department, University of Leicester; ²Department of Cardiovascular Sciences and NIHR Cardiovascular Biomedical Research Unit, University of Leicester

Objectives

Patients with an increased Body Mass Index have a paradoxical survival benefit in settings characterised by metabolic stress such as cardiac surgery. We hypothesise that obesity triggers changes in gene expression patterns and signalling that underlay obesity paradox.

Methods

Obesity-related gene expression profiles were retrieved from the NCBI Gene Expression Omnibus using NCBI utilities in Python scripts. The selected profiles were analysed using linear models for microarray data and network meta-analysis tools. The resulting statistically different transcripts were subjected to pathway analysis. In parallel, we explored Slim-PLS, Autoencoders, and Teacher-Student models. The stability of the machine learning approaches was assessed by the levels of overlapping genes and performance metrics.

Results

Searches identified 20,561 expression profiles. After removing data from tissues from children, pregnant women, tumour or treated samples, cell lines or cultivated primary cells, 4,025 profiles were included in the analysis. Genes of the cell cycle, transcriptional and translational regulation pathways differed between normal/underweight and overweight/obese class I. Genes involved in immune response were most different between normal/underweight and obese class I/II. Genes involved in immune response, translational and transcriptional regulation were most different between overweight/obese class I and obese class I/II. Best discrimination between groups was achieved using autoencoders (87.09%), and the best gene overlap between sampling sets was achieved with the Teacher-student network (86%). All machine learning results overlapped with the standard analysis.

Conclusions

Our data extend the potential use of neural networks as discriminators to gene identification purposes. The Machine learning approach allows limiting significant genes to those essential to discriminate between tested groups and has potentially broad application in diagnostics.

Exploring Gene Inactivation as Therapeutic Targets in Surgery Patients

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¹Department of Bioinformatics, Molecular & Cell Biology; ²Department of Cardiovascular Sciences and NIHR Cardiovascular Biomedical Research Unit, University of Leicester

Objectives

Increased Body Mass Index (BMI) is a risk factor for cardiovascular death; however, recent studies have reported better survival rates for patients with elevated BMI during metabolic stress such as cardiac surgery. We hypothesize that gene loss-of-function variants associated with obesity and increased risk of cardio-metabolic diseases have predictive value in cardiovascular surgical patients. This project aims to explore differences in genetic variants and their impact in patients stratified by BMI categories.

Methods

NCBI transcriptome datasets were utilized in the prediction and annotation of loss of function variants with the use of bioinformatic tools and Genome Aggregation Database (gnomAD). Statistical analysis was conducted using plink and regression model was applied.

Results

Fifteen out of 2301 loss-of-function variants differed among the groups ($p < 0.00001$). Significant variants were validated in heart surgery patients data to delineate obese and nonobese. Using colocated genes, we project the impact of these variants on molecular signalling pathways.

Conclusions

The data supports the potential of specific inactivation of genes in obese surgical patients. Further research is necessary prior to developing therapeutic strategies.

Adult Cardiac COVID-19

Should Routine Preoperative Thoracic CT Imaging be Performed for Patients Undergoing cardiac Surgery? Insights from the COVID-19 Pandemic

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Objectives

The 2019 novel coronavirus (COVID-19) pandemic necessitated changes to pre-operative practices to allow the ongoing safe provision of cardiac surgery. At our institution low-dose non-contrast thoracic CT scans were introduced as routine for urgent patients to exclude sub-clinical COVID-19 infection. The aim of this study was to investigate the incidence of unexpected abnormalities or pathology identified on these CT scans and assess the impact on patient care.

Methods

A retrospective case note review was undertaken for all patients undergoing cardiac surgery between 08/04/2020 and 07/07/2020. Those undergoing pre-operative CT imaging for COVID-19 were further analysed for identification of unexpected findings that led to changes in clinical management. Changes to management were classified as non-operative, minor operative change and major operative change (change to index procedure).

Results

A total of 121 patients had cardiac surgery during the study period. Pre-operative CT scans were performed in 58 (47.9%) patients. Of those imaged, 22 (37.9%) had unexpected abnormalities identified. No patients had confirmed sub-clinical COVID-19 infection. In 9 (15.5%) patients, pathology identified led to a change in clinical management and in 3 (5.2%) patients, pathology identified on the CT scan resulted in a major operative change. The highest incidence of clinically relevant abnormalities were found in patients undergoing combined surgery (66.7%) or aortic valve surgery (30%).

Conclusions

There is a high incidence of newly detected pathology when routine pre-operative CT imaging is performed in patients undergoing cardiac surgery. Pre-operative CT scanning led to over 15% of patients experiencing a change to their anticipated clinical management. For 5% of patients, the findings on the pre-operative CT resulted in a major change to their operation. Routine adoption of pre-operative CT imaging for all patients undergoing cardiac surgery should be considered.

Patients with Aortovascular conditions on the Elective Waiting List for Surgery During the COVID-19 Pandemic: What Happened to Them?

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¹Sheffield Teaching Hospitals; ²John Radcliffe Hospital; ³Southampton University Hospital; ⁴Manchester Royal Infirmary; ⁵Brighton & Sussex County Hospital; ⁶Queen Elizabeth Hospital; ⁷Castle Hill Hospital; ⁸Freeman Hospital; ⁹Glenfield Hospital; ¹⁰St Bartholomew's Hospital

Objective

Due to the worldwide COVID-19 pandemic, elective surgery was suspended by then end of March 2020 to concentrate healthcare resources to COVID-19 patients and those requiring urgent and emergency surgery. The aim of this study is to assess the impact of delaying surgery for patients with aortovascular conditions awaiting elective surgery.

Methods

Prospective data was collected from March to August 2020 across 10 aortic surgery centres, concentrating in patients with aortovascular diseases already on the waiting list or included during the study period. Local electronic patient records for each patient were reviewed on 1st September 2020 for demographics and outcomes. Primary outcomes were surgery, endovascular therapy or death. Secondary outcomes were emergency intervention. Anonymous data was submitted by a secure online portal and analysed by the coordinating centre. The study was approved by local clinical effectiveness units.

Results

233 patients with aortovascular conditions were on elective waiting list for surgery at 10 centres in the UK. Mean age was 60 years and 72% were males. The commonest diagnosis (85%) was aneurysms, of different locations (47% root, 27% ascending, 6% arch, 14% descending thoracic and abdominal, 6% multisegment). Patients on waiting list were monitored and offered treatment based on modified prioritisation protocol/guidelines. 55 patients (24%) received surgery and only 1 patient (0.4%) died during the study period. None of the patients were offered endovascular treatment or presented as emergency due to aortic complications. Patients with larger aortic dimensions were prioritised.

Conclusion

75% patients have not received surgery and are at risk of adverse events and outcomes. Close monitoring of their symptoms and expeditious surgery during the following months will be needed to avoid increased mortality in this group of patients. Further follow-up and outcome results are needed.

A Multi-centre Analysis of Clinical Decision Making for Non-elective Cardiac Surgery Referrals During the COVID-19 Pandemic

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¹St Bartholomew's Hospital; ²Liverpool Heart & Chest Hospital; ³James Cook University Hospital; ⁴Hull and East Yorkshire NHS Trust; ⁵University Hospital Leicester; ⁶Royal Victoria Hospital, Belfast; ⁷University Hospital of Wales

Objectives

The COVID-19 pandemic caused significant disruption to the provision of cardiac surgery in the United Kingdom. Elective surgery was largely postponed and some centres were also unable to provide urgent surgery. The aim of this study is to assess the patterns of referrals to cardiac surgery and clinical decision making through the peak of the pandemic.

Methods

This multicentre prospective study collated data on all patients referred for cardiac surgery between 1st March to 1st August 2020. Demographic and outcome data were obtained at each centre from local electronic records, anonymised, and transferred securely for analysis by the lead centre. This study received clinical effectiveness approval at each centre.

Results

In total, 1175 patients were referred for urgent/emergency cardiac surgery from 122 hospitals to seven cardiac centres in the UK. Data was complete for 97.7% of patients. Mean age was 65 years and 878 (74.7%) were male. Diagnosis was coronary artery disease (CAD) in 661 (56%), valve disease in 240(20%), valve + CAD in 92(8%), aortovascular disease in 104 (9%) and other pathology in 49 (4%). Treatment was open surgery in 841 (72%), percutaneous in 87(7.4%), optimal medical therapy in 172 (14.6%) and elective surgical clinic review in 48 (4.1%). Sixteen patients (1.4%) died prior to intervention. Of these outcomes, 978 (80%) concurred with the original plan on referral. Trends in treatment modality over time are shown in Figure 1 where over time the proportion of patients undergoing surgery increased as time progressed away from the peak of the pandemic.

Conclusion

We describe the first multicentre analysis of clinical decision making in referrals for inpatient cardiac surgery during the COVID-19 pandemic. The provision of cardiac surgery was maintained throughout, with the proportion of patients undergoing surgery compared to percutaneous therapy increasing over time.

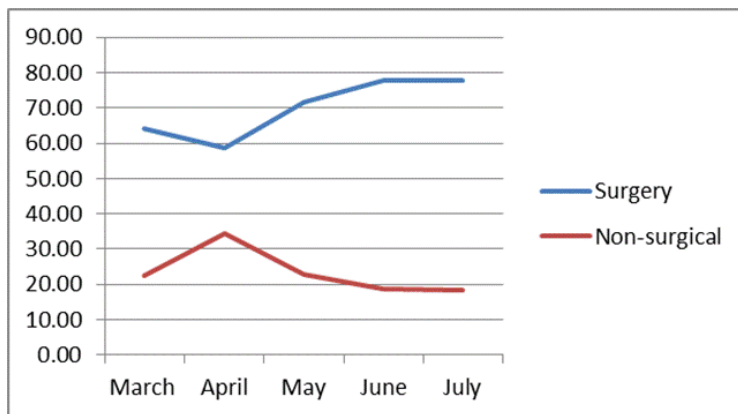


Figure 1. Outcomes of referrals over time

Coronary and Valvular Heart Surgery During the Surge and Peak of COVID-19 Pandemic: A Single Centre Experience

Haqzad, Y; Ayiomamitis, M; Omoregbee, B; Uchime, C; Cale, A; Ngaage, D

Castle Hill Hospital

Objective

During the COVID-19 pandemic, hospital resources were redistributed to deal with the pandemic. The consequent limited resources and the potential risk of hospital-acquired COVID-19 infection led to instinctive and consensus management decisions for patients with coronary and valvular heart disease (CAVHD) that were always not consistent with international guidelines. This study examines the decisions made and treatments offered to patients with CAVHD and how they varied from standard of care as per international guidelines. Our primary aim is to identify deviations in multi-disciplinary team (MDT) decisions for CAVHD patients during surge and peak of COVID-19 pandemic. Our secondary aim is to identify in-hospital outcome in this group of patients.

Methods

We retrieved prospectively collected data from the cardiothoracic, cardiology and MDT databases of our institution from March 1st, 2020 to April 30th, 2020. MDT decisions and treatment given were reviewed and In-hospital outcomes are reported

Results

After lockdown (21st march 2020), there were significant reduction in cardiac operations, 9 fold increase in PCI for patients with left main stem (LMS) / triple vessel coronary artery disease (TVD) and Reduction in number of patients discussed in MDT

94 patients were discussed in MDT during the surge and peak phases of COVID-19 pandemic

72 patients were discussed in the month of March

28 patients in April – more than 50% reduction (6 patients were discussed more than once and 1 died waiting for TAVI)

Conclusion

The surge and peak of COVID-19 pandemic has had a major impact in the management of patients with coronary and valvular heart disease, and disproportionately affected surgery compared to competing techniques: Reduction in number of patients discussed in MDT, Deviation from international guidelines for standard of care i.e increase in PCI for patients with LMS/3V CAD and Reduction in number of cardiac operations. In-hospital Mortality unaffected.

COVID-19 and Role of CT Chest in Pre-operative Screening; Our Centre Experience

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Morrison Hospital Swansea Wales

Objectives

The emergence of severe acute respiratory syndrome in late December 2019 and January 2020 and declaration by WHO as COVID-19 in March 2020 has had a major impact on the Health care system Nationally. Cardiac and Thoracic Surgery has been affected due to inherent critical care bed capacity. To operate on the patients safely in the current climate a theatre SOP was devised by St Bartholomew's for COVID-19 which included performing CT Chest on all patients prior to surgery to rule out classical COVID changes in lungs as part of pre-op screening. We established that protocol in our department as well.

Methods

We collected the Data from our PATS database, Radiology Imaging System and Welsh Clinical Portal. We collected the data on the patients operated between 1st April till 30th September 2020. There were total of 125 cardiac cases and 45 thoracic cases. Except for emergency and salvage procedures all other patients had CT Chest as pre-op screening for COVID 19.

Results

8 surgeries were canceled due to classical COVID related changes on the CT (Honeycomb appearances in periphery, tree on a bud appearance). The COVID 19 testing were all negative in these patients and their FBC particularly the lymphocyte count was normal along with CRP. 4 Patients were re-isolated for 14 days and then had repeat CT-Chest which was clear at that time and they underwent surgery with good post-op recovery. The other 4 patients underwent different treatment modality.

Conclusions

We have had no mortality due to COVID pneumoniae post-op. We believe that CT Chest as a pre-op screening does help in decision making especially in patients who are undergoing complex surgeries and patients who require in-house surgery. There is an element of false positive CT findings in patients who are in heart failure and it is difficult to distinguish between pulmonary congestion/oedema and COVID related changes.

Increased Mortality in Patients Undergoing Cardiac Surgery With a Post-operative Diagnosis of Covid-19

Sanders, J¹; Akowuah, E²; Cooper, J³; Kirmani, B⁴; Kanani, M²; Acharya, M⁵; Jeganathan, R⁶; Krasopoulos, G⁷; Ngaage, D⁸; Deglurkar, I⁹; Yiu, P¹⁰; Kendall, S²; Oo, A¹

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Objectives

Early surgical studies conclude those with Covid-19 have a high risk of death, especially those with a post-operative diagnosis. However, there are no studies relating specifically to cardiac surgery outcomes during a pandemic. We investigated the early experience of UK cardiac surgery outcome, specifically comparing those with a pre- and post-operative Covid-19 diagnosis.

Methods

This retrospective observational study collated data on adult patients undergoing cardiac surgery between 1st March 2020 and 30th April 2020 from nine UK centres. Data from the National Institute for Cardiovascular Outcomes Research (NICOR) Adult Cardiac Surgery database, the Intensive Care National Audit and Research Centre database (ICNARC) and local electronic systems was linked locally and analysed centrally. Local service evaluation/audit permission was obtained by each participating centre.

Results

755 patients, of whom 53 (7.0%) had Covid-19 underwent cardiac surgery. Of those with Covid-19, diagnosis was made pre-operatively in 17 (32.1%) and post-operatively in 35 (66.0%) (data missing in n=1 (1.9%)). Compared with those diagnosed before surgery, patients with a post-operative diagnosis were older (60years v 70years, p=0.029) had higher BMI (25.9kg/m² v 29.3 kg/m², p=0.047) and longer aortic cross-clamp times (72mins v 92mins, p=0.017). They also remained in hospital for five more days (7days v 12 days, p=0.024) and had a mortality rate of 37.1% (v 0.0%, p<0.0005).

Conclusions

Patients pre-operatively diagnosed with Covid-19 appeared to recover in a similar manner to non-Covid-19 patients. The mortality burden appears to particularly impact those diagnosed with Covid-19 post-operatively. To mitigate against this risk in subsequent Covid-19 peaks robust pre-surgery diagnosis protocols alongside effective strategies to maintain a Covid-19 free environment are needed. Dedicated cardiac surgery hubs could be valuable in achieving safe and continual delivery of cardiac surgery.

Patient Recovery from Heart Surgery During the Covid-19 Pandemic: The CardiacCovid Study

Sanders, J¹; Bueser, T¹; Beaumont, E²; Dodd, M²; Owens, G³; Murray, S⁴; Sepehripour, A¹; Clayton, T⁵; Oo, A¹

¹St Bartholomew's Hospital; ²London School of Hygiene and Tropical Medicine; ³Aortic Dissection Awareness UK and Ireland; ⁴SCTS; ⁵London School Hygiene and Tropical Medicine

Objectives

The outbreak of Covid-19, has been difficult and potentially stressful for everyone, and possibly heightened in those having cardiac surgery during the pandemic. We sought to explore the effect of the pandemic on recovery from cardiac surgery.

Methods

We established a prospective observational study (Ethics:20/YH/0132. Clinicaltrials.gov:NCT04366167) at the start of the pandemic. Eligible patients were >18years old undergoing any form of cardiac surgery between 23rd March 2020 (UK lockdown) and 4th July 2020 (large lifting of lockdown). Those too unwell or unable to give consent/complete the questionnaires were excluded. Participants complete the EQ-5D, impact of event (IES), depression (CES-D) and health service use questionnaire at baseline, 1 week after hospital discharge, and 6 weeks, 6 months and 1 year after surgery. Questionnaires are completed electronically (Amplitude system) or on paper and returned by post.

Results

In total, 395 patients underwent surgery of which 298 (91.7%) were screened and 203 (68.1%) gave consent to participate. Participants were predominantly male (74.6%), with a mean age of 63years, undergoing urgent/emergency (57.9%) CABG +/-valve (70.1%). Mean length of stay was 8.6days and in-hospital mortality was 0.5%. No patients had Covid-19. To date, baseline, 1 week and 6-week time-points have been completed with response rates of 98.5%, 65% and 79.3%, respectively. We aim to present the results of 1 week post-discharge and 6 week follow-up, the data of which we are currently being prepared for analysis.

Conclusions

We believe this is the largest/only study exploring the impact of the pandemic on cardiac surgery recovery, including quality of life, both in the immediate recovery phase and up to 1-year after surgery. Despite early outcome results not being available at time of writing, we deem this work will be of interest and may provide useful insights for patients who have surgery during subsequent phases of the pandemic.

Effect of COVID-19 on the Ability to Maintain General Cardiac Surgery Services: Results From a UK-Multicentre Study

Lopez-Marco, A¹; Cale, A²; Jeganathan, R³; Deglurkar, I⁴; Kirmani, B⁵; Kanani, M⁶; Mariscalco, G⁷; Jahangeer, S⁸; Krasopoulos, G⁹; Forlani, S¹⁰; Sanders, J¹

¹St Bartholomew's Hospital; ²Castle Hill Hospital; ³Royal Victoria Hospital Belfast; ⁴University Hospital of Wales; ⁵Liverpool Heart & Chest Hospital; ⁶James Cook University Hospital; ⁷Glenfield Hospital; ⁸Manchester Royal Infirmary; ⁹John Radcliffe Hospital; ¹⁰Sheffield Teaching Hospitals

Objective

During Covid-19 Pandemic, increasing number of patients required critical care beds to provide advanced life-support. This led to a reduction of capacity in facility and NHS workforce to deliver normal level of cardiac surgery. We sought to assess the effects of the pandemic on healthcare resources to deliver cardiac surgery.

Methods

Healthcare resources were assessed in 10 participating UK centres between March and August 2020. Resources were defined as the number of theatre lists available, percentage of theatre lists utilised as well as the number of beds available to cardiac surgery patients, both in the post-operative ward and ITU settings. Data were obtained at each centre and transferred securely for analysis by the lead centre. This study received clinical effectiveness approval at each centre.

Results

Of the 10 participating centres, 90% suffered a reduction on their surgical activity (with a mean activity of 11.3% (0 – 27%) in the critical weeks of the pandemic and a mean use of 36% of the theatre capacity during the whole study period). 30% of the centres were closed during the peak months of the pandemic. Ability to provide emergency treatment varied significantly among the different regions (Table 1) The number of ward beds was reduced after the lockdown (mean capacity 59% (0 – 100 %)), mostly due to closure of surgical wards to guarantee COVID-19 free areas. ITU beds were protected in 80% of the cases by ring-fencing beds and re-deployment of nursing staff to ITU environments

Conclusions

There was a significant regional variation, and some regions had to cancel their surgical activity completely after the lockdown. Dedicated cardiac units seemed to be protected, while units located in general hospitals had to significantly reduce or stop their activity. This study highlights the potential benefit of regional network approach in healthcare resources utilisation in order to maintain cardiac surgical services during a pandemic.

A Multi-Centre Prospective Cohort Study of Patients on the Elective Waiting List for Cardiac Surgery During the COVID-19 Pandemic

Yates, M¹; Balmforth, D¹; Kirmani, B²; Acharya, M³; Jeganathan, R⁴; Ngaage, D⁵; Kanani, M⁶; Deglurkar, I⁷; Sanders, J¹; Oo, A¹

¹St Bartholomew's Hospital; ²Liverpool Heart & Chest Hospital; ³University Hospital Leicester; ⁴Royal Victoria Hospital, Belfast; ⁵Hull and East Yorkshire NHS Trust; ⁶James Cook University Hospital; ⁷University Hospital of Wales

Objectives

During the worldwide COVID-19 pandemic, elective cardiac surgery was suspended to provide ICU beds for COVID-19 patients and those requiring urgent cardiac surgery. The aim of this study is to assess the effect of the pandemic on outcomes of patients awaiting elective cardiac surgery.

Methods

Data was collected prospectively on adult cardiac surgery elective waiting list patients on the list as of 1st March 2020 across seven UK cardiac surgical centres. Demographic data and outcomes (primary: surgery, percutaneous therapy or death; secondary: urgent intervention) as of 1st August 2020 were obtained from local electronic records, anonymised, and submitted securely to the lead centre for analysis. The study was approved by each local clinical effectiveness units.

Results:

On 1st March 2020, there were 1097 patients on the elective waiting list for cardiac surgery at the seven centres. At 1st August 2020, 48% (n=528) had met a primary outcome. Of these, 492 (45%) had elective surgery after a mean of 166 days on waiting list, with an operative mortality of 2.3%. Twenty patients (1%) had urgent surgery (CABG n=5, AVR n=5, AVR+CABG n=6, Mitral n=3, other n=2) and six (0.3%) underwent percutaneous therapy (TAVI n=4, PCI n=2), with no mortality after 172 (+/- 72 SD) days. Ten patients (0.9%) died without intervention mean 233 (+/-88 SD) days. 569 (52%) remained on the elective waiting list with a mean wait of 236 (+/- 82 SD) days.

Conclusion

Half of patients waiting for elective cardiac surgery prior to the national lockdown for COVID-19, remain on the waiting list more than twice the 18-week target. Furthermore, we show a 1% mortality whilst waiting. The vast majority of patients waiting for elective adult cardiac surgery during the lockdown have not been adversely affected by treatment delays.

Operative Outcomes of the Pan London Emergency Cardiac Surgery Response to COVID-19 Pandemic

Yates, M¹; Balmforth, D¹; Anderson, J²; Bhagai, M³; Avlonitis, V⁴; de Souza, T⁵; Livesey, S⁶; Lall, K¹; Bhudia, S⁷; Edmondson, S¹

¹St Bartholomew's Hospital; ²Hammersmith Hospital, London; ³Kings College Hospital, London; ⁴St Thomas' Hospital, London; ⁵Royal Brompton Hospital; ⁶St George's Hospital; ⁷Harefield Hospital

Objectives

As a response to the COVID-19 pandemic in London, all cardiac surgery centres collaborated to form a regional emergency cardiac surgery service. This was established to provide time critical cardiac surgery during the national lockdown. Two standalone cardiac centres coordinated and provided surgery for the region. The aim of this study is to review operative outcomes of patients undergoing surgery as part of the Pan London Emergency Cardiac Surgery (PLECS).

Methods

From 23rd March to 5th July 2020, all urgent and emergency cardiac surgery referrals from the greater London area were coordinated through St Bartholomew's and Harefield Hospital. Weekly meetings were held to review status at all units. Prospectively collected national audit data was reviewed retrospectively. Transplant and mechanical circulatory support procedures were excluded.

Results

There were 619 procedures performed during the study period. Mean age was 63 years (18-87), 453 (73%) were male and 451(73%) had good LV function. Operative urgency was emergency 55, urgent inpatient 346 and urgent from home 218 as shown in Table 1. Procedures were CABG 295, Valve 198, CABG + Valve 60, Major Aortic 43, Myectomy 7, Myxoma 6, Other 10.

In hospital mortality was 1.83% for urgent from home, 4.84% for urgent inpatient and 25% for emergency / salvage.

Conclusion

The Pan London Emergency Cardiac Surgery service provided a rapid, collaborative and effective service transformation within the NHS, to allow time critical surgery to continue with good operative outcomes, during the peak of the COVID-19 pandemic.

Table 1. Demographics and Outcomes by Urgency of Operation

	Urgent from Home (n = 218)	Urgent Inpatient (n = 346)	Emergency / Salvage (n = 55)
Age (years)	63	64	63
Male / Female	167/51	243/ 103	43/12
LV function			
Good	181	240	41
Moderate	32	77	9
Poor	5	29	5
Bypass Time (mins)	90	107	217
Cross clamp Time (mins)	62	74	125
Logistic Euroscore	4.24%	7.04%	26.72
Death	4 (1.83%)	15 (4.84%)	14 (25.45%)

Cardiac Surgery in COVID-19 Positive Patients: Is Delaying Surgery the Lesser Evil?

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St Bartholomew's Hospital

Objectives

Previous studies have shown that peri-operative infection with coronavirus disease 2019 (COVID-19) carries a significant mortality and morbidity. We aimed to determine the safety of delaying surgery in COVID-19 positive patients and to examine the associated mortality of post-operative infection.

Methods

Data for all patients who underwent cardiac surgery in our centre from March to July 2020 was prospectively recorded. Patients were screened for COVID-19 with a standard protocol consisting of two consecutive nasopharyngeal swabs for polymerase chain reaction for ribonucleic acid (PCR-RNA) analysis, a non-contrast CT chest, lymphocyte count and lactate dehydrogenase (LDH) levels.

Results

Seven patients developed COVID-19 in the early postoperative period prior to the implementation of the screening protocol. These patients had a mean length of stay of 7 days and extremely poor outcomes with mortality of 43%. An additional 2 patients developed later COVID-19 infection on days 23 and 37 respectively. Demographics and outcomes of these 9 patients are shown in Table 1.

A further 10 patients were diagnosed with COVID-19 on preoperative screening performed on the day of admission. 4 patients were discharged home with medical therapy for elective surgery and mean delay to surgery was 67(50-84) days. The remaining 6 patients underwent urgent treatment due to their presenting diagnosis and mean delay to surgery was 14.7(4–31) days. No patients developed COVID-19-related respiratory complications postoperatively and all 10 were extubated uneventfully in the first two days.

Conclusions

From our experience, deferring or postponing cardiac surgery in patients with confirmed COVID-19 is safe and enabled surgery to be performed with favourable outcomes. By contrast, the diagnosis of COVID-19 infection in the early postoperative period was associated with high postoperative mortality and prolonged length of hospital stay.

Patient	Male/ female	Age	Preoperative length of stay	Euro SCORE II	Elective/urgent	Operation	Bypass/ cross-clamp	Day of COVID diagnosis	Outcome	Time to outcome
1	Male	62	18	2.5	Urgent	CABG	75/96	3	Died	4
2	Male	56	1	1.03	Elective	CABG	77/86	8	Home	14
3	Male	21	4	0.77	Urgent	AVR	70/92	9	Home	12
4	Male	73	6	7.43	Urgent	MVR + CABG	144/173	8	Died	16
5	Male	72	22	2.97	Urgent	AVR + CABG	133/152	3	Died	11
6	Male	57	5	0.88	Urgent	CABG	84/104	4	Home	6
7	Male	71	16	1.26	Urgent	CABG	37/77	1	Home	16
8	Male	59	23	2.29	Urgent	MVR	84/101	23	Home	7
9	Female	79	1	4.91	Elective	MVR + TVR	73/123	37	Died	2

Impact of COVID-19 on the Mental Health Status of NHS Staff: A Staff Survey in a Large London Hospital

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¹St Bartholomew's Hospital; ²Royal Papworth

Objectives

We designed a study to assess the prevalence of generalised anxiety disorder, depression, and work-related stress experienced by NHS staff in a large tertiary London hospital treating COVID-19 patients between 25th May and 15th June 2020.

Methods

An anonymous survey was designed with demographic data and three questionnaires; generalised anxiety disorder-7 (GAD-7) and patient health questionnaire-9 (PHQ-9) were used to assess anxiety and depression, respectively. Health and Safety Executive Management Standards Indicator Tool (HSE-MS IT) was used to assess work-related stress.

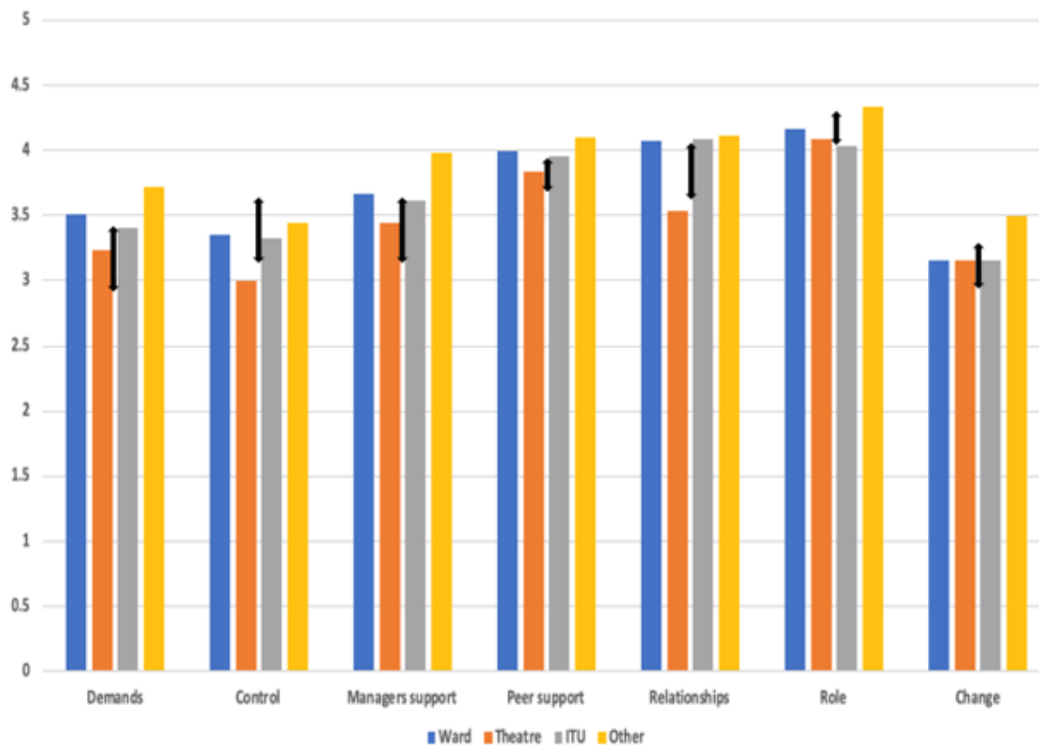
Results


302 staff members (106 males, 196 females) completed the survey. 96 (31.8%) participants had been tested for COVID-19; 44% for symptoms and 26% for contact. Mean length of time off work was 11.8 days (SD 8.54); COVID-19 symptoms, positive test results and self-isolation were frequently cited. The overall prevalence of GAD and depression were 125/302 (41.4%, 95% CI 35.8-46.9%) and 129/302 (42.7%, 95% CI 37.1-48.3%), respectively. The prevalence of symptoms suggestive of GAD and depression were higher in females vs males (49.5% vs 26.4%, $p=0.0005$) and (50.5% vs 28.3% $p=0.003$), respectively. Nurses, as compared to doctors, were more likely to report moderate to severe levels of GAD (29% vs 4%, $p<0.01$) and depression (25% vs 3%, $p<0.01$). Ethnicity had no influence on any end-point. The prevalence of symptoms related to GAD and depression in consultants ($n=16$) vs junior doctors ($n=46$) was 18.8% vs 34.8%, respectively, $p=0.23$. Work-related stress was also observed to be prevalent in our surveyed population with the following standards: Relationships, Role, Control, and Change showing a need for improvement (Fig. 1). 24.2% of our cohort highlighted 'inadequate PPE for staff' as the area of greatest concern.

Conclusions

Our study presents early evidence suggestive of a high prevalence of generalised anxiety, depression and work-related stress in NHS staff.

Figure 1. Health and Safety Executive Average Scores Stratified by Place of Work



 = Range of averages for each management standard sub-group as compared to benchmark data – ‘organisational averages’ of 136 institutions surveyed by HSE-MS IT. Top arrow denotes 80th percentile and above, while bottom arrow denotes 20th percentile and below.

PLECS: The Pan-London Emergency Cardiac Surgery Service - A Response to the COVID-19 Pandemic

Hussain, A; Balmforth, D; Yates, M; Lopez-Marco, A; Roberts, N; Uppal, R; Lall, K; Edmondson, S

St Bartholomew's Hospital

Objectives

The novel Coronavirus 2019 virus (COVID-19), has significantly impacted healthcare over the last 6 months. The need for invasive ventilation has also required the provision of intensive care beds in London to be reallocated. We proposed the formation of a Pan-London Emergency Cardiac Surgery (PLECS) service to provide urgent and emergency cardiac surgery for the whole of London.

Methods

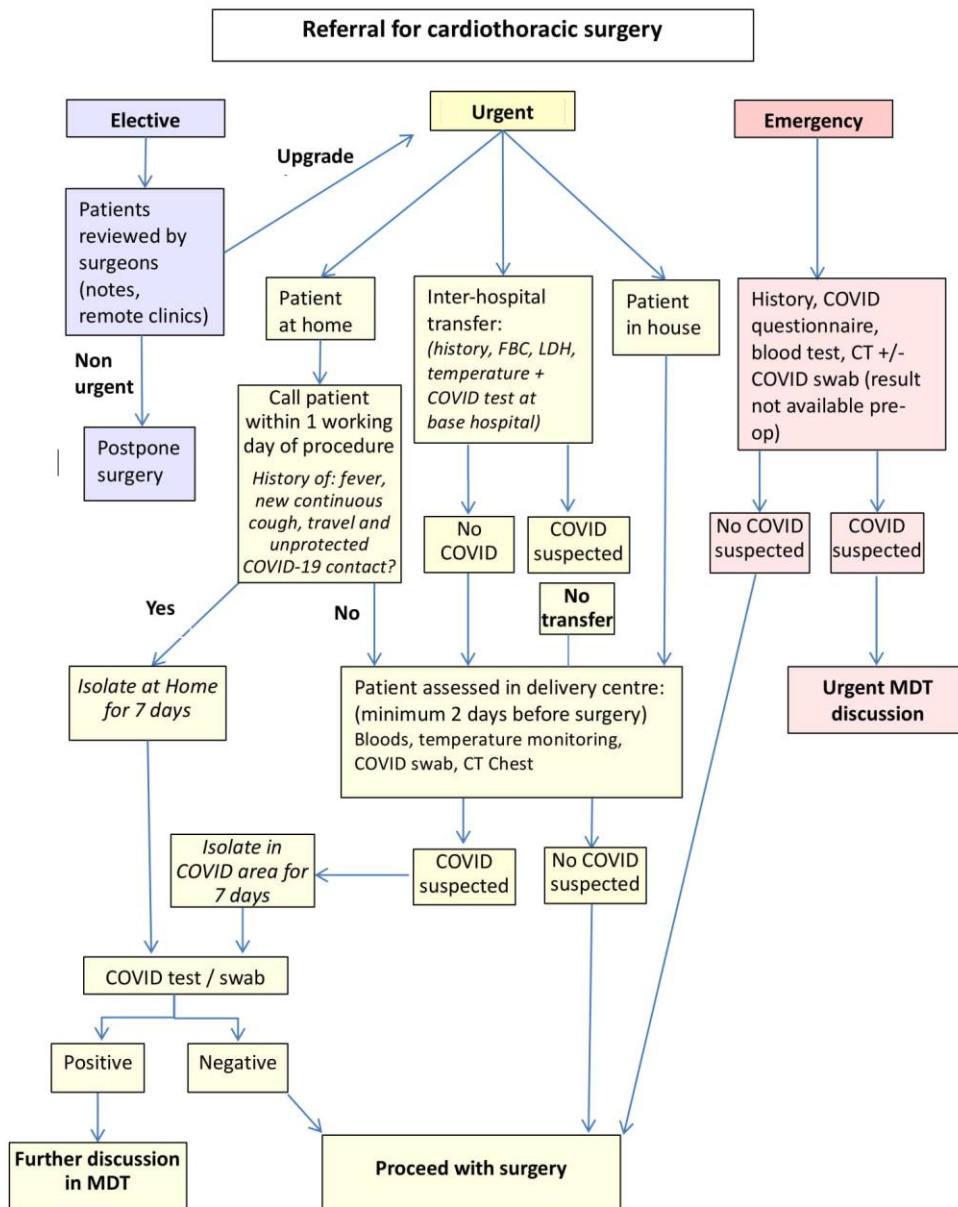
A two-unit delivery model was proposed after consultation with clinical leads at the various cardiac institutions across London. The two chosen units were high-volume cardiac surgery centres without on-site Accident & Emergency (A&E) services, namely Barts Heart Centre and Harefield Hospital. It is proposed that these hospitals be kept at least partially COVID-19 free in order to support the safe provision of emergency cardiac surgery.

Results

As a result of these efforts, a protocol detailing the pathways of patients (including COVID-19 positive) were produced. These pathways included protocols which aimed to keep both patients and healthcare staff from transmitting the virus. The flowchart demonstrates our initial pathways.

Conclusion

We outline our experience of setting up and delivering a pan-regional service in London for the delivery of urgent and emergency cardiac surgery with a focus on maintaining a COVID-free in-hospital environment. In doing so, we hope that other regions can use this as a starting point in developing their own region-specific pathways.



Assessment of Patient Satisfaction and Experience During the COVID-19 Pandemic in a Cardiothoracic Unit

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St Bartholomew's Hospital

Objectives

Hospital protocols were adapted during the COVID-19 pandemic to prevent the propagation of the virus and promote population welfare. Isolation measures, face masks, hospital-visitor restrictions and cancellation of some elective surgeries were mandatory. We examined patients' hospital experiences following admission for cardiothoracic procedures during the pandemic.

Methods

The survey was conducted between June and August 2020. Questionnaires were voluntarily completed on the discharge day by patients admitted to our hospital for cardiothoracic procedures. The survey contained 39 questions chosen specifically to address patients' experience and satisfaction before and during their admission. The survey scores were calculated with a maximum of 170 points indicating 100% satisfaction.

Results

206 patients (45% undergoing cardiac surgery, 30% thoracic surgery and 25% interventional cardiology) completed the survey. 58% of procedures were elective. 26% of patients had in-hospital stays <2 days. The average patient satisfaction score was 120/170 (70.6%); 126/170 (74.1%) following cardiac surgery, 123/170 (72.4%) following thoracic surgery and 117/170 (68.8%) following cardiology procedures (p=NS). Admission for 2 days prior to planned procedures for COVID-19 screening caused frustration in 17% of patients and 10% preferred an alternative treatment entailing a shorter hospital stay. During admission, 52% of the patients found the COVID swabs unpleasant and 89% felt staff took appropriate precautions to prevent virus transmission. 44% were unhappy about visitor restrictions. On discharge, 84% felt safe in the hospital during the COVID-19 period.

Conclusions

Overall patient satisfaction appears adequate. Optimisation of preadmission and perioperative protocols needs to be pursued, with the aim of delivering clear recommendations, improving safety against COVID infection, and ensuring patients perceive hospitals as safe environments for their interventions.

Congenital

Surgical Outcomes of Primary and Two-stage Atrioventricular Septal Defect (AVSD) Repair: A Single-institution Experience

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¹Ninewells Hospital; ²National Heart Centre Kuala Lumpur

Objective

To examine the surgical outcomes of primary and two-stage repair of complete atrioventricular septal defect (AVSD)

Method

This retrospective study included 74 patients who underwent operation for balanced complete AVSD between January 2015 to December 2018 in National Heart Centre Kuala Lumpur. Patient demographics, types of procedure, post-op complications and follow-up atrioventricular (AV) valve function were analysed.

Results

Seventy-four patients underwent complete AVSD repair (53 underwent primary repair, 21 had Pulmonary Artery Banding (PAB) prior to complete AVSD repair). Median age at PAB was 3 months (2.28-4.32months) and median weight was 3.10kg (2.70-3.82kg). At complete repair, the age for PAB group was 18 months (9.1-25.3months) and weight was 6.4kg(4.75-9.00kg). In the primary repair group, the age at repair was 7 months(5-16.25months) and the weight was 4.95kg (4.50-5.93kg).

In the PAB group, the median post-banding weight of patients rose from 3.1kg to 6.4kg. The rate of ventilator dependence decreased from 19.8 to 4.8%. There was no worsening of post-banding left AV valve insufficiency (5%) before the complete repair.

There were no statistically significant difference in the outcomes after complete AVSD repair in both groups (mortality p=0.133, morbidities p=0.471). There was a trend towards higher left AV valve insufficiency in the PAB group over time (at discharge, 10 vs 12%; at 3-months, 12 vs 6%; at 1-year, 14 vs 11%). There was also a trend towards higher rates of major post-operative complications (33 vs 21%) and in-hospital mortality (9.5 vs 1.9%) in the PAB group, compared to patients who underwent primary repair.

Conclusion

The overall result of complete AVSD repair is good. PAB remained as an effective palliative procedure for patients who are not suitable for primary AVSD repair at the time of presentation. However, it is associated with a higher incidence of left AV valve insufficiency at follow-up.

Supported Exercise Programme for Adults with Congenital Heart Disease (SEACHange)

Brown, S; Walker, N; Muirhead, E; Mearns, J

Golden Jubilee National Hospital

Background

Congenital heart disease (CHD) is a lifelong condition. Many patients require repeated surgeries during their lifetime, others may develop heart failure, arrhythmia or other problems. The benefits of regular exercise are well known. The aim of this pilot study is to determine the feasibility of a supported exercise programme to support physical and psychological wellbeing in adults with CHD, living in Scotland.

Methods

Patients attending the Adult Congenital Heart Disease clinic in GJNH were given a patient information leaflet explaining the purpose of the study with details if they wished to take part. Those who volunteered were assessed using a 6 min walk test to identify the appropriate group for their baseline fitness level. Group 1 walked less than 450m and Group 2 more than 450m. Further baseline measurements (Grip strength, Bicep strength, Quads strength, PHQ-9, GAD-7 and BMI) were completed for both groups. SNIP testing was also completed for Group 1.

Group 1 (n=10) were supplied with an inspiratory muscle trainer and an online exercise programme.

Group 2 (n=18) were given a daily step goal and an online exercise programme.

Baseline measurements were repeated after 12 weeks.

Results

Group 1 – Ten patients recruited, eight completed the programme (80%)

Group 2 – Eighteen patients recruited, fifteen completed the programme (83%)

Conclusions

Exercise in the adult cardiac congenital population is safe and effective when patients are given guidance and structure. This is an area which warrants further exploration in a larger congenital population.

Outcomes Following Surgery for Vascular Rings Related to Kommerell Diverticulum or Double Aortic Arch

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¹Birmingham Women's and Children's Hospital Foundation Trust; ²University of Birmingham; ³BWCH

Objectives

Vascular rings remain challenging in diagnostic and therapeutic terms. The presence and significance of a retro-oesophageal diverticulum is not always easy to assess. Equally challenging remains the diagnosis of double aortic arch when distal left arch atresia occurs. Resection for Kommerell diverticulum is not generally accepted as the treatment of choice.

Methods

All patients with vascular rings were identified in a 5-year period. This study retrospectively analyses the clinical trajectory in patients with vascular rings involving Kommerell diverticulum or double aortic arch treated surgically treated in a single paediatric centre. We noted patient demographics, ring anatomy and presentation history. The surgical technique performed on the Kommerell, if any, was also observed. Follow-up was then reviewed to identify complications and any symptom redevelopment.

Results

There were 293 patients with aortic arch anomalies entering the study through different initial clinico-imaging pathways. Twenty-four patients had double aortic arch, 20 were symptomatic and 19 were operated (3 asymptomatic). A significant number involved atresia of one of the arches (44.5%). In addition, 24 patients exhibited a Kommerell diverticulum, 11 being operated. Among these, one patient had their Kommerell resected and 4 patients underwent an aortopexy. We share our experience in diagnosing atretic portions of double aortic arches. We also propose an imaging surveillance method for evolving diverticula. Follow-up was completed in 91% of cases for an average period of 7.8 months. No major complications were identified and symptoms redevelopment was noted in one patient who received no further intervention.

Conclusions

Certain vascular rings require careful identification and tailored treatment. Symptom redevelopment was rare in the surgically treated group of patients. An aortopexy may be a feasible and low-risk alternative to Kommerell resection.

Native Pulmonary Valve Restoration Late Following Transannular Patch Repair of Tetralogy of Fallot

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¹Liverpool Heart & Chest Hospital; ²Alder Hey Children's

A 16-year-old boy had a history of a transannular patch repair of Tetralogy of Fallot in infancy. Repeated echocardiogram and MRI scans showed normal left ventricle parameters, free pulmonary regurgitation with velocity 1.1 m/s and increased right ventricle volume loading with EDVI raised from 108 ml/m² to 192 ml/m² over the past four years. Right ventricle outflow tract dimension at the level of the annulus was measured as 40 x 36 mm. No residual intracardiac shunts were detected. Given progressive right ventricle dilatation and free regurgitation, the patient was accepted for elective pulmonary valve replacement although being asymptomatic with borderline result of an exercise test.

During the redo surgery, previously positioned transannular patch was opened longitudinally in the middle. Inspecting the pulmonary valve we found the previous anterior commissure split in half with three well developed thin and pliable native leaflets. This anatomy was considered suitable for attempting a pulmonary valve restoration procedure. A pledgeted suture was used to reapproximate the anterior commissure at the point of highest leaflet insertion. After having tightened the suture, we easily passed across the repair by appropriate size dilator for the patient's BSA. The three leaflets coapted very well and we were satisfied with the result continuing the suture line in both proximal and distal direction plicating the transannular patch adjusting it to the pulmonary annulus size while closing the right ventricle outflow tract incision.

Postoperative echocardiogram showed a competent valve with a peak velocity of 2.8 m/s. At six-week follow up the patient remained well, and echocardiogram demonstrated a competent pulmonary valve with decreased velocity of 2.1 m/s across it.

We encourage a mindful preservation of pulmonary valve leaflets whenever it is possible at time of initial repair to implement this relatively easy operation to restore pulmonary valve function later in life.

Repair of Anomalous Origin of Right Coronary Artery (Video)

Acharya, M¹; Raheel, F²; Das, I²; Mimic, B²; Mariscalco, G²

¹Cardiac Surgery - Glenfield Hospital; ²Glenfield Hospital

The Fate of Truncal Valve Repair: Single Center Experience

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Freeman Hospital, Newcastle upon Tyne

Objectives

There are limited data available on techniques and outcomes of truncal valve repair (TVR). We report our experience with TVR in patients of all ages.

Methods

Retrospective review, single center.

Results

19 patients underwent TVR from August 2005 to September 2020, 16 for valve regurgitation and 3 for mixed disease. Valve anatomy was quadricuspid in 5 (26,3%) patients, tricuspid in 12 (63,2%) and bicuspid in 2 (10,5%). The median age and weight at surgery were 55 (range 2 days to 24,8 years) months and 18,9 (range 2,2 to 116) kg, respectively. Seven patients (36,9%) underwent TVR at the time of the initial truncus arteriosus repair. Repair techniques included: bicuspidization/tricuspidalization, leaflet plication, commissuroplasty, annuloplasty, leaflet resection. The surgical repair improved the valve function in 15 of 19 patients (79%). In-hospital death occurred in one patient. During a median follow-up 9.7 years there was one late death and 6 patients required truncal valve reoperation. Freedom from reoperation was 81% at 1-year, 74% at 5-years and 55,5% at 10-years. Reoperations included: early redo-valvuloplasty (N=1), TV replacement with prosthetic valve (N=4) at median 48 months (range 10 months to 5,4 years) post first TVR (2 of whom had second prosthetic valve replacement) and one patient had redo-valvuloplasty before undergoing a prosthetic valve replacement 2 years later. Freedom from truncal valve replacement was 62% at 10 yrs. At the end of the study, 5 patients ended up with a prosthetic valve. At latest examination, 9 patients had mild truncal valve regurgitation, 4 had moderate incompetence and 2 patients are awaiting surgery for severe regurgitation. Morphology of TV did was not a risk factor for valve reoperation

Conclusions

Truncal valve repair is a durable option with an acceptable reoperation rate, good function, and a low rate of needing truncal valve replacement, and should remain the primary option.

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Objectives

Pulmonary endarterectomy (PEA) is the guideline recommended treatment (1C) for Chronic thromboembolic pulmonary hypertension (CTEPH). PEA can be performed safely in conjunction with concomitant coronary artery bypass graft and valvular surgery. However, concomitant correction of adult congenital heart disease (ACHD) and CTEPH has not been previously reported.

Methods

The prospectively acquired PH database was reviewed retrospectively and 3 cases of PEA and correction of congenital heart defects were identified between 2018 and 2020. Patient management was discussed between the CTEPH and ACHD MDT's at the two centres and operations were performed jointly by a PEA and a congenital cardiac surgeon.

Results

All 3 patients had a successful concomitant surgery. First Case - 45-year-old female who presented with CTEPH predominantly involving both lower lobes and bilateral anomalous pulmonary venous drainage involving the upper lobes with mean Pulmonary Artery (PA) pressure of 38mm Hg and Pulmonary vascular resistance (PVR) of 8WU. Second Case - 76-year-old female who presented with CTEPH and a partial atrio ventricular canal defect with a small atrial and small ventricular component and moderate leak of the left AV valve with mean PA pressure of 46mm Hg and PVR of 12WU. Third Case - 47-year-old female who had CTEPH primarily involving the right lung and right hemi-anomalous pulmonary venous drainage to right atrium with mean PA pressure of 35mm Hg and PVR of 10WU. The mean PVR was reduced from 10±2WU to 3±1WU, and all made a satisfactory recovery with improvement in haemodynamics and right heart function.

Conclusion

Careful MDT discussion between CTEPH and ACHD teams is critical to the management of these complex patients and combined surgery is essential to ensure the best outcome. Important to the decision making is estimation that the PH is explained by the thromboembolic burden and that it can be effectively cleared and that the congenital lesion can be repaired.

Minimal Access Surgery in Paediatric and Adult Congenital Heart Operations

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Objectives

The use of minimal-access techniques in congenital cardiac surgery remains limited. We aim to report our experience in a series of paediatric and adult congenital patients undergoing surgery via minimally-invasive approaches.

Methods

All patients undergoing minimal-access congenital cardiac surgery (paediatric and adult) between January 2016 and October 2020 were included. Preoperative, procedural and outcome data were collected from electronic patient records.

Results

We identified 47 consecutive patients (24 paediatric, 23 adult). The median age at surgery in the paediatric group was 5 years [2 months-17 years] and 48 years [19-64] in the adult population. 38 (81%) procedures were performed via a lower partial sternotomy with or without J extension in the intercostal space, while in 19% (n=9) an upper hemi-sternotomy was used. The range of procedures included: atrial septal defect closure (68%,n=32), ventricular septal defect closure (9%,n=4), pulmonary artery banding (9%, n=4), tricuspid valve repair (4%,n=2), Ozaki procedure (2%,n=1), aortic valve repair (2%,n=1), anomalous left coronary artery arising from pulmonary artery repair (2%,n=1), anomalous aortic origin of coronary artery repair (2%,n=1) and ascending aortic replacement (2%,n=1). Two patients had preoperative endocarditis. One patient had previous cardiac surgery and lower partial resternotomy was used due to pre-existing manubrial osteomyelitis.

There was no early or late mortality. One patient required conversion to full sternotomy. Otherwise, there was no intra-operative complication. One patient required re-operation for bleeding. One patient had superficial sternal wound infection requiring debridement. At a median follow-up of 18 months [0-52], all patients were well with fully-healed sternal wounds.

Conclusion

Our series shows that minimal access congenital cardiac surgery can be performed safely in selected patients despite increased procedural complexity.

Modified Versus Conventional Ultrafiltration in Paediatric Cardiac Surgery: An Updated Systematic Review and Meta-Analysis

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Objective

Ultrafiltration following cardiopulmonary bypass is now established practice in paediatric cardiac surgery, ameliorating the inflammatory response to extracorporeal circulation and improving haemodynamic status. Recent studies have shown modified ultrafiltration (MUF) to offer improved outcomes compared to conventional ultrafiltration (CUF). We sought to appraise the current evidence for these techniques and update a previous 2011 meta-analysis.

Methods

A literature search was performed of the MEDLINE, EMBASE, CINAHL and Cochrane Trials databases. Meta-Analysis was performed with a random effects model with confidence interval of 95% using RevMan v5.4. All articles were assessed using the Cochrane Risk of Bias Tool and I² statistic for heterogeneity.

Results

A total of 564 original articles were retrieved, of which 22 comparative studies were included in analysis. There was a high degree of heterogeneity across all outcome measures, and there was no data available for post-operative diuretic use or post-operative renal failure. MUF was superior in mean arterial pressure, ICU stay in days (see Figure) and hospital stay, post-operative haematocrit, amount of chest tube drainage and duration of mechanical ventilation. Subgroup analysis showed increased benefit of a combined MUF+CUF strategy compared to MUF or CUF alone.

Conclusion

MUF should be considered for routine use in paediatric surgery as part of the bypass strategy in order to improve haemodynamic status and reduce the morbidity, mortality and hospital stay associated with cardiac surgery in the paediatric population.

Hands-on Surgical Training for Congenital Heart Surgery: From A to Z

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¹Leeds General Infirmary; ²Hospital for Sick Children (Sickkids)

Introduction

Training within congenital heart surgery (CHS) faces challenges such as reductions in training time and increasing patient expectations. This has led to calls to evolve training paradigms globally to augment current curricula. Here we describe the development and successful incorporation of a reproducible simulation platform within CHS using 3D-printed models.

Method

Consultant surgeons' consensus was reached on the procedures to include in the curriculum. 3D-printed models were developed from cross-sectional image data and modified to incorporate the surgical anatomy of the disease entities. A congenital chest simulator was developed to increase the fidelity of simulation, closely resembling intraoperative ergonomics. Objective procedure-specific assessment methods were incorporated to evaluate surgeon performance.

Results

The monthly in-house hands-on surgical training curriculum was successfully completed over an 11-month period (Jan-Nov 2019). Congenital heart surgical fellows performed each surgical case twice on 11 different cases. Models included: HLHS, AVSD, TOF, TGA, CoA, DORV, supraaortic arch stenosis, truncus arteriosus and interrupted aortic arch. 115 cases were completed by 7 fellows. 93% of the surgeons' time improved ($p < 0.00001$) with 71% improving in overall score between the two cases ($p < 0.005$).

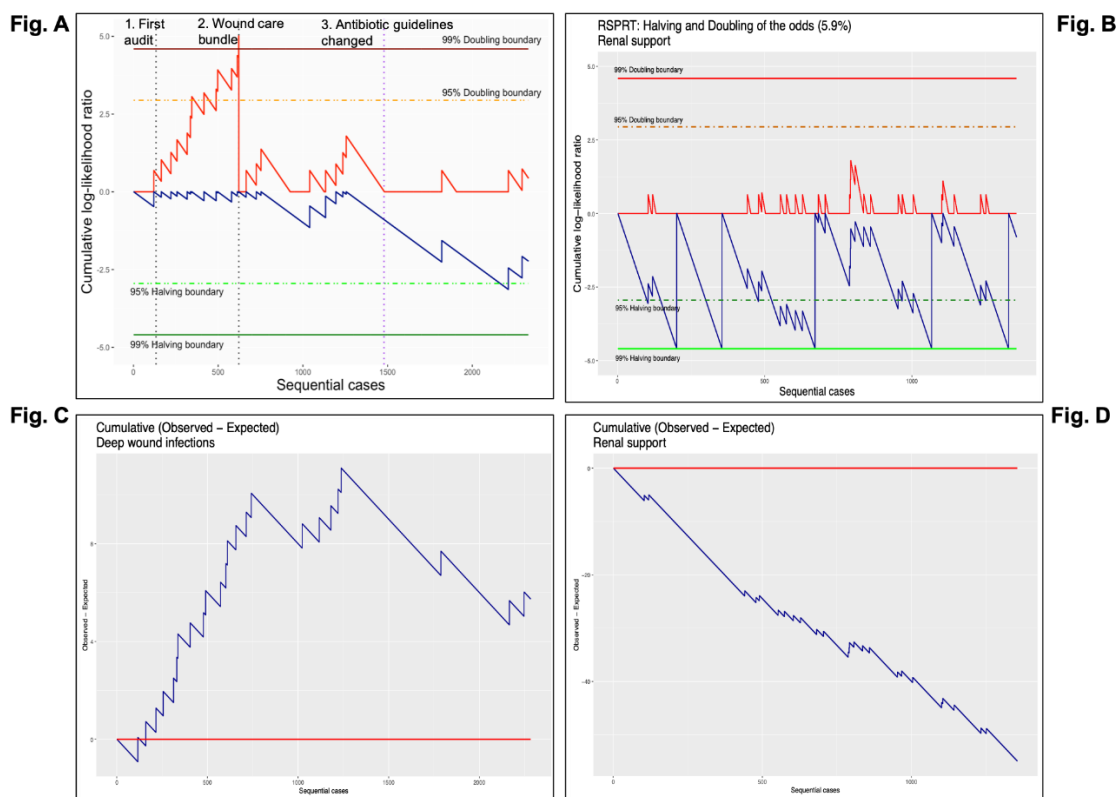
Conclusion

This study demonstrates the first successful incorporation of hand-on surgical training with 3D-printed models into a CHS curriculum. The methodology is reproducible across institutions internationally, which we aim to share along with the barriers faced. As training starts to move from a number to competency-based approach simulation will play a crucial role in the development and evaluation of the next generation of congenital cardiac surgeons.

RSRPT Plots: Innovation in Real-time Tracking of Post-operative Morbidities

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Birmingham Children's Hospital



Objectives

The reduction of post-surgical morbidity has become an important focus of quality improvement initiatives. The typical methodology of intermittent review of incidence masks clinically significant trends, averages performance over time and delays recognition of deviations from acceptable performance, as well as response to policy changes. We investigated the use of Resetting Sequential Probability Ratio Test plots (RSRPT) to overcome these obstacles and demonstrate its value as an adjunct in complication tracking/quality improvement.

Methods

Over a 5-year period, all sternal wounds underwent 90-day surveillance to identify both infective and non-infective complications. RSRPT plots were created and repeatedly reviewed to monitor deviations from target values in real-time. The impact of successive changes in surgical site infection prophylaxis and wound care on the incidence of wound complications is described.

Results

3323 patients (≤ 16 years of age) underwent cardiac surgery via median sternotomy. Based on initial performance, control limits were set at 1.6% for deep sternal wound infection and 8.6% for all other (infective and non-infective) wound complications. Compared to CUSUM plots and descriptive statistics, the derived RSPRT plots demonstrated the efficacy of successive interventions (wound care bundles, antibiotic prophylaxis changes) which resulted in a significant and sustained reduction in the incidence of superficial and deep wound complications (Fig.A, C). In view of their perceived utility, the use of these plots has now been adopted in the monitoring of other common post-surgical complications (Fig.B, D).

Conclusions

The use of RSPRT plots in addition to traditional audit analyses have demonstrated a unique ability to detect subtle trends, trigger changes in management and assess their impact in real time. We recommend their routine use in cardiac surgical audits for monitoring post-operative complications.

Adult Coronary Artery Bypass Grafting by Congenital Surgeons – A Propensity- Matched Analysis

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Objectives

Surgical myocardial revascularisation will be increasingly needed in adult patients with congenital heart disease (CHD). We investigated the results of coronary artery bypass grafting (CABG) performed on adult patients by congenital cardiac surgeons at our institution.

Methods

A retrospective, single centre study was conducted. Adult patients undergoing isolated or combined CABG done by two congenital surgeons from 2004 to 2017 were included. Early and late outcomes were analysed for the whole cohort. A propensity-matched analysis was also conducted to compare the results of isolated CABG between congenital surgeons and adult surgeons at the same centre.

Results

660 consecutive patients operated on by congenital surgeons were selected. 514 and 113 patients had isolated and combined CABG for acquired disease, respectively. 33 patients had CABG combined with surgery for CHD. 12 different congenital conditions were represented, the most common being atrial septal defect/partially anomalous pulmonary venous drainage (9 cases), pulmonary regurgitation (6 cases), anomalous coronary (4 cases) and atrioventricular septal defect (3 cases).

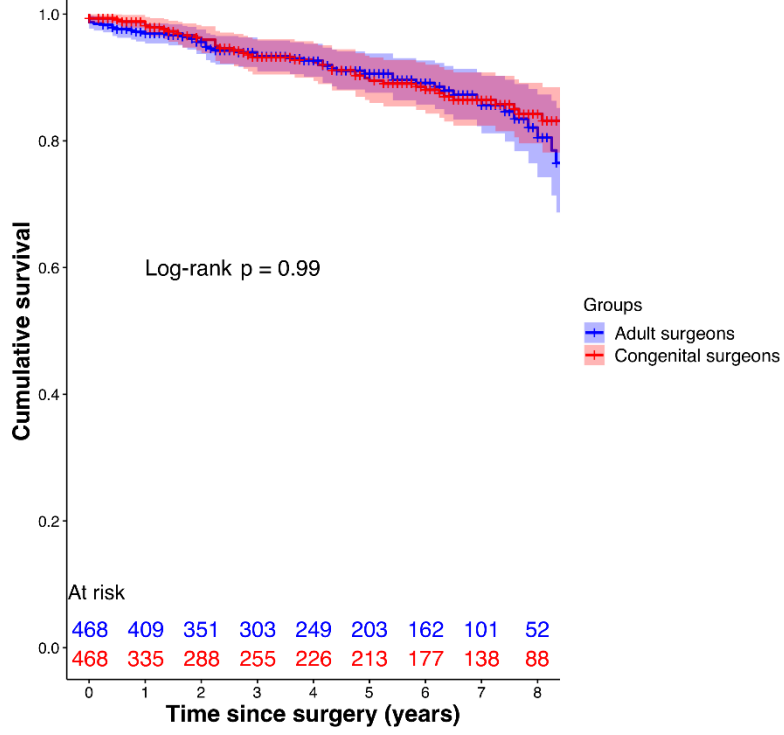
Overall early mortality was 1.2%, rate of re-exploration for bleeding was 4.5%, and a left internal mammary artery graft was used in 88.0% patients. One-year survival was 97.5% (96.2-98.8%) and five-year survival was 88.0% (84.8-91.3%).

After 1:1 propensity matching with adult surgeons (468 pairs), no significant differences were found in early mortality (0.6% vs 1.2%, $p=0.505$), re-exploration for bleeding (3.6% vs 3.0%, $p=0.72$) and late survival ($p=0.99$, Kaplan-Meier curves are displayed in Figure); arterial graft utilisation was higher for congenital surgeons.

Conclusions

CABG can be required in patients with a broad spectrum of different CHD. Congenital cardiac surgeons can perform CABG with no adverse volume-outcome effects and with results that are comparable to those of the adult cardiac surgeons at our centre.

ISOLATED CABG - Survival in matched patients



A Novel Tissue-engineered Vascular Conduit for Pulmonary Artery Reconstruction in a Growing Large Animal Model

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Objectives

Currently available materials for right ventricular outflow tract (RVOT) surgical reconstruction in the paediatric age are affected by size limitations, structural degeneration and lack of growth. We investigated a novel CorMatrix[®]-based biomaterial after implantation in a growing swine model.

Methods

Decellularised porcine small intestinal submucosa (CorMatrix[®]) was seeded with 2.5×10^5 /cm Wharton Jelly-Mesenchymal stromal cells (WJ-MSCs), which had been isolated from the umbilical cord of donor newborn pigs.

For *in vivo* testing, 9 four-week old (15-20 Kg) Landrace female pigs underwent supravalvar main pulmonary artery (MPA) replacement with a Cormatrix[®] interposition graft on beating-heart cardiopulmonary bypass. 5 animals received an unseeded graft and 4 animals received a WJ-MSC seeded graft.

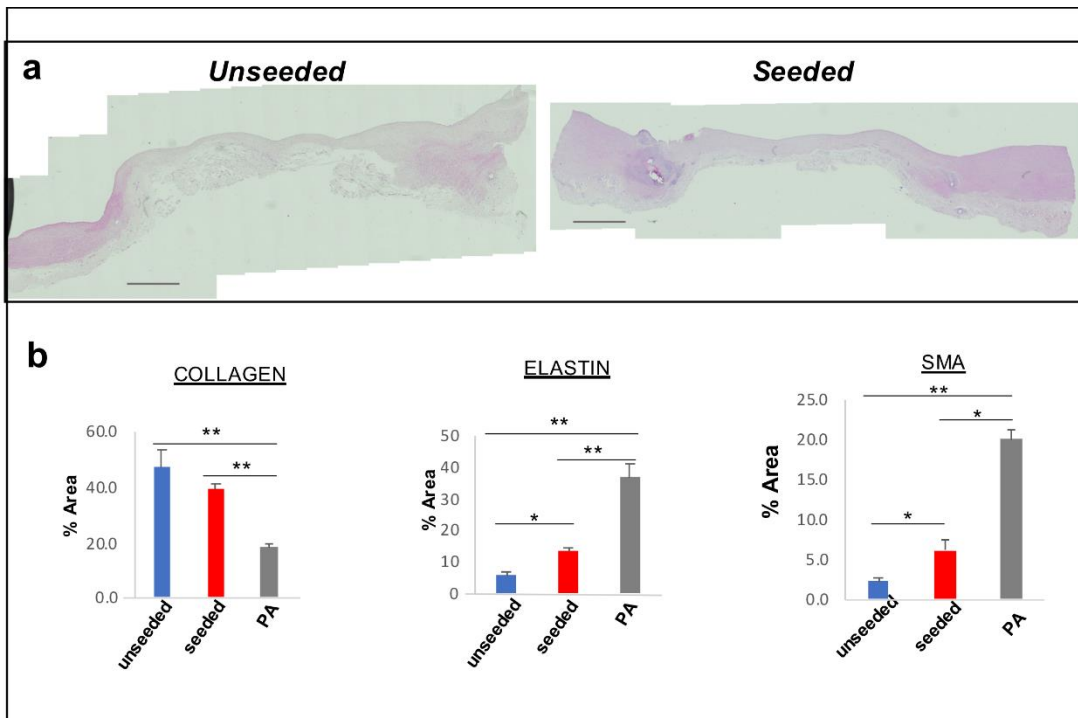
Animals were followed up for 6 months by regular clinical examinations, transthoracic echocardiograms (TTE) and cardiac magnetic resonance (CMR). At termination, sections of MPAs were assessed by inspection, histology and fluorescent immunoistochemistry; the fate of WJ-MSCs was determined with fluorescent *in situ* hybridization (FISH).

Results

2 animals died before the 6-month follow-up target. No graft thrombosis or calcification was observed in any animal. The explanted MPAs demonstrated a higher degree of cellular organisation, a higher concentration of smooth muscle actin-stained cells and a higher elastin content in the seeded group compared to the unseeded one. FISH showed a low concentration of WJ-MSCs in the explanted grafts, suggesting progressive colonisation by native cells; no WJ-MSCs migration to non-target organs was demonstrated. TTE and CMR data are also reported.

Conclusions

Cormatrix® seeded with WJ-MSC showed high biocompatibility, no structural degeneration and potential for growth after *in vivo* testing in a growing swine model. Our findings can be the background to develop a tissue engineered valved conduit for full RVOT reconstruction.



Cerebral Blood Flow Velocity during Weaning of V-A ECMO in Paediatrics

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Objective

Little is known about cerebral blood flow velocity (CBFv) during weaning from extracorporeal membrane oxygenation (ECMO). Aim of the study was to measure CBFv using transcranial Doppler (TCD) during different stages of ECMO weaning in a paediatric population.

Methods

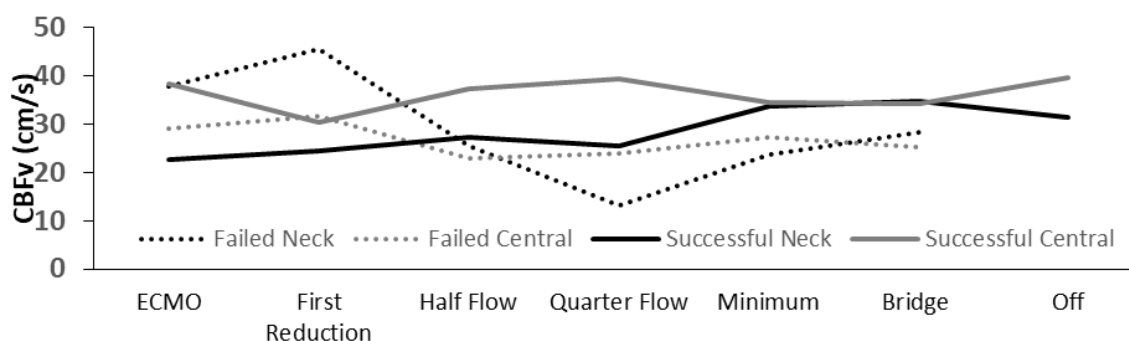
From January 2018 to March 2020 14 patients who underwent veno-arterial (V-A) ECMO were enrolled. Eight patients (mean age 69 days) had central cannulation for post-cardiac surgery support, while six patients (mean age 84 days) had neck cannulation for respiratory support. CBFv was measured from the middle cerebral artery during weaning at different time points: before reducing ECMO flow, $\frac{3}{4}$ flow, $\frac{1}{2}$ flow, $\frac{1}{4}$ flow, minimal flow, when off ECMO and post decannulation. Near-infrared spectroscopy (NIRS), blood pressure, heart rate, arterial oxygen saturation, pH, pCO₂ were recorded at the same time points. Repeated measures linear mixed modelling was used to compare CBFv at each time point for both cannulation types.

Results

Patients successfully weaned from ECMO had 10.2 ± 4.2 cm/s higher mean CBFv once-off ECMO. Patients with neck cannulation who failed had the lowest CBFv at $\frac{1}{4}$ flow compared to the baseline ($p=0.08$, CI- -5.77 , 70.3). NIRS measurements taken at the same time points did not follow the same changes to TCD.

Conclusions

CBFv was higher in patients who were successfully weaned from ECMO, irrespective of the cannulation site. TCD to measure CBFv could be used as an additional tool to guide successfulness of ECMO weaning. Larger study is needed to ascertain its role.



Cerebral Blood Flow Velocity in Neonates Undergoing Aortic Arch Surgery Augmentation with Hypothermic Perfusion at Two Different Temperatures

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Objective

To evaluate cerebral blood flow velocity (CBFv) variations in neonates undergoing aortic arch augmentation surgery with hypothermic antegrade cerebral perfusion (ACP) at two different temperatures.

Methods

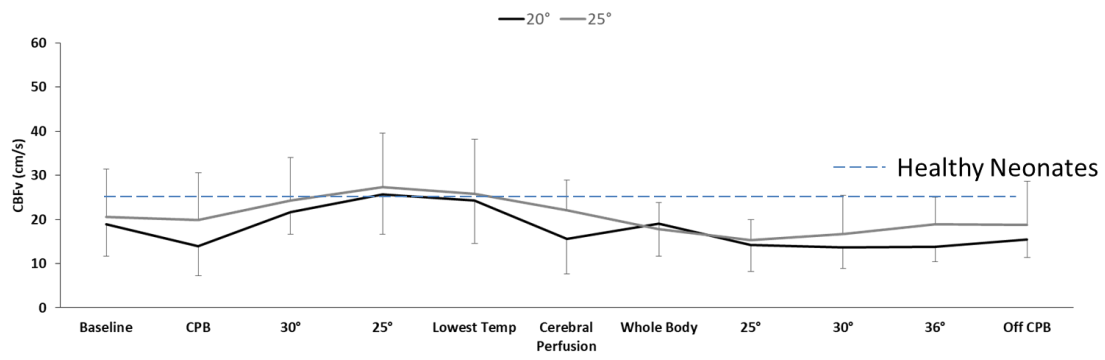
From October 2018 to February 2020, 24 neonates were enrolled in this study. Surgery was indicated for the following diagnosis: Five (20%) patients had Interrupted Aortic Arch (IAA), seventeen (70%) for Hypoplastic Aortic Arch with or without a VSD, and two patients (8%) had a Norwood operation for HLHS. Surgery was performed with hypothermic circulatory arrest with ACP at either 20°C or 25°C, according to surgeons preference or surgical complexity. Transfontanellar CBFv was measured using transcranial Doppler (TCD) from the middle cerebral artery at different time points during the whole operation: before CPB, during the cooling phase, during ACP, during the rewarming phase and after CPB. Bilateral near-infrared spectroscopy (NIRS), mean blood pressure, haematocrit, pO₂, pCO₂, pH and serum lactate were recorded at the same time points. CBFv with TCD was acquired from 10 healthy neonates as control group.

Results

When compared to the control group, mean CBFv in neonates undergoing ACP with hypothermic perfusion was lower during the cooling phase (23.5±6.5 cm/s vs 15.2 ± 5.1 cm/s p=ns) and higher during the rewarming phase (23.5±6.5 cm/s vs 26.5±11.1 cm/s p=ns), returning to baseline after the operation. Bilateral NIRS showed a similar pattern to CBFv. There was no difference in CBFv during ACP at different temperatures (20°C or 25°C) in each time points.

Conclusions

Patients undergoing hypothermic CPB and ACP show fluctuations in CBFv when compared to healthy neonates. CBFv is not influenced by perfusion at different hypothermic temperatures.



The Utility of 3D model in Facilitating Repair for Complex Transposition of Great Arteries

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¹College of Medical, Veterinary and Life Sciences, School of Medicine, Dentistry and Nursing, University of Glasgow, UK; ²Department of Paediatric Cardiac Surgery, Royal Hospital for Children Glasgow, Scotland, UK; ³Department of Paediatric Cardiology, Royal Hospital for Children, Glasgow, Scotland, UK

Background

The utility of 3D model in facilitating complex arterial switch (ASO) and biventricular repair is presented.

Methods

Two infants presented with complex TGA post-natally. In Patient A (3.6kg), echocardiography confirmed TGA, DORV, large inlet-outlet VSD, progressive LV outflow tract obstruction (LVOTO) (Vmax 4.4m/s). In Patient B(4.1kg) had multiple co-morbidities, CHARGE syndrome, recurrent NEC and severe tracheomalacia. Echocardiography confirmed TGA, DORV, and complete AVSD. Both patients had complete side-by-side great vessels: aorta was left/anterior to PA (A) and right/anterior (B). The myocardium 3D model was used for assessing relationship of VSD and great arteries and blood cast 3D model for coronary re-implantation.

Results

The 3D models confirmed feasibility for complex ASO and biventricular repair during infancy. In patient A, the 3D model excluded option of complex baffle without ASO, which would result in LVOTO and compromised RV volume. The design of VSD patch was aided by 3D model. A underwent ASO, Lecompte, intraventricular tunnel LV to neo-aortic valve and RV to neo-pulmonary valve, RVOT myectomy and patch, LVOTO relief (5.9kg, 9-month). Patient B was palliated with PA band/BT shunt due to multiple co-morbidities and sepsis. B underwent re-sternotomy, ASO, Lecompte, AVSD repair (two-patch technique) and RVOT myectomy (8kg, 4-month). Both patients were weaned off bypass on small amount of inotropes. Patient A and B were extubated 1.5 and 9.5 days post-ASO. Permanent pacemaker was required in one. Good ventricular function, coronary flow, atrio-ventricular and ventriculo-arterial valves were confirmed on post-operative echocardiography with no residual VSD and unobstructed biventricular outflow tracts in both patients.

Conclusion

3D-model is useful to (i) confirm feasibility of complex biventricular repair and arterial switch (ii) feasibility of repair during infancy and (iii) facilitate surgical planning to achieve optimal outcome.

Understanding Parents' Decision-making on Participation in Clinical Trials in Children's Heart Surgery: A Qualitative Study

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¹Birmingham Children's Hospital; ²University of Birmingham

Objectives

Less than 1% of children undergoing heart surgery in the UK are recruited to clinical trials and little is known about the views and attitudes of parents towards trials. This study explored parents' perspectives on decision-making about their child's participation in a clinical trial during their elective cardiac surgery.

Methods

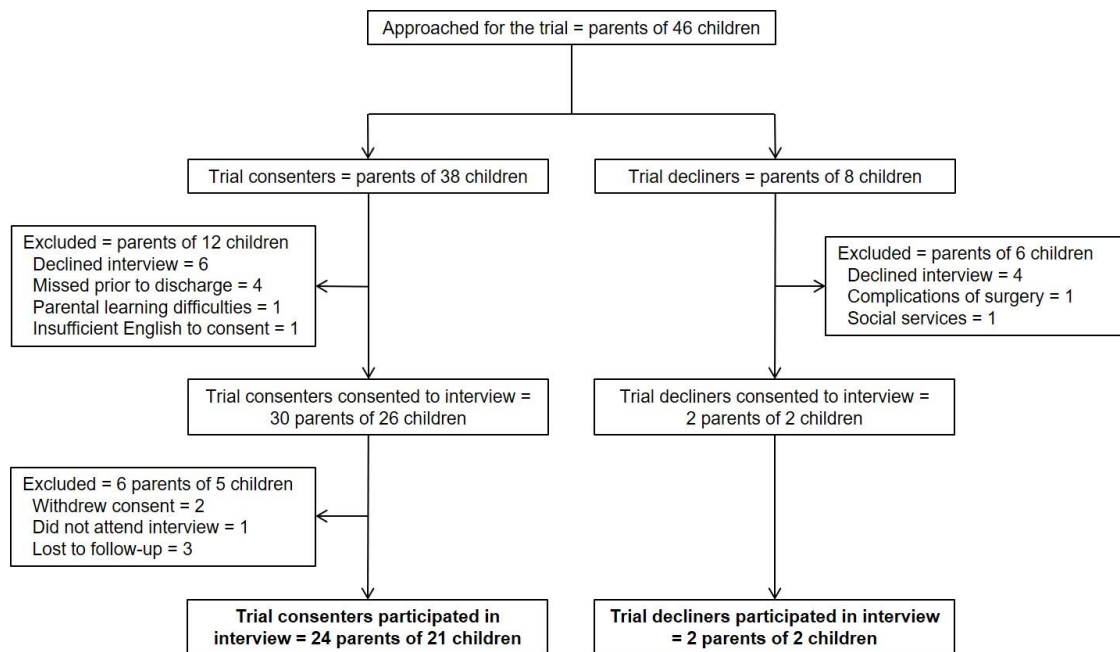
A single centre, qualitative sub-study was conducted as part of a multi-centre, double-blind, randomised controlled trial to investigate the effects of remote ischaemic preconditioning in children undergoing cardiac surgery. Parents of children approached to participate in the trial, both consenters and decliners, were eligible to participate. Semi-structured interviews were conducted face-to-face or by telephone following discharge, digitally audio-recorded, transcribed, and thematically analysed.

Results

Of 46 patients approached for the trial, 24 consenting and 2 declining parents agreed to participate in an interview (21 mothers, 5 fathers). Parental decision-making about research was influenced by 1) potential risks or additional procedures, 2) personal benefit and altruism for the 'cardiac community'; 3) information, preparation, timing and approach; and 4) trust in the clinical team and collaboration with researchers. All of these were placed within the context of their understanding of the trial and knowledge of research.

Conclusions

Parents of children undergoing cardiac surgery attach value to clinical research and are supportive of clinical trials when there is no or minimal perceived additional risk. These findings enhance our understanding of the factors that influence parents' decision-making and should be used to inform the design and conduct of future paediatric surgical trials.



Repair of Complete Atrio-Ventricular Septal Defect: Is Pre-operative Admission for Cardiac or Respiratory Failure Associated with Worse Outcome?

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Leeds Teaching Hospitals NHS Trust

Objectives

Repair of complete atrio-ventricular septal defect (cAVSD) has excellent outcomes, but some patients still suffer adverse events in spite of satisfactory repair. The clinical impression is that acute admission with pre-operative cardiac and/or respiratory failure leads to worse outcomes.

Methods

This was a retrospective single-centre study of 73 patients that underwent cAVSD repair from January 2013 to July 2020. 46 patients (Group 1) were elective admissions for cAVSD repair, and 27 patients (Group 2) were acute admissions that required cAVSD repair prior to discharge. 13 patients in Group 2 needed mechanical ventilation prior to surgery (MV).

Results

Patients in Group 1 were older than those in Group 2 (median age 140 [IQR 115 - 169] days vs 93 [73 - 127] days; $p < 0.001$). One patient in Group 1, and 2 patients in Group 2 had undergone a pulmonary artery band prior to cAVSD repair.

Post-operative follow-up period for the entire cohort was 1041 [182 - 1687] days. There were no 30-day deaths. Six patients (2 in Group 1 (4.3%) and 4 in Group 2 (14.8%) died in hospital at 102 [52-147] days. All deaths in Group 2 required MV, and MV - but not acute admission - was a significant risk factor for late in-hospital death ($p < 0.01$). Patients in Group 2 were more likely to have prolonged (>21 days) postoperative stay (9% of patients in group 1 vs 37% in group 2; $p = 0.003$).

Conclusions

Acute admission for cardiac and/or respiratory failure is not uncommon in patients with cAVSD and is associated with prolonged post-operative stay following cAVSD repair. The need for pre-operative mechanical ventilation significantly increases the risk of hospital death.

Outcomes After Paediatric Extracorporeal Cardiopulmonary Resuscitation (ECPR) in a Tertiary Centre

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¹Department of Cardiothoracic Surgery, Faculty of Medicine, Assiut University, Assiut, Egypt; ²Alder Hey Children's NHS Foundation Trust

Objective

To report our outcomes in utilizing extracorporeal membrane oxygenation (ECMO) institution for cardiac arrest.

Methods

Retrospective records of all patients that needed ECPR between January 2015 and July 2020 have been reviewed. Primary outcomes were survival to ECMO decannulation, hospital discharge and one-year survival. Secondary outcomes were the need for ECMO re-cannulation and neurology outcome using Paediatric Cerebral Performance Category (PCPC).

Results

A total of 44 consecutive patients were identified. 75 % were post cardiac surgery (n=33), mean time from arrest to initiation of ECMO was 39.5 mins +/- 17.7 mins. Mean highest lactate prior to ECMO was 12.9 +/- 4.4. 79.6 % of patients received central cannulation. 11.4 % of patients (n=5) needed more than one run of ECMO. Mean hours on ECMO were 175.4 +/- 212.5 hours and mean PCPC score was 2.14 +/- 1.68. Mean ICU stay was 16.2 +/- 16.9 days and total hospital stay was 47 +/- 68.5 days. Overall Survival to ECMO weaning was 68.4 % (n=13) vs 92 % (n=23) in neonates and paediatric patients respectively. Survival to hospital discharge was 47.4 % (n=9) vs 72 % (n=18) and one year survival was 42.1 % (n=8) vs 72 % (n=18) in the neonatal and paediatric cohort respectively.

Conclusion

Our survival rates are encouraging and in line with current published literature and comparable favourably to International ELSO (Extracorporeal life support organisation) registry for neonates and paediatric patients of all cause ECPR. Paediatric patients showed a survival advantage over neonates after ECPR.

Perfecting the Norwood Operation Using 3D-Printed Models (Video)

Hussein, N¹; Contreras, J²; Honjo, O²; Barron, D²; Yoo, S²

¹Leeds General Infirmary; ²Hospital for Sick Children (Sickkids)

Nursing & AHP Forum

A Retrospective Study Investigating the Prescribing Practice of Non-medical Prescriber (NMP) with Medical Prescribers Within the Cardiothoracic Specialty

Faulkner, S¹; Nayyar, B²

¹UHB QEH; ²UHB

Introduction

This study aims to compare the prescribing practice of non-medical prescriber (NMP) in an established advanced clinical practitioner (ACP) cardiothoracic team with medical doctors for the same cohort of patients. Prescribing practice between both cohorts will be assessed against two main categories; prescribing in accordance to national-and local guidelines and admission and discharge medication errors.

Method

Retrospective data was collated between October 2019 and December 2019 and audited. A pharmacist intervention scoring tool was used to compare errors in the categories identified. The intervention scoring tool identifies medication errors based on their severity and is classified as 1, 2, 3 or 4. Intervention 1 being the least severe and 4 being the most severe.

Results

The preliminary data suggested that the majority of prescribing errors in both cohorts are around medicines optimisation rather than admission and discharge errors. A larger proportion of errors were highlighted as an intervention 2 on the pharmacist scoring tool. The majority of interventions by the pharmacist were around anticoagulation/antiplatelet management and titration of statin doses post coronary artery bypass grafting (CABG). NMP prescribing was proved to be on par with medical prescribing in terms of errors; however more prescriptions were prescribed by an NMP than the medical team.

Conclusion

The study showed that ongoing teaching and education on medicines optimisation is essential. This audit supports further research on ACP NMP and benchmarking practice. It highlights the need for a dashboard system for NMP similar to that used by medical staff to monitor individual prescribing practice and thus reduce prescribing errors. The study highlighted the importance of ward-based pharmacist interventions and the importance of a future role of a cardiothoracic specialist NMP pharmacist.

CCU/Cardiology Referral Triage Project

Nolan, F; Young, F

Golden Jubilee National Hospital

Objective

Patients requiring physiotherapy input from cardiology units would routinely be referred from either nursing or medical staff should they deem it as appropriate. Due to the unprecedented times of COVID -19, with relation to staffing changes and increases in admissions to non-specialist areas, the triaging of these referrals has become problematic. This has led to an increase in inappropriate referrals as well as poor utilisation of physiotherapy skill mix. If a more structured referral process was in place, any potential risk to patients would be minimised, MDT time would be utilised more effectively, could improve patient outcomes and decrease hospital length of stay. The aim of this project is to minimise the amount of inappropriate referrals and develop a simple referral process.

Method

Six months of retrospective data was analysed to determine the extent of the problem prior to commencement of this project. A data collection sheet was created to collect six months of specific information from the patient being referred. An overall decision was made based on these factors to determine how appropriate the referral was. A referral form with similar factors was given to the referring units for staff to utilise. Data sheets were collected at the end of the month and a report created with overall numbers. Prospectively, a flowchart referral system will be created to streamline this process.

Results

The data collection part of the study is ongoing at present however will be concluded in December 2020. Comparatively, retrospective and current data indicated a 300% rise in referrals. This equates to 230 minutes of physiotherapy time being utilised inappropriately and 170 minutes of qualified physiotherapist time being utilised inappropriately for referrals that were suitable for assistant practitioners.

Conclusion

It is apparent inappropriate referrals have significantly increased as a result of staffing changes and increased admissions during COVID-19.

Minimising Blood Transfusion in Cardiac Surgery

Nolan, L; Ali, I; Zaidi, A

Morrison Hospital Swansea Wales

Objective

After cardiac surgery anaemia and blood transfusion are associated with an increased risk of morbidity and mortality. In Morrison Hospital's cardiac unit we are trying to avoid post-operative anaemia and avoid the proven risks of blood transfusion.

We have demonstrated this can be achieved by optimising pre-operative haemoglobin level. An initial prospective audit of 38 pts showed a highly significant correlation between Hb >120g/l and reduced need for blood transfusion.

We implemented a protocol of preoperative iron (orally or intravenously) in patients with Hb<130g/l.

This is a reaudit of all elective patients over a 2 month period from May to July 2019. Of 26 patients, 24 patients with a preoperative Hb >120 g/l received zero blood transfusion.

Conclusion

Patients with a higher pre-operative haemoglobin have a reduced incidence of blood transfusion.

Recommendations

Identification and correction of preoperative anaemia using iron, intraoperative measures to decrease blood loss and defining an optimal transfusion trigger based on patient factors, and routinely giving patients oral iron in the post-operative period to optimise haemopoiesis and rectify iron deficiency post operatively.

Do ACP Follow-up Phone Calls Reduce Hospital Re-admission Rates of Adult Patients Having Undergone Surgical Resection of Primary Lung Cancer?

Cahill, J; Kenyon, L; Kalkat, M; Naidu, B; Steyn, R; Bishay, E; Fallouh, H; Rogers, V

Queen Elizabeth Hospital, Birmingham

Objectives

The aim of the study was to review the impact of implementing an early follow-up service for patients who have undergone major surgery for lung cancer run by Advanced clinical practitioners.

Method

A retrospective review of 52 consecutive patients who received a follow-up telephone call following surgical resection of lung cancer. Patient concerns were identified and themes of advice were recorded to understand the needs of patients following discharge home. Clinical outcomes were also collected.

Results

Although some patients managed well following discharge, 83% of patients required some form of advice or guidance at home. Of these 52 patients, 6 had further follow-up in terms of a further telephone call, a further 8 had an early review in either a bespoke ACP clinic, GP surgery or routine clinic. Picking up medical issues early meant that they could be dealt with promptly and therefore the introduction of the service was associated with less use of emergency services including hospital readmission rates which dropped from 9.5% prior to the service to 3.8% in this cohort of patients.

Conclusion

An early lung cancer surgery follow-up service led by Advanced clinical practitioners provided information, guidance and signposting to other services in order to meet patients' needs as well as early detection of complications, in doing so there may be an associated reduction in hospital readmission rates.

Is There a Role for a Dedicated Thoracic Surgery Research Nurse?

Boyles, R; Rathinam, S; Nakas, A; Hargadon, B

Glenfield Hospital University Hospitals of Leicester NHS Trust

Objectives

The first research nurse in Thoracic Surgery at our trust was established in August 2018, to potentiate the department's expanding contribution to national multicentre trials. We aimed to analyse the impact of the introduction of this role on our unit's research contribution, and to present learning points from our first years' experience.

Methods

Clinical trials and patients recruited were compared a year before and after the introduction of a dedicated thoracic research nurse.

Overall patient experience, and the personal and professional development of the research nurse were other key areas of interest.

Results

The introduction of a research nurse creates an organised and systematic approach for clinical trials in thoracic surgery. Existing multidisciplinary relationships are enriched, providing an awareness of research trials in Thoracic Surgery and opportunities for contribution and involvement across specialties.

In the first year of the new role, an additional two studies were added to Leicester's contribution to multicentre trials; Prevention HARP2 looking the impact of a statin on postoperative cardiorespiratory complications as well as TOPIC 2, a randomised control trial looking at the effectiveness of epidural and paravertebral on thoracotomy pain.

Dedicated time liaising with patients helps to solidify their understanding of trials, allow a direct point of contact for any queries and creates improved handling of follow up.

Professionally, attendance at courses, presentations of ongoing work and networking as part of a larger research collaborative have all been encouraged.

Conclusion

The impact of a dedicated research nurse in Thoracic Surgery has resulted in increased patient recruitment to multicentre trials and strengthened the relationship between the clinical and research worlds. Despite the COVID-19 pandemic causing disruption to all research activities, we remain determined to expand our research portfolio and team.

Clinical Trial	Patients recruited 2018	Patients recruited 2019
PneumRx Endobronchial Coils	7	3 (closed July 2019)
Prevention HARP2	0	10
TOPIC 2	0	30

TV or not TV - That is the Question. The Impact of Media Exposure on Transplant Activity

McPherson, I¹; Chilvers, N²; Moreno-Esparza, G³; Muse, H¹; Clark, S¹

¹Freeman Hospital, Newcastle-upon-Tyne; ²James Cook University Hospital, Middlesbrough; ³Northumbria University

Objectives

Our unit was the subject of two television documentaries on cardiothoracic transplantation. The filming process was intrusive and prolonged but tolerated with the aim that transplant activity would increase. We evaluated the content of the documentaries and correlated this with transplant activity.

Methods

Two documentaries were analysed for hierarchy of programme content, aired in February 2016 (Doc. 1) and May 2018 (Doc. 2) respectively. Time series analysis of donor offers received and heart/lung transplants in adults and children performed each day from October 2015 to October 2018 at our centre were evaluated in relation to the documentaries.

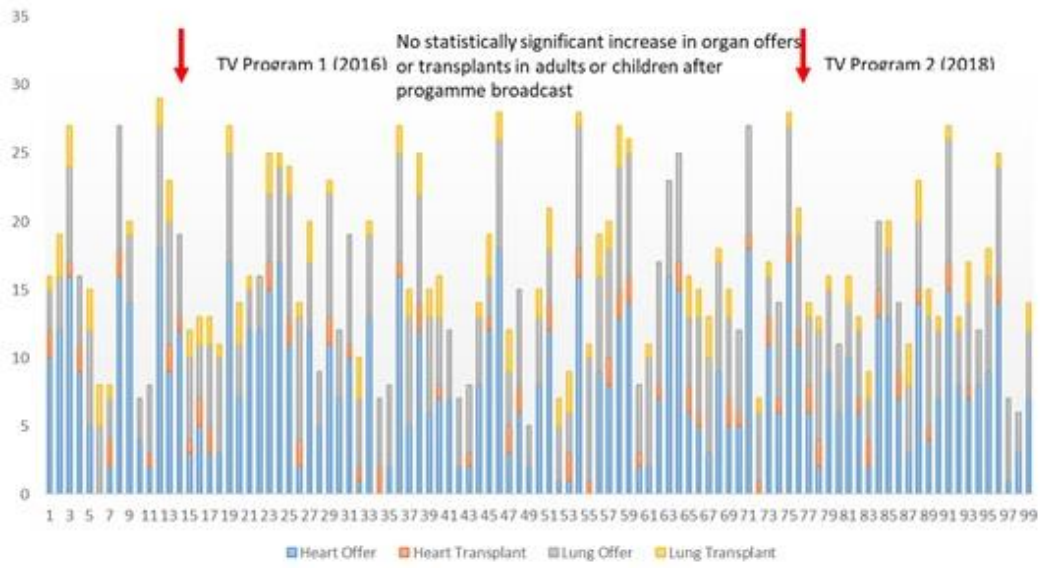
Results

Both documentaries had distinctive style, narrative and structure. Doc. 1 analysis showed greater focus on patients waiting for transplantation and its emotional impact. Doc. 2 had greater emphasis on the technical aspects of surgery and transplant coordination. There was no significant increase ($p > 0.05$) on the number of offers received nor the number of heart and lung transplants performed in adults or children for either program type after airing.

Conclusions

TV offers an exceptionally direct and important connection with the public, particularly in transplant when consenting to and understanding donation nationally is critical. Further study of national registrations to assess relationships between media exposure and transplant rate nationally is required to consolidate results. Additionally, research and wider discussion regarding how to best connect with and invest the public in transplantation by working with the media is crucial in helping to boost transplantation rates and benefit patients on the waiting list.

Organ Offers and Transplants with Time



A Bronchial Gangliocytic Paraganglioma (Video)

Patel, J; Vaughan, P

St Georges Hospital

Does There Need to be a Surgeon at the Table During Robotic Assisted Thoracic Surgery (RATS)?

Thomson, R; Read, M; Cowen, M; Rawling, S

Hull University Teaching Hospitals

Objective

To assess the safety and efficacy of utilising allied health professionals at the table during Robotic Assisted Thoracic Surgery.

Methods

Following the Royal College of Surgeons guidelines on new techniques and innovations, we agreed a local protocol with the clinical practice development committee, the first twenty cases would be audited then a review performed. Training was undertaken by the Consultant surgeon and a Surgical Care Practitioner (SCP), this involved industry teaching and assessment both practically and online. The ODP's and Nurses who had completed the advanced practice course had "in - house" and on-line training.

The consultant took the lead in the introduction, the SCP role was first assistant and a surgical and communication strategy was developed between the consultant and the SCP. It was decided that all potential conversions to open / VATS should be practiced and all staff were allocated their role in this, posters were strategically placed within the Operating room. Simulation training day supported by the whole team assisted with emergency drills Although the Surgeon was there to advise, all the ports were positioned by the SCP with the assistance from the ODP / Nurse, this was again audited for any complications. Docking, instrument changes, suctioning, retrieval, stapling and inta costal blocks were all carried out by the SCP under consultant guidance utilising the communication strategy.

Data was collected:

Docking times, Operation times, Complications, Length of Stay.

Results

Both the docking and the Operation times have reduced since introduction, there has been one patient with a prolonged air leak, no conversions to open or VAT procedure. We have performed a variety of thoracic procedures, the Consultant has assisted in port placement once due to adhesions.

Conclusion

We believe that following our introduction and audit it is feasible and safe for AHP's to be the only scrubbed staff for RATS.

Sharing the Learning Curve in Establishing an ODP-led Motor Evoked Potential (MEP) Service for Intervention on the Thoracoabdominal Aorta

Robertson, L; Theobald, G; Ireland, C; Nawaytou, O; Harrington, D; Field, M; Kuduvalli, M

Liverpool Heart & Chest Hospital

Background

Paraplegia is a rare but dreaded complication of thoraco-abdominal aortic surgery (TAAS) due to potential compromise of blood supply to the spinal cord. Historically neurophysiologists have been employed to perform Motor Evoked Potentials (MEP) as part of neuro-monitoring during Spinal Surgery and TAAS. Fully qualified neurophysiologists are expensive and due to the infrequent nature of such operations, hospitals often resort to expensive locum arrangements.

Methods

Between 2007 and 2017 our MEP service was delivered by a non-Allied Health Care Professional, BSc trained individual on an informal basis. In 2017 the service was formalised into the Theatre Staffing structure with two senior Operating Department Practitioners (ODPs) incorporating the MEP monitoring service into their roles. The ODPs attended industry run training courses as well as some informal training by the previous incumbent of the role.

Results

The service transitioned into delivery by ODPs without interruption. Several challenges and concerns were raised and noted within the wider Theatre Staff Group regarding roles and responsibilities. These were addressed successfully by changes to job descriptions, development of formal competencies and Standard Operating Protocols. In addition, ODPs conducted preoperative visits to explain their roles to patients. The MEP staffing group was kept intentionally small to facilitate maximum exposure to cases necessary to gain experience and expertise. Equipment was upgraded during the transition and enhanced monitoring was introduced. General data storage and individual patient electronic documentation was introduced. ODPs have developed and audit and research programme.

Conclusion

An MEP service has successfully been transitioned to delivery within Theatre Staffing structures by ODPs. The model of care is pragmatic, reliable, flexible, safe and cost effective.

Enhancing Physiotherapy Input to the Thoracic Surgery ERAS Pathway: Effects on Mobilisation, Length of Stay and Post-op Pulmonary Complications

Griffiths, S

University Hospital of Wales, Cardiff

Objective

To determine the impact of enhanced physiotherapy service and implementation of early recovery after surgery (ERAS) principles to the thoracic surgery service at UHW Cardiff. The primary aim was to reduce post-operative pulmonary complications (PPC) and consequently reduce the length of stay (LOS) and time to reach mobilisation goals.

Method

Baseline data was collected between October to December 2017 and compared to Quality Improvement (QI) data from June to August 2018. All patients planned for thoracic surgery during the QI period received enhanced physiotherapy input. Patients were assessed on day 0 with mobilisation if appropriate, then treated 3 times daily on days 1 and 2 post surgery. Day 3 onwards included once a day until independent.

Results

The post ERAS introduction patient group saw a reduction in days until independently mobile from median score of 2 days to 1 day post operatively (post op). This group also saw a reduction in median length of stay post op from 5 days to 4. Post op PPC rates increased marginally between the pre and post ERAS introduction groups from 9.7% to 10.3%, however the patient demographics showed a much higher rate of smokers at pre assessment clinic, from 13% to 38% reported current smokers.

Conclusion

These findings have limited external validity due to a small sample size and short duration of data collection. In addition, enhanced physiotherapy was only one component of the new ERAS implemented pathway. A full review of the new thoracic service may be of benefit.

The above QI project has demonstrated that the enhancement of physiotherapy within the thoracic surgery ERAS pathway does not appear to have influenced the PPC occurrence post op, however patients admitted during the QI project period demonstrated higher risk of complication. Additionally, despite the increase risk factor, the enhanced physiotherapy in conjunction with the wider MDT changes, may have contributed to reduced average LOS by a median of 1 day.

Introducing an Innovative Electromagnetic Navigational Bronchoscopy Service to a Regional Centre: The Experience of the Multi-disciplinary Team

Read, M¹; Cooper, M²; D'Souza, A²; Thomson, R²; Perkins, D²; Rawling, S²; Tentzeris, V²

¹HEY Hospitals NHS Trust; ²Hull University Teaching Hospitals NHS Trust

Objectives

Electromagnetic Navigational Bronchoscopy (ENB) is an innovative procedure that allows peripheral lung lesions to be biopsied without traditional invasive surgery. We assessed the introduction of this procedure to the wider surgical team.

Method

A multi-disciplinary theatre team travelled to Belgium to attend training on the Medtronic superDimension system. This team comprised a Registered Nurse, Operating Department Practitioner, Surgical Care Practitioner and Consultant Thoracic Surgeon. On our return, with initial support from Medtronic, we began to undertake the first cases at our centre. We evaluated our team's evolution over our first 50 patients, particularly our need to assure delivery of comparable results and avoid the spiral of a continuous learning curve.

Results

A core team has been able to disseminate knowledge and technical skills to the wider surgical team. We established safe and effective protocols and we carefully involved concerned specialties, such as radiology, microbiology and histopathology, to mutually overcome the initial challenges we faced. We managed to overcome difficulties which included maintaining a core team for the procedure in the face of staff shortages, managing and processing the biopsy samples at our laboratory at a separate hospital and rolling out training to the wider team. This development took place alongside a global pandemic.

We maintained a diagnostic yield of 65% and 77.5% were performed as day-cases. 5% of the patients required attention with chest drain insertion only and there was no associated mortality. One sample was lost, as it was sent to the wrong laboratory, and this incident was examined and learnt from.

Conclusions

The ENB service has now been successfully established at our centre. A wider team is now involved and we have succeeded in the reduction of the cumulative learning curve. We introduced and deliver a safe and effective new service for the benefit of our patients.

Setting up a Surgical AF ablation Follow-up Clinic, One Year on From Initial Planning

Wyllie-Lau, L

Nottingham University Hospital Trust

Objective

- Need to follow up patients undergoing Surgical AF Ablation to continue care and study
- Not currently being carried out routinely across centres in UK
- Review of patient rhythm and medication
- Travelled to USA to review 2 centres and collect data to set up clinic
- Pilot study set up in our centre
- Review of first few patients
- Change to planned follow up due to Covid-19

Method

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- Pilot study set up in our centre
- Review of first few patients
- Change to planned follow up due to Covid-19

Results

- Patients received DCCV and chemical cardioversions in a timely manner where possible
- Patients less compliant to general follow up engaged with clinic follow up and were encouraged to attend further consultant-led appointments which helped with treatment and monitoring of care
- Patients were positive about continued contact and monitoring of symptoms/follow up treatment
- Pilot clinic protocol was altered and added to on a working basis
- Reduced number of patients undergoing AF ablation surgery due to Covid-19
- Difficulty in review of patients due to Covid 19 and formal non-urgent investigations being suspended

Conclusion

- Formal follow up and documentation is required for best patient care and study
- Setting up a pilot study takes a lot of work and time
- Getting everybody on board is key to success
- Patients like the continued contact, monitoring and treatment
- Making changes to data collection points and method of data collection is important

A Royal Move from Old to New Papworth: A Personal and Reflective Account of the Move of one of the Largest Critical Care Units in the UK

Berny, B

Within this reflection I plan to share with you my personal account of the move of my cardiothoracic Critical Care Unit. I will be sharing my once in a lifetime experience as seen from my role as a Senior Sister and the transfer lead for CCA incorporating the planning and the actual events of the move.

Royal Papworth Hospital had been situated for the past 100 years in a small sleepy village called Papworth Everard in Cambridgeshire. For those of you that know it you will remember it as an amazing pioneering hospital with so much history. It was a hospital like no other treating an increasing number of patients each year within pre fab and old buildings constantly requiring repair.

The plan to move the hospital had long been spoken about throughout my 30 years of nursing there and many wondered if it would ever really happen. Over the years there were mixed views about what was best for its future but in 2019 after a couple of earlier postponements we finally moved to our new site, a brand new purpose built hospital on the outskirts of Cambridge.

So my account is the moving of my Critical care unit whilst maintaining an uninterrupted service for our patients on both the old and new site. I will include the planning involved and the use of a specialised transfer team consisting of a transfer and bedside nurse, a medic, perfusionists and ambulance drivers. I will include how we planned each patient move including patients on bi-ventricular assist devices and ECMO, what went well and what could have gone better. I hope to share my account as honestly as I can to demonstrate how good planning works and with a dedicated team what results can be achieved.

Altered States on ICU – Presentation of Images of the Hallucinations Described by Post-cardiac Surgery Patients

Stones, M¹; Sharp, J²; Balachandran, S²; O'Donnell, V¹; Kirov, G¹; Wilkinson, L¹; Nutt, D³; Owen, M¹

¹Cardiff University; ²University Hospital of Wales; ³Imperial College, London

Objectives

Delirium slows patient recovery and worsens outcome. Visual hallucinations are reported as the most distressing symptoms of delirium. The aim of this delirium study was to characterise the subjective experience of patients whilst on the cardiac intensive care unit (CICU).

Methods

All patients gave fully informed consent to take part in the study prior to heart surgery, 150 patients were recruited between January 2017 and January 2019. Elective and urgent patients were included, emergency patients were excluded. During their recovery on the surgical ward, patients were requested to complete the altered states of consciousness questionnaire (ASC-5D) with respect to their time spent on the CICU. Those patients who were found to have experienced visual hallucinations were offered the opportunity to describe them to the hospital artist. The artist used an overlay photomontage technique to produce photographic life-like images of the patients' hallucinations (for example see image 1)

Results



Approximately 50% of patients retrospectively reported visual hallucinations whilst on the CICU. This was many more than were identified at the time using the clinician-reported delirium rating scale (DRS-98). 60 images have been generated. The images were mostly bizarre complex scenes set against the background of the CICU. Fantastic dream-like scenes and simple hallucinations of colours and shapes were also visualised. Many hallucinations were distressing to the patients, but not always.

Conclusions

Many more post-cardiac surgery patients experience visual hallucinations than were previously recognised. The hallucinations were both complex and simple in nature and often unpleasant and distressing. These images give a unique insight into the patients' subjective experience of the altered states encountered on CICU following surgery. We intend making this series of pictures available for educational purposes.

How to Set up a Nurse-led Aortic Virtual Clinic

Ahearn, Ú; Toolan, C; Harrington, D; Akrigg, S; Field, M; Kuduvalli, M; Nawaytou, O

Liverpool Heart & Chest Hospital

Objectives

The nature of aortic disease means regular surveillance imaging is required pre and postoperatively, therefore volumes of patients seen in conventional consultant-led aortic clinics continually expand. In addition, referrals with incidental findings of borderline aortic aneurysms on CT scans have increased, particularly with the adoption of lung surveillance programmes. Overbooked clinics, extended waiting times and disgruntled patients prompted interest in developing a nurse-led aortic virtual clinic model for patients with stable aortic disease.

Methods

The interventions undertaken in clinic for patients undergoing routine surveillance were audited over 3 months. Patients were surveyed regarding their experience of the conventional clinic and whether telephone, Skype or letter based virtual clinic would be preferable. Nurses attended a day's conference learning how to set up a virtual clinic. Follow-up protocols were developed for imaging and also for referral from the conventional clinic ensuring at least one review by a Consultant. A programme of nurse education initiated and negotiation was required with Radiology to allow Nurse-led ordering of investigations. Appropriate reimbursement was achieved.

Results

Of 148 patients who attend clinic for routine imaging surveillance over 50% waited at least 1 hour for an appointment that, in 83% of cases, took less than 30 minutes. Over 98% of patients did not require intervention other than scan reporting and rebooking. Telephone consultation was the most popular follow-up option. Our nurse-led Aortic Virtual Clinic opened 12 months ago, a telephone follow-up model. Clinic utilisation is 100% with very positive feedback.

Discussion

Despite some initial challenges our Nurse-led Aortic Virtual Clinic is very popular with staff and patients and a pragmatic solution to the burgeoning number of patients with aortic disease requiring follow-up.

Elliott, T

UHS

This presentation reflects on how a fellowship travel award was used to visit the Lung Health Screening unit in Manchester. It discusses the reasoning for the visit, show the areas explored and highlights the implications for my area of work, once a local Lung Health Check commences.

My local CCG was named in 2019 to become one of the ten new sites to commence Lung Health Checks, in England. To investigate the potential impact on my Thoracic Surgical Unit a team of four nurses visited the current services at Manchester. Our aim was to understand the implications and strategies that would be needed in regards to managing this change.

Our visit took place in October 2019, during which time we wanted to investigate how the Health checks had impacted on Manchester's population and medical teams. The aim was to visit the mobile units themselves and talk to as many staff as possible. The visit also included Wythenshawe Hospital where Manchester's Thoracic surgical unit and Respiratory care is based.

During our time, there was the opportunity to also compare surgical and outpatient services as well as ward areas and nursing structures.

We were able to appreciate all aspects of the patient pathway from mobile unit, to respiratory services and pre/post-operative care. This trip also gave us the opportunity to reflect on our own practice and to see how our roles within UHS are the same or differed to those in Manchester.

Improving Patient Flow Through Cardiac ICU

Faichney, S

Golden Jubilee National Hospital

Objective

The aim of this quality improvement project was to demonstrate the potential to reduce "unnecessary" post cardiac surgery stay in ICU.

Methods

Having recognised the concept of "unnecessary" stay (time from when patient deemed fit for transfer to when actually leave unit) the nursing team used the following quality improvement methodology/tools to assess various changes:

Time and motion studies of current practice - gave baseline data

Pareto charts - identified key restrictions in patient journey

Driver diagram – documented and stimulated change ideas from the staff

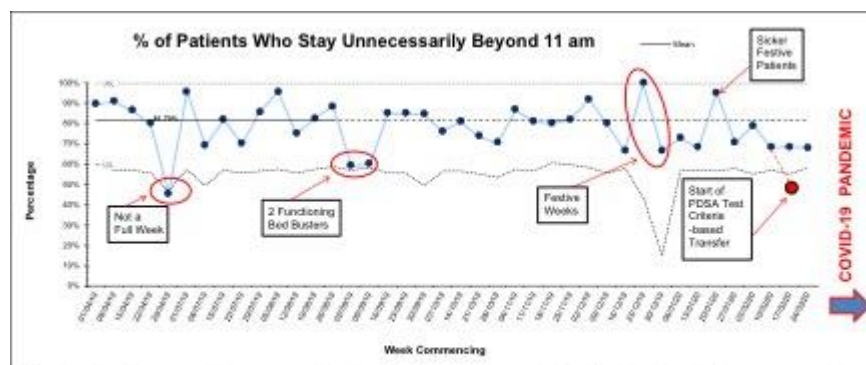
Development of measurement plans by staff

PDSA cycles of change ideas and measurement analyses

Results

Over 11 months, we were able to demonstrate reduced ICU stays as changes were introduced. Key changes were the introduction of "bed busters" (staff employed to clean & prepare bed space for next patient) and the adoption of a criteria-based transfer policy. Having the majority of nursing staff involved in developing, implementing and assessing the changes, a general awareness of streamlining the patient journey was established and this became a factor in reducing stays.

Overall, the "unnecessary" stay observed in 81.7% of patients fell to 52.6% of patients.



Conclusion

Relatively minor changes of nursing practice and an overall desire to streamline transfer from ICU had benefits for both patients and staff – apart from improved bed availability, stress levels, administrative time and costs were reduced. Effective communication and staff involvement was key in stimulating and driving the changes.

Early results from testing the criteria-based transfer policy were promising. Unfortunately, the advent of coronavirus resulted in the restructuring of our ICU to deal with Covid-19 patients before this change could be fully assessed.

Review of Physiotherapy Input for Patients Following Routine Cardiac Surgery

Eden, A

Royal Papworth Hospital

Introduction

At our hospital the physiotherapy team changed from using a screening tool to a referral system for physiotherapy intervention for non-complex cardiac surgery patients. This change enabled physiotherapy resources to be realigned by providing treatment to patients that would benefit.

Objectives

The aim was to evaluate the level of physiotherapy service required following a change from the physiotherapy team screening routine patients, to the process of nurses referring POD1 patients with respiratory or physical rehabilitation needs.

Methodology

A retrospective service evaluation of all patients who had cardiac surgery, admitted to the recovery unit was undertaken from 9th October 2018 to 30th December 2018. Information was taken from the ICU electronic notes system and inputted into an Excel spreadsheet, by registered ICU physiotherapy staff.

Results

The notes of 304 patients were reviewed, of which 56 patients (18%) were referred by the nursing staff for physiotherapy treatment, therefore 82% (248 patients) did not require treatment.

The main reason for referral was low paO_2 / high FiO_2 (57%), and assistance required to mobilise (23%). Other reasons for referral were sputum retention, CXR changes, history of lung disease and stroke.

The main treatments provided were breathing exercises, coughing, and mobilising to chair or marching on the spot. These are treatments that are commonly used by physiotherapists following surgery.

Conclusion

The change to a referral service on the cardiac recovery unit has led to fewer patients requiring physiotherapy. This is a reflection of patients having better pre-operative education, and post-operative optimisation enables patients to experience less pain and immobility, leading to less post-operative complications. By providing less physiotherapy input to non-complex patients, the physiotherapy staff are able to redirect resources to patients who require therapeutic treatment to enable them to progress.

A Service Evaluation of an Adult Aortic Surgery Service; Exploring the Potential Impact of Advanced Clinical Practice Roles Service Delivery

Millichope, A

Queen Elizabeth Hospital, University Hospitals Birmingham

Aim

This service evaluation will define and review the existing aortic surgery care pathway in a high-volume aortic centre and will explore the potential impact of an advanced clinical practitioner (ACP) role in service delivery, making recommendations for future service development.

Method

The current aortic service will be evaluated using a mixed methodology approach to data collection, combined with a peer review of other centres, and a scoping literature review to identify knowledge to inform decision-making in relation to changes that could be considered to improve service delivery.

Findings

Complex, high volume aortic surgery is highly specialised, and only performed at a limited number of centres, having a negative impact on the transferability and generalizability of the literature. The data collected included length of stay, complaints and the cost of outpatient clinics, and whilst the results have not been benchmarked against other centres, they provide an overview of this service. The evaluation also highlights the potential income generated from ACP clinics, which is the same tariff produced in any nurse clinic. It is proposed that this tariff is reviewed at a national level to ensure that ACP activity is captured and recognized at the level it deserves.

Conclusion

An aortic ACP has the potential to positively impact on the patient pathway and service delivery, by enhancing practice, developing new ways of working to improve quality and productivity, whilst ensuring sustainability for the future. The work undertaken and the findings thus far makes the first step to enhancing the aortic service delivery.

Authors

Amy Millichope MSc, BSc (Hons) RN

Louise Beesley MSc, BSc (Hons) RN

Dental Assessments for Patients Undergoing Cardiac Valve Surgery

Nayani-Low, S; Curl, C; Martin, M; Baghai, M

King's College Hospital

Objectives

Poor oral health has been implicated as a risk factor for development of infective endocarditis in those undergoing cardiac valve surgery. Due to this, a dental assessment is recommended to eliminate and/or control acute and chronic infectious foci prior to cardiac valve surgery to improve surgical outcomes.

This service evaluation aimed to review the referral pathway for patients requiring dental assessment prior to acute cardiac valve surgery.

Methods

Prospective data was collected for all patients who were referred for a pre-cardiac surgery dental assessment from May 2019 to March 2020. This data was analysed to explore the referral to assessment/treatment pathway and oral health needs of the cohort.

Results

40 patients were referred for dental assessment over a period of 10 months. 60% (n=24) of referrals were made within 5 days of admission. 79% (n=31) were assessed within 1 day of referral. The majority of these patients had planned dates for surgery within 5 days of referral (67%, n=26), with 23% (n=9) planned for imminent surgery.

82% (n=32) of patients required dental treatment prior to surgery, and 74% (n=29) had this carried out on the day of assessment. The most common treatment required was dental extractions (72%, n=28). Of those who proceeded to have cardiac surgery, 43% (n=14) underwent surgery without delay. For those who did have a delay with surgery, 32% (n=6) were dental related.

Conclusions

Overall, referrals were managed well and patients seen in a timely manner. Involvement of a dental team from an early stage is crucial to ensure positive patient outcomes, as this cohort have a high dental treatment need. Current referrals are for acute admissions, resulting in dental treatment being performed close to the time of surgery, which does not allow sufficient healing time prior to surgery. Further evaluation is recommended to assess incidence of post-operative complications as a result of dental treatment close to the time of surgery.

Kenyon, L

Queen Elizabeth Hospital, University Hospitals Birmingham

Objectives

The overarching aim is to improve outcomes for patients who have undergone curative lung cancer surgery by developing and delivering a holistic recovery package and surveillance pathway led by Macmillan Thoracic surgery Advanced Clinical Practitioners (ACP). The pathway aims to follow up patients as per protocol in over 90% of cases, where 'virtual' follow up is a major component reducing the need for face to face clinic attendance of patients receiving results of monitoring for lung cancer recurrence. Other aims are to improve recovery of quality of life after surgery and tailoring care for patients through a Macmillan Holistic Needs Assessment (HNA) thereby improving patient experience and satisfaction.

Methods

A retrospective audit of the last 18 months of the pathway was undertaken. Patient satisfaction with the service was collected.

Results

183 patients were audited. 136 continue on the pathway, 46 were discharged from follow up (26 reached 5-year surveillance limit, 10 recurrence, 4 died, 3 moved, 2 requested no follow up). Of 183, 100% had a HNA, resulting in 6 referrals to rehabilitation, 3 smoking cessation, 2 pain team (chronic pain), 20 dietary advice and 4 financial support, 2 psychology. 99.5% (182) expressed satisfaction with virtual follow up, 0.5% (1) preferred face to face consultation. 5.5% (10) were referred back to their Consultant with possible recurrence on CT. 1830 minutes of Consultant clinic time was saved with virtual follow up costing £19,581 (£107/appointment); virtual clinic cost £4,423 (£24.17/call). During Covid restrictions CT scans were delayed on average by 2 months; patients reported anxiety about attending hospital for their bloods and scan.

Conclusions

ACP led virtual clinic addresses the Cancer Patient Centred Follow up agenda and addresses the health and well-being needs of lung cancer survivors and is popular with patients. It saves clinic time and cost thereby improving efficiency.

Recovery From Intensive Care Unit-acquired Weakness (ICUAW) Following Aortic Valve Surgery: The Effect on Muscle Mass, Function and Quality of Life

Thomas, A¹; Griffiths, M¹; Kalakoutas, A²; Yates, M¹; Sanders, J¹

¹St Bartholomew's Hospital; ²Barts and the London School of Medicine

Objectives

Intensive care unit acquired weakness (ICUAW) is a debilitating condition, associated with increased mortality and morbidity and known to have a significant impact on recovery. Patients undergoing elective cardiac surgery lose considerable muscle mass in the first seven days after surgery. Therefore, we sought to investigate the effect of cardiac surgery on muscle mass and function at 7 days and 6 weeks after surgery and the effect on health-related quality of life (HRQoL), depression and reintegration into society.

Methods

Patients receiving surgical elective aortic valve replacement were included in the study. Muscle mass was measured using ultrasound of the rectus femoris cross-sectional area (RFcsa). Patients' function was calculated using the short physical performance battery (SPPB). HRQoL (EQ5D), depression (hospital anxiety and depression scale (HADS)) and reintegration to normal living (RNLI index) were also collected. Measurements were assessed preoperatively, at day 7 and 6 weeks after surgery.

Results

Thirty-one patients were recruited for the study, with 22 patients attending follow-up. Patients lost 6.5% RFcsa ($p < 0.0001$) in the first 7 days post-surgery and 10% ($p = 0.0014$) between pre-op assessment and follow up. The SPPB score decreased significantly in the first 7 days post-surgery, however increased considerably between day 7 and follow-up. The EQ5D visual analogue scale and crosswalk index (Figure 1) increased significantly from both preoperative assessment and day 7 to follow up. While depression scores significantly decreased between the same time points as the EQ5D, changes in anxiety and RNLI scores, were non-significant.

Conclusion

Patients undergoing surgical AVR lose RFcsa in hospital and continue to do so until 6 weeks after surgery. However, this does not appear to impact recovery, as function significantly improves from day 7 to follow up and patients' health score, function index and depression scores improve.

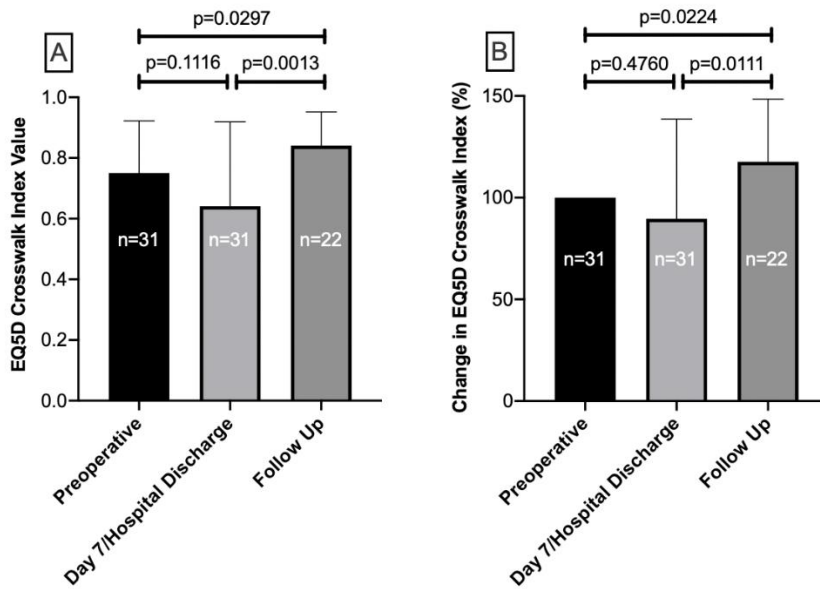


Figure 1: EQ5D Crosswalk Index value raw and normalised data of patients undergoing aortic valve surgery measured preoperatively, on day 7 or hospital discharge and at follow up.

EQ5D Crosswalk index **A:** Change in values ($F(1.453, 37.04) = 7.818, p=0.0036$). **B:** Change in values (%) ($F(1.619, 41.28) = 5.134, p=0.0149$). Data analysed using the mixed-effects model with Geisser-Greenhouse correction and Tukey's multiple comparisons and presented as mean [SD].

Mobilisation on Intra-Aortic Balloon Pump

Nolan, F; Lambie, N

Golden Jubilee National Hospital

Objective

The objective of this project was to develop a protocol which would lead to the introduction of a new service at the Golden Jubilee National Hospital, to facilitate safe mobilisation of patients on Intra-Aortic Balloon Pump (IABP). Due to manufacturer precautions limiting hip flexion to 30 degrees' patients were unable to get out of bed, leading to prolonged bedrest. This could be months for patients bridging to heart transplant. Resulting in muscle atrophy, reduced exercise tolerance, weight loss, decreased respiratory muscle function, longer post-operative recovery and increase the risk of intra and postoperative complications including mortality Our aim was to pre habilitate and optimise this cohort of patients for transplantation.

Method

The team conducted a literature search and, although there was no hospital in the UK mobilising on IABP there were studies in USA and Norway. The team engaged with all the stakeholders including Cardiologists, NSD nursing staff, surgeons and patients. The team wrote and developed a robust protocol which was reviewed and approved by clinical governance. Our mobilisation protocol was modified from the Ramsey protocol. Patients was given a patient information sheet and then consented.

Results

This has become standard practice at The Golden Jubilee National Hospital with all suitable patients on IABP mobilising and being physically maintained in this way. We have mobilised 12 patients and have walked these patients over 500 times with no adverse incidents. 10 patients went on to be transplanted. The team received an Advancing Health Care award UK October 2020 for innovation.

Conclusion

This new physiotherapy intervention is safe and effective. It has not only improved physical outcomes pre-operatively, it has led to timely post-operative extubation time (average 12 hours earlier) and shorter hospital length of stay (average 9 days earlier) when compared to previous patients on IABP before heart transplantation.

The Impact of Nurse-led Chest Drain Clinic on Hospital Length of Stay

Hindmarsh, A; Teh, E; West, D; Gomez, S; Carmen, C; Houston, R; Hudson, H

University Hospitals Bristol & Weston

Objective

Prolonged air leak after thoracic surgery is a common complication. It can prolong hospital stay, increase patient discomfort and there is a risk of complications such as empyema. By increasing length of hospital stay, it increases healthcare costs.

In our department, we instituted a weekly nurse-led drain clinic to manage patients who are otherwise well with prolonged postoperative air leak as out-patients. We assessed the complication rates and outcomes in this group.

Method

This is a retrospective study from January to December 2019. All new patients reviewed in the weekly chest drain clinic were included. Data was collected from hospital electronic records.

Results

There were 31 patients. Mean age was 64 (SD 13.55) years, 7 (23%) women and 24 (77%) men. 39% (n=12) had benign disease. 5 (16%) were non-smokers, and smoking status was unknown in another 5 (16%). 11 (35.48%) underwent a lobectomy or bilobectomy, 4 (12.90%) had a wedge resection, 2 (6.45%) had a segmentectomy, 2 (6.45%) had a lung volume reduction surgery, 1 (3.22%) had a pneumonectomy and 11 (35.48%) had an 'other' procedure- including washout of empyema.

Complication	Number (Percentage)
None	12 (39%)
Superficial wound infection	10 (32%)
Poorly controlled pain	4 (13%)
Empyema	3 (10%)
- Re-operated on	2 (6%)
- Antibiotic treatment only	1 (3%)
Readmitted	6 (19%)

The median length of readmission was 4 days. The median duration of chest drainage was 20 days, with the median length of hospital days saved of 11 days/patient.

Conclusion

Nurse-led chest drain clinic is an efficient way to manage post-operative prolonged air leak. Complication rates were comparable with another reported study. It significantly reduces hospital stay. Indirectly, this led to improved flow of patients in the hospital and reduces cancellation of surgery.

Improve Crisis Resource Management in Postoperative Cardiothoracic Emergencies Using in Situ Simulation

Silva, P; Amorim, C; Cotterill, J; Duarte, P; Gomez, M; Gomes, M

Royal Brompton & Harefield Hospital

Introduction

In-situ simulation is an effective educational method that facilitates practice review and reflection over individual, team and system strengths and weaknesses, in order to develop solutions to overcome those, improving safety and quality of care. Crisis resource management (CRM) incorporate technical skills (TS) and non-technical skills (NTS), both crucial for patient safety in acute settings.

Objectives

Develop Recovery team CMR skills on the management of post cardiothoracic emergencies, to consequently improve patient care and outcome.

Methods

Monthly delivery of high fidelity in-situ simulations exploring common emergencies post cardiothoracic surgery. Emergencies include tamponade, hypovolaemia, hypoxia, rhythm disturbances and cardiac arrest, expected to be managed through Advanced Life Support and Cardiac Advanced Life Support algorithms.

Each simulation is recorded for future visualization and discussion, followed by a debriefing. This explores the feelings of the participants, reviews the medical facts and promotes a discussion about CRM using advocacy-inquiry questions to facilitate reflection, correlation with the practice and identification of improvement strategies.

Results

Two feedback forms were used, with consistent results. The data extracted reveals an increased level of confidence directly proportional to participation, raised motivation to attend simulations, reflection over practice and performance improvement. The team also reported development in all domains of NTS (leadership, situational awareness, communication and resource management) which was assessed using "Teamwork self-monitoring tool: TeamMonitor

Implementation of the QEHB Advanced Clinical Practitioner-led Aorto-Vascular Service

Hewitt, K; Millichope, A; Faulkner, S; Bartley, T; Alldritt, R; Parry, C; Dunn, N; Sarkodie, A; Dronavalli, V; Mascaro, J

Queen Elizabeth Hospital, University Hospitals Birmingham

Background

The nature of aortic diseases means patients often require multiple interventions spanning their lifetime, resulting in huge emphasis on surveillance and close monitoring. Historically patients in the QEHB Aorto-Vascular service have been managed through MDT meetings consisting of surgeons, cardiologists and radiologists, viewing and discussing patient imaging thus forming a management plan. Traditionally, clinic appointments have only been offered to patients identified for surgery. Our aim was to complete a service review to evaluate how an ACP led service could improve this patient experience.

Method

A qualitative study surveyed 30 consecutive patients discussed at the Aortic MDT between Jan and March 2020, including both pre-op and follow-up.

Findings

Results demonstrated varied attendances to clinic with 13% of patients never being seen and 20% of patients not knowing who and how to contact if they experienced a problem. When asked, only 17% of patients were happy with the current format of letter-only communication. Alongside this data, qualitative patient experience was captured. Patients applauded good practice but identified areas of poor communication and use of jargon with no opportunities to discuss.

Implementation

The findings have been used to underpin the development of an ACP led aortic service. The team underwent specialist training, worked collegiately to write and implement protocols to be used in a virtual clinic which commenced in June 2020. Remote reviews of patients were undertaken to evaluate symptoms, explain imaging and importantly, an opportunity for patients to voice any concerns they might have improving patient experience with the benefit of presenting this information back to the MDT. We have evaluated the service as it has evolved and expanded to include a genetic aortopathy clinic to manage the patient as a whole, improve patient flow and improve on education provided. Audit of these services will be presented in February.

Prehabilitation in Cardiac and Thoracic Surgery

Nolan, F; Lyon, K; Lambie, N

Golden Jubilee National Hospital

Objective

Prehabilitation is evolving among many specialties to physically and mentally optimise patients for surgery. Patients referred for surgery are placed on a waiting list - a window of opportunity for these patients where prehabilitation has a role. We evaluated results from our physiotherapy prehabilitation study for cardiac and thoracic surgery patients. The aim was to determine whether a home-based physiotherapy prehabilitation programme improves patients' functional capacity measured by a 6-minute walk test (6MWT) prior to surgery and improve post-operative outcomes.

Methods

Once accepted for surgery participants were consented for the study. After completing a baseline 6MWT participants were randomised into the prehabilitation (P) or standard care (SC) group. The P group were provided with instructions in the use of a patient diary, pedometer and incentive spirometer and taught a home-based exercise programme. The SC group received current preoperative physiotherapy information only. Repeat 6MWTs were carried out on day of admit for surgery, after discharge from physiotherapy and at 6-8 weeks follow up.

Results

Forty patients completed prehabilitation. All participants showed an increase in functional capacity from baseline to preop however these were not statistically significant. Functional capacity on day of discharge and follow up appointment was not statistically significant. Day of discharge from physiotherapy (2.89 days (P) vs 3.60 days (SC) $p < 0.05$) and total postoperative hospital length of stay (6 days (P) vs 6.9 days (SC) $p < 0.05$) for thoracic patients were statistically significant.

Conclusion

This was a small pilot study however results were encouraging and further research into prehabilitation for cardiac and thoracic surgery is required. Physiotherapy prehabilitation provides patients with a safe and structured way to stay physically active or increase physical activity. Physiotherapy prehabilitation may be the next step in revolutionising ERAS.

Wolverhampton Infection Prevention SOP (WIPS): One year data.

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¹Queen Elizabeth Hospital, University Hospitals Birmingham; ²Royal Wolverhampton NHS Trust

Background

Following a service improvement review in 2017, identifying our SSI rate (sternal and graft) as 9%. Our aim was to create a bundled approach to reduce SSI in cardiac surgery.

Methods

November 2018 we implemented the use of BHIS score to risk-assess all cardiac patients and implemented our WIPS 'bundled approach' with a view to reduce our SSIs post cardiac surgery. Patients identified as low and medium risk continued with the standard pre-op decolonisation with differences in wound dressings used. High-risk bundle included the implementation of pre-op, peri-op and post-op changes to reduce SSI and dehiscence. Implementation of Photo at Discharge (PaD) and a new 'Wound Care Guide' were introduced to empower patients to monitor their own wounds post-discharge. Methods of data collection include; monitoring of inpatient wounds, utilisation of our SSI Surveillance Team, monitoring of re-admissions and monitoring of microbiology results. SSI's were classified according to the PHE protocol.

Results

All consecutive patients undergoing cardiac surgery from 01/11/18 to 01/11/19 were included (n=914). Of these 36 patients were diagnosed with SSI post cardiac surgery. 3% were sternal wounds and 1%, graft site. Of those graft site infections, 77% were open harvest. 3 were identified as a deep sternal wound infection (PHE protocol). 39% of patients were classified as high risk, 42% medium risk and 19% low risk. The average number of days post-op the SSI was identified was 19. With only 5% diagnosis as an inpatient.

Conclusion

Our 6-month SSI rate was 2.4% and our 12-month data 3%. Implementation of WIPS has helped reduce SSI rate by 5%. Our results show that utilisation of a risk classification tool could be beneficial in identifying those at a greater risk of developing SSI post-op. Emphasis on patient information is key to reduce SSI post-discharge.

The Impact of 24/7 ACP Service in Cardiac ITU and the Ward Area

Bartley, T; Lewis, M; Pittendriagh, R; McIntosh, E; Best, L; Sanchezrey, O; Bardsley, L; McShane, J; Maseyk, H; Hutchinson, N; Kong, R

Royal Sussex County Hospital

Objective

A three-year project supported by the Sussex Heart Charity & the Cardiac Surgery department was created to provide a 24/7 ACP service working across the Cardiac ITU and ward area as the first point of contact. At the time of creation this was thought to be one of the only units with an ACP covering both areas. We will outline how the project has come to fruition and demonstrate the impact of advanced practice functions across the four pillars of education, research & audit, clinical and leadership.

Design

While the model was based on Supernumerary status there was involvement in service provision with protected learning throughout the three years.

The ACPs undertook cover previously provided by SHO locums from the summer of 2018. They joined the SpR rota from Jan 2019 in preparation for the reduction of SpR's from 8 to 5 by natural attrition in Oct 2019.

Impact across the 4 pillars

Leadership is demonstrated in:

Positive 360 MDT feedback.

The joint SpR rota with non-resident SpR cover has enabled all trainees to have 4/7 operating days and one day in clinic/oncall.

The team have a National & International profile with fellowships, teaching and presentation at regional meetings, HEE, SCTS & EACTS

Clinical

The award of Ionescu fellowships have informed the ACP service development and a lung USS service. We have developed a pre op optimisation of Hb service and an EACU service for patients to attend rather than remain in hospital.

Education

ACPs provided day to day education for the department and Trust, on the CALS day and the Trust USS course. Moreover, they have been National Faculty for SCTS National education courses.

Research

ACPs are completing their MSc dissertations.

Conclusions

The project demonstrates successful MDT working for patients.

Analysis of night time calls demonstrates applied knowledge critical thinking and decision making.

What would we do differently, 10 not 8 WTE and some elements of comms. The service continues to evolve based on evaluation.

Wound Clinic Patients Management During COVID-19 Pandemic – St Bart's Experience

Liu, H; Razon, G; Lim, M; Ibrahim, S

St Bartholomew's Hospital

Introduction

Barts Wound clinic has been established to provide an efficient way of managing post-op surgical wound complications for many years. It has helped to manage and prevent the severity of surgical site infection (SSI) and more importantly, reduced hospital readmission rates.

Objective

The aim is to find out how patients were managed for surgical wound complications postoperatively during the COVID-19 pandemic period. To compare the feasibility of remote wound clinic (via email and/or telephone) versus the traditional face-to-face (F2F) wound clinic intervention.

Method

Data was extracted retrospectively over a six-month period from 23/03/2020 to 23/09/2020. This included patients seen F2F, as well as patients, managed remotely, the treatment or intervention they received, and the duration of their attendance. All patients, irrespectively, were screened for COVID-19 (CV19) symptoms using a CV19 questionnaire prior to attending the clinic.

Results

Results showed a total of 251 patients were managed during this period; in comparison to 475 patients (396 patients seen F2F and 79 patients managed remotely) six-month period prior to pandemic. Of the 251 total, 149 (59%) patients were seen F2F in clinic and 102 (41%) were managed remotely. Of the 149 F2F patients, 61% required negative pressure wound therapy (NPWT), 24% progressed to sternal wire removal and 14% required minimal intervention resulting in dry dressings. A total number of 102 (41%) patients were managed remotely via e-mail or telephone communication.

Conclusion

Implementation of remote management contributed to a reduction in F2F visits of wound clinic patients during the 6 months pandemic period, the data ultimately showed an advantage and feasibility of remote management. With a more rigorous triage process, the number of patients managed remotely can be increased significantly, thus improving the remote management process and making it a permanent feature of the wound clinic.

Patient perspective of Quality of Life (QoL) post Transcatheter Aortic Valve Replacement (TAVI): The Current Knowledge Base

Rea, N

Royal Infirmary Edinburgh

Objectives

TAVI is a novel treatment for Aortic Stenosis offered to patients with increasing age, multimorbidity and frailty who are too high risk for surgical aortic valve replacement (Kapadia et al., 2015). The treatment goal for this unique group of patients is an improvement in QoL. Research to date has demonstrated a QoL improvement using predetermined and structured QoL questionnaires but in the era of patient centred care there is a need to explore and understand the lived experiences (Health Improvement Scotland, 2017).

The aim of this literature search is to identify the current knowledge base of QoL following TAVI from the patient's perspective.

Method

A computerised search of relevant databases was carried out to locate published studies addressing this issue and by utilising the Preferred Reported Items for Systematic Reviews and Meta-Analysis (PRISMA) checklist it provided a systematic and rigorous approach.

Results

Eleven results were retrieved, and five relevant studies identified; Astin et al., (2017), Baumbusch et al., (2017), Lysell and Olsson et al., (2017), Kirk, Backer and Missel., (2018) and Wolf, (2020). Six studies were excluded as they did not address the topic outlined.

Overall, there is a sparsity of research providing an in-depth understanding from the patient perspective. It is clear these studies have offered a different patient perspective not sufficiently captured by standardised questionnaires previously used. A QoL improvement was evident for many but not all TAVI patients, with some reporting regrets of their decision to undergo the procedure. Living independently and having autonomy are important factors for this group of patients.

Conclusion:

More in-depth nursing research is needed to fully understand the patients lived experience given the complex needs of this group of patients. This will ultimately allow nurses and the wider multidisciplinary team to tailor services and care that ensures an individualised approach.

Virtual Cardiac Clinics During COVID – The New Normal?

Clark, S; Macpherson, I

Freeman Hospital, Newcastle

Objectives

COVID has led many to utilise virtual clinic consultations. Questions remain regarding technical aspects of such consultations, patient acceptance and surgeon satisfaction. We transitioned to using virtual clinics exclusively for all new and follow clinic visits from 1st April and sought to evaluate its success.

Methods

All new/follow-up clinics for cardiac surgical patients were conducted virtually. A dedicated webcam and microphone was used with Attend Anywhere software. All patients were sent joining instructions a week ahead of their consultation. Patient and surgeon questionnaires evaluated satisfaction with the clinic.

Results

110 patients underwent virtual consultations. 40 were new pre-op cases and the remainder follow-ups. Only 1 patient was unable to connect. 96% of patients were very satisfied with their consultation. 87% preferred to see a surgeon by video link rather than staff in a mask/PPE in a physical clinic. 100% patients felt that they had been able to ask all questions they wanted. 100% patients valued the convenience of being able to stay at home, involve family members (96%) and the safety from COVID (100%) compared to a hospital visit. Surgeons felt that all pre-operative information was conveyed and understood by patients via video link. For post-op cases wounds could be satisfactorily examined by video in 100% but AF could not be ascertained requiring physical review at the GP surgery to alter medication. 91% of patients would use the virtual clinic service again. 91% felt that the consultation was the same or better than face to face. Other patient comments included cost and time savings on transport/parking.

Conclusions

Virtual clinics have very high satisfaction. Patients like safely seeing us without a mask and with greater convenience than in physical clinics. Staff were able to obtain/convey all necessary information. Inability to examine for AF and adjust medication was an issue but may be resolved by telemedicine solutions

Improving Interpretation of Coronary Angiography: A Pilot Quality Improvement Project

Singh, S; Tirimanna, R; Hussain, A; Shaheen, A; Modi, A

Royal Sussex County Hospital, Brighton

Objectives

Coronary angiography interpretation is an essential skill in Cardiology and Cardiac Surgery. A pilot quality improvement project to educate foundation doctors and allied healthcare professional was undertaken.

Methods

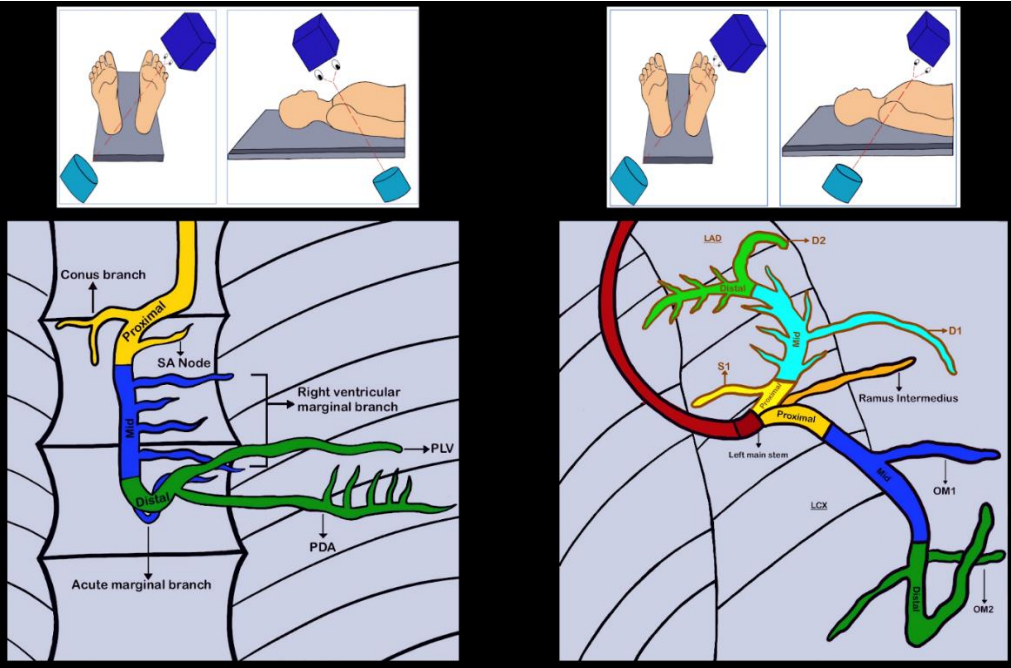
A test was constructed using google forms with coronary angiograms to identify coronary arteries and their branches. Eleven team members working on the wards were then recruited for this project who took the above pre-test. A digitalised basic guide to coronary angiogram interpretation (Fig. 1) was created for their study in a time-limited manner (3-days) and a post-study test was carried out. A pre and post-study self-reported confidence scores (1-5) were also collected. A two-tailed Fishers exact test probability test was used for comparison.

Results

The candidates got 24% of questions correct in the pre-test. The post-guide test showed an improvement in scores to 55% ($p=0.0001$). Self-reported confidence in interpreting angiogram increased in 66% of recruited members after only 3 days of study, but only from 1(range:1-2) to 2 (range: 1-3). Surgical care practitioners, advanced care practitioners, theatre nurses, and junior cardiac anaesthetists expressed interest in the teaching guide.

Conclusion

This newly written digital guide has demonstrated increased ability in interpreting coronary angiogram in the small number of candidates recruited in this pilot study. The basic digital guide was presented to the local trust medical education committee, who endorsed incorporating the guide into an e-learning module for a wider dissemination.



Telemedicine – Is This the Future of Post-cardiac Surgery Nurse-led Follow up?

Holmes, H; Ruiz Segria, C; Stewart, S; Aquino, M; Fewtrell, J; Trevis, J; White, R

James Cook University Hospital

Objectives

Face to face out-patient appointments were halted from March 2020 to help protect staff and patients from the spread of COVID-19. The established nurse-led surgical six week review clinic was therefore carried out via telephone and feedback was used to evaluate the new service concept, and improve ongoing telephone consultations.

Methods

Feedback surveys were distributed retrospectively to consecutive post-cardiac surgery patients, recruited during April 2020, who had their routine 6-week nurse-led review via telephone. Via yes or no responses, questions were grouped to assess; quality of the phone call, whether patients' concerns were adequately addressed, quality of advice given and patient preferences. Exclusions were made if they had attended a face-to-face appointment.

Results

The study population consisted of 80 patients (n=80). 89.9% (n=71) completed the survey, with 2.5% (n=2) excluded and the remaining either declining/non-respondents (8.8%, n=7). Analysis of the quality of the telephone calls demonstrated a 98% positive response. 93% of patients felt that their concerns were addressed and good quality advice given. 55% of patients felt that a telephone call was the preferred means of contact, as opposed to video call or face-to-face contact. 75% of patients felt there were advantages associated with this method of follow-up. Namely, its convenience due to reduced necessity of travel, whilst also accommodating their state and sense of vulnerability.

Conclusions

The telephone appointment achieved its aim of protecting the vulnerable cardiac surgical patients and minimised risk to staff during the first wave of the COVID-19 pandemic.

Due to the current pandemic the telephone review appointment continues. With further refinement, this will be offered as an option post pandemic.

Physiotherapy After Surgery for Malignant Pleural Mesothelioma: Clinician Attitudes at a Single UK-Centre

Gibb, M; Chandarana, K; Caruana, E; Nakas, A

Glenfield Hospital University Hospitals of Leicester NHS Trust

Objectives

Patients who undergo surgery for malignant pleural mesothelioma (MPM) are at risk of developing postoperative pulmonary complications (PPCs), physical deconditioning and multifactorial breathlessness. These may prolong hospital stay, delay patient recovery and increase morbidity. There is, however, little literature detailing physiotherapy interventions after surgery for MPM. We sought to investigate multidisciplinary clinicians' perspectives on physiotherapy practices after surgery for MPM, at a specialist thoracic surgical unit in the UK.

Methods

A survey was distributed online amongst doctors and allied health professionals in thoracic surgery at Glenfield Hospital, Leicester. The questionnaire inquired about physiotherapy interventions throughout the patient pathway.

Results

25 clinicians responded to the survey. Clinicians who responded to the survey were surgeons and doctors (32%) physiotherapists (8%) and the nursing team (60%). The main challenges for physiotherapy identified by respondents were cardiovascular instability (40%) and pain (28%) after major surgery for MPM. 89% of respondents were aware of currently used airway clearance interventions. 78% felt that diaphragmatic resection would limit the appropriateness of positive pressure physiotherapy interventions. 40% of respondents did not know that energy conservation advice was provided to patients. Prehabilitation was the most commonly identified area for quality improvement in this patient group.

Conclusions

There is variable awareness of current local and safe alternative physiotherapy practices following surgery for MPM by multidisciplinary clinicians at our institution.

Does the Assessment of Patient Frailty Provide Better Decision Making and Outcome in Patient's who have Cardiac Disease and Require Cardiac Surgery?

Quigley, J; Patvardhan, C; Chadwick, A; Fingleton, L

Royal Papworth Hospital

Objective

Implementation of a frailty team to improve the assessment and preoptimisation of patients with a clinical frailty score of 4 or more who are accepted for cardiac surgery.

A clinical frailty score can assist in understanding a patient's clinical status, their ability to withstand a big operation and the recovery that is required afterwards. Factors that are included within the frailty score is the patient's mobility, strength, support network, mental/cognitive health and their emotional resilience.

It is unknown which patients might benefit from enhanced preparation for surgery. It is also unknown as to whose postoperative recovery would have been improved by a period of preoptimisation. We have started to hypothesise that if we were to undertake clinical frailty scores on all patients and utilise the information derived from this to enhance our decision making that this would augment clinical decision-making and therefore these patients might suffer less postoperative complications, have a reduced length of stay and an improved experience.

Method

Quality improvement methodology to improve clinical frailty assessment and the implementation of a frailty team.

To improve overall compliance with the clinical frailty score. We hypothesise that adding in a timed up and go test (TUG), 6 metre walk and a grip strength measurement will enable efficient referral to the frailty team and early involvement of appropriate members of our support services. It is proposed that patients who score 4 will get OT and Physio pre-rehabilitation and patients who score 5 and above will receive full frailty team work up including complex geriatric assessment and associated preoptimisation.

Conclusions

This will enable us to identify patients early and improve our ability to offer a comprehensive preoptimisation management plan whilst the patient waits for surgery and consequent overall improvement in patient experience and postoperative outcome.

Training Theatre Staff in a Single Site Speciality Hospital for Robotic Thoracic Surgeries

Arcegono, T; Hopper, B; Stamenkovic, S

Barts Health NHS Trust

Aim

To investigate the need for clearly defined and uniformed training program in facilitating an effective transition of theatre staff to becoming adept with the da Vinci Xi surgical system.

Method

A focus group meeting was facilitated with the core robotic team (4 scrub nurses and 2 health care support workers) to explore the relevance of the initial training plan designed by assigned Da Vinci clinical representatives. Retrospective analysis was used to identify key themes which in turn, enabled a discussion of suitable training strategies for the wider theatre staff members.

Result

The initial thoracic robotic training scheme catered to the core team involved compulsory online assessments, immersion to off-site robotic theatre, hands-on teaching sessions and simulations. Discussions with the core group revealed three key themes of knowledge, safety and empowerment. It was concurred that the training provided was successful in relaying standard base knowledge of the new surgical technology to safely operate during routine procedures and troubleshoot when necessary. Ultimately, it has given staff members renewed sense of ownership of the speciality and confidence even during emergency situations.

Conclusion

The development and implementation of a comprehensive and adaptive theatre training program in robotic thoracic surgery highlighted the importance of a supported learning environment for theatre staff members particularly in acclimatising to a new and highly technical surgical approach. As of October 2020, 21 staff members have since been trained through the in-house robotic training scheme which is now allowing 50% of over-all scrub and support workers participate on the service. Related programs such as emergency undock training are organised twice yearly at a minimum to maintain efficient theatre communication and coordinated teamwork.

A Simple Solution to Optimise Prescribing Post Cardiac Surgery: A Quality Improvement Project

Williams, S; Lee, M; Yates, M; Dooley, N

St Bartholomew's Hospital

Objective

To improve prescribing in post-operative patients following cardiac surgery by applying a simple solution to facilitate prescription of the common post-operative medications.

Methods

We investigated post-operative prescribing in cardiac patients by reviewing a list of medications commonly prescribed. This included: beta blockers, single/dual antiplatelets, gastric protection, statins, diuretics, laxatives, and thromboprophylaxis. The results prompted the creation of a checklist of these regular medications, which was attached to critical care drug charts. This acted as an aide memoire of medications to consider prescribing for day one post-operative patients. Following the introduction of the checklist, the prescription rate was compared with the pre-intervention group.

Results

We reviewed prescribing in 60 patients before and after our intervention. Results following the checklist illustrated an improvement in prescribing throughout all nine medications with an average improvement of 39% prior to ward round and an 18% improvement following ward round. The greatest improvement in prescribing pre-round was for enoxaparin (57%) and laxatives (60%). Post-round the greatest improvement was for diuretics (25%), bisoprolol (23%) and laxatives (34%).

Conclusions

We have demonstrated that a simple checklist improved post-operative prescribing in routine cardiac surgical patients on day one both pre- and post- ward rounds.

A Study to Explore Delirium Following Cardiac Surgery

Sandeman, D

Royal Infirmary Edinburgh

The aim of this study is to identify the incidence of post-traumatic stress symptoms in patients with delirium following cardiac surgery and explore this patient experience.

Introduction

Delirium, an acute fluctuation of cognitive function is a historically known post-operative complication (Blachy et al 1964). There are multiple pre, post and intra-operative factors attributed to the development of delirium (Burns et al 2009). Whatever the precipitating factor, delirium not only causes psychological distress to the patient but also their loved ones (Partridge et al 2012). In some cases, this psychological upset, continues to affect the patient even after discharge from the hospital (Davydow et al 2008) referred to as post-traumatic stress symptoms. This mixed methods study looked at the pre-operative risk factors contributing to delirium and to explore the patient experience.

Methods

Phase I: Data collection included demography, pre-operative risk factors, *HAD scale, 4AT, *TIPI score. The recruited patients were post-operatively reviewed and screened for delirium using *CAM ICU & 4AT till the day of discharge from the hospital. Delirium-positive patients were assigned to phase II of the study.

Phase II: The researcher used 'Purposive Criterion' sampling method, the criterion being the phenomenon of delirium understudy (Polit & Beck 2013).

Phase IIa:(Post op 6-8 wks) Patients were assessed for delirium using 4AT and evaluated for *PTSS by undertaking *SCID.

Phase IIb: (Post op 3m) semi-structured interview to understand the delirium experience.

Findings

The recruited sample size was 406, of which 292 were male patients. The mean EuroSCORE was 4.77. Age (<0.001) at the time of surgery and pre-operative compromised renal state (<0.008) were found to be significant factors contributing to developing post-operative delirium. 73 patients developed delirium of which only 2 patients required ongoing psychological support.

Pat Magee Competition

Systematic Review and Meta-analysis of Iron Therapy in Anaemic Adults Without Chronic Kidney Disease: Updated Cochrane Review

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Objectives

Iron therapy is being recognised as an important pillar in the treatment of anaemia guidelines. This meta-analysis assesses the efficacy of iron treatment in adults without chronic kidney disease and its impact on clinical outcomes. Recent trials of iron treatment in patients undergoing major surgery have shown no significant difference in clinical outcomes.

Methods

Electronic databases were searched as per Cochrane methodology. Randomized controlled trials (RCTs) of iron vs. inactive control or placebo, as well as alternative formulations, doses, and routes were included. The primary outcome of interest was mortality as defined by the authors. Secondary outcomes were blood transfusion, haemoglobin levels, quality of life, serious adverse events, and length of hospital stay.

Results

112 RCTs totalling 22169 patients were included. There was no statistically significant differences in mortality between iron and inactive control. Both oral and parenteral iron significantly reduced the proportion of patients requiring blood transfusion [risk ratio (RR) 0.66, 95% confidence interval (CI) 0.48–0.90; and RR 0.89, 95% CI 0.82–0.97] and improved haemoglobin levels (mean difference MD 1.08, 95% CI 0.55, 1.61 and MD 1.52, 95% CI 1.05, 1.98) compared with inactive control. There was no significant difference in mortality, serious adverse events, quality of life and length of hospital stay. At a glance, there was no difference in transfusion and clinical outcomes between surgical patients and other groups.

Conclusion

In randomised clinical trials, iron treatment shows no difference in mortality or clinical outcomes, but reduces the risk of blood transfusion and improves haemoglobin.

Excision of Intraosseous Myelolipoma - A Rare Presentation of Myeloproliferative Disorder

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Objective

Adrenal Myelolipoma was first described by Gierke in 1905 and was named Myelolipoma by Oberling in 1929. It consists of mature adipose tissue and hematopoietic elements. Extra-adrenal Myelolipomas are extremely rare entities and a few cases of kidney, perirenal part, presacral region, retroperitoneum, pelvis, spleen, and chest have been reported in the literature.

Methods

We report a case of a 68-year-old lady with an incidental finding of a right 5th rib lesion that was referred for surgical assessment. The pre-operative Positron Emission Tomography (PET) scan showed a high uptake of the lesion but no other activity. She also had a background of previous Melanoma (completely excised 16yrs ago), Hepatitis C carrier, Hepatitis A and Bowen's disease of the vulva previously excised. Patient was assessed and scheduled for an elective diagnostic resection of the rib lesion.

Results

Patient had a right thoracotomy (VATS aided) and excision of her right 5th rib. The lesion did not seem to invade the lung parenchyma or any other rib. The chest wall defect was repaired with a Prolene mesh. The patient made an uneventful recovery. Pain was initially managed with a paravertebral catheter that was later switched to oral equivalents. Her drain was removed on the 3rd post-operative day on which she was also discharged home.

Conclusion

Myelolipoma is a benign tumour. Extra-adrenal location is extremely rare. Our literature review has revealed that only a handful of reported cases of these lesions are excised from the chest wall. Since it is extremely difficult to distinguish these benign lesions from other bone malignancies, we advocate a surgical excision when patient fulfils the relevant fitness criteria.

A Systematic Review and Meta-analysis of Studies That Have Evaluated the role of Mitochondrial Function and Iron Metabolism in Frailty

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Objectives

Frailty is a condition of global impairment due to depletion of physiological reserves. Even though the physical phenotype of this syndrome is well described, the underlying biological mechanisms are poorly understood. The aims of the current study were to identify the differences in mitochondrial function and iron metabolism between frail and non-frail subjects, and to investigate the contribution of different methodological approaches to the results.

Methods

Searches were performed, using five online databases up to November 2019. Studies reporting measurements of mitochondrial function or iron metabolism in frail and non-frail subjects or subjects with and without sarcopenia, were included. Pooled effect estimates were expressed as Standardised Mean Differences and 95% Confidence Intervals. Heterogeneity was expressed as I². Meta-analyses, moderator analyses and subgroup analyses were performed in R programming software.

Results

In total, 110 studies, reporting 79 different measures of mitochondrial function or iron metabolism, using 6 different experimental approaches, in 5 species, were identified in searches. Species and methodological approach contributed to severe heterogeneity for most outcomes. Significant decreases in measures of oxygen consumption were observed for frail humans but not in animal models. Conversely, no differences between frail and non-frail humans were observed for measures of oxidative stress, apoptosis, and autophagy, however, in animal models these processes were dysregulated in frailty. When the Fried frailty index was used for subject categorisation, the activities and abundancies of respiratory chain complexes were decreased in frail humans.

Conclusions

Inconsistency of frailty definitions, experimental methodology and reporting in the studies evaluating the molecular mechanisms underlying frailty may present a barrier to the development of effective therapies.

Optimisation of Preoperative Anaemia in Cardiac Surgical Patients

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Objectives

Preoperative anaemia is associated with higher rates of complications and worse postsurgical outcome. In addition, it is a strong predictor of blood transfusions. Preoperative haemoglobin levels can be optimized using intravenous iron infusion. However, its efficacy in patients undergoing cardiac surgery has not been fully elucidated. The aim of this study was to evaluate the effectiveness of IV iron infusion in cardiac surgical patients with anaemia.

Methods

A retrospective study was performed on 46 patients (23 males and 23 females) who underwent cardiac surgery and received IV iron therapy preoperatively, between 2014 – 2019, at Harefield Hospital, London. The changes in haemoglobin levels were assessed by comparing haemoglobin values before and after receiving IV iron infusion.

Results

Median increase in haemoglobin was 5 g/l (interquartile range – 1 to 9.75 g/l). In 22 patients, haemoglobin levels have increased by > 5 g/l, while 24 patients showed poor response to IV iron, with a haemoglobin increment of ≤ 5 g/l. The increments in haemoglobin were insufficient to reach the target range, since 56.5 % of the patients were still anaemic after the IV iron therapy. The median duration of administration of IV iron prior to surgery was 19.5 days.

Conclusions

This small study showed that IV iron infusion does not significantly improve haemoglobin levels in cardiac surgical patients prior to surgery. The likely explanations for this are the short time frame in which the IV iron was infused prior to surgery and the use of haemoglobin as a target marker as opposed to ferritin levels. Therefore, other laboratory markers (e.g., ferritin, transferrin, serum iron) should be used to predict a patient's responsiveness to IV iron in preoperative anemia.

Future studies should focus on other biomarkers of assessing anaemia, ensuring that the medication is given in a sufficient time frame to warrant benefit.

A Comparative Study of Prevention of Coronary Artery Disease at the Primary Level

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Objectives

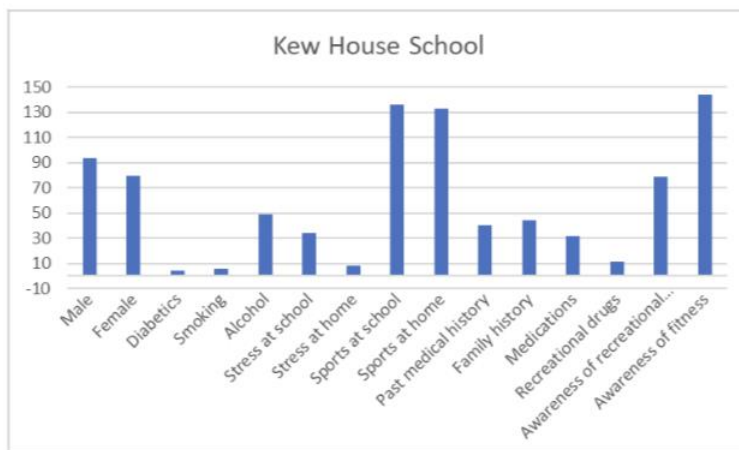
This study will compare two groups such as ages between 11 and 18 years and patients that have undergone coronary bypass graft with different risk factors leading to coronary artery disease. The reason to do this project is to address risk factors, to modify lifestyles and food habits and proper management of diseases such as diabetes and to educate the younger generation to control the prevalence of the disease.

Methods

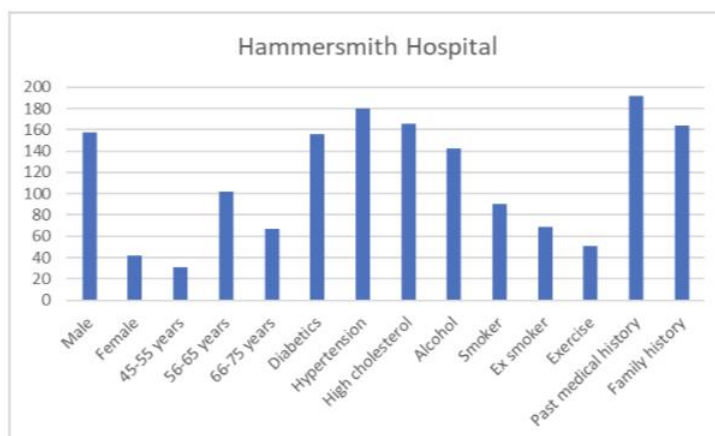
To establish the importance of relevant risk factors, the study was designed to involve two groups such as the students aged 11 to 18 years from a School, London and 200 patients who had followed by coronary artery bypass surgery from a hospital in London. 174 students out of 400 answered an online survey. The topics of the survey are gender, diabetics, smoking, alcohol, stress, sports, past medical history, family history, medications, recreational drugs and awareness of recreational drugs & fitness. And also included the risk factors in coronary artery bypass surgery patients.

Results

The study revealed that the students don't have enough knowledge about their medical issues and its consequences in their future life. This highlighted the importance of education for the students and parents at the community level including at school. That helps to modify their lifestyle, avoiding smoking & recreational drugs and understanding of genetic setup. An interview was conducted with almost all parents, teachers and students following the presentation at school. They all very impressed with the knowledge in dept that I have delivered, related to preventing and slowing down the disease process by modifying lifestyle and avoiding unwanted habits.



Graph 1: Online survey of risk factors of cardiac disease results from students of age 11 to 18 years at Kew House School, London, United Kingdom.



Graph 2: Data of risk factors of patients that have undergone coronary artery bypass surgery from Hammersmith Hospital, London, United Kingdom.

Conclusion

The study confirmed that if we provide adequate information and if remedies by organizing teaching sections in schools and in communities, it will help to reduce and control the incidence of diseases and financial burden on hospitals.

Post-operative Harlequin Syndrome – Rare Presentation of Paravertebral Complication

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Objective

Harlequin Syndrome was originally described by Neligan and Strand in 1952. It is an autonomic dysfunction of the upper cervical or thoracic sympathetic nervous system. Common characteristics are asymmetric, unilateral flushing of the face and upper thoracic region involving a sharp midline demarcation and the absence of sweating/flushing of the contralateral side.

Methods

We report a case of a 60-year-old lady that presented with persistent cough with no other respiratory findings. Imaging showed a right upper lobe opacity which was confirmed to be a T1a N0 M0 adenocarcinoma on CT-guided biopsy. She also had peripheral vascular disease, angina, type 2 diabetes mellitus and a previous nephrectomy.

Results

The patient underwent right VATS upper lobectomy and lymph node dissection. Under direct visualisation by the surgeon, a paravertebral catheter was sited at the beginning of the procedure. 20mls of 0.25% chirocaine was injected and topped up at the end of the case. The surgery was carried out successfully without complication.

While in recovery, the patient was noted to have an unusual facial appearance (Figure 1) with the absence of Horner's syndrome. The condition resolved after the paravertebral infusion was stopped.

Conclusion

Harlequin syndrome is a benign condition and is a rare presentation, with few reported cases in the UK. Iatrogenic harlequin syndrome occurs when there is unintentional injury after surgical dissection, insertion of central line or paravertebral block.



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The landscape of cardiac surgery has always been in flux. Its demise has long been a rumour greatly exaggerated, yet we must acknowledge the impact of innovations such as primary percutaneous coronary intervention (PPCI) and transcatheter aortic valve implantation (TAVI). We set out to look at what trends in cardiac surgery await us in the near future.

First, we looked at historical trends spanning 1997-2019 at the Royal Papworth Hospital. For each surgical category, we fit two regression lines – one using pre-2007 numbers and the other using post-2007, as PPCI/TAVI began at RPH in 2007. Both lines were linearly extrapolated to 2030 (Figure 1). Several surgical categories diverge at the 2007 breakpoint. Combined CABG/valve surgery is the most affected, isolated CABG also appears to be decreasing, and aortic valve surgeries although increasing in absolute volume, show blunting post-2007.

Our model makes several assumptions. We assume that all trends are linear and that RPH has infinite capacity for, accepts, and can perform all referrals. Although this analysis is mainly descriptive and the predictive model limited, we believe it is useful to consider these trends as a quick-and-dirty consideration of what we are likely to face – a Kwik-fiT Kareer Analysis Tool.

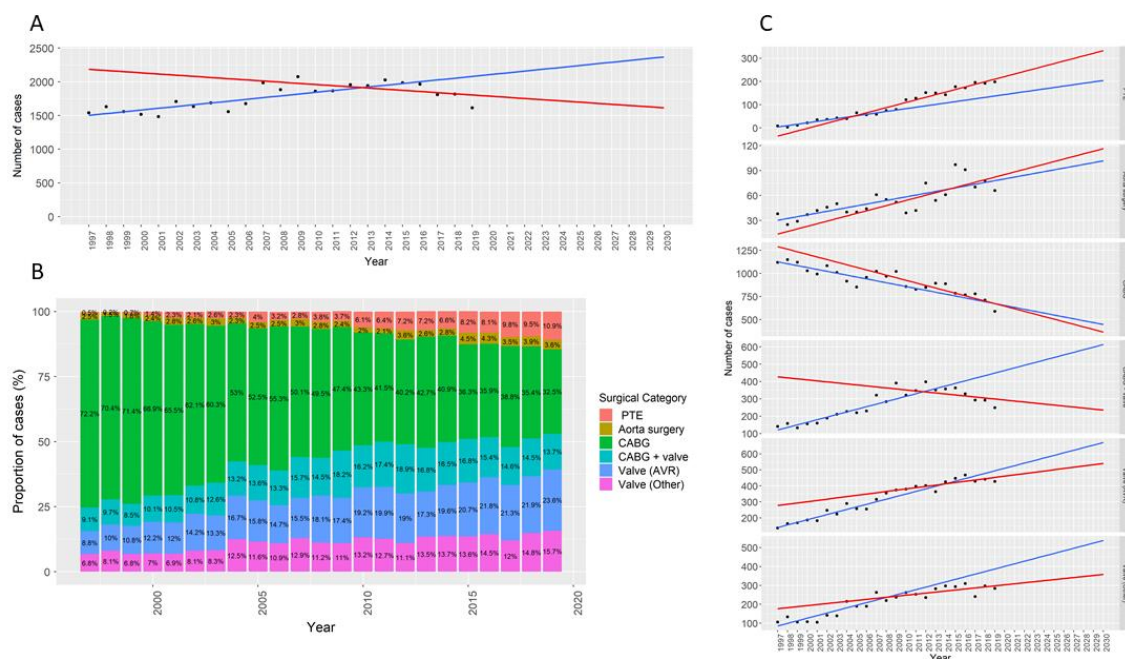


Figure 1. A: Trends in the total number of adult cardiac surgery (excluding PTE) at RPH with projections up to 2030. The red line indicates the linear trend post-2007, the blue pre-2007. The lines have been extended to 2030. **B:** Proportion of adult cardiac cases and change over time at RPH. **C:** Trends in absolute numbers of adult cardiac surgery at RPH with projections up to 2030. The red line indicates the linear trend post-2007, the blue pre-2007. The lines have been extended to 2030. AVR - Aortic Valve Replacement, CABG - Coronary Artery Bypass Grafting, PTE - Pulmonary Thrombo-Endarterectomy.

Portable Ultrasound of Jugular Venous Pressure Accurately Estimates Volaemic Status in Patients Undergoing Cardiac Surgery

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Objectives

Central venous pressure (CVP) is used to estimate the fluid status and cardiac filling pressures of post-operative cardiac patients. Ultrasound assessment of jugular venous pressure (U-JVP) provides a non-invasive, bedside method for estimating CVP. We aimed to determine if U-JVP can accurately estimate CVP in patients after cardiac surgery who were mechanically ventilated and when breathing spontaneously.

Methods

This prospective study of 114 post-operative cardiac surgery patients was performed in the Cardiac Intensive Care Unit of the Northern General Hospital, Sheffield. U-JVP and CVP were measured simultaneously. Measurements were taken whilst the patient was ventilated and then repeated when the patient was extubated providing non-ventilated readings.

Results

U-JVP and CVP showed strong correlation in ventilated ($r=0.72$, $p<0.0001$) and non-ventilated ($r=0.93$, $p<0.0001$) patients. Bland-Altman analysis revealed that U-JVP marginally overestimated CVP by 0.91mmHg in ventilated patients and by 0.11mmHg in non-ventilated patients. Excellent sensitivity and specificity of U-JVP was measured for low, normal and high CVPs in both ventilated and non-ventilated patients.

Conclusions

U-JVP accurately estimates cardiac filling pressure and fluid status in patients after cardiac surgery irrespective of their ventilatory status.

Transoesophageal Echocardiogram (TOE): Is TOE Necessary for Every Patient Undergoing Cardiac Surgery?

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Transoesophageal echocardiography (TOE) is routinely used during cardiac surgery in the UK. However, the vast majority of cardiac operations are performed on older, frailer patients, who often present with a range of factors which can complicate the procedure. Such elements include oesophagitis, peptic ulcer disease, and previous surgery on the gastrointestinal tract.

The invasive nature of TOE results in an adverse event occurring in 1 in every 50 patients who require this investigation during their operation. Life-threatening complications include oesophageal perforation, Mallory-Weiss tears, aspiration pneumonia and arrhythmias. TOE directly causes the death of the patient in less than 1 in 10,000 cases.

We present the case of a 70-year-old male who experienced splenic injury as a direct consequence of intra-operative TOE, and discuss the mechanism of this particular injury. This presentation will also go onto review the absolute and relative contra-indications for the use of TOE, and will question whether the benefits of the procedure outweigh the risks in every patient undergoing cardiac surgery.

Minimal Access Aortic Valve Replacement (AVR) – Is it Safe?

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Objective

To compare outcomes after minimal access aortic valve replacement (MiAVR) & conventional aortic valve replacement (CoAVR) in a single centre.

Method

The data was collected from patients who underwent isolated Aortic Valve Replacement (AVR) between 2016 and 2019 at the South Yorkshire cardiothoracic centre in England. The postoperative outcomes studied were a) 2-year in-hospital mortality rate, b) blood transfusion, c) re-exploration rate, d) time to extubation, e) acute kidney injury, f) time to drain removal, g) ICU stay, h) analgesic requirement, i) postop AF rate (POAF), j) length of hospital stay (LOS). A total of 540 patients underwent AVR, 361 with a conventional median sternotomy (CoAVR) and 179 with a minimal access aortic valve replacement (MiAVR). Due to data lost in transition, outcomes were gathered for a smaller cohort (211 CoAVR and 117 MiAVR)

Results

Patients were comparable with regard to age, gender and BMI. Pre-operative comorbidities were also comparable between both groups except for LVEF where CoAVR patients had higher percentage of poor LVEF than MiAVR. In addition, there were differences between the groups for mean logistic EuroSCORE (CoAVR>MiAVR), bypass and cross-clamp times (MiAVR>CoAVR). Re-exploration rate, time for extubation, analgesic requirements, ICU stay and LOS were all significantly lower in the MiAVR group. POAF rate was comparable between MiAVR and CoAVR, and both groups showed no differences in regard to 2-year mortality rate.

Conclusions

In this single centre retrospective study, we have demonstrated that MiAVR has some favourable outcomes over CoAVR in terms of extubation time, total LOS, ICU stay and analgesia requirement, while being comparably safe to CoAVR. MiAVR offers better cosmetic outcome, which can offer a psychological advantage, as well as a reduction in ICU and hospital stay may translate into less cost.

Length of Stay in Isolated Thoracic Trauma: What Matters?

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Objectives

Despite advances in trauma management, thoracic trauma (TT) remains the 2nd most common cause of death in trauma patients¹. Current literature focuses heavily on TT in the context of polytrauma and does not identify factors impacting isolated TT outcome. We aim to review the demographic of isolated TT patients presenting to our tertiary major trauma centre as well as the factors impacting on outcome, using length of stay (LOS) as the outcome measure.

Methods

This was a retrospective study evaluating trauma admissions. Only patients with isolated TT and minor injuries treated under the cardiothoracic team were included. Descriptive statistics was reviewed from 71-patient admissions between 2015-2018. A regression model was utilized for further analysis.

Results

The study had 48-males and 23-females. Median age was 64-years. Median LOS in those under 64-years was 5-days compared to 8-days for those over 64. 90% (n=64) of patients sustained blunt force trauma. The main mechanism was falling from a height of <2-meters (52%) followed by road traffic collisions (23%). Rib fractures made up the largest category of injury (79%). Mortality was 1% and occurred in the oldest male of the cohort who suffered pre-existing malignant disease. 49% (n=35) needed a chest drain with 80% inserted in the emergency department. Operative intervention occurred in 15% (n=11) of cases. The regression model showed age, number of co-morbidities and the presence of complications to be significant predictors of in-patient LOS. In our cohort it was found that for each additional year of age, LOS was prolonged by 10.9% (16-hours).

Conclusion

Older age and the associated reduced physiological reserve is likely further impacted by a trend of a higher number of co-morbidities in the older age group contributing to a longer LOS.

Severity Scoring in Isolated Thoracic Trauma: Correlations with Outcome

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Objectives

Despite advances in trauma management and improvements in public safety, thoracic trauma remains the 2nd most common cause of death in trauma patients¹. Multiple severity scores have been developed with the injury severity score (ISS) currently the standard. We aim to review the quality of CT input into thoracic trauma as well as predictors of poor outcomes and whether these correlate with the ISS.

Methods

This was a retrospective study evaluating trauma patients. Only patients with isolated thoracic trauma and minor injuries treated under the cardiothoracic team were included. Descriptive statistics was reviewed from 71 patient admissions between 2015 and 2018. A regression model was utilized for further analysis.

Results

The cohort consisted of 48 male and 23 female patients. The median age was 64-years. The vast majority (90%, n=64) sustained blunt force trauma. The main mechanism was falls from a height of less than 2-meters (52% n=37) followed by road traffic collisions (23% n=16). Rib fractures made up the largest category of injury (79%, n=56). Mortality was 1% (n=1) and occurred in the oldest male of the cohort who suffered pre-existing malignant disease. We found no statistically significant correlation between ISS and mortality. The median time taken to CT review was 367 minutes (6-1345 minutes). Median ISS was 10 (4-26). The ISS did not correlate with LOS (P=0.24). 35% (n=25) of patients required intensive care (ICU) intervention for a median of 2 days (1-27days). The ISS in this instance correlated positively with LOS in ICU (P=0.001).

Conclusions

The ISS was not shown to correlate significantly with LOS or mortality, although a statistically significant correlation was found between ISS and the LOS in ICU. Time taken for CT review was associated with a longer LOS, but this did not reach statistical significance. Further work is needed to refine scoring in thoracic trauma to correlate better with outcomes.

Subaortic-Aortic Annular Disproportion as a Substrate for Left Ventricular Outflow Tract Obstruction Following Atrioventricular Septal Defect Repair

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Objectives

Although left ventricular outflow tract obstruction (LVOTO) is a recognized risk after atrioventricular septal defect repair, quantitative assessments to define the substrate of obstruction remains lacking.

Methods

Morphometric analyses were based on measurements from early 2D-echocardiography (within 3-month post-op) for 96 patients (complete=64, partial/intermediate=32), which were compared against 40 age/weight matched controls (ASD/VSD). Late analysis (echocardiography over 1-year post-surgery) was performed in 46 AVSD patients (range follow-up 1.2-10.7 years).

Results

Although median Z-scores were lower in AVSD at aortic annulus (-0.33 vs 0.6; $p=1 \times 10^{-6}$) and subaortic areas (median -0.92 vs 0.61 in control; $p=1.7 \times 10^{-11}$), 92(96%) had adequate aortic annulus Z-score and 83(86.5%) had adequate subaortic Z-score (above -2.5). AVSD had smaller subaortic dimension compared to its annulus (8.0 vs 8.7mm, $p<0.001$); whilst control group had proportionate aortic annulus:subaortic dimension (10.5 vs 10.3mm, $p<0.96$). Two-third (62/96) AVSD had low subaortic/aortic ratio (<1.0), which increased to 38/46 (83%) at late analysis ($p=0.03$). The subaortic dimension remained smaller (12.2 vs 14.0mm annulus, $p<0.001$), with an increased discrepancy of subaortic/annulus dimension (0.940 early vs 0.895 late, $p = 0.036$). Partial/intermediate AVSD had a lower early subaortic/annulus ratio (0.89 vs 0.96, $p=0.045$), which persisted at late analysis (0.86 vs 0.93 in complete AVSD, $p=0.038$). 5/92(5.4%) patients required reoperation for LVOTO (mean 7.6 years post-op), with no difference between morphology or types of surgery.

Conclusion

Despite adequate Z-scores, AVSD demonstrated early disproportion between subaortic and annular dimension. The disproportionate subaortic/annular dimension could serve as a substrate for LVOTO, that was more pronounced over time.

Current Perspectives on Contemporary Rheumatic Mitral Valve Repair

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Objectives

Although the superiority of mitral valve repair (MVR) over replacement (MVR) is well-established in degenerative mitral valve disease, its role remains controversial in rheumatic heart disease (RHD). Nonetheless, many surgeons agree valve reconstruction should be the preferred primary correction as it boasts copious advantages over MVR. The aim of the review is to investigate current MVR techniques in RHD that address previous concerns of reproducibility, reliability, and long-term durability.

Methods

A comprehensive literature search was conducted on PubMed, Cochrane Library, Scopus and Medline using the keywords "mitral valve repair", "valve repair techniques", and "rheumatic heart disease". Thirteen observational studies between 1970 and 2020 were reviewed; analysis was emphasized on surgical techniques employed.

Results

Several studies observed a relationship between the degree of diseased tissue and durability of repaired rheumatic lesions. The current trend of MVR techniques emphasize resection of fibrotic rheumatic tissue plaguing valves, including leaflet peeling and shaving, yielding excellent clinical outcomes in studies employing this 'aggressive' approach. Of note, two studies found the usage of leaflet-related techniques to be a significant risk factor for valve failure, but mention reserving such methods for severe RHD. Other valuable techniques for successful contemporary RHD MVR include commissurotomy, chordal resection, chordal fenestration, and annuloplasty.

Conclusions

Durability of MVR is likely compromised not simply due to high technical demand, but a surgeon's reluctance; a common notion is that advanced rheumatic lesions are better treated by MVR instead of applying several MVR techniques. Thus, the current 'aggressive' MVR trend is aptly required not only in directly addressing the underlying rheumatic aetiology, but according to several authors, may help lower a surgeon's reluctance to repair, thereby enhancing durability.

Veno-venous Extracorporeal Membrane Oxygenation Used as an Adjunct in the Surgical Management of Acquired and Iatrogenic Tracheobronchial Pathology

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Objectives

Veno-venous extracorporeal membrane oxygenation (VV-ECMO) is recognised as an acceptable treatment modality for the management of acute refractory respiratory failure. In recent years, its use has expanded to include providing respiratory support for patients requiring surgery on the tracheobronchial tree. We have reviewed our experience of patients requiring VV-ECMO support for elective and emergency surgery for acquired and iatrogenic tracheobronchial pathology.

Methods

A retrospective review of all cases of tracheobronchial pathology managed surgically where VV-ECMO was used as part of the treatment in our centre between 2017 and 2020 was undertaken. Pre-operative characteristics, intra-operative & ECMO details and post-operative outcomes were collected and analysed.

Results

Five patients underwent surgery whilst established on VV-ECMO from 2017-2020. Reasons for surgery included repair of iatrogenic tracheal tear (n=2), repair of iatrogenic gastrobronchial fistula (n=1), elective tracheoplasty (n=1) and elective resection of carinal tumour (n=1). Median duration of VV-ECMO was 17 hours (range 4-543 hours) and median post-operative length of stay was 9 days (range 7-19 days). In-hospital and 90-day mortality were both 0% (n=0). Post-operative complications included reoperation for bleeding (n=1) and thrombosis (n=2).

Conclusions

VV-ECMO was safely utilised in the management of patients with a range of tracheobronchial pathology with low rates of post-operative morbidity. We have demonstrated that good outcomes can be achieved even in particularly unwell and complex patient cohorts if they are managed appropriately in high-volume specialist centres by an experienced multidisciplinary team.

Short-, Mid- and Long-Term Outcomes of Repair of Stanford Type A Acute Aortic Dissections

Pengelly, S

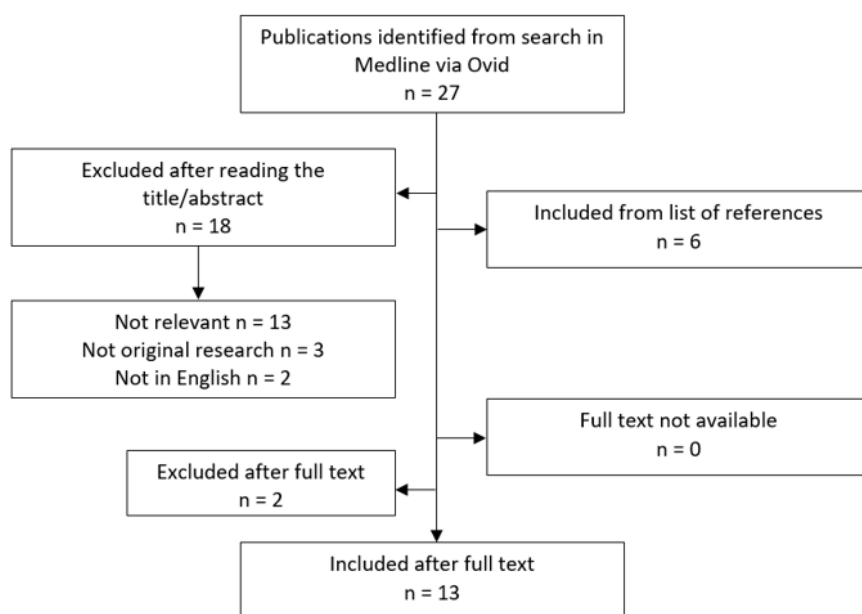
Cardiff Medical School

Objective

To evaluate the short-, mid- and long-term survival of patients undergoing repair of Stanford type A acute aortic dissections and to identify key factors which influence this.

Methods

Meta-analysis on Medline via Ovid was conducted using keywords in the title: outcomes; repair; aortic dissection; type A. Publications before 2000 were excluded.



Results

13 papers published from 2007-2019 providing data from 1979-2017 were selected. Sample sizes ranged from 94-3013. Ages ranged from 20s-90s covering a range of procedures from medical to total arch replacement. Mortality rate without intervention is 60% within the first 48 hours. Median in-hospital survival of 87%, 82.8% at 1 year and 30% at 20 years. Aortic root repair (ARr) has a 4% greater risk of reoperation over 15 years compared to aortic root replacement (ARR). Preservation of the native aortic valve significantly increases survival ($p=0.03$).

Conclusions

Timely intervention is key to improving outcomes. Surgery is the management of choice in all cases despite age, gender or stroke. Most studies showed no significant difference in mortality between types of surgical repair (ARR, ARr, total arch replacement and aortic valve resuspension) therefore more invasive procedures are safe to use when the indications are present to prevent long term complications.

Long-term Outcomes of cardiac Surgery in Octogenarians at University Hospital of Wales (2010-2019)

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Objectives

Cardiac surgery in octogenarians has been steadily increasing in the UK. In this study, we aim to evaluate the long-term survival of octogenarians who received cardiac surgery. We will also determine significant factors which affect their survival.

Methods

A retrospective single centre review was performed using prospectively collected data, recorded on the PATS database (Patient Analysis Tracking System), on all octogenarians undergoing cardiac surgery from January 2010 to January 2019. 683 patients were identified and 54 patients (7.90%) were excluded due to emergent/salvage surgery or missing data. Patients underwent CABG (n= 130), single valve replacement (n= 166), valve replacement + CABG (n= 240), valve replacement + others (n=48), and valve replacement + CABG + others (n= 45).

Results

Crude operative mortality in Octogenarians was 3.8% which compares very well with the reported mortalities of 3.4% - 13.4% internationally. In addition, crude overall survival was .794 and .648 at 3- and 5-year, respectively. 3-year and 5-year survival is 0.766 and 0.637 for CABG, 0.852 and 0.749 for single valve replacement, 0.761 and 0.565 for valve replacement + CABG, 0.886 and 0.533 for valve replacement + others, and 0.734 and 0.693 for valve replacement + CABG + Others. Cox Proportional Hazards Regression Model identified Male gender, Previous Myocardial Infarction, Presence of Congestive Heart Failure and Additive EuroSCORE as statistically significant factors which affected survival.

Conclusion

This single centre review demonstrates that the operative mortality and long-term survival of cardiac surgery in octogenarians are excellent. Therefore, cardiac surgery in octogenarians should be considered safe to do and not withheld based on their advanced age alone.

Attitudes of Medical Students and Trainees About a Career in Cardiothoracic Surgery

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Objectives

Cardiothoracic (CT) surgery is a dynamic and demanding specialty, which is popular amongst medical students thus, posing as a favourable career choice for many. However, there is a significant proportion of medical students who prefer to choose other specialities instead, for different reasons. The aim of this study is to identify factors affecting the uptake of cardiothoracic surgery as a career by medical students, junior doctors and trainees globally.

Methods

A comprehensive literature review was conducted using PubMed, EMBASE, SCOPUS and CINAHL using specific keywords including "cardiothoracic surgery" AND "medical student" AND "career". Inclusion and exclusion criteria were also developed to ensure only relevant studies were used for the paper. Information on the perspectives, knowledge, and beliefs on cardiothoracic surgery amongst medical students and trainee doctors worldwide was collected.

Results

Most data were sourced from UK and US-based studies with only a minority of literature from other parts of the world. Uptake of cardiothoracic surgery amongst medical students, junior doctors and trainees is generally low, on a global level. Deterring factors identified from this review included work-life balance, professional satisfaction, lifestyle, and family planning, the latter being especially important for female medical students.

Conclusions

Although job posts are still being filled, the increasing numbers of medical students losing interest in a career in cardiothoracic surgery needs to be addressed. Areas of future research into this area would be to re-assess medical school curricula and opportunities to engage more in the field whilst at medical school and beyond.

A Study to Compare the Outcomes of Cardiac Surgery in Elderly and Very Elderly Patients

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Objective

Age is an established risk factor for cardiac and cardiovascular pathologies. An Aging population therefore places specific demands on healthcare systems. The aim of the study was to define changes in the ages of patients undergoing cardiac surgery and the impact of age on outcomes following cardiac surgery.

Method

All patients aged over 60 years, undergoing cardiac surgery at the Lancashire Cardiac Centre between 1996 and 2015 were eligible for inclusion. Elderly was defined as age > 65 years and octogenarians >80 years of age. Pre-, peri- and post-operative data were collected from NICOR (National Institute for Cardiovascular Outcomes Research) submitted data-sets. Data were analysed in five year periods, using appropriate statistical methodology and *p* values less than 0.05 taken as significant.

Results

14514 patients were eligible for inclusion; 78.5% were elderly of which 9.8% octogenarians. The percentage of elderly patients increased throughout the study (72.4%, 75.9%, 79.1% and 83% respectively), as did the mean age of each group (68.5 years, 69.2 years, 70.9 years, 72 years respectively). 30-day mortality rate increased with age (60-64 year, 2% compared to 7.6% in the > 85-year group). Post-operative atrial fibrillation, gastro-intestinal and respiratory complications all increased with increasing age. Figure one demonstrates positive correlation between post-operative ITU, in-patient stay and age.

Conclusion

The cardiac surgical population is aging and increasing age is associated with higher post-operative mortality and morbidity rates. Longer ICU and in patient stays further confirm the increasing demands of an aging population on a tertiary surgical speciality.

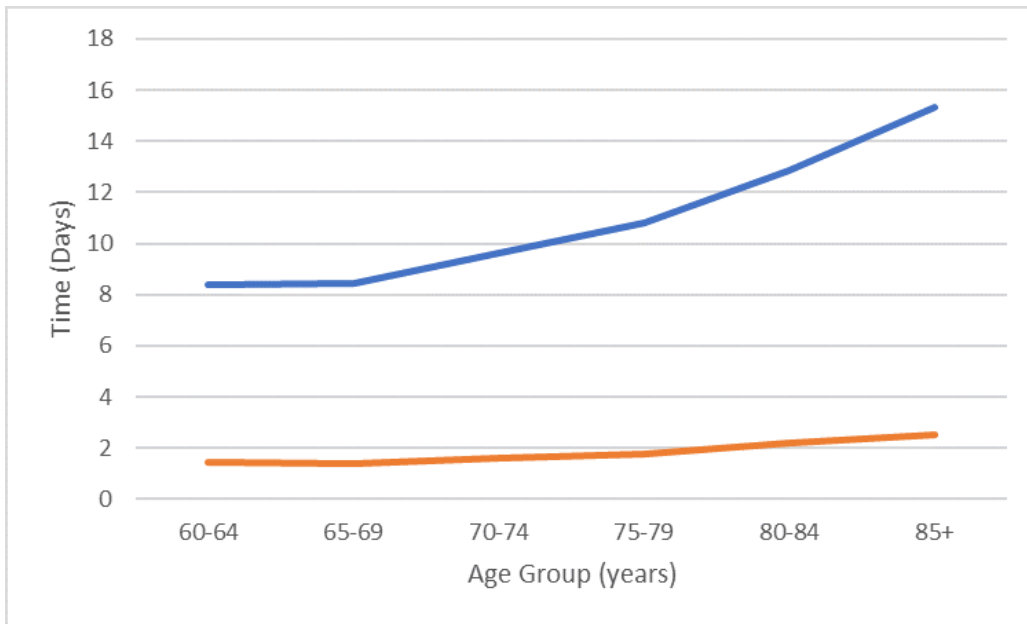


Figure one:

Graphical representation of relationship between age and total in patient stay (blue line) and duration of ITU stay (orange line).

Maintenance of Cardiopulmonary Bypass and Management of Catastrophic Retroperitoneal Haemorrhage During a Minimally Invasive Aortic Valve Replacement

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Nottingham University Hospital Trust

Introduction

Case study of a rare event of occult bleeding during cardiopulmonary bypass (CPB) on a patient undergoing minimally invasive cardiac procedure, which resulted in major haemorrhage.

Analysis of identification of haemorrhage and role of cardiac team in problem solving, and the teams management and steps that were taken to rectify blood loss. The importance of teamwork.

Patient

76y M, undergoing planned minimally invasive aortic valve replacement. The patients pre-bypass haemoglobin was 14g/L.

Treatment and complications

Bypass was initiated and temperature maintained at 36°. Ante-grade cardioplegia was given with asystolic arrest achieved.

The perfusionist was unable to maintain a cardiac index of 2.6, and fluids were given and the surgical team alerted. The haemodilution anaemia was corrected using red blood cells.

The recognition of occult blood loss due to retroperitoneal haemorrhage was identified and the major haemorrhage protocol was initiated. General and vascular surgical teams were alerted.

The surgeon completed the AVR emergently and weaned the patient from CPB to facilitate heparin reversal with protamine, to reduce further blood loss. The arterial cannula was left in situ for transfusion and to maintain patient pressure in the post bypass period.

Twenty-one units of products given to the patient using the CPB machine a precise rapid infuser to maintain patient pressure.

Result

Emergency laparotomy was carried out by vascular and general surgeons with successful repair of tear in the right common iliac vein, secondary to inadvertent damage by the dilator during percutaneous femoral vein cannulation. The patient had an uneventful recovery and was discharged home on day 7.

Lessons

Many areas of potential volume loss during CPB, which must be understood by all. Communication between the wider team is imperative. Maintaining constant patient blood pressure was essential, so despite considerable use of products the patient had a good outcome.

Adult Presentation of Diaphragmatic Hernia: A Case-series

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Objectives

Diaphragmatic hernia is primarily congenital in aetiology and typically seen in the paediatric population. We describe the presentation and clinical characteristics of a series of congenital and acquired cases that presented in late adulthood.

Methods

We identified a series of cases of non-acute diaphragmatic hernia repair performed by a single surgeon between 2002-2020. The clinical and radiological records were reviewed to isolate hernia aetiology, procedure performed and post-operative complications.

Results

Five patients with a mean age of fifty-six years (38-71), 3 males, presented with chronic shortness of breath and recurrent chest infections spanning a period of years. One patient described symptoms originating in childhood. A further 2 patients revealed a history of major road traffic collision more than 20 years previously. All patients underwent chest x-ray and subsequent CT thorax. Imaging revealed bowel contents present above the right hemithorax in all cases. An anterior defect in the central tendon of the diaphragm adjacent to the pericardium was visible in all 3 congenital patients. 1 patient, presenting post-trauma, demonstrated disruption of the superior fibromuscular portion of the right hemi-diaphragm. 4 patients underwent patch repair, with marked improvement in their symptomatology post-operatively. 1 case is awaiting intervention.

Conclusions

Diagnosis of diaphragmatic hernia in the context of shortness of breath requires a high index of clinical suspicion. Morgagni hernia appears to be the predominant developmental abnormality and must be distinguished from post-traumatic hernias.

Different Treatment Options for Left Main Coronary Artery Aneurysms -- A Comparative Study

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¹Medical University of Plovdiv; ²University Hospital "St. George", Plovdiv, Bulgaria

A coronary artery aneurysm (CAA) is in itself a relatively uncommon diagnosis, nevertheless, when present, they tend to be of the right coronary artery (40-87% of CAAs). On the other hand, left main coronary artery (LMCA) aneurysms occur in just 0.1% of patients undergoing percutaneous coronary intervention (PCI), and thus are considered even rarer.

The following will be a comparative study between various methods of treatment of LMCA aneurysms. Owing to its uncommon occurrence, the management of such aneurysms has not been explored in great depth. By analysing cases, assessing their comorbidities (e.g. CAD), identifying their treatment method, and evaluating their outcome (complications, symptom relief, etc.), the general treatment recommendation was found to be surgical, largely due to the risk of rupture and embolization.

However, even within the realm of surgical treatment, there are many adaptations to the procedure – for instance, some recommend coronary artery bypass graft (CABG) without closure of the aneurysm (which is beneficial when considering the patency of grafts), whilst other circumstances call for closure of the LMCA orifice, along with ligation of the aneurysm (eliminating the risk of rupture and embolization). The purpose of this study is to compare such treatment options, determine the advantages and disadvantages of each and assess the factors that necessitate a particular treatment method.

Comparing Alternative Surgical Techniques for the Harvesting of the RGEA in CABG

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The harvesting of the right gastric epiploic artery (RGEA) for the use as a conduit in the coronary artery bypass graft (CABG) procedure was first used in the late 1980's since then it has remained a viable option however still second to the gold standard option of the internal mammary arteries (IMAs). It is however comparable in result to the great saphenous vein (GSV). Our department has developed an alternative technique in harvesting the RGEA in particular the incision made into the diaphragm making an arcuate (curved) incision and extending the median sternotomy caudally into an upper laparotomy, according to our study this has shown to be somewhat successful however other alternate techniques exist such as the use of robotic surgery and harvesting the RGEA laparoscopically. It is worth mentioning that it is important to compare different aspects to each method and in particular the comparison in the patency of the graft over time depending on the different techniques. By comparing our case study with other studies of alternate surgical methods, such as the use robotic surgery, we are able to establish some advantages and disadvantages to both techniques such reduction of harvesting time and quicker recovery times in the case of robotic surgery.

Key words: RGEA, alternative technique, robotic

First Time, Isolated Surgical Aortic Valve Replacement: A 14-year Single Centre Experience

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Objectives

Surgical Aortic Valve Replacement (SAVR) is the gold standard treatment for severe aortic stenosis (sAS) which has been established over the last five decades. We sought to evaluate outcomes for isolated SAVR over a 14 year period at our institution.

Methods

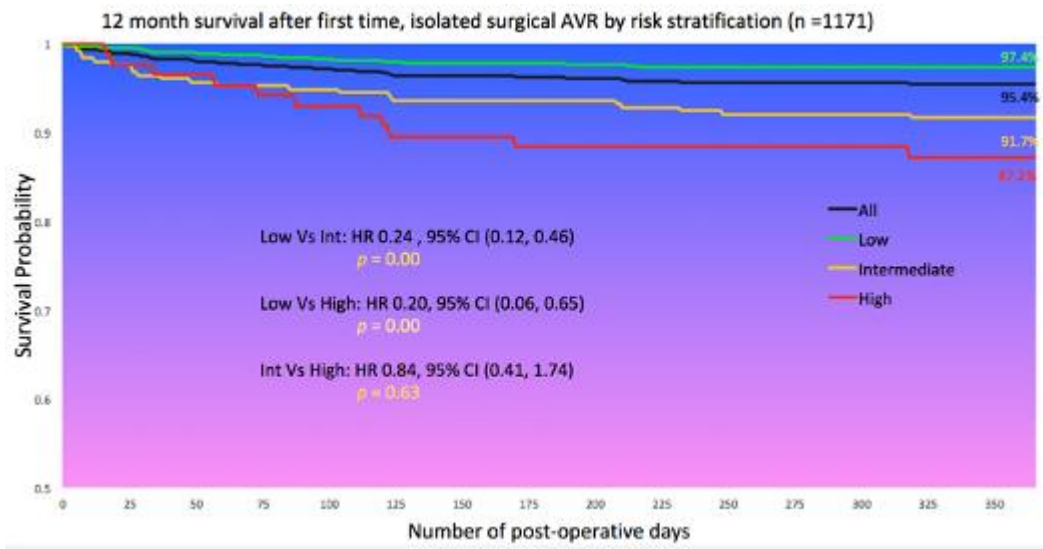
Analysis was performed on a prospectively collected database for patients who underwent first-time, isolated SAVR between Jun-2004 until Jun-2018 at a single institution. Patients were risk stratified according to logistic EuroSCORE (LES) as low, intermediate and high. Outcomes of interest were in-hospital mortality, 12 month survival, CVA, new haemofiltration (HF) and Permanent Pacemaker (PPM) insertion. Statistical significance via ANOVA, Chi-Square and Fisher's Exact testing. Kaplan-Meier survival curves were constructed for 12 month survival. Hazard ratios were calculated to determine significance.

Results

A total of 1179 SAVR procedures (833 low, 252 int., 86 high) were analysed, with an in-hospital mortality of 1.2% (0.36% low, 3.17% int., 3.49% high). Kaplan-Meier 12 month analysis (Figure 1) showed a 97.4% survival for low Vs 87.2% for high risk (HR 0.2, 95%CI 0.0-0.65, $p=0.00$). No significant difference was found between the int. and high-risk groups. New HF for low, int. and high groups was 0.96%, 2.78% and 5.81% respectively ($p<0.01$). Overall, CVA and PPM insertion was 0.43% and 0.85% respectively with no significant difference between the groups. There was a significant trend of increasing age and LES but decreasing mortality over time.

Conclusions

SAVR remains a very safe and durable operation in low-risk stratified patients. In-hospital mortality, CVA, need for PPM and new HF all remain less than 1% despite aging demographics. One year survival for low risk is groups is >97%, with persistently <1% rates of CVA and PPM insertion across all groups. SAVR remains the benchmark against which all interventional approaches for sAS should be evaluated to determine future clinical practice.



Is Age Just a Number in Cardiac Surgery? Evaluating Outcomes of an Octogenarian Cohort at a Single Cardiac Centre.

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Objectives

Cardiac surgery in octogenarians is now widespread, but with many perioperative risk factors and outcomes not fully assessed in the literature. Our objectives were to describe the perioperative characteristics of this patient group and evaluate survival outcomes compared to younger age-groups.

Methods

All adults (N=4957) undergoing cardiac surgery between 2011-2017 at this institution were retrospectively studied, encompassing 312 octogenarians and 952 septuagenarians (70-75). Data was evaluated with univariate and multivariate testing while mortality was assessed using Kaplan-Meier and cox regression analyses.

Results

Compared to the septuagenarian-group, octogenarians revealed more patients having previous surgery ($p=0.016$), less diabetic patients ($p=0.034$), lower BMI ($p=0.002$), and longer hospital stay ($p<0.001$). Compared to rest of study, octogenarians contained more female patients ($p=0.012$), a greater EuroSCORE ($p<0.001$), longer ITU stay ($p<0.001$) and contained more ITU readmissions ($p=0.023$). The octogenarian group did not contain a significant 30- and 90-day mortality but revealed a significant mortality at 1-year against septuagenarians ($p=0.039$) and rest of study ($p<0.001$). Kaplan-Meier analysis revealed an insignificant estimate between the two elderly cohorts. Furthermore, a cox regression accounting for covariates in the data found octogenarian group-membership to be insignificant ($p=0.444$). Independent risk factors for mortality included BMI ($p=0.045$), emergency surgery ($p=0.04$), type of cardiac procedure ($p=0.007$), reoperation ($p<0.001$), bypass time ($p<0.001$), ITU time ($p=0.041$), total Hospital stay ($p=0.01$) and diabetes ($p=0.023$).

Conclusion

In this study, octogenarians report specific differences in their perioperative characteristics along with promising short- and medium-term survival. Such outcomes must constantly be monitored so that cardiac surgery can be further tailored to this elderly cohort.

Deep Sternal Wound Infection in Off-pump Coronary Artery Bypass Grafting: A Case-Control Study

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Objectives

Despite deep sternal wound infection (DSWI) constituting a serious complication in coronary artery bypass surgery, literature remains scarce with regards to the outcomes in off-pump Coronary Artery Bypass Grafting (OPCAB). We aimed to identify the risk factors for the development of DSWI in OPCAB.

Methods

In our institution, 8442 patients were identified to have underwent OPCAB from 1st April 2009 to 31st December 2018. Their data was analyzed retrospectively, with 956 enrolled on this study based on the inclusion criteria. Subjects were assigned into two groups: Group 1 with DSWI (n=63) and Group 2 without DSWI (n=893). Conversion to on-pump coronary artery bypass grafting, redo procedure, acute coronary syndrome and concomitant cardiac surgery procedures formed part of the exclusion criteria adopted. Preoperative, laboratory, intraoperative and postoperative patient characteristics were collected.

Results

The prevalence of body mass index (BMI) ≥ 40 kg/m² (7.9% vs 1.9%, respectively; P=0.01), lower extremity atherosclerotic arterial disease (23.8% vs 7.2%, respectively; P=0.001) and the use bilateral internal thoracic artery (19.5% vs 2.5%, respectively; P= 0.008) was significantly higher in patients with DSWI. The incidence of morbidities, including reoperation due to bleeding (26.4% vs 2.1%, respectively; P<0.001), stroke (4.8% vs 0.8%, respectively; P=0.02), acute renal failure (7.9% vs 0.8%, respectively; P=0.001), delirium (7.9% vs 1.7%, respectively; P=0.008), blood transfusion (30.6% vs 9.8%, respectively; p<0.001) was significantly higher in patients with DSWI.

Conclusions

Development of deep sternal wound infection was increased by a BMI of >40kg/m², lower extremity artery disease and use of BITA grafts. Patients with DSWI were also at higher risk of postoperative stroke, reoperation, and acute renal failure.

The Role of a Student-run Cardiothoracic Initiative: Increasing Medical Students' Engagement in Cardiothoracic Surgery

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Brighton and Sussex University Hospitals NHS Trust

Background

In 2015, the Royal College of Surgeons of England published a national undergraduate curriculum which did not highlight cardiothoracic surgery (CTS) as one of its thirty-five key surgical conditions. Hence, 40% of medical students get teaching in CTS with only 10% being exposed to clinical placements (1). This potentially explains the downward trend seen in students wishing to pursue CTS. A pilot study involving a peer-taught basic surgical skills workshop at Brighton and Sussex medical school (BSMS) demonstrated a significant increase in the number of students interested in a surgical career (28% to 89%). This has led to the development of a CTS initiative.

Aims

1. Spark medical students' interest and expand their knowledge in coronary bypass and valve surgery
2. Inspire more women to pursue a career in CTS
3. Encourage BSMS to include CTS teaching in their core curriculum

Methods

An initiative was made to create a student CTS society at BSMS.

1. WETLAB surgical workshops involving coronary anastomosis, aortic and mitral valve surgery.
2. Career talks featuring women in CTS regarding their journey, and the challenges they have faced.
3. Weekly social media case studies and discussion posts.

Results

The cardiac WETLAB workshops have started and have had an excellent uptake. They have received positive feedback from all students and a marked improvement in knowledge was observed between the pre and post questionnaires. The interactive social media posts have had excellent engagement, with the total number of followers on Instagram, Facebook and Twitter exceeding 500. The career talks regarding women in cardiac specialities are in place for 2021.

Conclusion

Currently, the initiative is receiving positive feedback; indicating the crucial role the society is playing in improving the engagement in CTS.

Reference:

1. Gasparini, M., et al., Medical student exposure to cardiothoracic surgery in the United Kingdom. *Interactive Cardiovascular and Thoracic Surgery*, 2019. 29: p. 173-178.

Does Patient-prosthesis Mismatch Affect Patient Survival Following Surgical Aortic Valve Replacement?

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Objectives

Patient-prosthesis mismatch (PPM) was first described in 1978, whereby the effective orifice area (EOA) of a transplanted valve is smaller than the original valve after insertion. PPM is a complication of surgical aortic valve replacement (sAVR) with conflicting research in its relationship to patient mortality. This study aims to investigate the relationship between PPM, measured using the indexed geometric orifice area (IGAI), and patient survival.

Methods

A study cohort was produced from patients who underwent isolated surgical aortic valve replacement between 1996 - 2008. Categories of no-PPM, moderate-PPM and severe-PPM groups were defined using IGAI values. PPM was defined as IGAI <0.85, with moderate = 0.65 – 0.85 and severe = <0.65. Regression analysis was carried out on the relationship between IGAI and survival time. Graphs were produced for 1-, 5-, and 10-year mortality of PPM groups.

Results

A total of 609 patients who underwent isolated surgical aortic valve replacement were studied. Patient characteristics showed that the majority of the severe PPM group were female and aged <70. Regression analysis found no relationship between IGAI values and survival time. PPM was more prevalent in the 5- and 10-year mortality groups.

Conclusions

The regression analysis conducted in this study was unable to explain the variance in data between IGAI and survival. Further research should be conducted on the relationship of IGAI to patient survival.

Robotic Excision of Pulmonary Sclerosing Pneumocytoma

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¹School of Medicine, University of Liverpool, Liverpool, UK; ²Liverpool Heart & Chest Hospital, Liverpool, UK

Introduction

Pulmonary sclerosing pneumocytoma (PSP) is usually described in middle aged females that are non-smokers. It is generally thought to be benign but malignant like behavior has been reported, with the presence of lymph node metastasis. Surgical resection is the treatment of choice of this rare lesion. This is carried out most commonly by wedge resection or lobectomy, but successful segmentectomy has also been reported. We report the first case of robotic resection of a pulmonary sclerosing pneumocytoma in a young male.

Case report

A 20-year-old Caucasian male presented with an incidentally found 48mm multilobulated mass in the right lower lobe on CT (Image 1). The patient was asymptomatic and full CT staging revealed no other significant findings and no size significant lymphadenopathy. CT-guided biopsy diagnosed this as a benign PSP. CT thorax was repeated 3 months later and the mass had increased in size to a maximum diameter of 52mm. Robotic right lower lobectomy was successfully performed and the patient made a good post-operative recovery, being discharged on day 2. Post-operative histology confirmed the mass to be a 54mm sclerosing pneumocytoma, staged pT3 pN0 pMx with complete resection. Robotic surgery allowed for the early discharge of the patient and a return to usual activities within 3 weeks. In view of the reported malignant potential, we advocate close follow-up of these patients.

Conclusion

Robotic resection of pulmonary sclerosing pneumocytoma is feasible and safe. In this case it provided a means to accelerate recovery for the patient and a rapid return to daily routine. Utilising a less traumatic robotic approach, with minimal blood loss and post-operative pain is beneficial to both young, fit patients and may be also advantageous in those with poor lung function or multiple co-morbidities.

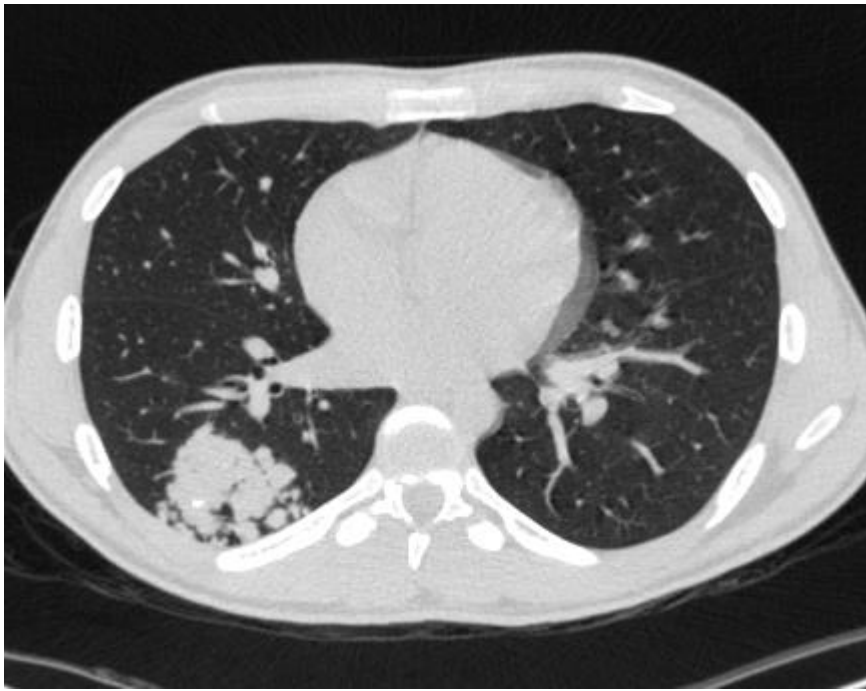


Image 1. CT thorax demonstrating right lower lobe lung mass. CT guided biopsy revealed a benign pulmonary sclerosing pneumocytoma.

Successful Aortic Valve Repair and David Procedure for a Dilated Pulmonary Autograft Post-Ross

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Introduction

The Ross procedure involves replacing the native aortic valve with the patient's own pulmonary root (autograft) and replacing their pulmonary root with a cadaveric homograft. By using a native valve in the aortic position, haemodynamic characteristics become favourable and long-term anticoagulation is not necessary.

Long-term autograft dilatation with resultant aortic regurgitation is, however, a known complication of the Ross procedure. Up until recently this was managed by re-do valve and root replacement. Valve sparing root replacement operations such as the David procedure have been proposed as an alternative to preserve the neo-aortic valve and avoid long-term anticoagulation.

Case report

A 50-year-old man who underwent the Ross procedure 20 years ago presented with autograft dilatation and severe aortic regurgitation (AR). The pulmonary homograft was intact with minimal calcification. He was consented for a root replacement and a trial of valve preservation or a mechanical valve replacement.

Re-sternotomy was uneventful and central cardiopulmonary bypass initiated. The autograft was dissected from surrounding cardiac structures. Autograft valve cusps were healthy with no calcification or fenestrations, hence, a David procedure with a 32-mm Dacron Valsalva graft was undertaken. Following valve reimplantation, the effective height of the 3 cusps was assessed and found to be 10mm. Postoperative Trans-Oesophageal Echocardiogram showed no AR. The patient was discharged 7 days post-surgery and was doing well at follow-up.

Discussion

This case discusses the successful management of a post-Ross patient with autograft dilatation and AR. Valve salvage was possible with no AR at discharge. Long-term follow-up is necessary to ensure durability. This report adds to the limited literature regarding valve sparing operations following a Ross procedure. It also supports trials at salvaging the autograft with valve repair to avoid prosthetic complications.

An Audit to Evaluate the Use of Flutter Bags in Patients with Prolonged Postoperative Air Leak

Vilar Alvarez, M

University Hospital Southampton

Introduction

Prolonged air leak is a common postoperative complication in thoracic surgery. At our institution, we manage ongoing air leak with a Flutter bag as a method of ambulatory chest drainage, enabling earlier discharge.

Objectives

To assess and report the safety and efficiency of the use of Flutter bags in patients with a prolonged postoperative air leak.

Methods

A retrospective audit looking at thoracic surgery patients who attended clinic with a prolonged postoperative air leak requiring a Flutter bag from January 2017 to December 2019, excluding any other reasons for Flutter bag use or any other ambulatory chest drainage. Patients were identified from the thoracic ward attendee records, and additional data was obtained from hospital patient records. Data was input into and analysed using Microsoft Excel.

Results

From January 2017 to December 2019, we operated on 3257 patients and 202 (6.2%) of those had a prolonged postoperative air leak and met the criteria. Length of hospital stay showed a reduction from a mean of 7.0 (range 2-23) days in 2017 to a mean of 5.6 (range 1-25) days in 2019 ($p=0.0328$). Nine patients experienced minor complications. 193 patients (95%) had an uneventful outpatient chest drainage management.

Conclusion

The data shows that outpatient management of prolonged air leaks through the use of Flutter bags is a safe practice that can be accomplished with a significant rate of success. This results in an enhanced patient safety, by reducing morbidity associated with a longer hospital stay, allowing early mobilisation and having a low rate of complications. It also has an economic impact, and by reducing the length of stay it decreases hospital costs and increases availability of beds, which leads to reduced waiting times and cancellations due to lack of beds.

Early Diagnosis and Correction of Lobar Torsion Following Left Upper VATS Lobectomy

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Introduction

Lobar torsion is a rare complication following lung resection. Clinical features are often non-specific and may include tachycardia, tachypnoea and fever. In their algorithm, Dai *et al.* suggests a high degree of clinical suspicion and the progression of consolidation/atelectasis or a shift in the position of a lesion on CXR are indications for further investigation by bronchoscopy or CT scan. Treatment is to reposition the lung back to the correct anatomical position or to resect the lung if it is not viable. We present a case of lobar torsion following left upper lobectomy that was diagnosed in the immediate post-operative period.

Case report

A 69-year-old lady underwent a three port, left VATS upper lobectomy and systematic lymph node sampling for a T2aNO adenocarcinoma. At completion of the operation the lung appeared to expand well, with no air leak present on test inflation. On post-operative CXR (figure 1) the left lower lobe was occupying an unusual position, suggesting possible torsion. The patient was asymptomatic as diagnosis was made in the early post-operative period and was taken back to theatre. The left lower lobe had undergone a counter clockwise twist and was untwisted by VATS and placed back in the correct anatomical position. CXR after the repositioning showed the normal anatomical position of the left lower lobe following an upper lobectomy. Following this the patient made an uneventful recovery and was discharged home on day 4.

Conclusion

This case report shows the value of early recognition and correction of lobar torsion. Early diagnosis, whilst the lung is still viable, is important to preserve pulmonary function in the long term. We would suggest a high degree of clinical suspicion if the remaining lung following lobectomy is in an abnormal position on the initial post-operative CXR.

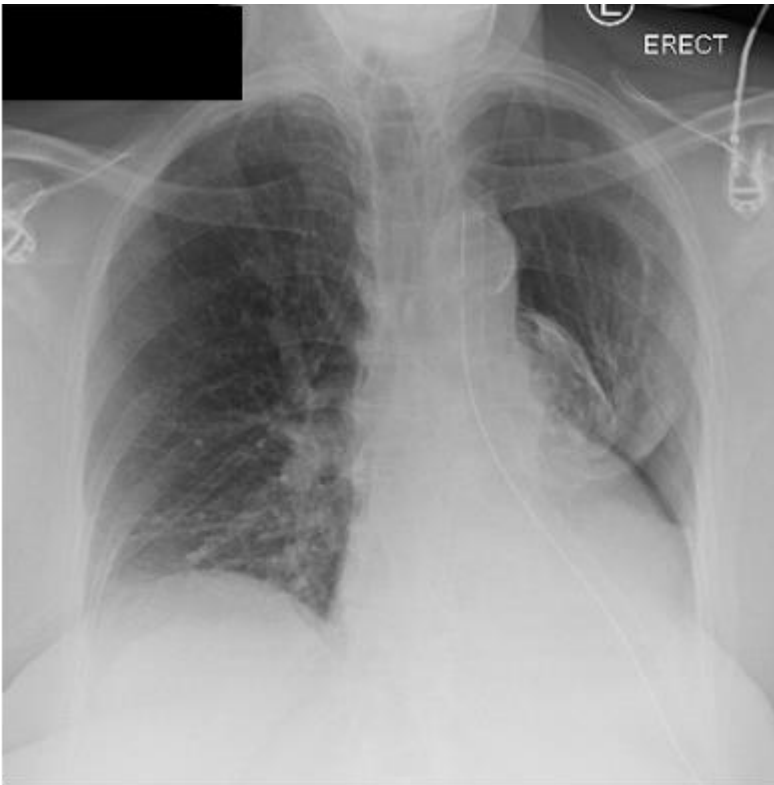


Figure 1. CXR taken in the recovery room following left upper lobectomy shows the remaining lower lobe to be in an abnormal position.

Percutaneous Neck Venous Cannulation for Cardio-pulmonary Bypass (Video)

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The Application of Extracorporeal Haemoadsorption Blood Purification Devices in Left Ventricular Assist Device Implantation

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Background

We aimed to determine the impact of extracorporeal haemoadsorption blood purification devices on overall survival and morbidity rates in left ventricular assist device (LVAD) recipients. Literature suggests that the removal of inflammatory blood cytokines by extracorporeal blood purification devices can improve postoperative outcomes.

Methods

In this retrospective single-centred study, 207 patients at our institution received an LVAD between August 2010 and January 2020; 72 patients also underwent extracorporeal blood purification therapy (Cytosorb) during surgery. Propensity score matching resulted in 112 patients (extracorporeal blood purification device: 72 patients; non-extracorporeal blood purification device: 40 patients). Comparison of survival rates, major in-hospital and follow-up adverse events, and pre- and post-implantation laboratory parameters were carried out between the two groups.

Results

In-hospital mortality and overall survival were unvaried by extracorporeal blood purification device use, but the risk of respiratory failure (54.2% vs 30.0%, $p < 0.05$) and the need for mechanical ventilation beyond 6 days post-implantation (50.0% vs 27.5%, $p < 0.05$) increased in its use. Furthermore, it led to more patients remaining on LVAD support when compared to their matched cohort ($p < 0.05$). We also found that, while LVAD implantation alone significantly increased white blood cell, c-reactive protein, and interleukin-6 levels ($p < 0.05$), extracorporeal blood purification device use did not affect these parameters.

Conclusions

Overall, extracorporeal blood purification device use might potentially increase the risk of in-hospital respiratory complications and the time spent on bridging therapy. However, no change in inflammatory marker and postoperative survival was found.

Role of Exogenous Carbon Monoxide in the Exacerbation and Progression of Coronary Artery Disease

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Objectives

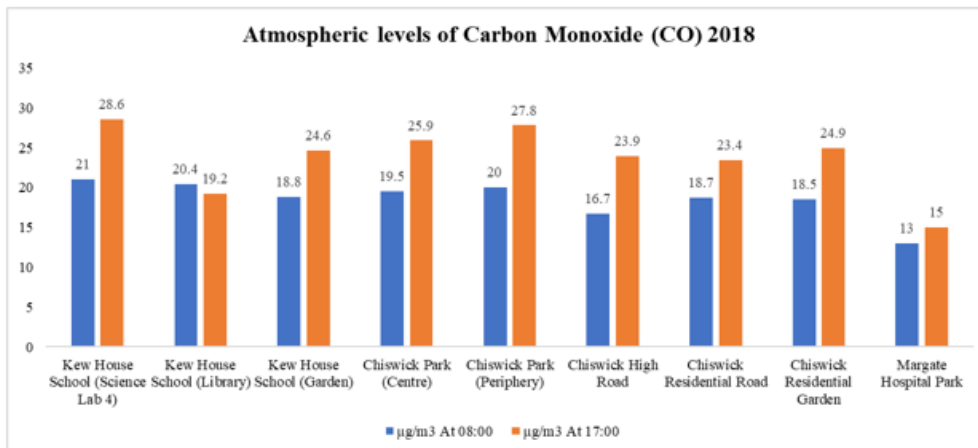
The aim of this study is to establish the impact of hypoxic manifestations of carbon monoxide (CO) in the development and the exacerbation of coronary artery disease including myocardial infarction. The controlled clinical studies in patients with coronary artery disease show that the duration of exposure to CO at levels exacerbates underlying cardiovascular disease, including enhanced myocardial ischemia and increased cardiac arrhythmias. In patients with exertional angina, carbon monoxide exposure intensifies the exercise induced myocardial ischemia, increased duration of angina symptoms and decreased time to onset of ST segment depression indicative of myocardial ischemia.

Methods

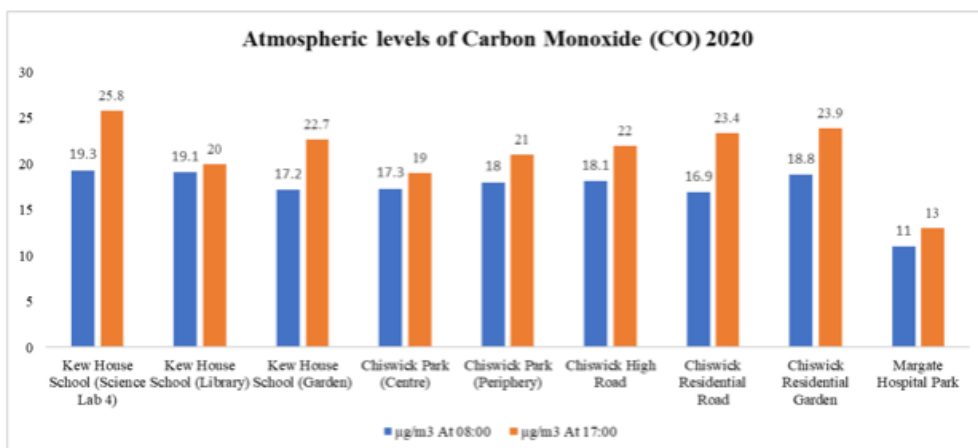
The CO measurements were taken from Kew House School; science Laboratory, library & garden, Chiswick Park centre & peripheral areas, Chiswick High Road, Chiswick residential road & garden and finally Margate hospital park. These measurements were taken at the time points of 17:00 & the next day at 08:00 to be able to see what the difference would be around the closest times together. The two set studies are from the years of 2018 & 2020. To take the measurement a carbon monoxide meter was used.

Results

In 2018 the CO production is higher than normal levels that varies from place to place secondary to the formation of CO in that particular area such as laboratory and high street. In addition, it is demonstrated that the trees help to eliminate carbon monoxide levels during the night, to create low carbon monoxide levels in the morning. Furthermore, in 2020 there is a general decrease in carbon monoxide levels, that can be due to reduced usage of vehicles and factories because COVID-19.



Graph 1. Graph showing atmospheric carbon monoxide measurements at two time points in a day (Year 2018).



Graph 2. Graph showing atmospheric carbon monoxide measurements at two time points in a day (Year 2020).

Conclusion

This means to reduce levels of carbon monoxide communities can plant more trees and reduce the use of motor vehicles, which indirectly helps to control the progression of coronary artery disease to some extent and other health hazards.

Journey of Patients with Lung Cancer: Does South East Scotland's Cardiothoracic Service Meet the NHS Scotland Standard for Waiting Times?

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¹University of Edinburgh; ²Edinburgh Royal Infirmary

Objectives

Little is known about the pathways of patients treated under the South East Scotland cardiothoracic service. The primary aims of this project were to track patient journeys from initial referral to surgical resection and to identify where delays occurred. The secondary aims were to audit whether the 95% standards for 62 and 31-day treatment targets set by NHS Scotland were met.

Methods

The pathways of patients who received surgical resection for primary lung cancer between January 2019 and January 2020 were retrospectively analysed. Intervals between initial referral, 1st CT scan, pathological diagnosis, surgical referral, surgical review, last imaging, and surgical resection were investigated. 62 and 31-day target dates were obtained from patient records and audited.

Results

A total of 94 patients met the full inclusion criteria. 51 patients (54.3%) were referred from outside of NHS Lothian. The median (IQR) time from initial referral to surgical resection was 104 (84 - 134) days. Greatest intervals occurred between initial referral and surgical review at 77 (59 – 106) days and between 1st CT scan and last imaging at 63.5 (30 – 93) days. Only 23.3% of patients with documented target dates met their 62-day targets, while 70.5% of patients met their 31-day targets.

Conclusions

Pathways are prolonged with the greatest delays occurring during intervals related to diagnosis and staging. Patient waiting times fail to meet the 95% standards set by NHS Scotland, with unknown implications for patients. Further analysis is required to assess the effects these delays have on patient outcomes and to suggest implementable measures to optimise patient care.

Opioid use After Rib Fractures: Do we Over-prescribe?

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Objectives

It is often challenging to manage rib-fracture associated pain. Opiate-based strategies are often adopted, however, this may result in dependence and additional morbidity. We sought to audit the use of opiates for thoracic trauma patients within our thoracic surgical unit.

Methods

All patients admitted with rib fractures between December 2019 and March 2020 were included. Data was collected from electronic patient records, to include a minimum of six months follow-up. Local audit approval was obtained. Statistical analysis was performed using STATA SEv16.

Results

37 patients were admitted with rib fractures over the study period (68% male, n = 25, with a mean age of 69.3 years \pm 14.5). 8 patients were excluded due to pre-admission opiate use, with 29 patients included in final analysis. 90% (n = 26) were prescribed an opiate during their admission, with 76% (n = 22) being discharged on opiates. 21% (n = 6) required additional opioids analgesia in the community after discharge.

Conclusion

Opioids remain a first line analgesic strategy for rib fracture patients locally, with continued prescription of opiates by primary care physicians in a large proportion of our patients. A better understanding of this problem is required, and local practices may need to be updated to mitigate the risk of dependence in this population.

Dehiscence of Mitral and Tricuspid Annuloplasty Ring: A Systematic Review with Pooled Analysis

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Objectives

Mitral and tricuspid ring annuloplasty dehiscence with consequent recurrent valve regurgitation is a rare but challenging procedural failure. The incidence and predisposing risk factors for annuloplasty ring dehiscence include technical and pathological ones.

Methods

A systematic database search with pooled analysis was conducted of studies that only included dehiscence rate of mitral and tricuspid ring in EMBASE, MEDLINE, Cochrane database and Google Scholar, from inception to October 2020. The primary outcomes were dehiscence rate in mitral and tricuspid by type of ring implanted (rigid, semi-rigid and flexible). Secondary outcomes were 30-day mortality, dehiscence rate by pathology and by ring size.

Results

Our search yielded 402 relevant studies. 16 studies met the inclusion criteria with a total of 7,957 (6543 mitral, 1414 tricuspid) of which 87 (1.33%) patients mitral and 30 (2.12%) in tricuspid had dehiscence. A significant difference in mitral dehiscence rate was found by ring type (semi-rigid 1.86%, rigid 2.32% and flexible 0.43%; $p < 0.05$) but not in tricuspid (rigid 1.55%, flexible 0.95%; $p = 0.4$). There was no significant difference in rate of dehiscence by ring size in mitral valve ($p = 0.13$) but there was higher dehiscence rate in ischaemic compared to non-ischaemic mitral regurgitation ($p = 0.02$). There was no significant difference in 30-day mortality between mitral ring types (rigid 3.23% vs flexible 2.75% vs semi-rigid 2.44%; $p > 0.05$). Tricuspid flexible rings had higher 30-day mortality than rigid rings ($p < 0.05$).

Conclusion

Although rigid, semi-rigid and flexible annuloplasty rings provide acceptable valve repair outcomes, mitral annuloplasty ring dehiscence is clinically more common among rigid rings. Understanding the multifactorial nature of ring dehiscence will help in identifying the patients at high risk and improve their clinical outcomes.

Troponin Measurement in Paediatric Cardiac Surgery: A Systematic Review

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Objectives

Troponin is a commonly used biomarker of myocardial injury following surgery. However, there are inconsistencies in the measurement and reporting of biomarkers due to a lack of standardised approach. This systematic review evaluates the use of troponin in paediatric cardiac surgery.

Methods

The MEDLINE, CENTRAL, EMBASE, and LILACS/IBECs databases were searched and relevant systematic reviews or meta-analyses were reviewed for additional studies. Inclusion criteria were the measurement and reporting of troponin in children undergoing cardiac surgery, with no restrictions on study design, year or language.

Results

125 studies were identified. The most frequent aim was risk factors/prognostic value for post-operative course (28, 22.4%) followed by cardioplegia (27, 21.6%). Cardiac troponin I was the most reported assay (93, 74.4%). 116 different time points for troponin measurement were identified: preoperative baseline was the most frequent (79, 63.2%) followed by 24-hour post-operative (43, 34.4%). Forty-nine (39.2%) studies only represented troponin values across time points graphically. 57 (45.6%) studies also reported other cardiac biomarkers, with CK-MB being most frequent in 32 (25.6%). The most frequent clinical variables compared were cardiopulmonary bypass time (95, 76%), aortic cross-clamp time (73.6%), and duration of inotropic support/inotropic score (68, 54.4%).

Conclusions

The current literature illustrates marked differences in how troponin is measured and reported in paediatric cardiac surgery. We found variations in assay, time points and clinical outcomes, alongside uncertainty regarding other cardiac biomarkers and lack of reporting of numerical troponin values. These inconsistencies precluded the pooling of results for meta-analysis and highlight the importance of a standardised approach to the measurement and reporting of troponin release following cardiac surgery in children.

Registration

PROSPERO CRD42020187060

Predicting Post-operative Complications in Patients Over 75 Years When Referred to Thoracic Surgery

Haxha, F¹; Alzetani, A²

¹University Hospital Southampton; ²Southampton General Hospital

Objectives

Thoracic surgery is the field of medicine involved in the surgical treatment of diseases affecting organs inside the chest. More than 34,000 cardiothoracic operations take place in the UK each year, and following surgery, patients typically remain in the hospital for up to a week and require ongoing support throughout. Many possible complications may arise post-operatively, especially in a group as vulnerable as those in the 75+ age range. We aim to look at these complications in those undergoing thoracic surgery at a regional centre.

Methods

This is a retrospective study from 2019 to 2020 on 120 patients at a regional centre undergoing thoracic surgery. We collected the pre-operative Performance status (PS) and comorbidities and they were scored using the Charlson Comorbidity Index (CCI). Any post-operative complications whilst in hospital were noted (minor and major).

Results

In our study there were 44 males and 36 females over the age of 75 with an average age of 80 (age range 75-91). Post-operative complications occurred in 32.5% of patients over the age of 75 (26/80). In patients over the age of 75, 20 out of 67 (29.9%) who scored >4 on the CCI score developed post-operative complications. On the other hand, in patients under the age of 75 who scored >4 on the CCI, only 2 out of 10 (20%) developed postoperative complications. A student t-test showed that there was no statistically significant difference in the data and therefore the CCI was not a statistically viable index score in predicting post-operative complications.

Conclusions

The CCI only takes into account a set criteria of co-morbidities and excludes other relevant factors. There should be better assessment of this group of senior patients pre-operatively to mitigate the risks of surgery and improve their outcomes postoperatively.

Outcomes After VATS Versus Open Lobectomies for Lung Cancer: A VATS Approach Reduces Length of Stay and In-hospital Mortality

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Liverpool Heart & Chest Hospital NHS Foundation Trust

Objectives

Historically lobectomies for lung cancer were performed with an 'open' approach, involving a large thoracotomy incision. The widespread adoption of VATS changed the operative landscape, resulting in a marked increase in the number of VATS lobectomies performed. Studies have found significant reductions in post-operative morbidity with this less invasive approach. Despite this, VATS lobectomy rates in the UK vary widely. This study sought to compare patients undergoing VATS and open lobectomies in a large cohort of patients in order to analyse the effect of operative intention on patient outcomes.

Methods

All patients who underwent an open or VATS lobectomy between 2013-2019 in our institution were studied and data on a range of patient characteristics and post-operative outcome measures were collected.

Results

A total of 2015 lobectomy patients were included; 1202 were completed with an open approach and 813 with VATS. Patients undergoing VATS were statistically more likely to be female (54.49%), of an older age and higher ASA grade ($p < 0.05$). Those with smaller tumour sizes and minimal nodal/metastatic disease were more likely to undergo a VATS procedure ($p < 0.0001$). Length of stay was significantly higher with an open approach at 6 (4-9) days compared to VATS at 4 (3-7) days ($p < 0.0001$). 30-day mortality was significantly lower with VATS (0.74%) when compared to an open approach (2.5%) ($p < 0.0001$).

Conclusion

VATS was found to be superior to an open approach with regards to patient outcomes, as it significantly shortened length of stay and 30-day mortality. However, factors including presence of more advanced TNM stage play a role in operative selection for open procedures. Further studies with more robust matching and/or randomisation are required to more accurately determine any differences between the techniques.

Targeted Postoperative Pain Management in Thoracic Surgery at Southampton

Belal, J¹; Alzetani, A²

¹University of Southampton; ²Southampton General Hospital

Objectives

Of those that undergo thoracic surgery, 60% experience severe pain in the post-operative period. New techniques specific to this surgery have been in use such as regional & local blocks which provide more targeted pain relief in addition to the traditional systemic approaches such as patient controlled analgesics (PCA). The aim of the project is to review what measure are used in this centre and their efficacy.

Method

A retrospective review of patients who had thoracic surgery in a regional centre from September 2019 to September 2020. Patients were selected if they had invasive procedure and an overnight hospital stay. Day surgery or no incisions were excluded. Patient data such as type of surgery, use of local/regional anaesthetic agents, postoperative types, amounts and duration of systemic analgesics, pain scores and length of hospital stay (LOS) were all collected.

Results

Seventy-five patients were included with a mean age of 64 (range 21 – 88) with more male patients (38; 50.7%). There were more VATS patients (40; 53.3%) as open surgery are infrequently used. Average length of stay for VATS was 3.95 days (SD =1.99) and for open surgery was 5.85 days (SD=4.34). The median pain score for VATs was 7 compared to 8.25 for open surgery. PCA was used in 75.38 %, LA was 87.69%, Paravertebral block 32.30%, Intercostal block 44.61% and only 1 patient had an epidural. There was a correlation between pain score and LOS (T Score: 4.803; P value <.00001). The most important outcome variable was the length of stay as in most cases patients are not discharged until they are relieved of pain on oral analgesics only. Therefore, the longer the hospital stay the more post-operative pain.

Conclusion

Open thoracotomies had a longer hospital stay as they have the most noxious stimuli input. Patients were randomly selected which avoids selection bias thus making this study generalisable. A Weakness of this study is the lack of patient follow up after they are discharged.

Predictors of Short-term Outcome After CABG in the South-Asian Community: A Propensity Matched Analysis

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Objectives

Ethnicity is not incorporated into standardised pre-operative risk-stratification tools for cardiac surgery. This study aimed to compare short-term outcomes following coronary artery bypass graft (CABG) surgery in South Asian and non-Asian patients.

Methods

This retrospective observational analysis was conducted using prospectively collected data for consecutive patients undergoing isolated CABG surgery via sternotomy between the years 2011 and 2019. Initially, 1957 patients were identified (799 South-Asian, 40.8%). The patient groups were then propensity matched according to 10 relevant pre-operative covariates (Age, body mass index, pulmonary disease, renal failure, smoking, diabetes, ventricular function, renal failure): 675 non-Asian patients were matched against 675 Asian patients.

Results

Operative mortality was 1.77% and similar between the two groups ($p=0.447$). Multivariate regression analysis found predictors of operative mortality to be pre-operative serum creatinine, age, left ventricular (LV) impairment and extent of coronary disease. The effect of creatinine on mortality was selective for South-Asian patients ($p=0.015$). LV impairment was a predictor of mortality in non-Asian patients, however, this effect did not exist in South-Asian patients.

A composite value for short-term complications (incorporating death, stroke, reoperation, haemofiltration and pneumonia) was formulated. Predictors of worse outcome were age and creatinine (coef 0.002, 95% CI 0.0004 – 0.004, $p=0.019$) in the overall cohort, as shown in Table 1. Subgroup analysis found age to remain a selective negative predictor of complications in South-Asian patients.

Table 1

	Co-Variate	Coef	95% Confidence Interval	Standard Error	P value
Whole Cohort	Age	0.034	0.012-0.057	0.011	0.002
	South Asian Ethnicity	-0.128	0.59-0.33	0.24	0.585
	Smoking	0.271	0.082-0.623	0.18	0.132
	Creatinine	0.0024	0.0003-0.0045	0.001	0.019
	Dyspnoea	0.137	0.173-0.447	0.16	0.387
	LV impairment	0.0026	0.025-0.03	0.014	0.855
	Cross-clamp time	0.0064	0.001-0.014	0.004	0.089
South Asian Cohort	Age	0.043	0.016-0.71	0.014	0.002
	Creatinine	0.0011	-0.0011-0.0034	0.0012	0.330

Results presented above are from ordinal logistic regression.

Conclusion

This study highlights the cumulative risk associated with ethnicity and renal disease in predicting outcomes following CABG. This warrants further investigations in larger populations, thus guiding pre-operative risk-stratification.

A Systematic Review and Meta-analysis of the Flexible and Rigid Annuloplasty Ring After Mitral Valve Repair for Degenerative Disease

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¹Bristol Medical School - Medical Student; ²University of Bristol - School of Clinical Science; ³Bristol Heart Institute

Objective

Ring annuloplasty is the standard approach in mitral valve (MV) repair. Currently, knowledge relating to the long-term efficacy of devices on a comparative basis is limited. Our primary outcome in this meta-analysis was to analyse the long-term results of a flexible versus rigid annuloplasty ring in degenerative MV disease.

Methods

A systematic literature search was undertaken of all clinical control trials comparing the outcomes of mitral annuloplasty surgery with the flexible and rigid ring in MEDLINE. A pooled risk-ratio meta-analysis was done to evaluate long-term survival rates and recurrence of mitral regurgitation (MR).

Results

The initial Medline search retrieved 7275 papers and the final sample consisted of only 9 studies (7 retrospective and 2 prospective). The most common flexible ring reported was the Duran ring (3 studies) and pericardium (3 studies). Pooled meta-analysis no differences in terms of five years survival between the two groups (RE model -0.19[-0.95;0.57], $p=0.62$) nor in terms of long-term (>5 years) recurrence of severe MR (RE 0.42[-0.13;0.99], $p=0.13$). There was an important degree of heterogeneity for both outcomes (I²: 46.2% and 74.6% respectively).

Conclusion

The literature on flexible ring in degenerative MV disease is largely fragmented with different types of rings used and mostly retrospective analysis. No differences were found between the rigid and flexible ring in terms of long-term survival and recurrence of MR, but more prospective trials are needed on this topic.

Predictive Factors of Mortality and Morbidity in the Surgical Management of Infective Endocarditis in Intravenous Drug Users

Zubarevich, A¹; Szczechowicz, M¹; Osswald, A¹; Easo, J¹; Arjomandi Rad, A²; Vardanyan, R²; Schmack, B¹; Ruhparwar, A¹; Zhigalov, K¹; Weymann, A¹

¹Department of Thoracic and Cardiovascular Surgery, West German Heart and Vascular Center, Essen, Germany; ²Faculty of Medicine, Imperial College London

Objectives

Despite advances in antibiotic therapy and medical management, infective endocarditis presents itself as a serious condition with high mortality rates. The following is particularly true for patients with a history of long-term intravenous drug abuse. The aim of this study was to evaluate the factors which can predict the mortality and morbidity of surgical intervention in intravenous drug abusers with infective endocarditis.

Methods

At our institution, we identified 24 patients with a history of active intravenous drug abuse from 2007 to 2020 (17 male, mean age 38.5 ±8.7). All patients received surgical intervention for infective endocarditis and were followed up for a mean period of 4.2 ±4.3 years.

Results

Predictive factors of mortality in our cohort included isolation of Enterococcus species and liver failure, as well as Logistic EuroSCORE and EuroSCORE II. Patient mortality at 30-days was 12%; at one-year was 22%; and at three-years was 28%. Septic shock was at 12.5% (n=3), the most common cause of death in our cohort. The most commonly isolated organism from blood cultures was Staphylococcus species. Following discharge, five patients were readmitted to hospital with recurrent infective endocarditis.

Conclusion

In avoidance of recurrent infective endocarditis, increased morbidity post-surgically, and a high mortality rate, surgical treatment of infective endocarditis in intravenous drug abusers should be performed with urgency, supplemented with concomitant antibiotics. Furthermore, addiction therapy should be considered in the post-surgical management plan due to the high rate of relapse in patients. Further prospective research is required to conclusively determine optimal management for best surgical and medical outcomes in this patient cohort.

Establishing Best Practice for Re-opening Minimal Access Cardiac Surgical Cases

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Objectives

To avoid full sternotomy, minimal access cardiac surgery has been increasingly popular over the past few years but is still prone to complications such as bleeding and cardiac arrest. Current STS guidelines provides good guidance on precautionary measures and initial management, however, does not include specific guidance about the safest technique to reopen in these patients. This survey reviewed the current practice for re-opening minimal access cardiac surgical cases and aimed to establish best practice in these cases.

Methods

We performed a cross-sectional study (n=41) of the cardiothoracic surgeons that perform minimal access surgeries in UK by using an online survey to assess techniques used in emergency re-opening in bleeding or cardiac arrest cases. The results of the questionnaire were then analysed using SPSS 25.

Results

Results showed only 39% (n=16) of the hospitals follow specific protocols for reopening minimally access patients. The results also showed a building consensus that for cases that bleed, the bleeding was managed through the original incision. For cases of cardiac arrest, the majority surgeons preferred performing immediate full sternotomy. However, only 78% (n=32) centres have a battery-powered saw to achieve this and only 68% of the centres has a resident cardiothoracic registrar cover overnight, which is recommended by STS guidelines.

Conclusions

The data shows the need for additional guidance especially as the STS guidelines do not include this subset of patients. This was demonstrated by the difference observed in techniques used to reopen bleeding and cardiac arrest cases. We hope to widen the scope of the questionnaire and incorporate the final results into an expert consensus statement.

Contemporary Outcomes of Surgical Aortic Valve Replacement: A High-volume Single Centre Study

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Objective

With the advent of transcatheter aortic valve implantation (TAVI) has come an expectation that there will be a decline in surgical aortic valve replacement (SAVR). This has been fuelled by trials beginning to compare outcomes between TAVI and SAVR in lower risk patients. The aim of this study was to perform a detailed examination of our contemporary outcomes following SAVR in patients over the age of 60.

Methods

This retrospective cohort study observed all 1005 patients over 60 who underwent isolated primary SAVR from January 2015-December 2018. The cohort was stratified by surgical risk, defined as Logistic EuroSCORE <10 (low risk) vs ≥10 (high risk). Outcomes included in-hospital complications and patient survival.

Results

The median age and logistic EuroSCORE of the cohort were 75 years and 6.4 respectively. The overall 30-day mortality was 1.7% and was increased significantly with surgical risk ($p=0.02$). The 30-day mortality of elective patients was 1.1%. Overall 1-year and 2-year survival were 94.3% and 91.7% respectively, which significantly increased with surgical risk. In the low risk cohort this survival rate increased to 96.6% and 94.9%, respectively. The rates of postoperative stroke, pacemaker implantation and acute kidney injury were 1.2%, 3.6% and 20.8%, respectively.

Conclusions

SAVR can be performed in patients over 60 years old with excellent outcomes, which compare very favourably with outcomes from TAVI trials, with their highly selected patient cohorts. We would assert that SAVR should continue to be considered as a first line treatment option for patients with aortic valve stenosis.

The Present and Future of Virtual Reality in Cardiac Surgery

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¹Faculty of Medicine, Department of Medicine, Imperial College London; ²Faculty of Medicine, Barts and The London School of Medicine and Dentistry, Queen Mary University of London; ³Department of Dermatology, University of Duisburg-Essen, Germany; ⁴Division of Cardiovascular Surgery of Pronto Socorro Cardiológico de Pernambuco; University of Pernambuco, Recife, Brazil; ⁵Department of Thoracic and Cardiovascular Surgery, West German Heart and Vascular Center, University of Duisburg-Essen, Essen, G

Objectives

The aim of the study was to provide a systematic review of literature on the current integration of virtual reality (VR) in Cardiac Surgery and the future opportunities offered by virtual reality in surgery.

Methods

An extensive search was performed using the MEDLINE, EMBASE and Cochrane Controlled Trials Register (CCTR) databases. The search criteria were: ["Virtual reality" OR "augmented reality" AND "cardiac surgery"] in title/abstract. Reference lists of these articles were also screened for any further relevant papers. The eligible abstracts have been full-text-screened for any relevant data related to the use of Virtual Reality in Cardiac Surgery, by two independent reviewers, with any conflicts resolved by a third party.

Results

Following examination of the remaining titles and abstracts, 59 articles were regarded of relevance to the topic of the manuscript. 24 papers from the search have been included in the review. Three main areas were identified including medical education (n=5), preoperative planning, intraoperative and postoperative assistance (n=19). Virtual reality has shown promising results with regards to medical education both at the undergraduate and postgraduate level. It has also shown to provide great opportunities for preoperative surgical planning in congenital heart disease; intraoperative and postoperative assistance to both surgeons and patients when combined with current imaging technologies. The use of transoesophageal echocardiography and Computerized Tomography to create VR images have shown to improve the visualisation of surgical targets and enhance the beating-heart intracardiac surgical outcomes.

Conclusion

Overall, despite the limitations which exist in this area of research, such as a relatively low number of publications due to novelty of the topic, virtual reality establishes itself as very promising tool in supporting cardiac surgery in its drives towards innovation and developing surgical teaching methods.

A Single Centre Study of Peri-operative Transfusion in First-time Cardiac Surgery

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¹Newcastle University; ²Freeman Hospital

Objectives

At our institution at least two units of blood are crossmatched for each first-time cardiac case, these are often not used which risks wastage. Through analysing current practice and highlighting predictors for transfusion we hope to reduce inefficiency.

Methods

Between April 2018 and March 2019, 665 patients, 73% male, underwent first-time cardiac surgery at our hospital. We retrospectively collected crossmatching and transfusion data for the 24hr perioperative period. Patients' transfusion data was then split by procedure performed and further analysed for anaemia and body mass index (BMI). In our group, the mean age was 68, mean BMI 28.8kg/m² and mean haemoglobin 136g/l.

Results

In a year of first-time cardiac surgeries, 1674 units were crossmatched of which, 75% were returned unused. Overall, 28% of patients required transfusion with the highest surgical group being aortic dissection at 65%. A haemoglobin of <120g/l conferred the greatest risk of transfusion with a risk ratio of 3.6 (95% CI [2.9, 4.4]) and with a BMI <20 giving a transfusion risk ratio of 1.9 (95% CI [1.2, 3.1]).

Conclusions

Indiscriminate crossmatching is both inefficient and unnecessary. Although there are several predictors of transfusion, haemoglobin and BMI are key.

Gender Representation of Authors Accepted for Presentation at the 2020 Society for Cardiothoracic Surgery Annual Conference

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¹Imperial College School of Medicine; ²Department of Surgery, West Middlesex University Hospital

Objectives

Cardiothoracic surgery has traditionally been a male-dominated specialty with only 3% of cardiac surgery consultants being female in 2019. Presenting research at conferences allows trainees to network and this is often the first step in the career pathway. Our study aims to analyse the gender disparities at this initial stage.

Methods

Accepted abstracts and authors were identified using the published list on the 2020 SCTS annual conference website. Both first and last author names, total number of authors and abstract area were extracted from each accepted abstract and categorized into cardiac or thoracic surgery if possible. Genderize.io was used to initially predict the gender of the first and last author. Any that could not be determined were queried on internet searching and predicted through pronouns/pictures. If the gender was still inconclusive, it was excluded from analysis.

Results

There were 426 abstracts accepted for presentation at the 2020 annual society meeting with 811 first and last authors identified. We identified the gender of 87.5% with Genderize.io, 9.2% using Google and 3.2% remained unidentifiable. There were 140/394(35.5%) female first authors and 58/392(14.8%) female last authors. Female first author representation varied across different categories: Nursing & AHP Forum (37/46,80.4%) the highest and Mitral Valve (3/19,15.8%) being the lowest. Female first authors were more likely to work with female senior authors in thoracic surgery (OR 2.73 95% CI 1.01-7.37) but there was no such trend in cardiac surgery (OR 1.06 95% CI 0.46 - 2.44). Male first authors were more likely to have many co-authors than female first authors (4.37 vs 3.69, $p=0.01$).

Conclusions

Despite big progress made in some areas, more female representation must be encouraged in many areas. Prominent senior consultant role models could mentor and encourage more engagement from young women in SCTS meetings.

Pulmonary Metastasectomy: Does it Make a Difference?

Mason, S¹; Abah, U²; Smith, M³; Duvva, D³; Asante-Siaw, J³; Woolley, S³; Mediratta, N³; Page, R³; Shaw, M³; Shackcloth, M³

¹School of Medicine, University of Liverpool, Liverpool, UK; ²Royal Stoke University Hospital, Stoke-on-Trent, Staffordshire, UK; ³Liverpool Heart & Chest Hospital, Liverpool, UK

Introduction

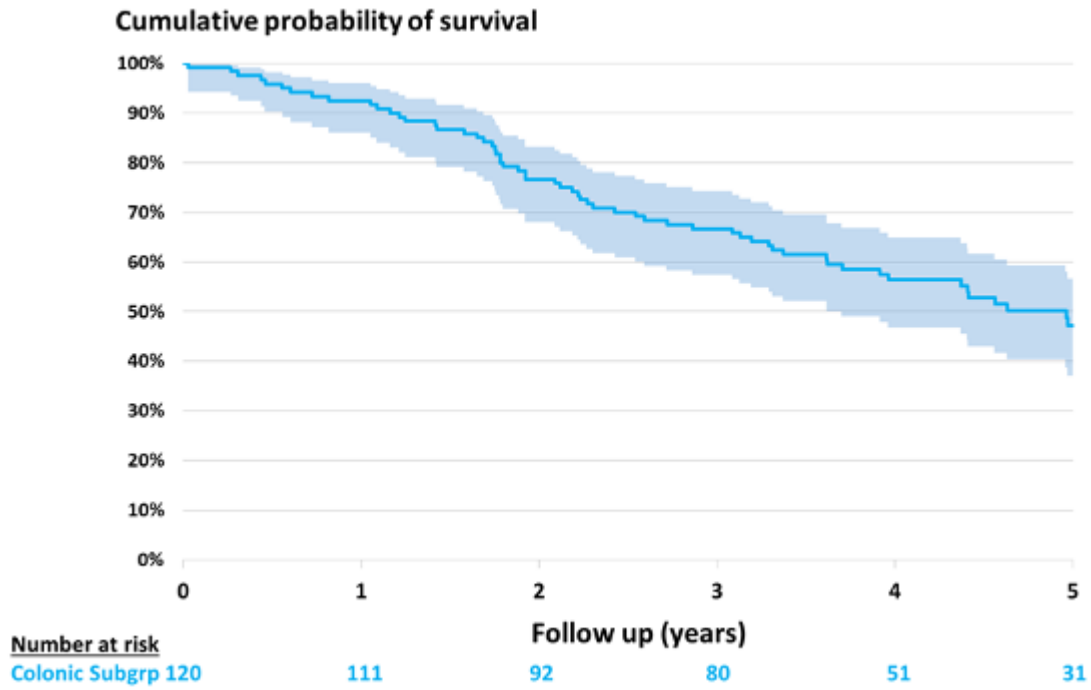
Pulmonary metastasectomy for colorectal cancer has caused much debate amongst thoracic surgeons over the years and the question regarding its impact upon overall prognosis remains unanswered. Proponents of pulmonary metastasectomy will cite data, quoting a 50% (+/-5%) survival rate at 5 years, but an argument can be made that resection of these metastases does not impact upon prognosis. A randomised control trial was developed to finally answer this question, however failed to recruit significant numbers for a meaningful statistical analysis. Favourable prognostic factors, such as a single metastasis, a long disease free interval and a low carcinoembryonic antigen are indicative of improved prognosis, but do not specifically address the additional benefit of pulmonary metastasectomy. We examined the outcomes of patients at our centre following pulmonary metastasectomy.

Method

Data was collected from a prospectively filled database. All patients that underwent resection for lung metastasis secondary to colorectal cancer were included. Demographic and outcome data were analysed and a Kaplan Meier survival curve plotted.

Results

From July 2013 to July 2016, 120 patients were identified who underwent pulmonary metastasectomy for colorectal cancer. The mean age of the cohort was 66, 64% were male, median ASA was 2, PS 0 and MRC dyspnoea score 0. All procedures were performed electively. Resection consisted of 87 wedge resections, 32 lobectomies and 1 pneumonectomy. Of these, 6% experienced postoperative complications, including lower respiratory tract infection, prolonged air-leak, postoperative arrhythmia and reoperation. Kaplan-Meier survival analysis showed a survival of 99% at 90 days, 92% at 1 year, 66% at 3 years and 45% at 5 years.



Conclusion

Pulmonary metastasectomy for colonic metastasectomy can be performed with minimal morbidity and good a survival nearing 50% at 5 years, the debate as to whether resection ultimately impacts prognosis.

The Activity of Cardiothoracic Surgery Throughout the COVID-19 Pandemic

Ball, T

University Hospitals Plymouth NHS Trust

Objective

To investigate the consequences of COVID-19 on activity of cardiothoracic surgery and cardiothoracic waiting lists for surgery at our hospital in 2020.

Method

995 patients who had cardiothoracic surgery at our hospital between 1st April and 1st October 2019 and 2020 were investigated. Cases were defined as elective, urgent and emergency. Waiting list data was evaluated using the capacity plan monitoring report at our hospital.

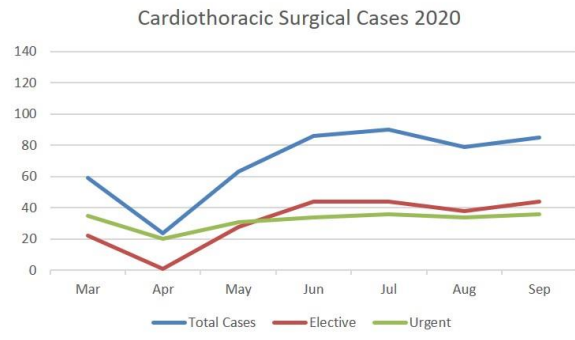
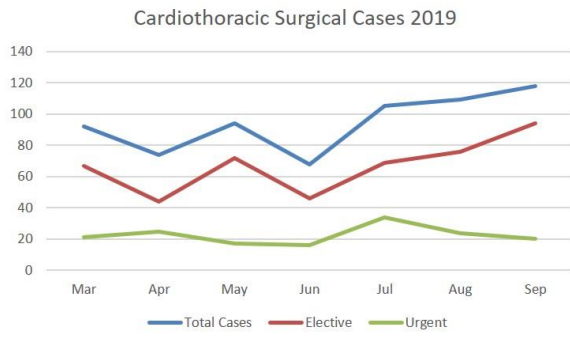
Results

In 2020, there were 33% less surgical cases undertaken compared to 2019. There was a reduction of 59% in April and 29% in May compared to 2019 due to COVID-19 restrictions. Total cases in June increased by 29% compared to 2019 despite ongoing restrictions, due to the availability of theatres and post-operative beds. Elective cases decreased by 50% ($p=0.0089$) compared to 2019. Urgent cases increased by 40% ($p=0.031$), with an increase by 82% in May and 113% in June. This was due to an increase of CICU capacity by 86% during these months. The number of cases undertaken between July-October reduced by 18% compared to 2019 following CICU returning to pre-COVID-19 capacity.

In April 2020, the cardiothoracic surgical waiting list increased by 17% due to cancellations of surgery but decreased by 16% between April-July due to the resumption of surgery and cancellation of outpatient appointments. Between July-October, outpatient waiting lists reduced by 20% following their resumption, suggesting less referrals.

Conclusion

COVID-19 has disrupted cardiothoracic surgery through cancellations, however urgent cases increased as a result of the availability of post-operative resources, suggesting that increasing these facilities would improve case workflow year-round. Following the resumption of cardiothoracic activity, the outpatient waiting list has decreased significantly, suggesting less referrals for appointments. This should be investigated to ensure that patients are not missing the care that they require.



Are Amiodarone and Digoxin safe to use in Post Cardiac Surgery Patients with Concomitant Pulmonary Hypertension?

Makam, R; Tajmohamed, N; Siraj, E; Chaudhry, M; Cowen, M; Qadri, S; Loubani, M; Hussain, A

Castle Hill Hospital, Hull York Medical School

Objectives

Post-operative arrhythmias following cardiac surgery can have a significant effect on postoperative morbidity and mortality especially in patients with pulmonary hypertension. The aim of this study is to evaluate the pharmacological effects of amiodarone and digoxin on human pulmonary arterial tissue.

Methods

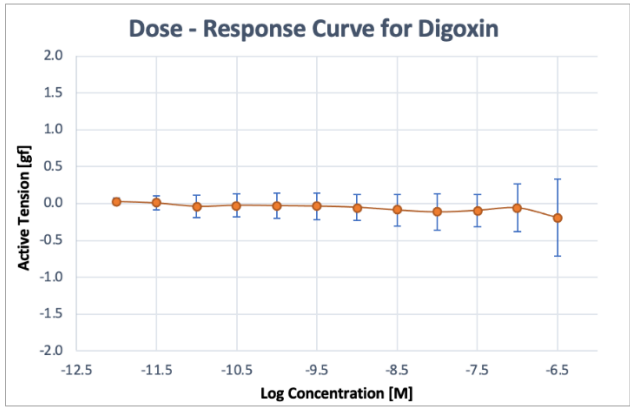
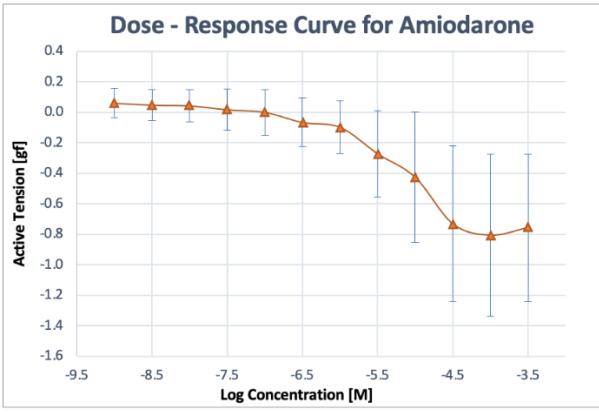
Serial dilutions of amiodarone and digoxin were prepared ranging from 775 pM to 7.75 mM and 320 pM to 32 μ M respectively. Human pulmonary arterial tissue was obtained from patients who consented prior to their lobectomies, to donate resected lung tissue to be used in this scientific study. The pulmonary arterial rings were then dissected and mounted onto to the multiwire myograph through which changes in isometric tension against digoxin and amiodarone were documented. The arterial rings ranged between a diameter of 2–4 mm and length between 2-3 mm; n=12 from 3 patients for amiodarone and n=8 from 2 patients for digoxin. The arteries were pre-constricted using prostaglandin F₂ α before cumulative addition of amiodarone and digoxin. The viability of the arterial rings was assessed using Acetylcholine and potassium chloride KCL.

Results

Amiodarone caused a dose-dependent vasodilation in the pulmonary arteries, whereas Digoxin did not show any significant effect on arterial tension. Amiodarone showed initial significant vasodilation at 30 μ M and had the greatest response at 100 μ M with an active tension of -0.805gf (\pm 0.530) and digoxin had the largest effect at 300nM with an active tension of -0.192gf (\pm 0.523).

Conclusions

The study demonstrated that amiodarone showed promising characteristics as a vasodilator whereas digoxin showed a relatively neutral effect. However, additional trials are required to validate the results of this study and determine their clinical significance.



Five Year Propensity Matched Outcomes of Minimally Invasive vs Conventional Isolated Aortic Valve Surgery

Oo, S¹; Khan, A²; Chan, J¹; Vohra, H¹

¹Bristol Heart Institute; ²University of Bristol

Objective

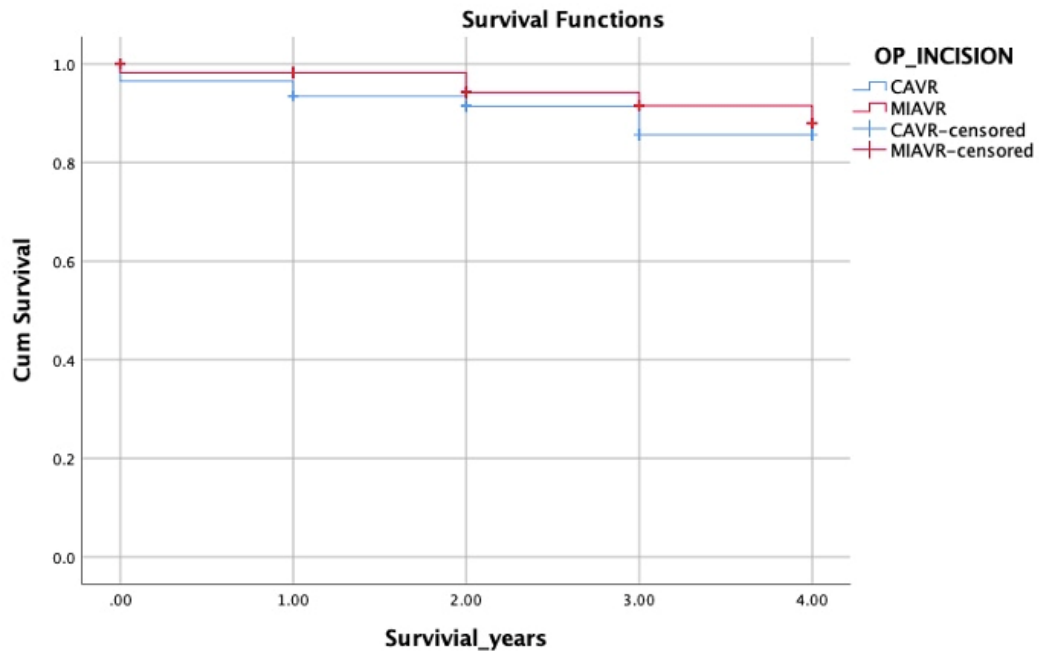
To analyse the early and mid-term outcome of patients undergoing conventional isolated aortic valve replacement (CAVR) versus minimally invasive isolated aortic valve replacement (MIAVR).

Methods

This is a single centre retrospective study involving 653 patients who underwent isolated aortic valve replacement either via CAVR (n=516) or MIAVR (n=137) between August 2015 and March 2020. Using pre-operative characteristics, patients were propensity matched (PM) to produce 114 matched pairs. Assessment of peri-operative outcomes, early and mid-term survival and echocardiographic parameters was performed.

Results

PM analysis showed that larger sized aortic valve prosthesis were inserted in the MIAVR group (22.8 ± 2.5 mm) compared to CAVR group (22.0 ± 2.2 mm)($p=0.010$). CPB time was longer with MIAVR (94.4 ± 19.5 mins) compared to CAVR (83.1 ± 33.3 ; $p=0.003$). There were no differences in the early post-operative complications and mortality between the two groups. Follow-up echocardiographic data showed significant difference in mean aortic valve gradients between CAVR and MIAVR groups (17.3 ± 8.2 mmHg and 13.0 ± 5.1 mmHg, respectively; $p=0.001$). There was no significant difference between CAVR and MIAVR in the mid-term survival at 3 years. (log-rank test $p=0.314$).



Log-Rank test p=0.314.

Years

PM Group	0	1	2	3	4
CAVR	114	97	91	63	29
MIAVR	114	108	97	71	26

Patients at risk (number)

Conclusion

This study found that larger aortic valve sizes with lower mean gradients are being implanted in the MIAVR group. Despite the longer CPB time in the MIAVR group, there was no significant difference in the early complications, mortality and mid-term survival between MIAVR and CAVR. Further studies will be required to analyse the long-term survival.

Risk Profiles and Outcomes of Patients Undergoing Surgical Aortic Valve Replacement and TAVI: A Single Centre Experience

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¹Medical School and Vascular Biology Research Group, St George's University London, UK; ²Cardiology Clinical Academic Group, St George's University Hospitals NHS Foundation Trust & St George's, University of London; ³St George's Hospital, University of London, UK

Objective

Surgical aortic valve replacement is the gold standard for the management of symptomatic severe aortic stenosis. However, TAVI is now well-established as an alternative therapy for patients who are at high or prohibitive risk for surgery. We wished to document any change in surgical patient risk profiles and outcomes between 2006 and 2016 and report these differences between 2016 surgical patients and contemporary TAVI patients. We hypothesised that 2016 surgical patients would have similar age, surgical risk and outcomes to their 2006 counterparts. Furthermore, we hypothesised that while 2016 TAVI patients would be older and have higher surgical risk than contemporary surgical patients, major outcomes, as measured as a composite endpoint of in-hospital mortality and in-hospital stroke, would be similar.

Method

All patients from a single centre with symptomatic severe aortic stenosis undergoing either surgical aortic valve replacement in 2006 and 2016 or TAVI in 2016 were included in this retrospective analysis. Hospital electronic records and local databases were reviewed to obtain baseline patient characteristics and clinical outcomes. Statistical analysis was performed with either a Student's t-test or Fisher's exact test, with a p value <0.05 considered significant.

Results

A total of 491 patients were included in the study. Surgical patients in 2006 had similar risk and outcomes to their 2016 counterparts. In 2016, patients treated with TAVI were older than contemporary surgical patients (80.6±1.2 vs. 69.1±1.9, p<0.001) and had higher logistic EuroSCORE (23.0±1.9 vs. 8.6±0.6, p<0.001). There was no significant difference in in-hospital mortality, in-hospital stroke or the composite endpoint.

Conclusion

Over the past decade there has been no significant changes in surgical patient risk characteristics and major outcomes. Despite current TAVI patients having higher pre-operative risk than contemporary surgical patients, major outcomes are similar.

Thoracic Benign

Thoracic Surgery in the COVID-19 Era: A Tertiary Single Centre Report

Mayer, N¹; Perikleous, P¹; Doukas, G¹; Bruijnen, H²; Finch, J¹; Beddow, E¹; Anikin, V¹; Asadi, N¹

¹Royal Brompton & Harefield Hospital, Department of Thoracic Surgery, London, UK; ²Former Department of Vascular and Endovascular Surgery, University Hospital Augsburg, Germany

Objectives

The impact of COVID-19 on the NHS has been dramatic. On the 17th of March, measures to reduce the nationwide COVID-19 spread were introduced. Elective surgery was postponed, maximizing capacity for COVID-19 patients requiring respiratory support. Delay in lung cancer resections might result in reduced survival. We evaluated our thoracic surgery performance during the pandemic in 2020 compared to the equivalent time period in 2019.

Methods

Data was retrospectively collected from prospectively populated databases and patients medical records during the COVID-19 outbreak between 16th March to 31st May 2020 and the same period in 2019.

Results

Between 16th March and 31st May 2019, 220 patients (60% male) underwent thoracic procedures compared to 145 patients (57% male) in 2020 [$p=0.01$]. Median age 67 years (IQR 54, 74; 2019) and 63 years (IQR 55, 72; 2020, [$p=0.24$]) was comparable. In 2020, patients with higher ASA grades [$p<0.0001$] but less current smokers underwent operations [$p=0.004$]. 40% of the procedures were lung resections in both years, the rate of pulmonary resections for NSCLC was maintained with 25.9% (N=57, 2019) vs. 27.6% (N=40, 2020, [$p=0.72$]). Bronchoscopies were reduced (N=125 in 2019; N=29 in 2020, [$p<0.0001$]) and no SARS-CoV-2 infection was diagnosed postoperatively. No difference in median LOS 5 days (IQR 2, 7.5; 2019) versus 4 days (IQR 1, 6.5; 2020, [$p=0.14$]) was detected. Mortality remained on the same low level [$p=0.49$].

Conclusion

Despite unprecedented restrictions due to COVID-19, we ran an effective thoracic service. With prioritization of urgent cancer procedures, we have maintained our lung resection rate under maximal safety for patients and staff.

Uniportal Subxiphoid Bilateral Removal of Self-introduced Thoracic Foreign Bodies (Video)

Sahdev, N¹; Punjabi, K²; Williams, L³; Peryt, A³; Coonar, A³; Aresu, G³

¹St George's Hospital; ²St George's University of London; ³Papworth Hospital

Thoracic Surgery in Covid-19 era. A Survey of UK Based Centres

Papoulidis, P

Blackpool Victoria hospital

Covid-19 just burst into our lives and changed our everyday habits. But for thoracic surgeons there was a big impact. Close proximity to airways, bronchoscopies, aerosol procedures along with uncertainty of what to do, how to protect everyone and mainly the patients, what is allowed and mainly to not let patients breach their target dates are important parts in decision making. Training was in jeopardy as well, as the fear of the unknown was growing every day.

In the light of all these questions, a survey was conducted amongst the thoracic surgeons of UK to monitor their views. The impact to workload was another big question to answer and mainly how the UK teams dealt with the situation as the amount of facilities and workforce that been relocated for the pandemic made the impact worse.

The survey was conducted through the SCTS started from April 2020 till end of May 2020. There were fourteen (14) questions that tried to give answers of our views.

A 63% of the answers came from consultants and the rest from SAS, trust doctors and NTNs and all of the regions of the country been represented.

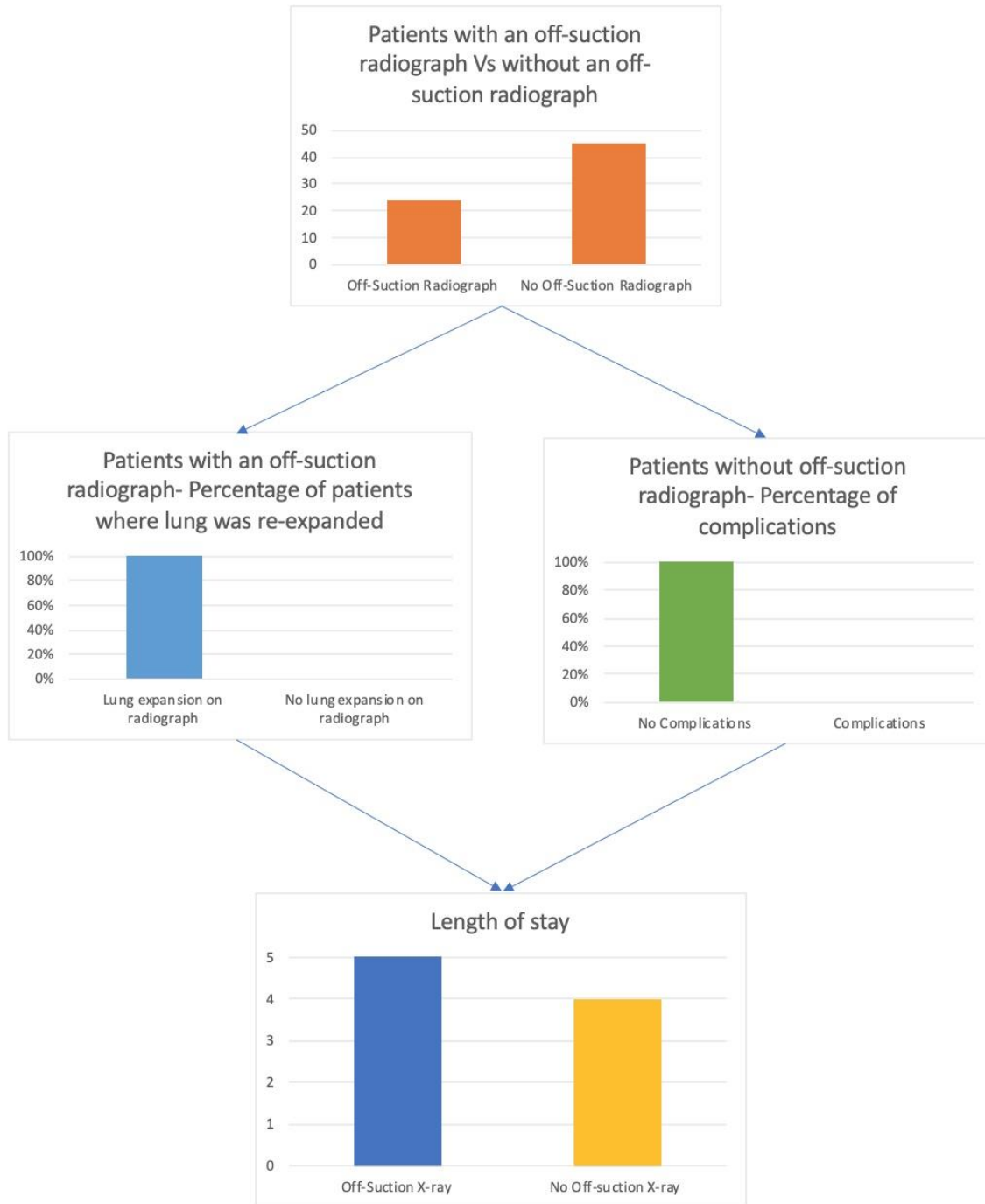
More than 75% of the units had their facilities (beds, operating room) and personnel been relocated to treat Covid-19 patients, and 89% of the work was emergencies and inpatients only. The majority of the units though after the first week started to do some selected, close to breach, electives as well. Only 5% of the departments/consultants continued with the thoracic procedures taking place as normal.

The overall idea of operating during pandemic was a dilemma as 57% of surgeons agreed that a Covid 19 exposure for patients will be higher, especially in some geographical areas, and the mortality/morbidity could be devastating. And based on that, the need of ad-hoc MDTs for 48% of the surgeons was important, even though 21% would decide on their own discretion and 8% would perform no surgery at all, unless strictly necessary (ie endobronchial stents).

Does Performing 'off-suction' CXR Following Thoracic Surgery for Pleural Disease Change Post-operative Management: A Single Institution Perspective?

Sahdev, N; Kar, A; Smelt, J; Tan, C

St George's Hospital



Objectives

Following thoracic surgery for pleural disease, intercostal drains are sometimes placed 'on suction' to aid lung expansion and pleural apposition, especially after pleurodesis procedures. Occasionally, an 'off suction' chest radiograph(CXR) is used to confirm lung re-expansion, prior to drain removal. A further CXR is then routinely taken prior to discharge.

The aim of this study was to investigate whether the intermediate step of an 'off-suction' CXR changes the management of thoracic patients and reduces incidence of complications including reintervention.

Methods

Thoracic operations that routinely required drains to be placed on suction post operatively were analysed retrospectively for a 6-month period. The operations included all pleurodesis procedures: pneumothorax (either with pleurectomy or talc), effusions (requiring talc) and empyema drainage or debridement.

Results

69 consecutive patients were included in the study;58 men and 11 women with a median age of a 56 [17-89]. 25 underwent elective surgery and 44 were urgent inpatient referrals. 24 patients underwent an 'off-suction' CXR and in 45 patients no 'off suction' CXR was performed. 100% of patients who had an 'off suction' CXR, had their drain removed as there was lung re-expansion. Of those patients who did not undergo an 'off-suction' CXR there were no complications (i.e. ITU admission, pneumothorax or re-insertion drains) and a reduction in length of stay compared with the 'off suction' CXR group (4vs5 days, median respectively).

Conclusion

This study demonstrates that the use of an 'off-suction' CXR after pleural thoracic operations did not change patient management. In fact, it prolongs length of stay and therefore represents additional unnecessary time and expense. We recommend adhering to consistent chest drain management protocols within a unit, as these have been shown to reduce complications and length of stay; however, a routine 'off suction' CXR should not be performed.

Combined Minimally Invasive Resection of Thoracic Neurogenic Dumbbell Tumors: A European Experience

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University Hospital Southampton

Background

Paraspinal tumors are rare neoplasms arising from neurogenic elements of the posterior mediastinum and surgical resection can be challenging. We demonstrate feasibility and outcomes from the first European case series of combined laminectomy and VATS resection of thoracic neurogenic dumbbell tumors.

Methods

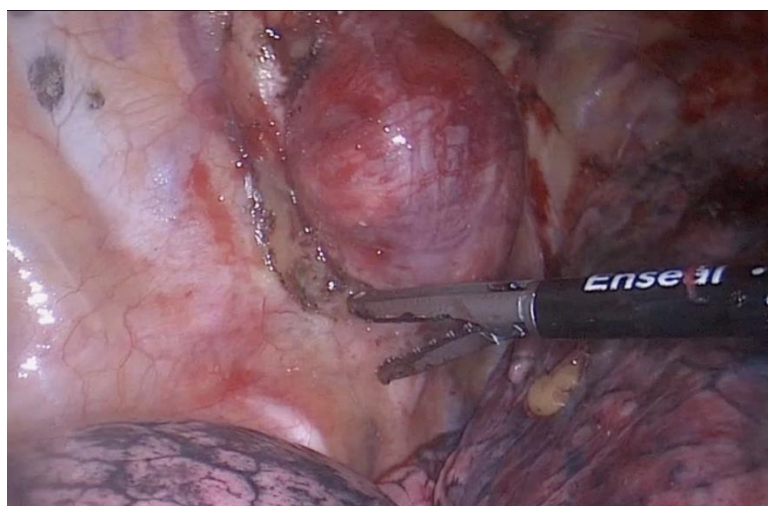
Retrospective review all combined thoracic dumbbell tumor resections performed at our institution between March 2015 – February 2019 was undertaken. Outcomes included operative time, blood loss, length of stay and recurrence rate. Statistical analysis was performed with SPSS statistics (v26). Values are given as mean \pm standard deviation and median \pm interquartile range.

Results

Seven patients were included and there were no major complications or mortality. Mean tumor size and operative time were 66 (\pm 35) mm and 171 (\pm 63) minutes respectively. Median blood loss and length of stay were 40 (\pm 70) ml and 4 (\pm 3) days respectively. One patient required conversion to thoracotomy to remove a tumor of 135 mm in maximal dimension. Histology in all 7 cases confirmed Schwannoma. There was no disease recurrence at a maximum follow-up of 54 months.

Conclusions

Our experience demonstrates favorable operative times, minimal blood loss and short length of stay when dealing with relatively large tumors compared to previous reports. Thoracotomy may be required for tumors exceeding 90mm and chest drain removal on the operative day can facilitate early mobility and discharge. We advocate a combined, minimally invasive laminectomy and VATS resection as the gold-standard approach to thoracic neurogenic dumbbell tumors.



Surgery for Empyema: A SCTS National Survey for the Procedural Choices of Consultant Surgeons in the United Kingdom and Ireland

Green, J; Purchase, D; Hussain, A; Loubani, M; Tentzeris, V; Cowen, M; Qadri, S

Hull University Teaching Hospitals NHS Trust

Objectives

There is a lack of national guidance on the available surgical interventions for empyema, which are mainly: open decortication; video-assisted thoracoscopic surgery (VATS) decortication; VATS drainage; and rib resection and drainage (RRD). We aimed to investigate these procedural choices across consultants in the United Kingdom (UK) and Ireland.

Methods

A 10-item questionnaire was disseminated via the Society of Cardiothoracic Surgeons to their members inviting consultant surgeons to partake.

Results

32 surgeons from 21 centres were in the final analysis. Open decortication and VATS drainage were most commonly performed (both by 30 surgeons), followed by VATS decortication (by 29 surgeons) and RRD (by 27 surgeons). Distribution of self-reported procedure percentages demonstrated that VATS drainage and decortication were performed more than open decortication or RRD [Figure 1]. Qualitative indications of primary procedure choice, with reasoning, highlighted a disparity in clinical decision making.

Conclusions

Procedural choice for empyema is varied and largely unguided in the UK and Ireland. Although there is no indication for VATS drainage in the current guidelines, it is performed as frequently as traditional decortication. A direct evaluation of the impact of these different treatment modalities on patient outcomes is therefore needed.

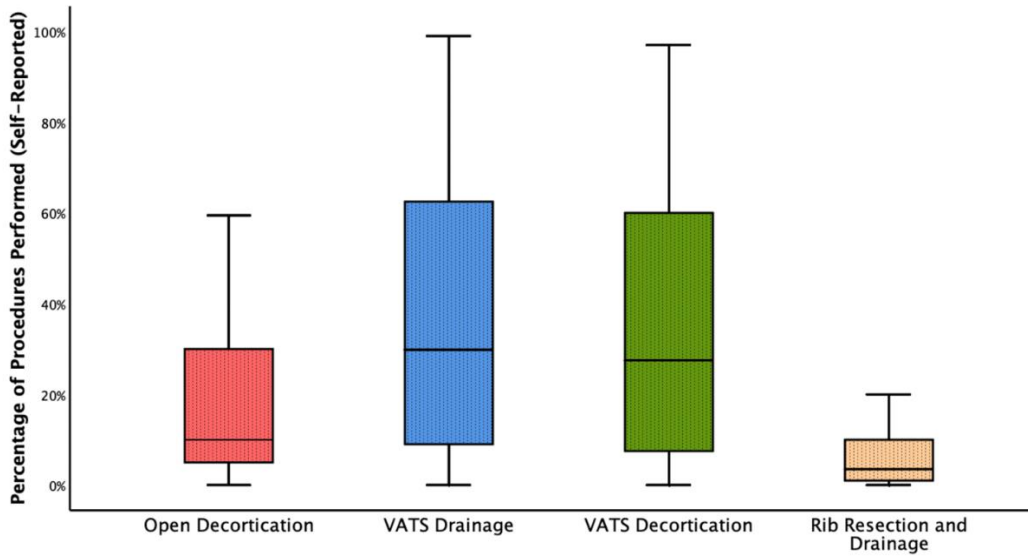


Fig 1. Self-reported percentages by respondents of each procedure performed. VATS, Video-Assisted Thoracoscopic Surgery.

A Single-centre Experience of Patients Undergoing Thoracic Surgery Whilst Established on Veno-venous Extracorporeal Membrane Oxygenation (VV-ECMO)

Eadington, T; Taylor, M; Krysiak, P; Rammohan, K; Fontaine, E; Granato, F; Joshi, V; Venkateswaran, R; Barker, J; Shah, R

Manchester University NHS Foundation Trust, Wythenshawe Hospital

Objectives

Veno-venous (VV) extracorporeal membrane oxygenation (ECMO) is used to facilitate gas exchange and reduce the intensity of mechanical ventilation in patients with severe acute refractory respiratory failure. Its use has increased significantly over the last decade. In the United Kingdom, the use of ECMO is restricted to the specialised units providing a cardiopulmonary transplantation and mechanical circulatory support (MCS) service. We reviewed our experience of patients requiring thoracic surgery whilst established on VV-ECMO.

Methods

A single-centre retrospective review was undertaken of all patients undergoing thoracic surgery whilst established on VV-ECMO between 2012 and 2019.

Results

17 patients underwent 26 thoracic surgical procedures whilst on VV-ECMO in our centre. 59% of patients (n=10) required one operation, 29% (n=5) required two operations and 12% (n=2) required three operations. Of the 26 procedures, 12% (n=3) were undertaken via a video-assisted (VATS) approach and 76% (n=20) were undertaken via an open approach. The remaining 12% (n=3) were isolated endobronchial procedures. The most common reason (54% of all procedures [n=14]) for undergoing thoracic surgery whilst on VV-ECMO was for evacuation of haemorrhagic pleural collections. An additional 15% of procedures (n=4) were formal decortications of empyema. 12% of patients (n=3) underwent surgery on VV-ECMO for repair of iatrogenic injuries (tracheal tear [n=2] and gastrobronchial fistula [n=1]). In-hospital mortality was 29% (n=5).

Conclusions

Patients requiring ECMO support are often critically unwell, and hence mortality and morbidity in this patient group is often correspondingly high. The number of patients requiring thoracic surgical intervention whilst established on ECMO is growing. Our results demonstrate that this is safe and achievable when undertaken in a high-volume specialist centre.

The Utility of Surgical Cardiac Sympathetic Denervation in the Management of Ventricular Arrhythmias for All Etiologies: A Systematic Review

Casey, L¹; Eaton, D²

¹St. James's Hospital; ²Mater Misericordiae University Hospital

Introduction

The antiadrenergic and antifibrillatory effects of cardiac sympathectomy in pathological states such as long QT syndrome are well established, and the indications for the procedure have expanded since the video-assisted thoracoscopic approach was first used in 2003 (Li et al., 2013). However, the procedure is currently largely used in cases of failed medical therapy, or medication intolerance, and large randomised controlled trials are thus non-existent in the literature. The aim of this study was thus to perform a systematic review of the available literature to examine the utility of cardiac denervation in the management of all ventricular arrhythmias.

Methods

A total of 16 studies published between 2009 and 2019 were evaluated for bias using the Risk of Bias in Non-Randomised Studies- of Interventions (ROBINS-I) tool. In addition the Harbour and Miller Grading System (2001) was used to assess the significance of the evidence in this review.

Results

All studies demonstrated a protective effect of sympathectomy against ventricular arrhythmias in both primary and secondary prevention strategies. The following risk of bias was observed: low in 4 studies, moderate in 8 studies, and serious risk in 4 studies. The highest level of evidence observed was 2++ in 3 studies.

Conclusion

Cardiac sympathetic denervation was found to provide benefit for patients with ventricular arrhythmias and either structural heart disease or inherited arrhythmia syndromes, in cases of refractory disease or in patients who require a primary prevention strategy where first-line therapies are not tolerated. The evidence for this is entirely observational, however the risk of bias observed was largely moderate or low.

Predictors of Surgery in People with First Episode of Spontaneous Pneumothorax: A Prospective Observational Pilot Study

Kim, J¹; Ur-Rasool, M¹; Papoulidis, P²; Idris, L¹; Milton, R²; Kouritas, V¹

¹Norfolk and Norwich University Hospitals NHS Trust; ²St. James's University Hospital, Leeds Teaching Hospitals NHS Trust

Objectives

People admitted for their first episode of spontaneous pneumothorax (SP) are historically referred to surgeons if the air leak continues for 5 days or referred for elective surgery after a second episode. We aimed to identify predictors of surgical intervention during the same hospital admission or during a next episode.

Methods

Patients with first episode SP admitted for a chest drain insertion were prospectively investigated over 10 months. All patients were connected to a Thopaz[®] digital drain system. Data included smoking status (and cannabis), air leak as digitally recorded (after drain insertion and for 5 consecutive days), time to complete re-expansion of the lung, type, side and extent of the SP and the chest CT findings.

Results

32 patients were investigated. The mean age was 43.6±22.0 years. 78.1% were male. 14 patients underwent emergency surgery during their admission and 3 underwent elective surgery. Patients who underwent surgery and patients who did not undergo surgery were similar in terms of age, gender, BMI, type, side, smoking status, type and extend of SP.

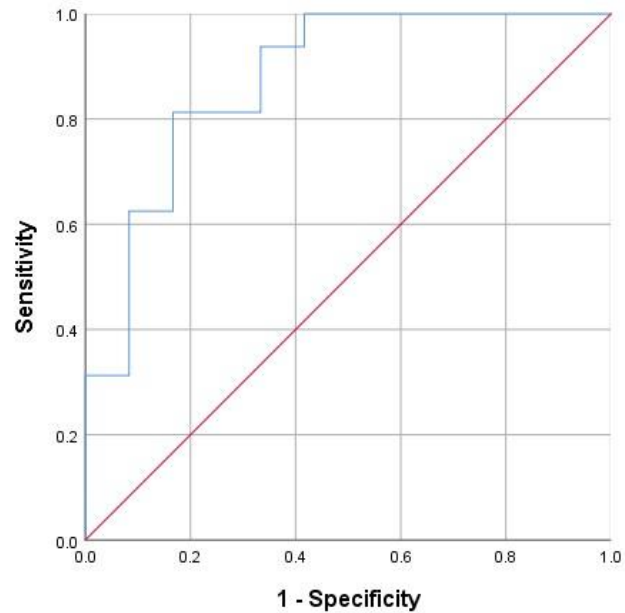
Air leak on day 2, day 3 and not immediate lung expansion post drain insertion were strong predictors of surgery ($p=0.03$, 0.037 and 0.03 , respectively). Longer duration of air leak and air leak on day 1 had the tendency to be predictors ($p=0.051$ and 0.055 , respectively) but did not reach statistical significance. Multivariable analysis showed that the air leak on day 2 was an independent predictor of surgery ($p=0.036$).

ROC analysis showed people with air leak >190mls/min on day 2 post drain insertion have a high probability of surgery (sensitivity 81.3% and specificity 83.3%), while the AUC was 0.875, $p=0.001$.

Conclusions

Patients with first SP episode who have air leak >190 mls/min have a high probability of having surgery. Therefore, an early referral to surgeons should be considered. Additionally, probabilities of such a result are higher if the lung is not expanded immediate.

Figure 1: Receiver operating characteristic curves (ROC) depicting the predictive potential of the air leak on day 2 in predicting surgery. Area under the curve (AUC) 0.875



A Case of Slipping Rib Syndrome Managed with Thoracic Surgery (Video)

Santhirakumaran, G; Kar, A; Shah, M; Hunt, I

St George's Hospital, London

Outcomes Following Addition Of Pain Team Member To Thoracic Multi-Disciplinary Team Morning Ward Round

Smith, M; Duvva, D; Devonshire, R; McCormack, H; Bhawnani, A; Mayhew, D; Shackcloth, M

Liverpool Heart & Chest Hospital

Objectives

In April 2018 we introduced a routine pain team presence on our morning multi-disciplinary team thoracic ward round. We reviewed this change in practice with an emphasis on patients strong opiate usage.

Methods

We performed detailed retrospective analysis of all thoracic cases prior to the change in practice in April 2018 and for the period 12 months later. Opiate prescriptions on discharge for our thoracic patients were analysed from January 2018 to present.

Results

We observed a reduction in number of patients taking both quick and modified-release oxycodone from 21 to 8 in March 2018 and 2019 respectively. This was despite similar patient characteristics, case mix and pre-operative analgesia use. Over a 6 month period in 2018 compared to 2019 we observed significant reduction in the percentage of patients being discharge on strong opiates (Table 1).

	April	May	June	July	August	September	Mean	SD
2018	15	19	9	6	9	4	10.33	5.64
2019	10	2	6	3	4	6	5.17	2.89
							p=0.037	

Table 1. Number of thoracic patients discharged on both quick and modified release oxycodone.

Conclusions

Pain team presence on our thoracic MDT ward round was well received with positive staff and patient feedback. Whilst multi-factorial, we observed a statistical significant decrease in strong opiate usage at the point of discharge and a more coordinated strategy to post-operative analgesia. This has prompted further study into these outcomes.

Video-assisted Thoracoscopic Drainage as an Alternative to Decortication for Empyema: A Proposal for a National Longitudinal Evaluation (SEALS)

Green, J; Purchase, D; Isaac, E; Hussain, A; Loubani, M; Tentzeris, V; Cowen, M; Qadri, S

Hull University Teaching Hospitals NHS Trust

Objectives

Empyema is associated with significant morbidity and mortality. At our centre surgical management is through open decortication or video-assisted thoracoscopic surgery (VATS) drainage, the latter being poorly evidenced in the literature. We audited these two interventions with the aim of understanding the impact on patient outcomes.

Methods

Patients undergoing surgery between 2013 and 2019 were audited from a single tertiary care centre. Propensity-matching was undertaken of those undergoing VATS drainage to equal cases of open decortication. Only full cases were included and matched based on age, sex, side of operation, and relevant co-morbidities.

Results

The final sample ($n = 42$) demonstrated that VATS drainage was associated with a significantly lower hospital length-of-stay (median 6 days; IQR 4.5 – 8.5) compared to open decortication (median 11 days; IQR 7 – 13) ($p = 0.010$) [Figure 1]. There was no difference in 30-day mortality or disease resolution (chest x-ray findings and inflammatory markers) between groups post-procedure.

Conclusions

Patients undergoing VATS drainage at our centre experienced a shorter hospital length of stay, with comparable disease outcomes to a well-evidenced intervention. If this less invasive procedure produces the same outcomes, then VATS drainage may be considered a preferred option. Therefore, this audit became a pilot for which our collaborative multi-centre evaluation (SEALS) has been developed, which aims to directly compare all surgical treatment modalities for empyema.

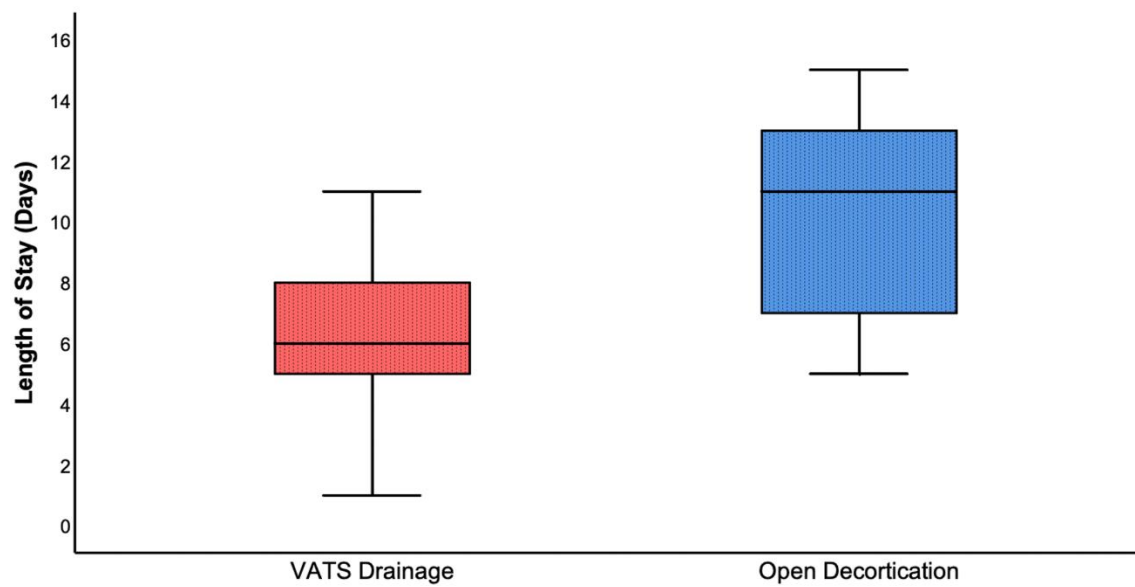


Fig 1. Comparative hospital length of stay between procedures. VATS; Video-Assisted Thoracoscopic Surgery.

Utility of a Novel Radiological Score in Predicting Clinical Outcomes in Large Pulmonary Embolism. A Comparison with sSimplified PESI Score.

Zahid, A; Verghese, J; Raj, S; Haque, S; Ikhlaq, J; Satur, C

University Hospital of North Midlands NHS Trust

Introduction

Pulmonary Embolism (PE) is associated with a notable risk of morbidity and mortality. CT pulmonary angiograms (CTPA) are used in the diagnosis of pulmonary embolism and also to determine the clot burden and right ventricular strain.

University Hospital of North Midlands (UHNM) PE score is a radiological score created to optimize risk analysis of patients with large PE using radiological features. The score assesses location of clot (L) in major pulmonary arteries (scores 1, 2 and 4), the degree of occlusion (o) (score 1,2 and 3) and the impact on the right ventricle (RVR) (scores 1,2 and 3). Interventricular septum morphology (S) is also assessed (scores 1, 2, 3 and 4). Multipliers are used to obtain the total score, $[(L \times O) \times RVR] + S$. Maximum score is 64. This score is correlated with clinical outcome. The PE severity is classified into mild (1-9), moderate (10-14) and severe ≥ 15 .

Methods

A retrospective analysis of CTPAs (From 1/3/2014 till 1/07/2018) was performed. A total of 485 patients, whose CTPA showed Large PE/Saddle embolism, were included in study. All CTPAs showing segmental/sub-segmental PEs and CTPAs with poor quality imaging were excluded. S-PESI was calculated retrospectively using clinical notes.

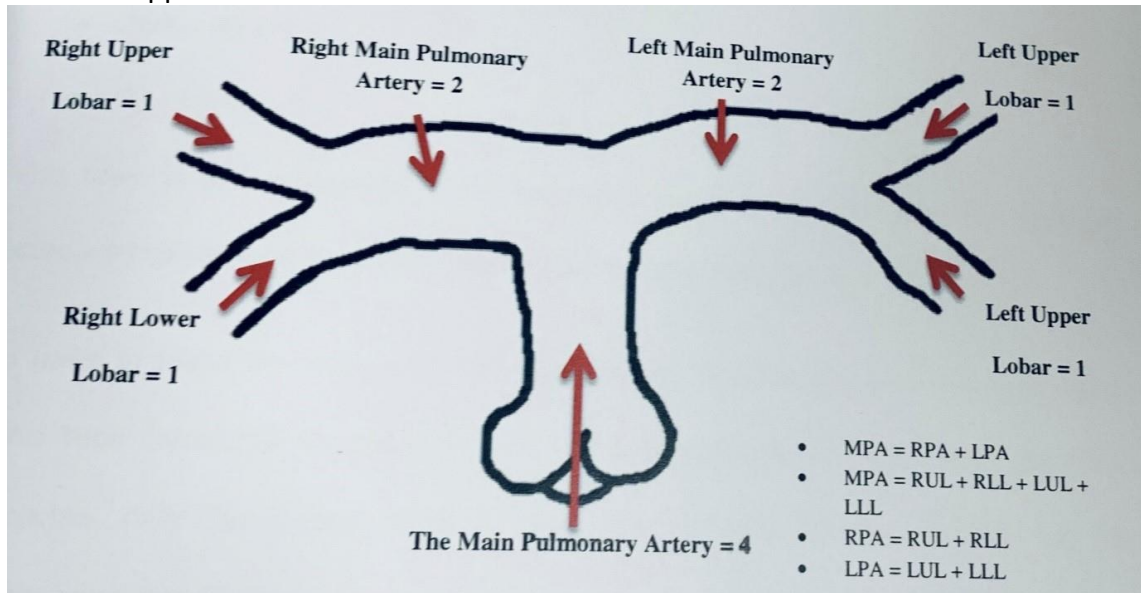
Results

Out of 485 patients, 99 patients had S-PESI score of 0 (20.4%), these patients had average UHNM PE score of 9 and their average inpatient hospital stay was 5 days. 5 patients out of 99 ended up in having thrombolysis, 7 had inpatient cardiothoracic referral for surgical intervention. 3 patients out of 99 died in 30-day period.

Conclusion

UHNM PE score has comparable performance in identifying the risk of haemodynamic compromise in large PE. It improves the specificity by risk stratifying large PEs into 3 groups, hence can be utilized in clinical decision making regarding appropriate treatment and predicting clinical outcomes. Further studies are needed to validate its utility before its

universal application.



An Alternative Safe Technique for Encircling Vessels in Thoracoscopic Pulmonary Lobectomy (Video)

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Evaluating the Impact of Setting up an Outpatient Pleural Service on Referrals to Thoracic Surgery: A Single Institution Perspective

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St George's Hospital London

Objectives

Rapid diagnosis and initiation of management for pleural disease has been transformed by introduction of physician-led outpatient services. We sought to establish the impact this has had on referrals to our thoracic surgical service.

Methods

All patients attending the outpatient pleural service (Jan-Dec 2016) were evaluated; only those presenting with effusions were further analysed (n=102). 2-year follow-up data was collected on diagnosis, number of pleural service attendances/procedures, referral to thoracic surgery and subsequent intervention, along with overall survival. Patients were stratified into risk for surgery based on comorbid status and presence of cardiac risk factors.

Results

The mean age was 71.3 years (range: 29.9 – 94.9). Schematic 1 illustrates the aetiology and pathway for patient intervention. Less than 20% (n=19) of all patients were referred to thoracic surgery (16 underwent a procedure). Of the remaining 83 patients not referred, 34% (n=28) were thought to have a pathology which may have benefited from surgical intervention. In two cases, patient frailty was reason for non-referral, but no reason was provided for the remainder. We risk-stratified patients and found 16% (n=13) were not surgical candidates and 13% (n=11) would have been high risk for surgical intervention.

At 2-year follow-up, 51 (50%) of patients had died. The average time to death from first clinic attendance was 370 days (range: 8–1235 days).

Conclusions

The outpatient pleural service has helped in the management of patients presenting with pleural disease. However, there are patients that still subsequently require thoracic surgical intervention. It is also important to identify patients that could benefit from referral to thoracic surgery for assessment and stratify them accordingly by operative risk.

Oesophago-pleural Fistula After Pneumonectomy; A Case Report and Systematic Review

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Objectives

Oesophago-pleural fistula (OPF) is an infrequent but highly complex complication of pneumonectomy with a mortality of up to 63%. There is a paucity of data on the optimal treatment strategy.

Methods

Systematic review was conducted in line with PRISMA guidance concerning OPF following pneumonectomy. Demographic, operative and management data were analysed.

Results

30 full manuscripts of the 76 abstracts were included in the analysis. Data was limited to case reports or small series. In total, information for 58 patients was included. Median age was 59 years, with a median follow-up time was 18 months. Most authors adopted sepsis control with chest drainage and pleural lavage and the mean number of interventions was 1.6. Overall mortality was 31% (18/58).

There was no significant difference between the time to presentation following left (29.2+/-39.28 months) and right pneumonectomy (66.24+/-110.62) ($p=0.2271$) nor any significant difference between successful outcomes following intervention for OPF after left (11/14) compared to right pneumonectomy (31/41) ($p=0.8219$) or 90-day mortality ($p=0.4571$).

However, 26% of patients had synchronous broncho-pleural fistula and 90-day mortality was significantly higher in these patients (6/15 vs 6/43. $p=0.0395$).

25 patients who underwent additional pericardial, oesophageal or a nodal resection or intervention at the time of pneumonectomy had a significantly reduced mean time to presentation with OPF (21.49+/-60.15 vs. 84.99+/-114.31. $p=0.0148$) and a higher 90-day mortality (8/25 vs 3/32. $P=0.0414$).

Conclusions

Major heterogeneity of management hinders the introduction of standardised guidance of post-pneumonectomy OPF. An MDT approach involving Oesophago-gastric and Cardio-Thoracic Surgery is vital. An international strategy for data collection and analysis could provide clarity on optimal management of this rare but highly morbid complication.

Cavernostomy and Pedicled Latissimus Dorsi Flap for Aspergilloma of the Lung

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Objectives

The major challenge of resection of pulmonary aspergilloma is the obliteration of intra-thoracic dead space which remains due to tissue loss or lack of residual lung expansion. When resection is deemed too high-risk, cavernostomy may be a suitable alternative to manage acute problems such as life-threatening haemoptysis and to facilitate hospital discharge. A variety of published methods are used to extirpate the residual intra-thoracic space; thoracoplasty, free and pedicled omental flap, myoplasty and pedicled muscle flaps, most frequently utilizing the trapezius, rhomboid and pectoralis muscles. We identified reports of latissimus dorsi flaps being used but reported in small numbers, multi-stage procedures or without substantial follow up.

We present 5 patients who underwent pulmonary resection with single-stage implantation of a latissimus dorsi flap to provide substantial volume of viable tissue with which to fill the persistent space following resection.

Methods

Clinical records of all patients who underwent LD flap repair for presumed pulmonary aspergilloma between 2011 and 2018 in our centre were reviewed. Demographic and clinical preoperative data are summarised in Figure 1.

Results

Post-operative data are summarised in Table 1 (follow up duration 8-22 months). Three patients were treated electively and survived for the period of follow up. One of the two patients admitted as an emergency died after discharge, the other had no notable complications.

Conclusions

We recommend planned pedicled flap reconstruction with plastic surgery involvement in managing the space following pulmonary aspergilloma surgery. This has led to good patient outcomes in select cases. Success relies upon good interdisciplinary team working across plastic and thoracic surgery teams.

	Presenting complaint	Primary pathology	Risk factors	Length of stay (days)	Intra-operative detail	Duration of follow up (months)	Complications	Survival
Case 1 (68F)	Massive haemoptysis causing haemodynamic instability	Right upper lobe aspergilloma	Bullous emphysema, Previous TB, Previous secondary pneumothorax	34	Emergency postero-lateral right thoracotomy, cavernostomy, 3rd rib resection + pedicled LD flap	8	Prolonged respiratory weaning period of 24 days post-operatively	8 months
Case 2 (31F)	Productive cough and single episode of haemoptysis	Right upper lobe aspergilloma		8	Elective right postere-lateral thoracotomy, right upper lobectomy and wedge resection of middle lobe, no rib resection + pedicl	60	Chronic pain	Alive
Case 3 (30M)	Sepsis	Extended multi drug-resistant TB related empyema	Previous right upper lobectomy with bronchopleural fistula formation and breakdown of stump secondary to infection	43	Urgent extended postero-lateral right thoracotomy, repair of bronchopleural fistula, myoplasty for empyema + pedicled LD flap	Followed up out of region	No notable complications	Alive
Case 4 (27M)	Haemoptysis	Left upper lobe aspergilloma	TB	12	Elective left postero-lateral thoracotomy, left upper lobe trisegmentectomy, no rib resection + pedicled LD flap	22	Bronchoscopy on day 4 post-operatively due to concerns of collapse, normal intra-operative appearance of anatomy	Alive
Case 5 (62F)	Chronic haemoptysis	Left upper lobe aspergilloma	Type 2 Diabetes Mellitus (tablet controlled)	10	Elective left lateral thoracotomy, cavernostomy + Intercostal pedicled LD flap	Followed up out of region	Readmission with 15 x 15cm seroma over thoracotomy site	Alive

Uniportal Thoracoscopy Linked to an Enhanced Recovery Programme is Superior to Traditional Approaches in Management of Pleural Empyema

Aladaileh, M; Ni Fhlatharta, M; Olaniyil, J; Brown, R; Redmond, K

Mater Misericordiae University Hospital

Objectives

In recent years, there has been a paradigm shift in the management of patients presenting with pleural empyema towards minimally invasive modalities. Till today, few reports advocate uniportal-video assisted thoracic surgery (U-VATS) for decortication.

Methods

This is a single-centre retrospective analysis of 120 consecutive patients who underwent U-VATS decortication from January 2015 to June 2019. The patients were divided into ERAS and non-ERAS groups.

Results

The literature review demonstrated that a U-VATS approach was superior in outcomes to either a M-VATS or open thoracotomy approach.

In this study, the mean age of patients was 56 (range) years, 67% were males. Complete decortication was obtained in all patients through a U-VATS approach. Fifty patients (41.6%) presented with stage II and 70 patients (58.3%) stage III empyema. The mean length of hospital stay for all patients of 5.4 ± 3.9 days, and the post-operative chest tube duration noted to be 5.1 ± 3.6 days. Length of stay was significantly shorter in the ERAS group compared with the non-ERAS group (P-value 0.005).

Conclusion

U-VATS decortication should be the preferred initial approach to the treatment of stages II and III empyema. When U-VATS decortication is aligned to an ERAS programme, outcomes are superior to all other treatment approaches.

Management of Large Tracheal Tear with Carinal Stent (Video)

Aladaileh, M; Brown, R; Eaton, D

Mater Misericordiae University Hospital

Review of Acute Thoracic Admissions in a Thoracic Surgical Unit

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Castle Hill Hospital

Objectives

The aim of this study was to review acute admissions to our Thoracic Surgery Unit. and identify the referral pattern, presenting aetiologies/pathologies, treatment offered, length of hospital stays and final discharge destination. This analysis could provide valuable information in resource allocation to the thoracic unit in terms of bed spaces and its effect on routine elective activities.

Patients and Methods

Data of patients admitted to thoracic surgery from January 2019 to December 2019 was collected from the thoracic surgery database as well as from the referral letters and discharge notes.

Results

628 patients were admitted to Thoracic Surgery during this period, of which 146 (23%) were acute admissions. 47% of the referrals were from Local A/E, followed by Inpatient transfers (33%) and 11% from peripheral A&E. 51% admissions were due to trauma. Pneumothorax/Haemothorax (38.7%) and Chest wall Injuries-Rib fractures (32.9%) were the commonest diagnosis. 11% of referrals were due to empyema. 40% (58) patients were managed with chest drain alone 40% (58), 32% (47) required surgery and 28% (41) managed conservatively/pain control. Mean hospital stay was 9 days. In patients who had surgery, mean hospital stay was 11.9 days and 7.6 days for patients managed conservatively +/-Chest drain. Amongst trauma patients mean hospital stay was 7 days and 11 days for non-trauma admissions.

Conclusion

Almost a quarter of total admissions were acute admissions. Interestingly, a large proportion of these patients were managed conservatively +/- chest drains. The hospital stay for acute admissions exceeds that of elective admissions. This puts pressure on ward beds and negatively affects the elective/urgent thoracic cancer admissions. Thus, we must find ways of reducing hospital stay for acute admissions who do not require surgery to unburden the pressure on hospital beds for more electives.

Nutritional and Anthropometric Predictors of Outcome in COVID-19 Patients Requiring Invasive Ventilatory Support

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Glenfield Hospital University Hospitals of Leicester NHS Trust

Objectives

Despite a highly-selective approach to intensive care (ICU) admission for patients with severe COVID-19, mortality remains high in this patient group. Additional stratification tools may guide future patient selection, and inform appropriate resource allocation.

Morphological change of the psoas muscle (MPM, a surrogate of sarcopenia on computed tomography (CT)) and prognostic nutritional index (PNI) have shown good predictive validity in various critically ill populations. We sought to evaluate the predictive validity of MPM and PNI in a critically-ill C-cohort requiring ICU admission.

Methods

Patients at a single institution in the UK (March to June 2020) were identified retrospectively. Local approval was obtained. Data was extracted from electronic patient records. Patients who had not undergone CT within 7 days of ICU admission were excluded. Two reviewers independently calculated the short-to-long axis ratio (SLR) of the psoas muscles at L3 vertebral level. PNI was calculated using pre-ICU admission albumin and total lymphocyte count. MPM Grade ≥ 2 (SLR $< 50\%$) and PNI < 40 were defined as high-risk cutoffs. The primary outcome was survival to ICU discharge. Statistical analysis was performed in STATA SE v16.

Results

27 patients (age 49 ± 7 years, 74% (n = 20) male, median Charlson Comorbidity Index of 1 (range 0 to 3)) were included in the final analysis. 70% (n = 19) required extracorporeal membrane oxygenation (ECMO). 48% (n = 13) survived to ICU discharge. 63% (n = 17) were at least obese, 55% (n = 15) had $MPM \geq 2$, and 89% had (n = 24) $PNI < 40$. Interrater agreement for MPM measures was 85% (Cohen's Kappa 0.563 ± 0.122). The Area Under the Receiver Operating Characteristic curve (AUROC) was 0.409 (95%CI 0.217 to 0.601) for MPM Grade 2 or above, and 0.458 (0.335 to 0.582) for PNI below 40.

Conclusions

MPM and PNI are not clinically-useful measures for stratifying COVID-19 patients who are deemed likely to benefit from invasive ventilatory and ECMO support.

Pectus Carinatum: Is Ravitch an Obsolete Procedure for the Deformity?

Khalil, A; Andrew, S; Stoicescu, C; Kolvekar, S

St Bartholomew Hospital

Objective

Pectus Carinatum (PC) account for 20-25% of all patients presenting with chest wall deformities at St Bartholomew Hospital. The aim of this study was to analyse the impact of a thoracic brace for correction pectus carinatum deformity.

Methods

A dedicated monthly clinic for chest wall deformities is being held at our institution. A prospective data was collected and analysed for all patients presenting in clinic from September 2016-September 2019. Thoracic brace is a new modality of treatment for PC and is less invasive than conventional Ravitch Procedure. Patients with pectus carinatum deformity were identified, examined and a 3-dimensional image of the chest wall was taken for a bespoke thoracic brace measurement. The thoracic brace was fitted and all patient were reviewed in the post brace application period at regular intervals at 6 weeks, 3 months, then on quarterly basis. Braces were applied for 18-24 months depending on the age and extent of deformity.

Results

188 patients were reviewed in the clinic over a period of 36 months. The mean age of presenting patients was 20.12 +/- 2 years. 89% of the patient population were males and 11% were females. Pectus carinatum accounts for in 20% of the population. 92% (35/38) were deemed to be suitable and ready for a brace application. 84% (32/38) agreed for the brace fitting and 78% (30/38) underwent thoracic brace fitting so far. 11% of the patient population presenting chest wall deformities were tested with braces. The patients were reviewed at regular intervals and a 3-4 months follow results were excellent. Patient with age between 11-17 yrs respond earlier and better. No hospital admission was required and no complication were noted. The compliance and patient satisfaction with the procedure was 100%.

Conclusions

Thoracic brace is a less invasive and acceptable modality of treatment for PC with excellent results. Early detection of deformity and prompt brace application is key to success.

Pneumothorax Surgery: What is the Optimal Timing of Intervention?

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Oxford University Hospitals NHS Foundation Trust

Objective

There is no evidence on which to base the ideal timing of surgery in patients with spontaneous pneumothorax and persistent air leak. BTS guidance for management of symptomatic primary spontaneous pneumothorax during the Covid-19 pandemic recommended ambulatory management where feasible, moving away from surgical referral after 3-5 days of air leak. Given the majority of spontaneous pneumothoraces will resolve within 14 days, we sought to examine the outcomes of patients undergoing elective and urgent pleurodesis to determine whether elective procedures are associated with superior outcomes.

Methods

We retrospectively reviewed the outcomes of consecutive patients who underwent surgical pleurodesis for spontaneous pneumothorax between May 2011 and December 2019. Electronic patient records were examined for procedural scheduling, primary versus secondary pneumothorax, type of operation and length of stay. Radiological imaging was reviewed for pneumothorax recurrence following pleurodesis. Ipsilateral recurrence was defined as a further episode of pneumothorax on the side of operation, after satisfactory post-drain removal chest x-ray.

Results

312 consecutive pleurodesis procedures were performed between May 2011 and December 2019. In 186 (59.6%) cases the indication was primary spontaneous pneumothorax and secondary pneumothorax in the remainder. 189 (60.6%) underwent urgent inpatient surgery and 123 (39.4%) were electively admitted. 25 (8.0%) patients developed ipsilateral recurrence. 19 (10.1%) patients who underwent urgent operation had an ipsilateral recurrence versus 6 (4.9%) elective patients ($p=0.1$). Median postoperative length of stay in the urgent group was 4 days (IQR 3-6) and 3 days (IQR 3-5) for elective cases ($p<0.001$).

Conclusion

Patients undergoing urgent inpatient pleurodesis have a significantly longer postoperative length of stay when compared to those admitted electively. Recurrence rates may also be influenced by timing of operation.

Surgical Cardiac Sympathetic Denervation for Refractory Cardiac Arrhythmias in Patients with Underlying Structurally Abnormal Hearts

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Mater Misericordiae University Hospital

Background

The use of cardiac sympathetic denervation (CSD) is well documented for its antiarrhythmic effect in those with structurally normal hearts, in particular in the paediatric population. It is primarily used for the management of congenital conductive syndromes such as long QT syndrome and catecholaminergic polymorphic ventricular tachycardia. Here we present a novel use of CSD in the management of refractory cardiac arrhythmias in adult patients with acquired cardiac disease resulting in structurally abnormal hearts.

Methods

Six patients underwent bilateral cardiac denervation via Video Assisted Thoracoscopic Surgery (VATS) between 2014 and 2020. This procedure involves identification and division of the lower half of the stellate ganglion and the sympathetic ganglia from T1 to T4.

Results

The patients were all male, aged between 33 and 68 (median=54), with the underlying indication being refractory ventricular tachyarrhythmias requiring recurrent defibrillation in five patients and debilitating inappropriate sinus tachycardia in the final patient. The underlying aetiology was ischaemic heart disease in the majority of cases, with one patient post congenital cardiac surgery, and one post-viral restrictive cardiomyopathy. Three were done as urgent inpatient procedures and three as elective cases. Complications included intraoperative ventricular arrest, postoperative compensatory hyperhidrosis, transient post-operative Horner's syndrome, and haemothorax requiring reexploration in theatre; each complication occurring in one patient out of six. Post-procedure, all patients were alive at discharge and report a significant reduction in symptoms relating to arrhythmias and no further ICD shocks on follow-up (range 2 months-4 years).

Conclusion

CSD can significantly reduce life-threatening cardiac events (VF/VT) and should be considered in all patients with structurally abnormal hearts experiencing uncontrollable ventricular arrhythmias.

Tissue Patch is Effective in Management of Air Leak in Lung Volume Reduction Surgery (LVRS)

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Glenfield Hospital, University Hospitals of Leicester NHS Foundation Trust

Objectives

Prolonged postoperative air leak is a well-established complication after thoracoscopic LVRS for emphysema. Various techniques are used to reduce air-leak after LVRS. TissuePatch™ is a widely used surgical sealant film which aims to seal and reinforce against air leaks during surgical repair of the lung parenchyma. We sought to review its impact and assess its efficacy on our LVRS cohort.

Methods

Data were collected from a single hospital over a 10year period, from 2010-2020, from patients who underwent LVRS. In this retrospective study of prospectively collected data, our cohort was divided into Group 1: patients who received TissuePatch™ intraoperatively and Group 2: patients who were treated with Bioglue or Buttressed staple lines. Comparisons were then made between the groups including length of post-operative air leak, length of hospital stay, and the need for a Portex® bag on discharge.

Results

Data were extracted from 166 patients who had LVRS during that 10-year period. Group 1 was comprised of 95 and Group 2 of 71 patients respectively. The duration of air leak was 14.7 +/- 11.8 in Group 1 and 12,9 +/- 9.8 in Group 2 ($p= 0.26$), Mean length of stay was 14.7 +/- 10.2 days in Group 1 and 12.1 +/- 7.7 days in Group 2 ($p=0.06$). There was 24% (23/95) of patients from Group 1 who were discharged home on a Portex bag and 28% (21/74) from Group 2 ($p=0.54$).

Conclusions

The use of TissuePatch™ managed air leak as effectively as the alternatives used in our unit for LVRS cohort in this 10year period. Randomized Clinical Trial may be indicated in order to identify reliably the effects from the use of air leak sealant adjuncts in LVRS.

Survey-based Research in Thoracic Surgery: A Systematic Review of Reporting Practices

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Objectives

Surveys are a valuable tool for assessing stakeholders' knowledge and attitudes. There is a need to approach questionnaire-based research with the same methodological rigour as other study types. We sought to assess the quality of reporting of survey-based research in the contemporary thoracic surgery literature.

Methods

Studies that utilised a survey methodology, published over a 3-year period (October 2015 to September 2018) in the three highest-ranking thoracic surgery journals (SCImago Journal Rank 2020) were identified. Screening, data extraction and rating against a validated, dedicated checklist (endorsed by the EQUATOR network) was performed independently by two reviewers. Conflict was resolved by involvement of a senior author. Statistical analysis was performed using STATA SE v16.

Results

Literature searching revealed 871 studies, of which 48 original articles were included for final analysis. 77% of the included studies were published in the *Annals of Thoracic Surgery*. 68% of questionnaires involved clinician respondents, with 35% having been delivered online. All articles described the study population within the text. Whilst 73% of papers mentioned the response rate, only 2% of papers provided thorough analysis of non-responders. 60% of studies used a newly developed survey tool, however only 21% of these outlined the steps taken to devise the questionnaire, and only 7% commented on the reliability/validity of the tool devised. 77% of articles provided details of their statistical analysis, with 69% justifying the choice of approach. There was no difference in the reporting quality between journals ($p = 0.62$) or by year of publication ($p = 0.38$).

Conclusions

The reporting quality of survey-based research in thoracic surgery is inconsistent. The use of established checklists may improve the conduct and reporting of future survey research.

Multidisciplinary Approach to the Management of Descending Mediastinitis

Surendrakumar, V; Menon, A; Rogers, V; Fallouh, H; Naidu, B; Steyn, R; Kalkat, M; Bishay, E

University Hospitals Birmingham

Objectives

Descending necrotising mediastinitis following deep neck space infection has historically been associated with high mortality. In recent years, there has been an increase in the incidence of cases. We report our five-year experience of managing this condition in a regional thoracic surgical unit.

Methods

Patients who were managed for descending mediastinitis between 2015 and 2020 were identified using a prospectively maintained database. Data was collected retrospectively on patient demographics, clinical management, operative approach and length of stay.

Results

Ten cases of descending mediastinitis were identified with a mean age of 41 years (range 25 – 57 years). Pharyngeal abscess was the commonest presentation, with three cases of odontogenic origin. Management involved either staged neck and chest drainage or a joint procedure with ENT (n = 5). Mediastinal drainage via VATS was performed in 56% of cases. Mean length of stay was 30 days (range 6 – 80 days) with 67% (n = 6) requiring intensive care admission. There was no in-hospital mortality.

Conclusion

Our experience has shown that descending mediastinitis is more prevalent in the younger age group with odontogenic or cervical infections and can be successfully managed with early diagnosis and prompt intervention. A multidisciplinary and minimally invasive approach with concomitant cervical and mediastinal drainage achieves access to all compartments of the mediastinum and is recommended for these patients.

Is Prolonged Air Leak Associated With Infective Complications After Lung Resection?

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Objectives

Persistent air leak (PAL) is a common occurrence following thoracic surgery. It is associated with significant morbidity, including patient discomfort due to the need for prolonged pleural drainage; and may prolong hospital stay. We sought to evaluate the association between PAL and pleuro-pulmonary or wound-site infection in a post-lung resection cohort.

Methods

Patients undergoing lung resection at a single institution in the UK between November 2019 and February 2020 were identified retrospectively. Local clinical governance approval was obtained. Data was extracted from electronic patient records. PAL was defined as an air leak lasting more than five days postoperatively. Statistical analysis was performed in STATA SE v16.

Results

115 patients (age [mean±SD] 66±12 years, 42% (n = 48) male, 24% (26/109) never smokers) were included. 62% (n = 68) of patients underwent anatomical resection. 57% (n = 62) of procedures were performed thoracoscopically. PAL occurred in 15% (n = 17) of patients. Incomplete lung expansion in the first 24 hours postoperatively was not predictive of PAL (p = 0.23). PAL was associated with an increased frequency of clinically-diagnosed pneumonia (53% vs 24%, p = 0.02) and pleural or wound (35% vs 5%, p = 0.001) infection; as well as higher peak leucocyte count (MD 2.2x10⁹/L, 95%CI 0.4 to 3.9) and C-reactive protein (MD 51mg/L, 95%CI 7.3 to 95.1) postoperatively.

Conclusions

PAL is associated with a clinically-meaningful increase in parenchymal, pleural and wound infections after lung surgery. There may be a role for prophylactic antibiotics in patients with PAL.

Anterior Chest Wall Reconstruction Using a Custom Made Three-dimensional (3D) Printed Prosthesis – An Institutional Experience

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University Hospital Birmingham

Objectives

Anterior chest wall resections can leave large defects which pose a challenge to restore normal function using conventional reconstruction techniques. Custom-made 3D prostheses are emerging as a suitable alternative, that could achieve a better functional and cosmetic result.

Methods

The ideal reconstruction material should provide rigid support and prevent paradoxical chest wall movement, be biocompatible, reduce the risk of infection and provide adequate cosmetic results. Here we present our experience with anterior chest wall reconstruction using a custom-made 3D-printed titanium prosthesis with porous polyethylene coating (Anatomics Pty Ltd (St Kilda, Australia).

Results

Three patients underwent sterno-costal reconstruction using the 3D-printed prosthesis; two were female, median age 55 years. Indications were: recurrent breast cancer invading the chest wall, complete non-union of the sternum post CABG and spontaneous osteomyelitis of sterno-manubrial joint. One patient was readmitted with infection of implant and had to undergo a partial removal at over one-year post-procedure. All patients were satisfied with the stability of the chest wall and cosmetic result and reported an improved quality of life post procedure.

Conclusion

Three-dimensional printed prosthesis are a feasible alternative to reconstruct chest wall defects. Further research into clinical outcomes and health economics is needed to determine if the cost associated with these are justifiable over conventional methyl-metacrylate chest wall reconstructions.

Innovative Feedback in Cardiothoracic Surgical Training

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University Hospital Southampton NHS Foundation Trust

The operating theatre is an area where technical skills as well as decision-making are refined. Traditionally operative skills are taught in an apprenticeship model where the trainee is an apprentice to the expert surgeon, observing, learning, participating and then performing cases. Central to this process is the performance feedback. Current surgical training pathways document training events using a post event debrief with limited benefit. This misses vital learning opportunities in the procedure as well as elements the trainee and even the trainer are unconscious to.

We used a video feedback platform allowing real time interactions on performance as well as post procedure debrief with a video capture adjunct. This was complete for 2 cardiothoracic trainees over 6 different thoracic surgical procedures and the feedback was documented on benefit and ease of use relative to the current posthoc portfolio meeting.

Operative time and blood loss was not significantly different for both methods. A mean of 20 items of feedback were noted regarding each procedure utilising video feedback platform compared to 6 for the posthoc method. Trainees found access to the video invaluable to reviewing performance and allowed a better understanding on how performance could be improved.

Video feedback should be utilised as a tool enabling better performance feedback in thoracic surgical training. Further data is needed to confirm the generalisability of this model.

Simendo®: Virtual Reality for the New Reality

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Glenfield Hospital University Hospitals of Leicester NHS Trust

Introduction

The opportunity for technical skills training in clinical practice has declined in recent years. This has been further exacerbated by the current Covid-19 pressures. Simulation plays an essential role in modern surgical education. Virtual Reality (VR) simulation offers an alternative to traditional box trainers, with increased flexibility as to task variation and adjustable levels of challenge, as well as the opportunity for automated metrics.

Objectives

We aim to evaluate face and construct validity of the Simendo® Virtual Reality Laparoscopy Simulator, for the acquisition of basic minimally-invasive (thoracoscopic) skills; and concurrent validity for individual performance during a minor VATS procedure.

Methods

Our single-centre cohort study will involve participants with varying levels of surgical experience and exposure.

We will use three clear methods to validate the Simendo®. [Stage 1] Face validity – Relevance of the Simendo® based on ratings by questionnaire. [Stage 2] Construct validity – Blinded rater discrimination between expert levels on each device, 'novice', 'intermediate', 'expert' and using discriminatory capacity of Simendo® automated metrics to differentiate. [Stage 3] Concurrent validity – Video submission and OSATS rating of VATS minor procedure comparing Simendo® ratings to real-life performance.

Conclusions

VR simulation allows a safe training environment and opportunities for surgical progression. During a time of social distancing and minimal face-to-face contact, the Simendo® has potential to shorten learning curves, and allow exploration of a self-directed curriculum and remote assessment.

Implementation of a Pre-Operative Pathway for Assessment of Indeterminate Thymic Lesions

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St Bartholomew's Hospital

Introduction

Robotic-assisted thoracic surgery (RATS) offers a safe method for therapeutic management of indeterminate anterior mediastinal lesions. Although much reduced, operative risk and morbidity still exist. We have introduced MRI in our pathway for indeterminate anterior mediastinal lesions (Figure 1) to differentiate thymic cysts and hyperplasia from solid lesions. The aim was to reduce benign resection rates whilst correctly identifying early malignant disease.

Methods

Retrospective analysis of patient data was performed for patients diagnosed with thymic lesions between December 2017 and October 2019. A new pathway using MRI was introduced in November 2018. Data analysed included MDT outcomes, MRI results for non-operated lesions and post-operative histology for surgically managed patients.

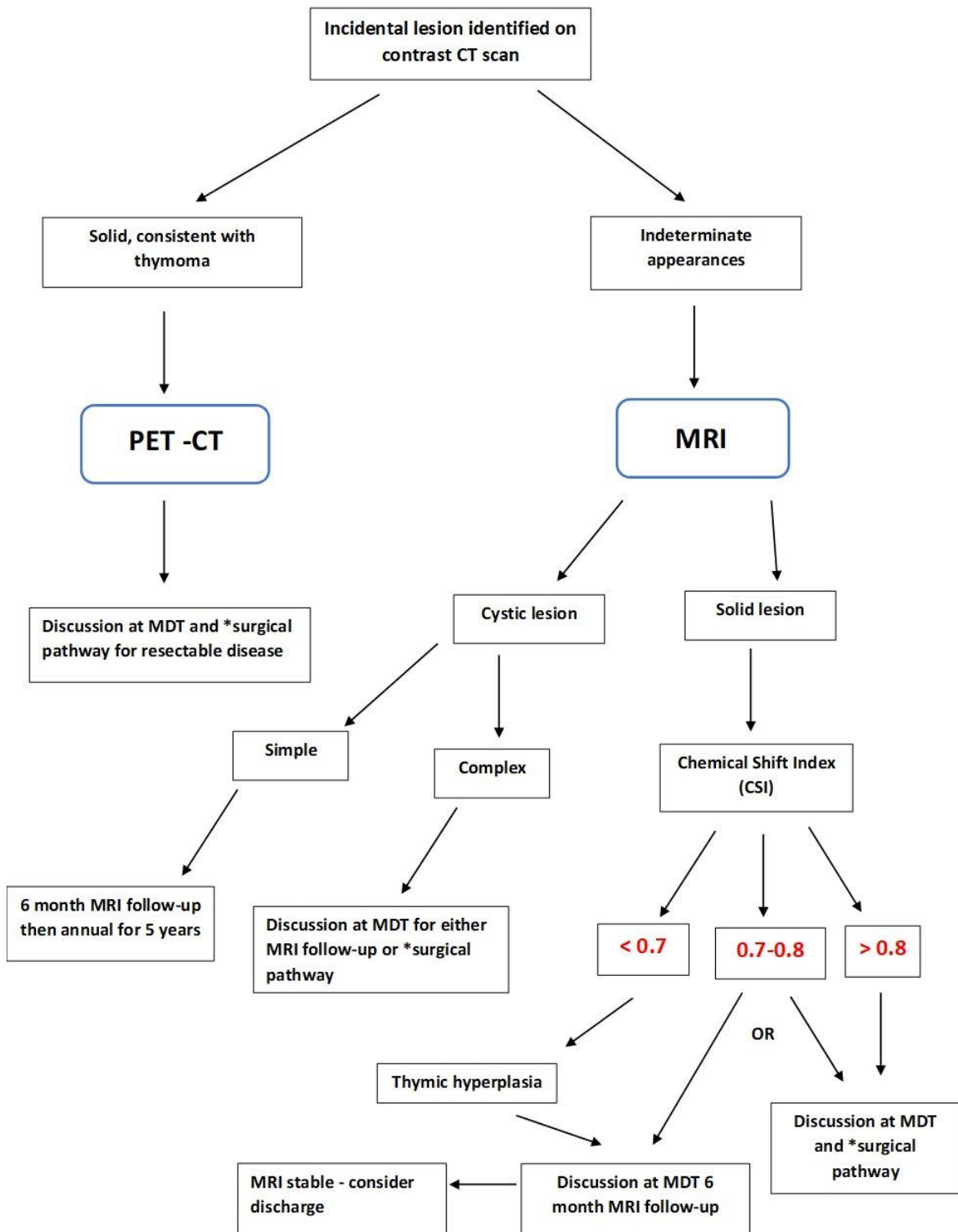
Results

Eighty-eight patients were included in this study. 42 patients were in the pre-MRI group (all undergoing surgery), and 46 in the post-MRI group. The total average age was 49 years. 10 patients had myasthenia gravis. The introduction of MRI for indeterminate lesions reduced the number of patients undergoing surgery from 42 (100%) to 21 (46%) ($p < 0.00001$). 25 patients (60%) in the pre-MRI group underwent surgery for benign disease; the new pathway with MRI reduced this to 6 patients (13%) ($p < 0.00001$). Notably, however, some patients underwent surgery for false positive MRI outcomes; proven benign on post-operative histology. 17 pre-MRI patients (40%) had malignant disease on post-operative histology. In comparison, in the post-MRI group, 71% of patients (15) who underwent surgery had malignant lesions on post-operative histology.

Conclusion

The introduction of a pathway for assessment of indeterminate thymic lesions (Figure 1), including MRI imaging and MDT discussion, significantly reduces the benign resection rate, patient exposure to surgical risks and potential morbidity, whilst maintaining similar detection rates of early malignant disease.

Management of the Incidental Thymic Lesion



Improved Survival after Chest Wall Reconstruction for Major Trauma

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University Hospitals of North Midlands

Objective

Chest wall reconstruction (CWR) was introduced at our institution for the management of major chest wall injury in September 2014. This study examined whether this treatment reduced mortality in major trauma.

Methods

We received 1296 patients with major chest wall trauma (Abbreviated Injury Score > 3) between September 2014 and December 2019. The outcome of patients treated by CWR was compared to those treated conservatively (Non-CWR). Data prospectively recorded in the Trauma Audit Research Network database and from clinical records were analysed by logistic regression analysis.

Results

The study cohort constituted 947 patients following exclusion criteria. The CWR group (n=157) had a higher flail chest incidence (84.9% vs 48.9%), $p < 0.001$, New Injury Severity Score (36.9 vs 34.6, $p=0.028$) and ventilation requirement (36.9% vs 25.6%, $p = 0.004$). Non-CWR patients had a higher incidence of head injury (26.7% vs 11.5%), $p < 0.001$. CWR patients had lower mortality, 6 (3.8%) vs 68 (8.6%), $p = 0.04$, HR 0.30 (95% CI 0.11, 0.83), $p = 0.020$. Exclusion of head injury from the analyses confirmed that reduced risk of death was not due to selection bias, HR 0.16 (0.04, 0.65), $p= 0.010$.

Outcome	Non-CWR (n=790)	CWR (n=157)	p-value
Admission to Critical Care	348 (44.1%)	101 (64.3%) *	<0.001
Length of Ventilation, Days, Median (IQR)	0 (0-1)	0 (0-6) *	0.0013
Critical Care - length of stay, Days, Median (IQR)	0 (0 ? 6.6)	3.9 (0 ? 12.6) *	<0.001
Hospital - length of stay, Days, Median (IQR)	10.0 (5.3 ? 20.7)	12.8 (8.3 ? 26.1) *	0.003
Death, n (%)	68 (8.6%)	6 (3.8%)	0.041

Conclusions

The study has confirmed clinical impression that chest wall reconstruction reduces the risk of death following major trauma. The results commend the treatment as a part of multi-disciplinary surgical strategy for polytrauma.

Chest Wall Stabilisation Facilitates Return to Manual Labour

McManus, K

Royal Victoria Hospital

Objectives

Randomised trials have demonstrated accelerated discharge from ICU and reduced length of hospital stay in patients with flail chest following trauma. However, there is little evidence that surgical stabilisation of rib fractures (SSRF) increases the ability of patients to return to work.

Methods

A database of 1127 patients examined between 1993 and 2019 for personal injury claims, on average 23 months post injury (range 2.3 - 109 months), provided a well-documented group to compare to a series of patients undergoing SSRF. Excluding 7 who had SSRF, 572 had a severe chest injury with Abbreviated Injury Score (AIS) of 3 or more. The mean Injury Severity Score (ISS) was 21.3 (range 9 - 66).

Between 2005 and 2019 a separate cohort of 65 flail chest patients underwent SSRF of whom 54 were for acute trauma (11 late fixation for non-union). 15 who were not in work prior to their injury and 2 who were unavailable for follow-up were excluded from analysis.

Results

While 76/100 (76%) of desk workers in the non-operated group were able to return to work, only 13/176 (7.8%) of heavy manual labourers and 45/162 (27.4%) of light manual labourers returned to their previous level of work. No-one returned to repetitive heavy labour. Heavy manual labourers, in particular, had difficulty re-training for deskwork, so many remained out of work in the long term.

Of those undergoing fixation 24/37 (64.9%) were able to return to work. Nineteen (51.4%) were able to return to manual labour including 7 (19%) who were able to return to repetitive heavy manual labour. 3 desk workers returned to competitive sport. The consequences of head injuries and limb fractures frequently impeded return to work.

Conclusions

In a highly selected group of patients SSRF was associated with a higher rate of return to work, particularly manual labour, compared to a similar group to whom surgery was not offered.

Use of ECMO in Non-elective Major Thoracic Surgery for Infectious Lung Abscess

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¹University Hospital Dresden; ²Bristol Royal Infirmary - University Hospitals Bristol; ³Klinikum Nuremberg; ⁴Hospital Universitario Virgen de las Nieves, Granada; ⁵Klinikum Dresden Friedrichstadt

Objective

Extracorporeal membrane oxygenation (ECMO) support for elective cardiothoracic surgery is well established. In contrast, there is not much data regarding the usefulness and outcome of ECMO in non-elective major lung resections for infectious lung abscess.

Methods

Patients undergoing non-elective major lung surgery for infectious lung abscess at 5 university and tertiary referral hospitals in Germany, United Kingdom and Spain were enrolled in a prospective database. Malignant disorders and intrathoracic complications of other procedures were excluded.

Results

There were 118 patients (88 male, 30 female). Median age was 59 years (Q1 49, Q3 67; IQR 18). Mean Charlson Index of comorbidity was 2.88 (SD 2.55). Surgical procedures were lobectomy (81), pneumectomy (19) and segmentectomy (18). Alcoholism (49), liver cirrhosis (12) and drug addiction (5) were common. Frequent preoperative septic complications were pulmonary sepsis (64), pleural empyema (63), persistent air leak (27) and respiratory failure (37). Mortality was 16/118. ECMO was used in 8 patients (pneumectomy 2, lobectomy 6) and several more received pre-ECMO treatment. Intraoperatively no ECMO-associated complications were encountered. EMCO (1/7 v. 15/110; Odds ratio (OR): 0.90, 95% CI 0.10-7.88, p=0.93) as well as the extent of pulmonary resection were not associated with higher mortality. Preoperative sepsis (OR: 16.22, 95% CI 2.07-127.45, p<0.01), preoperative air leak (OR: 11.82, 95% CI 3.62-38.64, p<0.001), acute renal failure (OR: 5.52, 95% CI 1.65-18.41, p<0.01) and Charlson index of comorbidity 3 (OR: 9.23, 95% CI 1.99-42.72, p<0.01) were associated with significantly higher mortality.

Conclusions

The use of ECMO is widening the possibilities for successful surgical management of infectious, non-malignant lung abscess. Not only actual ECMO patients but also many more, who only undergo surgery because of the availability of ECMO at any time, benefit from an increased readiness to use ECMO.

Does Pectus Carinatum Cause Disturbance of Exercise Function, A Prospective Pre-Operative Study?

Satur, C; Cliff, I; Watson, N

University Hospitals of North Midlands

Background

Pectus Carinatum is most commonly considered to be of primary cosmetic importance, with minimal impact on exercise function. We undertook cardiopulmonary exercise tests to evaluate whether patients with pectus carinatum exhibit evidence of exercise dysfunction.

Methods

Nine patients, all-male, with a mean age of 17.0 years (range 17 – 22) with pectus carinatum underwent investigation with CT scan, pulmonary function and cardiopulmonary exercise testing (CPET). Primary analysis included evaluation of oxygen utilisation, (VO₂ Max), stroke volume (VO₂/ HR) and Breathing Reserve (BR%) at peak exercise. Analysis of subgroups defined by VO₂ max > 80% predicted (HVO, n=5) and <80% (LVO, n=4), were utilised to delineate differing patterns of exercise pathophysiology.

Results

Haller's index was 1.68 (range 1.35 – 2.2) and standard pulmonary function test values were normal for the cohort without a difference between HVO or LVO subgroups. Median CPET values at peak exercise of RER and pH for HVO and LVO were similar, RER (1.33 vs 1.38, p = 0.21) and pH (7.26 vs 7.29, p=0.33), but differed significantly for lactate (12.4 vs 6.5, p = 0.038) and HCO₃⁻ (-8.3 vs -5.40, p = 0.05). Subgroup analysis indicated HVO had higher values of work (97% vs 73%, p = 0.04), VO₂ max (97% vs 68%, p = 0.01), with reduced breathing reserve (47% vs 65%, p = 0.05). All 9 patients exhibited at least 1 element of exercise dysfunction. Regression analysis demonstrated compromised VO₂ max was causally related to abnormalities in ventilation, R² = 0.64, p = 0.005.

Conclusion

This study has demonstrated that patients with Pectus Carinatum may exhibit significant disturbance of exercise physiology. The findings indicate exercise dysfunction is attributable to compromised ventilation during exercise. Clinical assessment of pectus carinatum requires evaluation of exercise physiology.

VO2 Max Inadequately Defines Severity of Exercise Dysfunction of Pectus Excavatum?

Satur, C; Cliff, I; Watson, N

University Hospital of North Midlands NHS Trust

Objectives

Determination of normal exercise capacity of patients with Pectus Excavatum by a value of VO2 Max > 80% may fail to identify dysfunction. We tested the ability of a normal value VO2 Max to predict uncompromised exercise function defined by normal values of metabolism and ventilation during cardiopulmonary exercise testing (CPET).

Methods

72 patients, 62 (86.1%) male with a mean age 20.8 years (SD \pm 6.5) with Pectus Excavatum underwent investigation cardiopulmonary exercise testing (CPET). Subgroups were defined as HVO (VO2 Max > 80%, n= 34) and LVO (VO2Max < 80%, n=38). Primary analysis compared CPET measures at peak exercise of Oxygen utilisation (VO2 Max), Anaerobic Threshold (AT) and Maximum Ventilation (VE). The predictive capacity VO2 MAX to delineate patients with normal values of AT (>50%) and VE (>50%) was tested.

Results

The Haller's index was 3.98 (\pm SD 3.98), FEV1 was 92.1% (\pm SD 12.7) and Inspiratory Capacity 86.3% (\pm SD 14.7) did not differ significantly between subgroups. All patients exhibited marked engagement in exercise, RER was 1.26 (\pm SD 0.12), Heart rate was 88.1% (\pm SD 7.7) of predicted, and lactate change 8.3 (\pm SD 3.1) at peak exercise. Cohort analysis revealed VO2 Max was 78.2% (\pm SD 13.7), AT of 43.8% (\pm SD 10.3) and VE was 50.5% (\pm SD 13.5). HVO and LVO values of VO2 Max were 89.8% (\pm SD 7.8) and 67.8% (\pm SD 8.5) respectively, p<0.001. Of the HVO group only 9 (26.5%) had normal AT and VE, and of LVO, 1 (2.6%). Exercise dysfunction affected 62 (86%) of the cohort of patients.

Conclusion

Of patients with pectus excavatum and normal VO2 Max, 74.5% were incorrectly characterised with no disturbance of exercise function. Accurate evaluation of the exercise dysfunction caused by Pectus Excavatum requires in-depth analysis of CPET data.

What Happens When a Comprehensive Lung Volume Reduction Service is Offered to a New Referral Practice?

Baranowski, R¹; Waller, D¹; Ashrafian, L²; Badiger, R³; Powrie, D⁴; Lawson, S⁵

¹Barts Thorax Centre, St Bartholomew's Hospital; ²Guy's and St Thomas' NHS Foundation Trust; ³East Suffolk and North Essex NHS Trust; ⁴Southend Hospital; ⁵Pulmonx

Objectives

NHS England is considering commissioning lung volume reduction (LVR) therapy more widely but there remains doubt about the uptake and its impact. We aimed to record the effects of offering a comprehensive LVR service to a previously naïve referral population.

Methods

A group of 5 District General Hospitals within one largely rural county with a population of 2 million people were visited by the LVR team and given educational lectures promoting the referral guidelines, treatment modalities and their benefits reinforced by referral proformas; easy access contact details and interval feedback presentations on the outcomes of referrals. All patients underwent a multidisciplinary selection process. Latterly a dedicated LVR clinic has been established in the centre of greatest referral.

Results

Eighty-five patients (54M: 31F, 73 low, 11 moderate and 1 high risk) have been referred in 2 years period. 56 procedures have been performed: unilateral lung volume reduction surgery on 37 patients (23 robotic assisted and 14 by VATS, endobronchial LVR 19 times in 17 patients. 15 patients await treatment. 9 have declined to attend and 2 have withdrawn. Only 5 (5.9%) were considered unsuitable after multidisciplinary assessment. There has been inequality in the volume of referrals between the 5 practices: 42, 27, 10, 3 and 2 cases respectively with two centres referring 67% of the patients. There has been a steady increase in the rate of referral from 2(1-2) cases per month in the first 3 months to 8(7-8) in the last 3 months. In our second year, we have seen a significant increase in referral practice compared to year 1 ($p=0.021$).

Conclusions

This experience highlights the large potential demand for LVR therapies and the benefit of personalized promotion of the techniques and referral criteria but a continuing variability in uptake. This information will be useful in planning a national LVR program particularly in new geographical areas.

Salvage Pulmonary Resection in Stage IV Lung Cancer After Pembrolizumab Case Series and Literature Review

Smith, A; Wali, A; Montes, A; Hadaki, M; Karapanagiotou, E; Bille, A

Guy's Hospital

Objectives

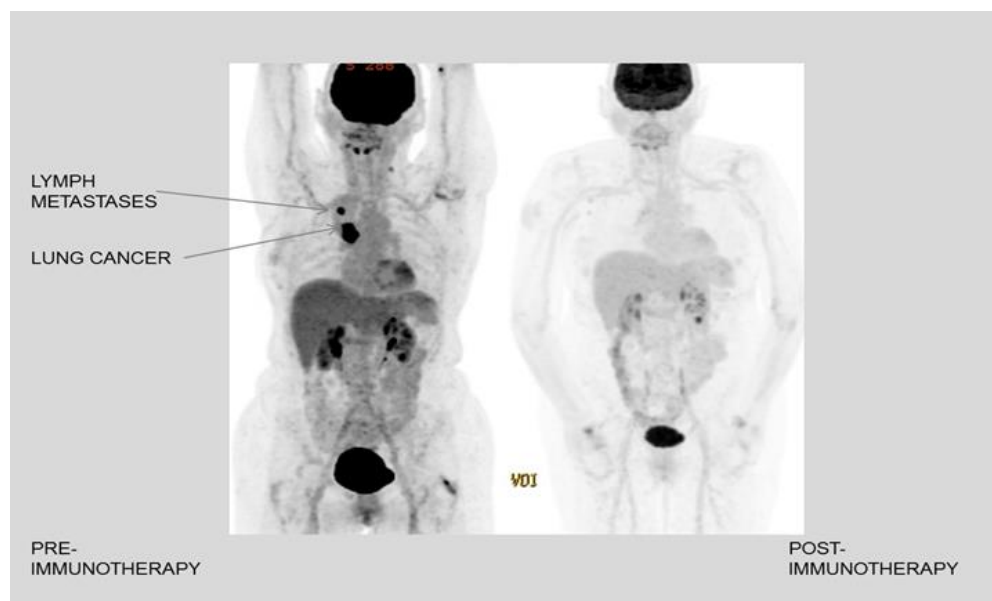
Immune checkpoint inhibitors have demonstrated improved survival in patients with advanced non-small cell lung cancer (NSCLC), but their role in multi-modality therapy alongside surgical intervention has not been defined. We present five cases where pulmonary resection was undertaken following palliative pembrolizumab treatment in combination with cisplatin/pemetrexed.

Methods

We performed a single institution, retrospective analysis of 5 consecutive patients who underwent Pulmonary resection following treatment with pembrolizumab immunotherapy for stage IV lung cancer between January 2019 and June 2020.

Results

Median age was 59; 4 patients were female.



Three patients had a stage IV lung cancer downstaged with residual primary lung cancer and two patients developed synchronous primary lung cancer while on immunotherapy. 4 patients had an anatomical lung resection through a thoracotomy, and 1 a VATS wedge resection. There was no in-hospital mortality and no postoperative complications. Complete oncological resection was achieved in all patients. The patients remain disease-free at 3, 6, and 9 months follow up respectively, with one patient awaiting follow-up imaging.

Conclusions

Salvage surgery after immunotherapy should be considered in selected patients even with metastatic disease.

Subxiphoid Uniportal Video-assisted Thoracoscopic Surgery Thymectomy: Another Safe and Effective Technique

Abiuso, V; Budacan, A; Mahendran, K; Fallouh, H; Bishay, E; Steyn, R; Naidu, B; Kalkat, M; Hernandez, L

UHB NHS trust

Objectives

Subxiphoid uniportal VATS (S-UVATS) is currently used across a wide range of thoracic surgical procedures. In this study we aim to review our experience and outcomes in patients who underwent S-UVATS thymectomy and compare them with those operated by conventional VATS and median sternotomy.

Methods

Retrospective analysis of a prospective collected data of patients who underwent thymectomy between January 2019 and May 2020. Outcomes measures were post-operative pain, length of stay, days of chest drain, complications and 30-day/hospital mortality.

Results

A total of 41 patients were reviewed: 7 S-UVATS; 24 conventional VATS and 9 median sternotomy (Table 1). There was no statistically significant difference between days of drainage between S-UVATS and conventional VATS ($p=0.128$) and S-UVATS and median sternotomy ($p=0.10$). When comparing length of stay, there were statistically differences between S-UVATS and conventional VATs ($p=0.045$). No differences between S-UVATS and median sternotomy in this regard. All the S-UVATS cases achieved R0 margins for thymoma resections. Complication rate among the three groups demonstrated to be similar. There was no 30-day mortality in any of the groups.

Conclusions

S-UVATS thymectomy provides similar early outcomes when compared to conventional VATS/median sternotomy thymectomy; it is feasible, safe and clinically sound in resecting thymic tumors.

Parameter	S-UVATS (n=7)	LI-VATS (n=25)	Median Sternotomy (n=9)
Age (years)*	67 [32-73]	61 [23-78]	61 [41-75]
BMI, (kg/m ²)*	27.2 [22.3-32.8]	28.3 [18.8-45.5]	27.6 [23.8-36.3]
Diameter of the lesion (mm)*	46 [25-65]	35 [11-78]	46 [25-90]
Days of drainage, median (IQR)*	2 [1-4]	1 [0-16]	1 [1-2]
Length of hospital stay, median (IQR)*	4 [3-7]	2 [1-17]	6 [1-8]
Conversion, n (%)	0	3 (12)	N/A

Bilateral VATS		2 (8)	
Median Sternotomy		1(4)	
Complications, n (%)	2 (28)	7 (28)	5 (55)
Re-admission, n (%)	0	1 (4)	0
30-day/Hospital mortality	0	0	0

Table 1. *Results presented as median[interquartile range]; S-UVATS: Subxiphoid uniportal VATS; LI-VATS: Lateral Intercostal VATS; BMI: Body Mass Index.

Multicentre Evaluation of Renal Impairment in Thoracic Surgery (MERITS-1) Outcomes

Naruka, V; Collaborators, M; Students, S

Hammersmith Hospital, Imperial College, London

Objectives

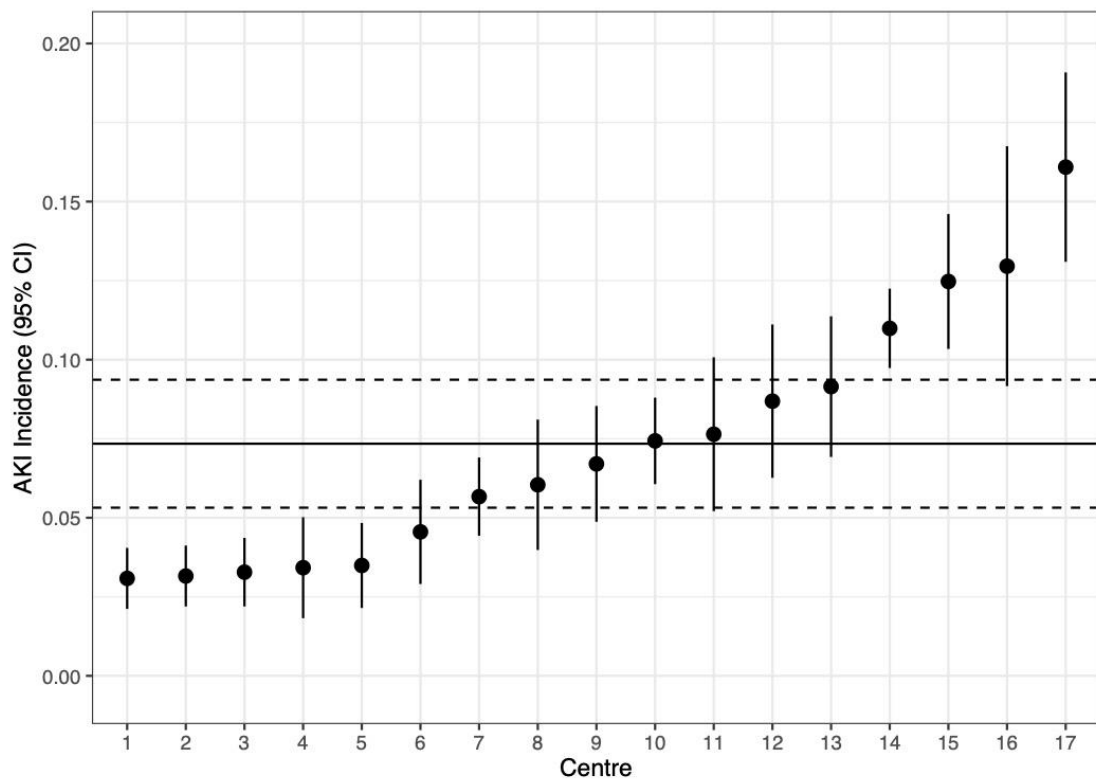
Mortality in thoracic surgery is very low, limiting its use in risk stratification. We proposed acute kidney injury (AKI) as performance measure to drive quality improvement as it is more common than death, easy to measure and associated with meaningful outcomes i.e. length of stay and cost. Currently there are no national estimates of incidence or baseline characteristics of AKI post-thoracic surgery. The primary aim of MERITS-1 is to determine AKI variation after thoracic surgery in multiple centres.

Methods

MERITS-1 is a multicentre observational retrospective study in thoracic surgery with the participation of SCTS STUDENTS. All SCTS thoracic surgery centres were invited to join. Each participating unit provided data on patients undergoing thoracic surgery between 1.4.16-31.3.17. We collected SCTS operation code, sex; dates of birth, operation, discharge, death; AKI stage; peak creatinine; pre-op and post-op renal replacement therapy. To estimate post-thoracic surgery AKI incidence for GB & Ireland within a margin of 1.5% (with 95% confidence) we calculated that we required at least 2520 patients. 18 local PIs, 22 data coordinators and 81 data collectors participated.

Results

In 10 months, 17 centres contributed complete data on 15154 operations. The AKI incidence ranged from 3.1-16.1% (mean 7.2%±2.1%,95% CI) (Fig. 1). There was a statistically significant variation in AKI incidence across the participating centres. We also found significant associations between AKI, length of stay and mortality.



Conclusion

AKI incidence varies significantly between thoracic surgery units. Since there are important health and economic benefits in reducing AKI it is worthy of further investigation. The MERITS programme offers a structure to do this. We wish to recruit more centres, study this longitudinally and further develop a risk stratification system. Different unit practices can be reviewed to drive improvement to the level of best performing centres.

Unusual Radiologic Findings in Covid-19 Pneumonia. Is There A Need For Surgical Intervention?

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¹Golden Jubilee National Hospital; ²University Hospital of Wishaw

Objectives

Among the less common CT changes seen in COVID-19 pneumonia are cystic changes or pneumatoceles. There have been a few studies of CT findings in COVID-19. Each of these studies have reported pneumatocele, or at least cystic changes, as a less common but potential complication of COVID-19 pneumonia (1,2,4). With a further case study reporting giant bulla formation in a patient who suffered COVID-19(3). Pulmonary pneumatoceles are parenchymatous, thin-walled, air-filled cysts. Post-infectious pneumatoceles are a common complication of acute Staphylococcus pneumonia especially in young children, and there is a decreasing incidence of that with age (2). Most pneumatoceles resolve spontaneously with conservative treatment and invasive management is required only in case of complications.

Methods

We present unusual radiological images of 3 cases with COVID-19 confirmed pneumonia, who eventually recovered from the viral infection, but later developed further complications with pneumatocele formation. All 3 cases were referred to our unit for consideration of surgical management.

Results

Two of the 3 cases required invasive ventilation. Although pneumatocele formation may be caused by invasive ventilation, this is not the common trend seen with these patients with Covid-19 pneumonia. One of the cases was initially considered for surgical intervention; however, gradual resolution of pneumatoceles was observed without any surgical input. Pneumatoceles can appear as part of Covid-19 pneumonia long-term sequelae. It is important clinicians recognize this unusual pathology and treat it conservatively in the first instance, considering that surgical input may be required in complicated cases.

Conclusions

In our small cohort, pneumatoceles were discovered post-COVID-19 infection and usually due to other complications such as pulmonary embolism or tension pneumothorax. Even though CT scan findings are significant, conservative management is proven to be successful and safe.

Predicting Morbidity in Rib Fracture Patients: Do the Old and Frail STUMBLE?

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Glenfield Hospital University Hospitals of Leicester NHS Trust

Objectives

Rib fractures are associated with significant morbidity and mortality. The STUMBL screening tool has been developed and externally validated in an Emergency Department setting, with the aim of informing the level of care required for the inpatient management of chest wall trauma. We sought to assess the predictive value of this tool in predicting the required care setting for patients managed by a speci

Methods

All patients with rib fractures admitted under our care between January and December 2018 were included in a purpose-designed, prospectively-maintained database. A physiotherapist performed the STUMBL screening assessment on first patient contact. Additional data was obtained from patient imaging and case records. Statistical analysis was performed in STATA IC v14.

Results

78 patients were included in the data analysis. 57 (73%) were male, with an average age of 67 years (range 16 to 93), a clinical frailty score (CFS) of 2 (IQR 2 to 4) and a STUMBL score of 20/59 (IQR 15 to 25). The median number of ribs fractured was 4 (range 2 to 10), and the initial oxygen saturation on admission was 96% on room air (range 82-100%). 74 (94%) patients were managed in a ward-based setting, whilst the remaining 4 (6%) required a higher level of care. The average hospital length of stay was 5 days (range 0 to 21).

The STUMBL screen correctly predicted the highest level of care required in 61 (78%) patients, whilst it overestimated care requirements in 13 (17%) and underestimated them in 4 (5%). The validity of age, CFS and STUMBL scores in predicting clinical outcomes – as estimated by the area under the ROC curve – and summarised in the table below (presented with 95% CI).

	ITU admission	Readmission	Failure to return to ADLs
Age	0.455 (0.111 to 0.800)	0.708 (0.559 to 0.857)	0.644 (0.497 to 0.792)
CFS	0.599 (0.125 to 1.000)	0.752 (0.573 to 0.932)	0.705 (0.568 to 0.842)
STUMBL	0.621 (0.364 to 0.878)	0.656 (0.488 to 0.823)	0.728 (0.595 to 0.861)

Conclusions

The STUMBL screening tool has moderate clinical value in informing the level of care required for patients admitted for rib fracture management. The STUMBL score is inconsistent in offering additional risk stratification for morbidity beyond that provided by age and frailty.

Early Results of a Robotic Lung Volume Reduction Surgery Programme

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Objectives

Our primary objective was to prove that robotic LVRS was safe in terms of providing similar in-hospital outcomes to VATS LVRS. Our secondary objective was to assess the impact of robotic LVRS on postoperative pain, changes in pulmonary function and conduct a cost analysis.

Methods

Single centre retrospective analysis of patients undergoing VATS and robotic LVRS between November 2015 and October 2019 at our institution. 12 robotic and 24 VATS LVRS cases were identified.

Results

We observed 0% mortality at 30 days. An overall 90-day mortality rate of 2.78% due to a single death following robotic surgery ($p=0.1515$). Robotic LVRS patients had fewer chest drains ($p<0.001$) and were significantly less likely to be admitted to critical care post-operatively (8.3% vs 70.8%, $p=0.001$) compared with those undergoing VATS LVRS. The median post-operative length of stay was 8 days in the VATS group (IQR 5-11) and 6.5 days in the robotic group (IQR 3.75-12) ($p=0.626$). The median strong opioid requirement in the first 24 hours in the robotic group was 1mg (IQR 0-27mg) and 58mg (IQR 28-68mg) in the VATS group ($p=0.0008$). 14 patients in the VATS group and 6 in the robotic group experienced a respiratory complication post-operatively ($p=0.57$). Robotic LVRS was associated with a short learning curve and after 6 cases operative time fell and plateaued at a time similar to that taken for VATS LVRS. Both groups showed an increase in FEV1 and DLCO, and a decrease in RV at follow up. Costs were lower in the robotic LVRS group primarily due to decreased use of critical care.

Conclusions

Robotic LVRS appears safe and at least as cost effective as VATS LVRS. We demonstrated a short learning curve with the robotic approach and a reduction in critical care usage, length of stay and IV opioid use in the first 24 hours post-operatively. We advocate a prospective RCT to explore the benefits of robotic LVRS further.

To Develop, Implement and Evaluate an Integrated Care Pathway for Patients Presenting with Pneumothorax

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¹Mater Misericordiae University Hospital; ²RCSI

Objective

Pneumothorax accounts for 7,045 bed days in Ireland per year (1). An evidence-based integrated care pathway (ICP) with a focus on ambulatory care for suitable patients, multi-disciplinary treatment algorithms and early discharge to an ANP led chest drain service was implemented for the first time at multiple tertiary referral sites in Ireland, with analysis of both economic and patient outcomes.

Methods

This is a prospective multi-centre observational study powered to detect a clinically significant difference in length of stay following implementation of an ICP for pneumothorax patients. The control arm is calculated using historic national HIPE data. In addition to economic endpoints the study evaluates patient outcomes including self-reported quality of life data (using the EQ5D-5L framework).

Results

Thirty-two patients were recruited over an eleven-month period. Implementation of the Pneumothorax ICP resulted in a statistically significant reduction in inpatient length of stay of 2.84 days from 7.4 to 4.56 days ($p=0.001$), and thus a per-patient cost saving of 2314 euro.

Conclusions

This project has demonstrated that through the development and implementation of an ICP, standardisation of care for pneumothorax patients with a focus on ambulatory management is economically beneficial for the healthcare service. It is anticipated that this work will be used to inform healthcare policy at a national level in Ireland.

Reference:

1) Office HP. H180359 HIPE Information. 2018.

Robotic-assisted Versus Video-assisted Thoracoscopic Lung Volume Reduction Surgery – Initial Comparison

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Objectives

Robotic-assisted thoracic surgery (RATS) in lung volume reduction surgery (LVRS) offers the potential benefits of reduced chest wall trauma, controlled and targeted lung stapling using indocyanine green (ICG) dye and near-infrared (NIR) thoracoscopy. We aimed to compare outcomes of RATS LVRS with conventional LVRS using video-assisted thoracic surgery (VATS).

Methods

Having previously reported our learning experience, we subsequently compared the initial series of 44 consecutive RATS LVRS cases (using intravenous ICG and NIR thoracoscopy) with an immediately historical cohort of 26 VATS LVRS operations (using conventional light thoracoscopy). All patients had similar selection workup and procedures were triportal and unilateral under single lung ventilation and general anaesthesia using stapled lung excision. Comparisons focused on preoperative characteristics, perioperative parameters and early functional outcome at 3 months.

Results

In comparable groups of patients undergoing unilateral LVRS, when compared to VATS, RATS resulted in a reduction in hospital stay (6.5 vs 9.5 days, $p=0.018$) with an improvement in functional outcome (postop change in MRC score -2 vs -1 $p=0.003$) without an increase in operative time (100 ± 34.1 vs 90.2 ± 40.7 min, $p=0.277$). There was a trend towards more effective reduction in residual volume by RATS ($p=0.07$). No perioperative mortality or 30-day mortality was reported in either group.

Conclusions

The reduction in hospital stay seen after RATS may be explained by reduced postoperative chest wall dysfunction and reduced severity of air leak allowing for earlier discharge. Improvements in dyspnoea may result from more effective reduction in hyperinflation from targeted excision using functional intraoperative imaging with ICG and Endowrist staplers.

This initial comparison of this novel technique with conventional VATS suggests that a prospective randomized trial is justified and feasible.

SSI Dashboard: Early Experience of Using NSHD/HES Data for Postoperative Wound Infection Following Lung Resection

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Royal Brompton & Harefield NHS Foundation Trust

Objectives

Our aim was to develop an efficient method of reporting surgical site infection (SSI) rates, via an 'SSI Dashboard' for patients undergoing lung resection.

Methods

We determined a dataset based on classification and diagnostic codes in Tableau™ for the period April 2010 to March 2018. SSI were included up to 30 days, detected on primary admission, readmission to own hospital or to other hospital and compared with our SSI data collected prospectively by trained personnel.

Results

There was no significant difference between the SSI rates collected prospectively by trained surveillance personnel (1.5% [6/404]) and the SSI Dashboard (1.5% [91/6148]) in this patient group ($P=1.0000$). The SSI Dashboard indicated a significant difference between the two hospital site's overall SSI rates (Centre A SSI rate is 2.0%, interquartile range (IQR) 2.7 compared to Centre B 1.1%, IQR 1.7; $P=0.0042$). This finding was similar the prospective surveillance snapshots. If SSI readmissions to other hospitals were removed, this difference persisted (Centre A 1.4% vs Centre B 0.8%, $P=0.0355$). Similarly, was a difference in coded VAC and/or debridement ($P=0.0412$) between the hospital sites (Centre A 0.4%; Centre B 0.1%). There was no significant difference between the hospital sites for on spells coded with postoperative wound infection and sepsis ($P=0.1008$), mortality ($P=0.2167$), readmission to own or other hospital ($P=0.1034$ and $P=0.0634$), however there was a difference in total readmissions (own and other hospital, $P=0.0156$). Interestingly, readmission to other hospitals with SSI constituted 80% of our total SSI readmissions.

Conclusions

Despite concerns of differences in the identification, completeness, and verification of a simple binary approach as compared to prospective surveillance, our experience suggests that the SSI Dashboard is comparable for SSI rates, and is superior in identifying important trends in SSI treatment and readmissions following lung resection.

A Contemporary Experience of Surgical and Endobronchial Lung Volume Reduction Procedures

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Background

Lung volume reduction surgery (LVRS) and endobronchial valve implantation (EBVI) are both accepted treatment modalities for management of patients with persistent symptomatic emphysema after maximum medical therapy, despite some previous studies reporting high rates of morbidity and mortality. We have reviewed our experience of lung volume reduction procedures.

Methods

A single-centre retrospective review of patients undergoing LVRS and/or EBVI between August 2012 and December 2019. Pre-operative characteristics and post-operative outcomes were reported. In-hospital mortality, post-operative length of stay (PLOS) and overall survival between the two groups were compared using appropriate statistical tests.

Results

58 patients underwent lung volume reduction during the study period (EBVI 55.2% [n=32], LVRS 44.8% [n=26]). 67.2% (n=39) were male and the mean age was 59.6 years (\pm standard deviation [SD] 10.3 years). 76.9% of LVRS patients (n=20/26) underwent surgery via a video-assisted thoracoscopic (VATS) approach and 23.1% (n=6/26) underwent surgery via thoracotomy. 73.1% (n=19/26) underwent sub-lobar resection and 26.9% (n=7/26) underwent anatomical lobectomy. 15.4% (n=4) of patients suffered prolonged air-leak (>7 days). For the EBVI patients the mean number of valves inserted was 3.0 (\pm SD 2.0). Median PLOS for LVRS vs EBVI was 7.0 days (\pm interquartile range [IQR] 4.8-11.8 days) vs 4.5 days (\pm IQR 2.0-7.8 days), p=0.016. In-hospital mortality for LVRS vs EBVI was 0% (n=0) vs 3.1% (n=1), p=0.363. Median follow-up time was 28.5 months (range 1-87 months). There was no significant difference in overall survival between the 2 groups (log-rank analysis p=0.078).

Conclusions

These results demonstrate that acceptable short-term outcomes and comparable overall survival can be achieved when patients undergo LVRS and EBVI in high-volume specialist centres with an appropriate patient selection process.

Santhirakumaran, G; Kar, A; Shah, M; Hunt, I

St George's Hospital, London

Objectives

Slipping rib syndrome (SRS) is not well recognised by physicians and many patients have multiple consultations and investigations prior to diagnosis. SRS is caused by hypermobility of the costal cartilages of the 8-10th ribs. Patients present with intermittent chronic anterior chest wall/upper quadrant abdominal pain. It affects young adults, but is described in any age group; more commonly in females. Recent studies have demonstrated the importance of performing early dynamic ultrasound of the chest wall (DUS) prior to any intervention. We report an early case series including the management protocol implemented.

Methods

A single centre retrospective review of all patients (n=6) undergoing surgical intervention for SRS between September 2019 – September 2020. Data consisted of patient demographics, symptoms, pre-referral investigations, DUS, intervention, post-operative length of stay and complications.

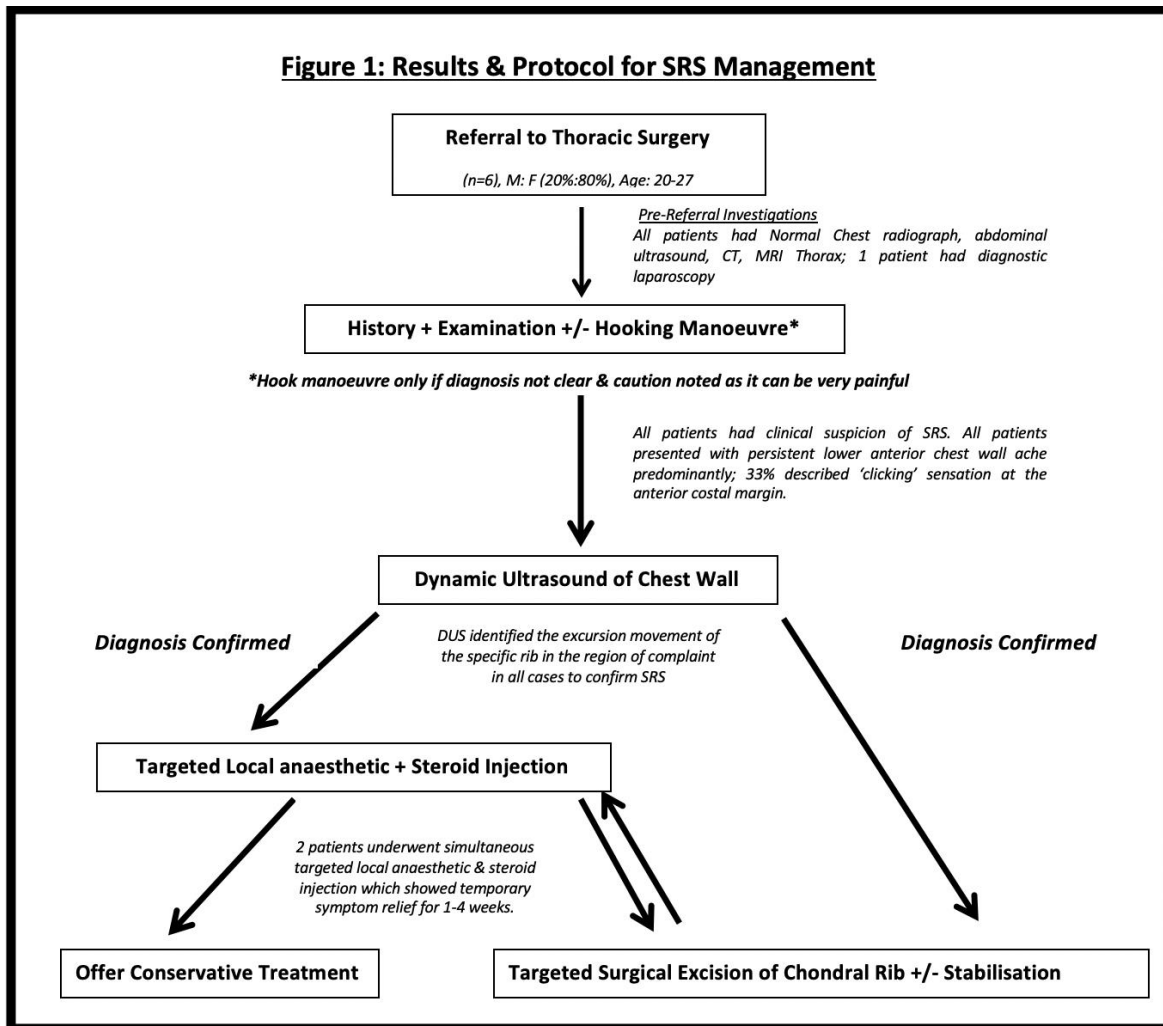
Results

Figure 1 summarises the patient pathway including key results; it also illustrates the treatment algorithm for SRS devised in our unit. Median length of history was 3 years - DUS identified the excursion movement of the specific rib in all cases. 2 patients underwent simultaneous targeted steroid injection which showed temporary symptom relief. All patients underwent thoracic surgery (<24hrs admission) for targeted excision of hypermobile rib tip. Post-operatively, 80% patients reported complete resolution of initial pain complaint; in one case repeat DUS demonstrated rib stump conflict with superior rib requiring redo further excision of costal cartilage.

Conclusions

SRS intervention requires careful patient selection and is dependent on early input from a dedicated chest wall service. Collaboration with musculoskeletal radiologists is essential. The management protocol developed highlights adjunct DUS can allow temporary relief with steroid injection; targeted chondral rib excision may offer longer-term successful outcomes +/- rib stabilisation.

Figure 1: Results & Protocol for SRS Management



Is Telemedicine an Effective means of Providing Remote Clinical Services?

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Background

The outbreak of COVID-19 pandemic caused severe disruption to health care delivery across the country. Lockdown and social distancing rules sorely limited the capacity of conventional face-to-face consultations. With little to no preparation, virtual clinics were implemented en masse and the national health service embraced telemedicine more so out of necessity rather than convenience. The average of thoracic surgical patients is 62.1years in the United Kingdom [1]. We undertook a survey to evaluate patient's experience and overall satisfaction with telemedicine in a demographic where technology adoption is historically low.

Methods

Thoracic surgery patients who had been reviewed remotely via telephone were invited to participate in the survey via post. The questionnaire was administered as either a paper form or via a QR code.

Results

A total of 342 questionnaires were administered with an overall response rate of 45.6%. Most of the responses were returned in paper form (87.9%). 69.5% of the responders were >65yrs of age. The majority of responders (47.2%) were pleased with the overall experience of virtual clinics, thus were willing to continue. 37.3% still preferred in-person consultations. 15.5% were undecided. There was a direct correlation between age of responders and reluctance to continue with telephone consultations. This was not attributed to technology illiteracy as most (93%) owned at least a smartphone, tablet or computer.

During the period of the audit, no serious adverse events were identified due to lack of physical consultations and no patients were lost to follow up.

Conclusion

Our experience has shown that telemedicine is a safe and acceptable means of conducting surgical clinics.

Predictive Validity of Lymphocyte Counts in Patients with Suspected COVID-19 Infection in the Early Postoperative Period

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Objectives

Lymphopenia is associated with COVID-19 diagnosis and poor prognosis. It is also a well-recognised common haematological finding after all surgery. Recent research has highlighted the benefit of maintaining 'COVID positive' and 'COVID-free' patient streams within hospitals. However, relatively high rates of false negative virology testing and an awareness of the presence of asymptomatic infection complicates our ability to do so. Therefore, establishing a multi-factorial triaging tool for possible COVID-19 infection is vital to the safe provision of care for surgical patients. We sought to evaluate the predictive validity of lymphocyte counts and ratios for COVID-19 infection in the early postoperative period.

Methods

Thoracic and General Surgery patients operated at three UK hospitals between March and June 2020, and with confirmed Covid-19 postoperatively were included. A local, case-matched control group (4:1) of consecutive patients was identified. Local audit approval was obtained. Statistical analysis was performed in STATA SEv16.

Results

70 patients (15 Covid-positive, 47% male, age 64±14 years) were included in final analysis. Predictive accuracy was highest for maximum post-op temperature >38C with nadir lymphocyte count <1.1x10⁹/L (72.8%, 95%CI 60.9 to 82.8%). Nadir lymphocyte count (92.3%, 95%CI 76.1 to 97.8%), peak platelet-lymphocyte ratio (PLR) >180 (92.3%, 95%CI 62.8 to 98.8%) and peak neutrophil-lymphocyte ratio (NLR) >6 (90.9%, 95%CI 58.1 to 98.6%) showed high negative predictive value. Positive predictive value was highest for febrile lymphopenia (40.9%, 95%CI 26.9 to 56.5%).

Conclusion

The absence of lymphopenia, NLR >6 and PLR >180 may be useful in reducing suspicion of Covid-19 infection in postoperative patients. None of the assessed lymphocyte measures or ratios show sufficient specificity for clinical application in a surgical cohort.

Defining Postoperative Pulmonary Complications in Thoracic Surgery: Validity of the StEP Collaboration Recommendations

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Objectives

The Standardized Endpoints for Perioperative Medicine (StEP) collaboration has published extensively on the standardisation and use of outcome measures in perioperative research. Their recommended definition of 'postoperative pulmonary complications' (PPC) has yet to be validated in thoracic surgery. We sought to assess the predictive validity of the StEP definition of PPC, against the previously validated Melbourne Group Scale (MGS).

Methods

Patients undergoing lung resection at a single institution in the UK between November 2019 and February 2020 were identified retrospectively. Local clinical governance approval was obtained. Data was extracted from electronic patient records. A clinical diagnosis of PPC was used as the reference endpoint. Statistical analysis was performed in STATA SE v16.

Results

115 patients (age [mean±SD] 66±12 years, 42% (n = 48) male, 24% (26/109) never smokers) were included. The incidence of PPC was 28% (n = 33) by clinical diagnosis, 5% (n = 6) by MGS, and 38% (n = 44) by StEP. The Area Under the Receiver Operating Characteristic curve (AUROC) was 0.591 (95%CI 0.524 to 0.658) for MGS, and 0.635 (0.536 to 0.735) for StEP. MGS was highly specific (100%, 95%CI 95.6 to 100.0%) but showed poor sensitivity (18.2%, 6.9 to 35.5%). StEP demonstrated a specificity of 69.5% (58.4 to 79.2%) and a sensitivity of 57.6% (39.2 to 74.5%).

Conclusions

The StEP definition represents a higher predictive validity for PPC after thoracic surgery than previously-available measures. The adoption of standardised clinical outcome definitions will allow for future research to be more meaningful and synthesisable.

Predicting Postoperative Pulmonary Complications in Thoracic Surgery: Validity of the ARISCAT Score

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Objectives

The Assess Respiratory Risk in Surgical Patients in Catalonia (ARISCAT) risk score was developed to predict postoperative pulmonary complications (PPCs). It has not been robustly validated in a thoracic surgical cohort. We sought to assess the clinical usefulness of the ARISCAT score in identifying patients at risk of PPC, compared to two risk stratification indices in routine use: the American Society of Anaesthesiologists Physical Status Classification (ASA) and the Charlson Comorbidity Index (CCI).

Methods

Patients undergoing lung resection at a single institution in the UK between November 2019 and February 2020 were identified retrospectively. Local clinical governance approval was obtained. Data was extracted from electronic patient records. A clinical diagnosis of PPC was used. High-risk groups were defined as ARISCAT \geq 45, ASA \geq 3 and CCI \geq 6. Statistical analysis was performed in STATA SE v16.

Results

115 patients (age [mean \pm SD] 66 \pm 12 years, 42% (48/115) male, 24% (26/109) never smokers) were included. 29% (33/115) of patients suffered PPC. 20% (23/115) were classified as high risk by ARISCAT, 46% (53/115) by CCI, and 85% (98/115) by ASA. The Area Under the Receiver Operating Characteristic curve (AUROC) was 0.655 (95%CI 0.544 to 0.766) for ARISCAT \geq 45, 0.604 (0.559 to 0.648) for ASA \geq 3 and 0.501 (0.384 to 0.617) for CCI \geq 6. ARISCAT had a specificity of 87.8% (95%CI 78.7 to 93.9%), but a sensitivity of 39.4% (22.9 to 57.9%).

Conclusions

The ARISCAT score outperforms ASA and CCI in predicting PPC after thoracic surgery, however, may miss identifying at-risk patients due to its low sensitivity. Accurate identification of high-risk patients may allow targeted mitigation of risk factors.

Minimally Invasive Dual Cavity Double Crown Technique for Diaphragmatic Hernias -- The 'Birmingham' Technique

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Background

Diaphragmatic hernias are rare with limited evidence for efficacy of various repairs. Minimally invasive abdominal laparoscopic approach, conducted by general surgery is widely performed with good results. However, posterior failure due to the proximity to the rib cage as well as potential injury to the mediastinal structures have been observed. In larger hernias, the highly invasive open thoracoabdominal approach might exclude unfit patients due to the high morbidity and potential mortality of these cases. Minimally invasive combined technique using staged VATS and laparoscopic combined approach has been developed with good results.

Methods

A diaphragm hernia interest group with thoracic and upper GI surgeons and a radiologist was set up with discussion of all diaphragmatic hernias and joint review by the group. 6 patients were selected for this procedure; however, surgery has been performed only on two patients to date due to Covid-19 pandemic. The cases were a left traumatic diaphragmatic hernia containing spleen, splenic fixture and greater omentum and a Bochdalek diaphragmatic hernia containing stomach, transverse colon and left kidney. In both cases, a minimally invasive dual cavity double crown technique was performed collaboratively by upper GI and thoracic surgeons; hernia was reduced laparoscopically followed by fixation of composite mesh to the diaphragmatic defect using an inner crown of prolene sutures and VATS approach to place an outer crown of ethibond sutures. Peri-costal sutures were placed from the thoracic end to compensate for the posterior diaphragmatic deficiency.

Results

Both patients made uneventful recovery with discharge on day 7. Post-op CT scan showed successful repair with both remaining symptom-free at 12 and 8 months respectively.

Conclusion

A multidisciplinary team approach and staged Minimally invasive dual cavity double crown technique is safe for complex diaphragmatic hernias with good outcomes.

Thoracic Oncology

Minimally Invasive Thymectomy in Early Stage Thymoma - The New Standard?

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Objectives

Standard approach for thymectomy is open, however, VATS has been implemented with uncertain oncological outcome. Complete resection is mandatory, with excellent survival in early Masaoka-Koga stages. Aim of our study was to show whether to consider VATS thymectomy equal to open resection regarding oncological outcome and long-term survival.

Methods

A 10-years retrospective analysis of prospectively collected data identified 129 patients after thymectomy for early-stage thymoma (Masaoka-Koga classification stage I+IIA/B) between January 2009 and March 2020. Data was retrieved from our institutional database, operative logbooks and peripheral follow-up institutions. Complete resection was defined as en-bloc tumour resection, thymectomy (including the thymus horns) and radical removal of mediastinal fat in between both phrenic nerves. Statistical analysis was done using IBM® SPSS® Statistics version 26.

Results

129 patients underwent 33 (25.6%) VATS and 96 (74.4%) open resections for early-stage thymoma (41% stage I, 59% stage II). Median age was 63 years (Range 30; 85). Mean LOS was 3.1 days (95% CI 2.7; 3.7) in the VATS group compared to 5.5 days (95% CI 4.9; 6.1, $p < .0001$) in the open group. 97% (N=32) were R0-resections in the VATS group vs 91.7% (N=88) R0-resections in the open group. No major complication appeared following VATS resections compared to 5,2% (N=5) complications in the open group. No significant difference in 10-year survival ($p = .167$) was found; however, no death in the VATS group was noted. Multivariate analysis showed only age to be negatively associated with survival ($p < .006$).

Conclusion

Early-stage thymomas are feasible for minimally invasive resection with excellent safety profile, resulting in shorter LOS and less postoperative complications. There was no significant difference between the two groups in survival, mortality in the VATS group was 0%. Randomized controlled trials should be considered to confirm favourable VATS results.

Chest Wall Resection for Sarcoma. Should the NICE Sarcoma Quality Standard be Refined?

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Objectives

Chest wall sarcoma comprises 15% of sarcoma diagnoses in the UK, and resection is the mainstay of curative treatment. The 2015 NICE sarcoma quality standard recommends 30-day mortality and 2-year recurrence as surgical quality markers, but does not define audit standards. We reviewed our own practice and performed a national survey of thoracic surgery sarcoma units in an attempt to define possible audit standards.

Methods

We retrospectively analysed resections performed for chest wall sarcoma at our centre from 2008 - 2020, looking specifically at 30-day mortality and 2-year recurrence. Data collected included the patient demographics and histology including resection margin. A Fisher's exact test was performed to assess for significant difference between those with primary and metastatic disease. We also surveyed UK thoracic surgeons in sarcoma centers on acceptable recurrence rates.

Results

20 patients were identified, and 16 had primary disease. Median follow-up time was 1765 days, further patient details are in table 1. There were no deaths within 30 days. An R0 resection was achieved for 19 (95%) patients. 17 patients completed 2 years follow up (13 with primary disease, 4 with metastatic), 2 recurrences occurred in those with primary disease (15%), compared with 3 in the metastatic group (75%). There was no statistically significant difference between the two groups ($p=0.0525$).

40% of 10 survey respondents knew their units recurrence rate, however 70% use recurrence in the consent process. All respondents felt <20% was an acceptable 2-year recurrence rate.

Conclusions

Mortality risk appears low. Recurrence was more common in resections for metastatic sarcoma, and is likely to be affected by other factors like tumor subtype and grade, suggesting that overall recurrence rates may not be a good quality marker. National data collection would help to define future quality standards for unit benchmarking.

Age (IQR)	63 (50-72)
Male:Female	15:5
Median follow up time (IQR)	1369 days (874-2578)
Sarcoma Histology	Chondro (8), Pleomorphic (4), Synovial (2), Fibrous (2), Osteo (2), Angio (1), Leiomyo (1)
Histology grade	High (10), Low (2), Unspecified (8)
R0 Resection	19 (95%)
2 Year recurrence (Primary disease)	2 (15%)
2 Year recurrence (Metastatic disease)	3 (75%)
30 Day mortality	0

Training in VATS Lobectomy is not Dependent on Conventional Lobectomy Experience

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Leeds Teaching Hospitals NHS Trust

Introduction

Video-assisted thoracoscopic (VATS) lobectomy is now well established in the treatment of early-stage lung cancer. In our unit, performing around 350 anatomical lung resections per annum, 80% of pulmonary lobectomies are performed by VATS. The traditional view that training in VATS lobectomy should be reserved for senior trainees and consultants with considerable open experiences is not evidence based. We therefore wanted to determine if prior conventional thoracotomy experience is needed for consultants to initiate training in VATS lobectomy. We also wanted to ensure this training does not adversely impact on patient outcomes.

Methods

We retrospectively identified patients who had undergone VATS lobectomy since December 2015. The operation notes of these patients were reviewed to determine the primary surgeon. The trainees were then separated into NTN and non-NTN before being classified as experienced in open lobectomy if they had performed over 20 conventional lobectomies. We then examined the medical case notes to assess for postoperative morbidity and mortality.

Results

888 VATS lobectomies were reviewed. Of those 356 (40%) were performed by trainees – 182 by NTN and 174 by non-NTN. 3 of 8 NTNs and 6 of 16 non-NTNs were classified as experienced. An unpaired student t-test was used to compare the experienced and non-experienced groups – there was no statistically significant difference ($P < 0.05$) in terms of number of cases performed. Further comparison showed no difference in morbidity and mortality between consultant and trainee cases ($P < 0.05$).

Conclusion

In our centre with consultant surgeons who are experienced in VATS lobectomy, conventional thoracotomy experience is not a requirement to be trained safely in this technique.

Outcome of Modern Airway Stenting for malignant Tracheoesophageal Fistula

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Objective

Malignant tracheoesophageal fistula is a devastating condition. Advanced cancer makes surgical intervention often impossible. Purpose of our study was to evaluate the effectiveness of modern airway stenting for closure of the fistula, improvement of quality of life and fitness for further cancer treatment.

Methods

All patients receiving airway stenting at a German University Hospital were included in a prospective database. Study period was January 2018 to August 2020. Modern fully silicon covered self-expanding metal stents (SEMS) were used.

Results

A total of 23 airway stents were placed in 17 patients. Initial stent implantation and closure of the fistula were always successful. Stent malfunction or dislocation were not observed. Malignant primary diseases were oesophageal cancer (14) and lung cancer (3). There were 3 female and 14 male patients. Median age was 62 years (Q1 56, Q3 69, IQR 13). Median Charlson Score of Comorbidity was 7. In-hospital death was 4/17. Mechanical ventilation (4) was associated with higher odds for in-hospital mortality (2/4 v. 2/13; OR: 5.50, 95% CI 0.46-65.16, p=0.17). Longitudinal elongation (2), change (3) and removal (1) of stent were feasible. Following stent insertion 9 patients were fit for radiation therapy, 10 were eventually discharged home and 3 transferred to other facilities. Case fatality during the study period was 12/17. Median survival of all 17 patients was 112,5 days (Q1 30, Q3 151,75, IQR 121,75 days). Median survival of patients discharged home or transferred was 131 days (Q1 100, Q3 170,25, IQR 70,25 days). All surviving patients (13/17) reported a better quality of life with fewer symptoms (coughing, aspiration, shortness of breath).

Conclusions

Airway stenting with modern SEMS is an effective palliative treatment option for malignant tracheoesophageal fistula. Following stent implantation many patients are fit for further cancer treatment. Mechanical ventilation is associated with poor prognosis.

Diagnostic Segmentectomy Using Robotic Assisted Thoracic Surgery: A Feasibility Study

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Objectives

The increased use of lung screening programs will challenge the management of solitary pulmonary nodules. These lesions will be small, may be centrally placed and will prove difficult to biopsy preoperatively. Pulmonary segmentectomy offers a one-stage diagnostic and therapeutic procedure with the advantages of speed of process but the disadvantages of surgical morbidity in benign cases.

Methods

All patients had CT and CTPET. All decisions to operate were made after discussion at a Lung MDT.

Results

Over an 18-month period RATS segmentectomy without a preoperative biopsy was performed in 48 patients (26M:22F). A median of 2 (1-4) segments were removed; 30 left (22 upper; 8 lower) and 18 right (5 upper;13 lower). Conversion to open segmentectomy was required in 4 (8.1%) cases due to adhesions or bleeding. Overall median hospital stay was 5 (2-23) days. There was no in-hospital mortality. Malignant diagnoses were found in 38 (77.5%) patients: adenocarcinoma (including 2 cases of minimally invasive adenocarcinoma), squamous carcinoma, neuroendocrine tumour, carcinoid and metastasis. A benign diagnosis was found in 11 (22.5%) cases, in these 2 required conversion to thoracotomy but their hospital stay was no longer than the overall. On comparison between the benign and malignant groups there were not any clinical differences in preoperative characteristics or postoperative outcomes.

Conclusion

Diagnostic RATS segmentectomy offers an effective and efficient method of therapeutic biopsy in early lung cancer. It should be compared to protocols involving pre-resectional diagnostic biopsy.

Salvage Surgery and Immunotherapy for Locally Advanced Non-Small Cell Lung Cancer After Definitive Chemoradiotherapy: A Literature Review

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St George's Hospital

Objectives

Stage III NSCLC remains a diverse entity that varies from resectable to unresectable disease. Concurrent chemoradiotherapy (CRT) has been the guideline-recommended radical treatment. The failure rates of this approach are increasing in the form of locoregional or distal recurrence. The available treatment options for maintenance or post-recurrence management of these tumors have been consolidation systemic anticancer treatments and salvage therapy. We present the current evidence comparing these two treatment modalities.

Methods

2 systematic reviews looking specifically into immunotherapy agents (*Skrzypski et al.*) and salvage surgery (*Dickhoff et al.*) have been identified on literature review.

Results

The median overall survival (OS) following salvage surgery was between 9 – 46 months on 8 retrospective series. The median progression-free survival (PFS) varied between 12-43.6 months. Morbidity among the surgical series was 25.7%-58% (at least one major complication) and the 30-day mortality was 0-7.7%.

The evidence for immunotherapy following definitive CRT is derived from 3 trials. SWOG 0023 showed that gefitinib was associated with worse OS compared to placebo (23 months vs. 35 months, $p=0.013$) and grade 3-4 pneumonitis in 3% of the gefitinib group. START trial showed no significant improvement in overall survival with Temecotide compared to placebo (25.6 vs. 22.3 months, $p=0.12$) but there was a survival benefit for the subgroup of patients receiving concurrent CRT (30.8 vs. 20.6 months, $p=0.016$) with similar incidence of serious adverse events (pneumonitis 3%, CNS metastasis 3%). Finally, the PACIFIC trial showed an improvement with Durvalumab on PFS (16.8 vs. 5.6 months, $p<0.0001$) and significantly prolonged time to death or distant metastasis (23.2 vs. 14.6 months, $p<0.001$). Death due to adverse events was 4.4% in Durvalumab group.

Conclusion

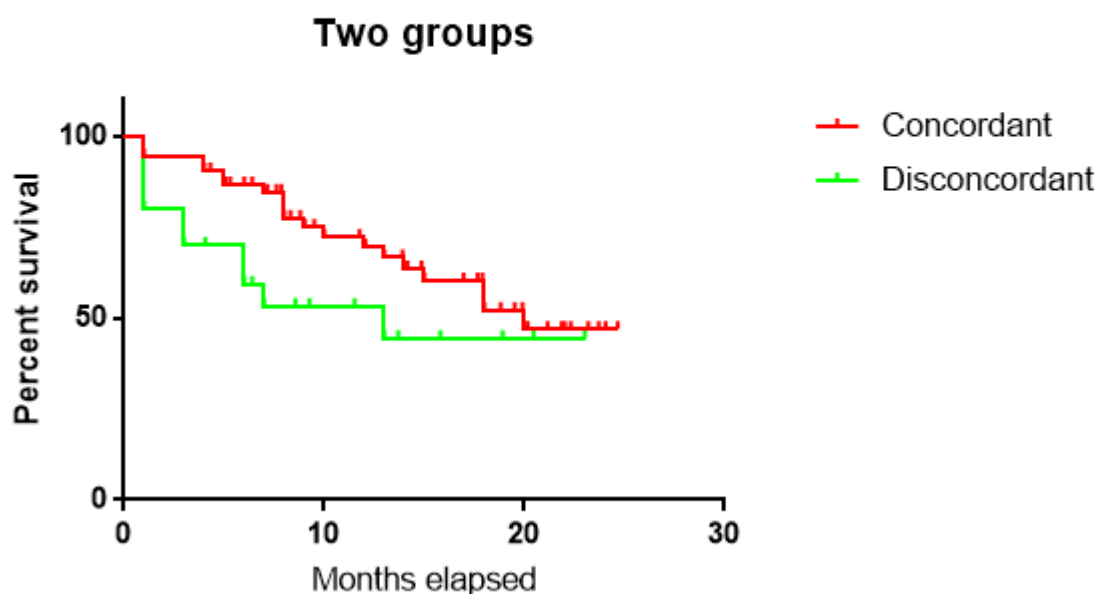
Salvage surgery has been associated with improved OS and PFS compared to immunotherapy for stage III NSCLC

How Much do we Actually Know Before Embarking on Radical Surgery for Mesothelioma? The Multidisciplinary Implications for Preoperative Workup.

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HISTOLOGY



Objective

Preoperative assessment of histological sub-type and nodal metastasis influences treatment selection and prognosis. We aimed to evaluate the accuracy of preoperative assessment and its effect on postoperative survival after pleurectomy/decortication (P/D).

Methods

P/D or extended P/D was performed in 73 patients : 62 male (85%), 11 female (15%), age 66.8 (33-79). All patients were evaluated with CT thorax/abdomen. 23 (32%) also had CTPET. Only 1 patient had invasive mediastinal staging. 56 (78%) had induction chemotherapy and all had restaging CT.

Results

Accurate preop assessment of both cell type and nodal stage was found in only 26 (36%) patients.

Cell type discordance between preop assessment and postop histology was found in 19 (26%) pts. In 16 (22%) there was negative discordance (epithelioid to biphasic) whilst 3 (4%) had positive discordance. Negative discordance was associated with significantly inferior survival to those with concordant findings ($p=0.029$)

Cell type discordance was found in 9 of 39 pts (23%)- VATS biopsy; 6 of 15 (40%) - biopsy via medical thoracoscopy and 4 of 18 (22%) - US/CT guided percutaneous biopsy. The method of biopsy had no significant effect on the rate of discordance ($p=0.4$).

Nodal discordance was found in 32 (44%) pts: 24 pts (33%) who were cN0, were pN1 while 8 pts (11%) who were cN1 were ypN0 (7 after induction chemo) and one pN0. Negative nodal discordance was not associated with inferior survival, $p=0.72$. In the 24 pts with negative nodal discordance the discordant nodes would be amenable to EBUS/EUS (i.e stations 2,4,7,8,9,10) in 20(83%) cases.

Conclusions

Assessment before radical surgery should be maximized to improve postoperative survival. Multiple, multi-site pleural biopsies are needed to reduce cell type inaccuracy. Both cell type and nodal discordance should be noted as potential confounding factors in the interpretation of comparative survival between surgical and non-surgical modalities.

Pulmonary Lobectomy as a Combined Diagnostic/therapeutic Procedure can be Applied Safely in Patients with Lesions Suspicious of Primary Lung Cancer

Smith, A; Pilling, J

Guy's Hospital

Introduction

There are a group of patients with a pulmonary tumour, suspicious of a primary malignancy, where CT guided biopsy (CTGB) is declined and the tumour is too central for frozen section (F/S). Surgical management involves pulmonary lobectomy (PL) for diagnosis and treatment. We set out to determine the results of this course of action.

Method

A retrospective review of a prospectively collected database to determine the frequency and outcomes of patients submitted to PL for probable primary lung cancer without pre or intra-operative tissue diagnosis.

Results

In the 57 months from January 2015, 333 consecutive patients underwent PL in a single thoracic surgical practice. 208 (62%) had a pre-operative diagnosis, 36 (11%) underwent intraoperative frozen section and 18 (5.5%) were performed for metastatic disease. 71 (21%) patients underwent PL as a combined diagnostic and therapeutic procedure [42 male, 29 Female, median age 73 years (range 54 to 85)]; 14 LUL, 8LLL, 27 RUL, 11 ML, 10 RLL, and 1 bilobectomy; 41 VATS, 12 converted, 18 thoracotomy. 19 (27%) underwent an unsuccessful attempt to obtain a diagnosis [17 CTGB, 1 EBUS, 1 EBUS and CTGB].

The median length of stay was 4 days (range 2 – 13). There were no in-hospital deaths and one death within 30 days. During hospitalization; one patient underwent further surgery for bleeding, 4 suffered prolonged air leak, six new atrial fibrillation and six were treated for infection.

68 of 71 patients (95.7%) were found to have a malignant diagnosis, see table, the commonest being NSCLC (n=58), all three benign diagnoses were granulomatous inflammation.

Diagnosis	
1. Malignant	68 (95.8%)
1.1 Non-Small Cell Lung Carcinoma	58 (81.8%)
1.2 Small Cell Carcinoma	1 (1.4%)
1.3 Carcinoid	7 (9.8%)
1.4 Lymphoma	2 (2.8%)
2. Benign	4 (5.6)
Tuberculosis	2 (2.8%)
2.2 Granuloma	1 (1.4%)

Conclusion

In appropriately consented patients PL as a combined diagnostic and therapeutic procedure is safe and is highly likely to remove a malignant tumour.

Beyond the Learning Curve in Robotic Thoracic Surgery: Outcomes of a High-volume UK Institution

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Objective

Over the past 12 months an increasing number of units within the UK have begun to offer robotic thoracic surgical (RATS) procedures. Despite this, NHS England is yet to routinely commission robotic-assisted lung resection due to a lack of evidence over its effectiveness and safety. We report our experience beyond the learning curve with the DaVinci XI system.

Methods

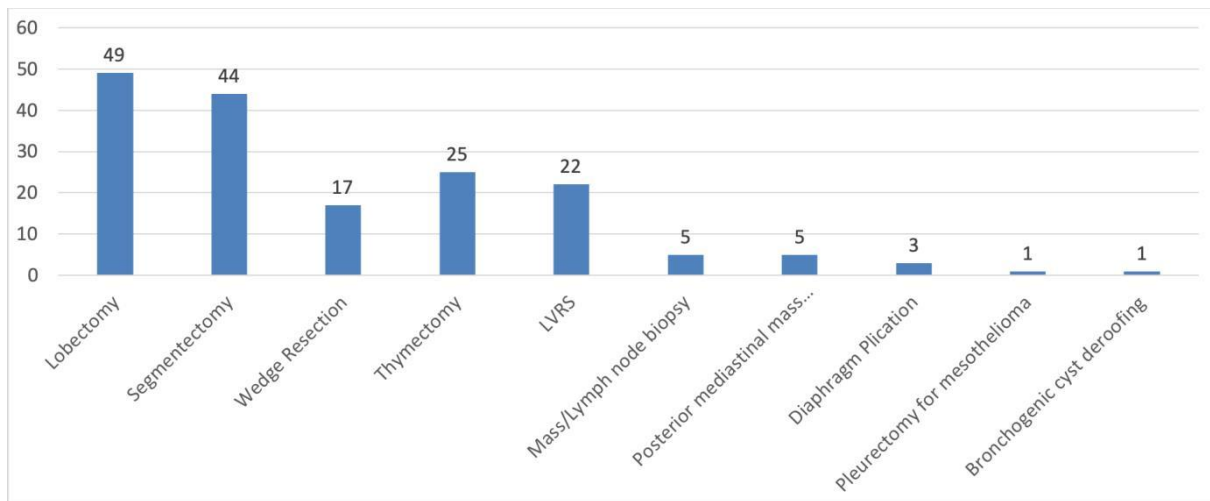
Our robotic programme commenced in September 2017. To allow for early learning curve, all RATS cases from December 2018-October 2019 were retrospectively reviewed. Intraoperative events, length of stay, post-operative morbidity and mortality outcomes were assessed.

Results

Four consultant surgeons performed 172 cases during the study period, of which 54% were anatomical lung resections (Figure 1). 27% were training cases. Median length of stay was 4 days (0-37). There were 14 conversions, 8 of which were planned due to either disease burden, adhesions or inability to achieve lung isolation. In one case an emergency thoracotomy was required to control haemorrhage. There were 37 complications of which 74% were Clavien-Dindo grades I-II, the most common of which was persistent air leak. In-hospital mortality was 2.4% (3/172).

Conclusions

Robotic surgery can safely be applied to a wide range of thoracic procedures. Beyond the learning curve, RATS has facilitated an increasing number of complex and sublobar resections through a minimally invasive approach. With careful perioperative planning conversions can be minimised, reducing complications and achieving good early outcomes with excellent patient satisfaction.



The Role of Serum Mesothelin in Monitoring Patients Following Extended Pleurectomy Decortication: An Interim Analysis

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Objectives

Monitoring for disease progression after extended pleurectomy decortication (EPD) is essential. Currently, computerised tomographic scans (CT) are used, but interpretation is difficult. Serum mesothelin has shown promise. The aim of this study is to prospectively analyse serum mesothelin levels in patients undergoing EPD to assess its utility as a marker for outcomes.

Methods

A prospective database of patients undergoing EPD from July 2017 to March 2019 was used. Mesothelin samples were obtained: pre-and post-operatively, 3, 6, 9 and 12 months. CT scans were performed every 3-months to determine radiological status. Serum mesothelin was analysed using the Mesomark ELISA. Disease-free interval and overall survival were calculated from the date of operation until the date of radiological progression, death, or censor. Categorical data was analysed using Pearson Chi-Square. Continuous data was analysed using the Mann-Whitney U test. Univariate analyses were performed using the Kaplan-Meier method. Data was analysed using SPSS Version 25.

Results

Twenty-three patients (18 males; median age: 71 years (IQR:65-75 years)) were analysed. The median pre-and post-operative mesothelin level was 2.05 nmol/L (IQR:1.1-7.28 nmol/L) and 0.77 nmol/L (IQR:0.45-2.03 nmol/L), respectively. During a median follow-up of 284 days, 17 patients progressed and 11 died. The median disease-free interval and overall survival was 272 days (SE:44; 95%CI:186-358 days) and 589 days (SE:129; 95%CI:336-842 days), respectively. Dividing mesothelin levels to <2 or >2 nmol/L, showed no differences in disease-free interval or overall survival (p=0.398 and p=0.58, respectively). The median mesothelin level increase in those who progressed was non-significantly higher than those who did not (0.37 vs. 0.01, respectively, p=0.2).

Conclusion

Serum mesothelin falls dramatically after EPD. Although not significant, mesothelin levels are 37% higher in patients who progress than those who do not.

Factors Influencing the Prognosis of Malignant Pleural Mesothelioma: A 5-year Analysis from a Tertiary Referral Centre

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Objectives

Extended pleurectomy decortication (EPD) for malignant pleural mesothelioma (MPM) is offered to patients to achieve the greatest survival possible. Whilst known adverse prognostic factors exist, we wished to assess the most important one's affecting survival.

Methods

An EPD database was retrospectively reviewed between August 2013 and July 2018. Patients undergoing EPD for MPM were included. Patients who died within 90 days and those with sarcomatoid disease were excluded. Demographic data along with overall survival data were collected. Survival time was calculated from the date of operation until the date of death or censor. Descriptive statistics were used to analyse demographic and pre-operative data. Categorical data was analysed using Pearson Chi-Square. Continuous data was analysed using the Mann-Whitney U test. Univariate analyses were performed using the Kaplan-Meier method. Multivariate analysis was performed using a Cox regression model. Data was analysed using SPSS Version 25.

Results

187 patients underwent an EPD for MPM (152 male, with a median age of 68 years (IQR:64-72 years)). The most common subtype was epithelioid (88%) and 55 patients had neoadjuvant chemotherapy. The median follow-up and overall survival was 16.6 months (IQR:9.1-27.3 months) and 16.9 months (SE:1.6; 95%CI:15.8-20.7 months), respectively. On univariate analysis: age ($p=0.013$), histology ($p=0.003$), stage ($p=0.017$), pre-operative haemoglobin ($p=0.024$), neutrophil lymphocyte ratio (NLR; $p=0.018$) and platelet lymphocyte ratio (PLR; $p=0.026$) were associated with decreased survival. On multivariate analysis: age (HR:1.59; $p=0.07$); histology (HR:1.82; $p=0.012$); stage (HR:1.79; $p=0.005$); haemoglobin (HR:1.48; $p=0.021$) and NLR (HR:1.76; $p=0.016$) were retained.

Conclusion

This study stresses the importance of pathological diagnosis and provides evidence to support the haematological parameters of low haemoglobin, high NLR and high PLR as negative predictive factors for survival.

How Well do we Optimise Patients Prior to Lung Resection

Smith, M; Oo, S; Woolley, S; Page, R; Mediratta, N; Asante-Siaw, J; Shackcloth, M

Liverpool Heart & Chest Hospital

Objectives

The thoracic patient undergoing lung resection often has modifiable risk factors. We set out to review our current practice in optimising key variables from referral to anatomical lung resection.

Methods

Retrospective analysis of 101 consecutive cases undergoing anatomical lung resections in 2018 was performed. Pre-operative anaemia, BMI, smoking status and COPD were studied and their actual management from outpatient clinic compared to evidence-based optimisation strategies.

Results

32% of the patients were current smokers. Of these smokers, 43% were advised to stop smoking pre-operatively, 39% offered nicotine replacement therapy and 28% referred to a smoking cessation service. Referral rates by registrars were higher than by consultants.

43% of patients had COPD based on spirometry with all being in either Stage 1 or Stage 2. Only 51% of those with COPD were on appropriate inhaled therapy.

Only 2% of patients had a haemoglobin <10, with one being investigated for this and one not. 3% of this cohort had a BMI < 18.5 yet none were referred to the dietician.

Conclusions

We identify several areas of potential improvements for our patients undergoing anatomical lung resection.

Considerable gains could be made with our smoking cessation measures and in the treatment of COPD with appropriate inhaled therapies. These improvements need to be in conjunction with our respiratory colleagues.

Our ability to keep patient waiting times short from outpatient review to admission date provides a challenge in providing optimisation pre-operatively.

Does the Site of Lobectomy Affect Post-op Mortality?

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Castle Hill Hospital

Objectives

Standard of care for early-stage non-small cell lung cancer is surgery in the form of lobectomy (1). Increased risk of postoperative mortality is associated with various factors (2). However, currently no definitive literature exists demonstrating any relation between site of lobectomy and mortality. The authors aim to analyse the impact of lobectomy site on postoperative mortality.

Method:

A retrospective study of patients who had single lobectomy in a tertiary thoracic centre between 2009 and 2019 was conducted. Patients having bilobectomies, pneumonectomies or combined procedures were excluded. Primary outcome was to compare operative and long-term mortality. Secondary outcomes were length of hospitalisation. Data was analysed using SPSS v26.

Results

1240 patients with a mean age of 67.5 years were included. 377 patients had a right upper lobectomy, 82 patients had a right middle lobectomy and 240 patients had a right lower lobectomy. 340 patients had a left upper lobectomy and 201 had a left lower lobectomy. A statistically significant difference between the groups was identified ($P=0.014$) and subgroup analysis confirmed that mortality in the left upper lobectomy group was statistically significantly higher than the left lower lobectomy group ($P=0.016$). There was no statistically significant difference between the other groups.

Conclusion

This study demonstrates a significant difference in mortality rates between patients having a left upper lobectomy compared with a left lower lobectomy. A randomised controlled trial would allow for the results of this study to be authenticated.

References

1. Surgical treatment for early-stage non-small cell lung cancer, Raman et al, J Thorac Dis. 2018 Apr; 10(Suppl 7): S898–S904
2. European risk models for morbidity (EuroLung1) and mortality (EuroLung2) to predict outcome following anatomic lung resections: an analysis from the ESTS database, Brunelli et al, European Journal of Cardio-thoracic Surgery March 2017

Surgical Resection of Multiple Primary Lung Cancers

Conybeare, A; Bikhmalla, S; Satur, C

University Hospitals of North Midlands

Objectives

To assess the role of surgery in the management of multiple primary lung cancers (MPLC). Historically, multiple lung nodules have assumed to be metastases and patients have been treated as such. However more recently there has been emerging evidence that some of these may be synchronous or metachronous primary lung cancers, with a quoted incidence of 0.73-11.7% (Arpeci, 2013). We looked at the 5-year survival of the surgically resected primary lung cancers in our hospital.

Methods

This is a retrospective study looking at all primary lung cancers resected between January 2010 and December 2015 (to allow a 5-year survival). The patients clinic letters, operation notes and date of death were reviewed from the hospital's computer system. The data collected included patient demographics, smoking status, co-morbidities, pulmonary function, TNM stage, type of surgery, histology, adjuvant chemoradiotherapies, subsequent surgeries and life expectancy.

Results

Of the 357 patients operated on for primary non-small cell lung cancer during this period, 32 had MPLCs, an incidence of 8.9% and an average of 10.6 months between first and second primary tumour. The demographics and pulmonary reserve of these two groups showed no statistical difference and a Kaplan-Meier analysis of their 5-year survival again showed no significance in survival between the two groups.

Conclusions

MPLCs are increasingly being identified as part of lung cancer surveillance. We show that the prognosis of such tumours does not affect life expectancy and suggest anatomical surgical resection of these tumours as standard.

Segmentectomy is a Good Surgical Alternative for the Treatment of Primary Lung Cancer

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University Hospitals of North Midlands

Objectives

To assess the management of patients undergoing surgery for primary non-small cell lung cancer in our hospital and compare this with the gold standard of lobectomies. Many papers group segmentectomies and wedge resections together as sub-lobar resections, however, we wanted to consider these as two discrete separate groups due to the anatomical differences between these sub-sets.

Methods

This is a retrospective study looking at all primary lung cancers resected between January 2010 and December 2015 (to allow a 5-year survival). The patients clinic letters, operation notes and date of death were reviewed from the hospital's computer system. The data collected included patient demographics, smoking status, co-morbidities, pulmonary function, TNM stage, type of surgery, histology, adjuvant chemoradiotherapies, subsequent surgeries and life expectancy.

Results

Of the 357 patients operated on for primary non-small cell lung cancer during this period, 74 underwent segmentectomies, 229 lobectomies and 49 wedge resections. Using a Kaplan-meier curve for life expectancy over a 5-year period suggested no difference in survival between the lobectomy and segmentectomy groups, but with an almost statistically significant reduction in survival in the wedge resection groups ($p=0.03$). This was despite the segmentectomy group being of an older age group than the lobectomy group (73 years and 70 years respectively ($p=0.006$)) and with worse respiratory reserve (24% <70%FEV1 and 41% <70%FEV1 respectively ($p<0.0002$)).

Conclusions

Segmentectomies are an excellent alternative surgical option for those with reduced pulmonary reserve or multiple primary lung cancers where lobectomies may not be the most appropriate solution.

Outcome of Surgery on Non-small Cell Lung Cancer with Pathological N2 Disease Without Neoadjuvant Treatment

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Nottingham University Hospitals NHS Trust

Objectives

Management of N2 disease of non-small cell lung cancer (NSCLC) is debatable. Our study is to demonstrate the outcomes of surgical intervention in this category of patients.

Methods

A retrospective study was done for prospectively collected data of 58 patients referred via a one MDT between 2011 to 2019 with pathological N2 NSCLC who didn't have neo-adjuvant treatment. We studied the survival, surgical outcome, recurrence, and development of new metastasis.

Results

Mean age 58 ± 5.5 years, 25 (43.1%) males and 33 (56.9%) females. 35 (60.3%) patients had lobar resection and 20 (34.5%) patients had pneumonectomy and 3 (5.1%) had sublobar resection. Hospital stay was 10.31 ± 9.6 days. 30-day mortality was 3.4%, 2 patients who had pneumonectomy and developed respiratory failure. 5-year survival for lobar resection, pneumonectomy and sublobar resection was 43.4%, 16.9% and 0 %, respectively ($p=0.06$). 31 (53.4%) patients had stage IIIA and 27 (46.6%) had stage IIIB. Overall survival was 47.8 ± 6.3 months with 5-year survival of 31.6%. 5-year survival for stage IIIA and IIIB was 33.4% and 29.9%, respectively ($p = 0.671$). According to tumour size, 5-year survival for T1, T2, T3 and T4 were 60%, 29.1%, 32.2% and 0%, respectively. 27 (46.6%) patients had adjuvant treatment. 5-year survival was 51.2% in those who had adjuvant treatment and 14.3% for those who didn't ($p<0.005$). Overall regional recurrence developed in 11.7% and distant metastasis developed in 25%. Disease-free survival (DFS) was 49 months. 5-year survival for skip and non-skip N2 disease was 33 % and 30.7 %, respectively ($p=0.5$). 5-year survival for single-station N2 disease was 34.5% and multi-station N2 disease was 27.3% ($p=0.4$).

Conclusion

Surgery for pathological N2 disease has encouraging results particularly when it is followed by adjuvant treatment. Lobar resection resulted in better survival. In our limited numbered study, no difference between single station, multi-station, skip and non-skip N2.

Experience of 37 Bronchial Sleeve Resections for Carcinoid Tumors

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Objectives

Bronchial carcinoids comprise less than 3%. Surgery is the standard of treatment for carcinoids. Because they have a relatively benign course, lung sparing procedures are preferable for centrally located tumors whenever possible in order to avoid unnecessary loss of functional lung tissue. The aim is to present our experience of performing bronchoplastic operations for carcinoids.

Methods

From 2008 through 2020 one surgical team performed 37 bronchial sleeve resections for carcinoid tumors of the lung. There were 51% (19) males and 49% (18) females with a median age of 42 years (range 21-66). Pathologically, 24 (64%) were typical carcinoid and 13 (36%) were atypical. Almost all of them were central – 36 (97%). Ia stage was diagnosed in 54%, Ib stage in 18,9%, IIa in 2,7%, IIb in 8,1%, IIIa in 13,5% and IIIb – 2,7%. In all cases an invagination technique was used to form an anastomosis per 1 cartilage semicircle. 16 variants of sleeve bronchoplastic reconstructions was performed, lobectomy – in 23 (62,2%) patients, bilobectomy – in 2 (5,4%), segmentectomy – in 6 (16,2%), isolated resection of bronchus – in 6 (16,2%) patients. 4 (10,8%) patients underwent bronchoangioplasty interventions. Circular resection of the pulmonary artery was performed in 3 cases, vena cava was resected in 1 patient. Ipsilateral mediastinal lymph node dissection was carried out in 26 (70%) cases, in 11 (30%) cases – sampling lymph node dissection.

Results

Surgical margins were negative in 100%. Complications occurred in 3 patients (8.1%) and included pneumonia (2,7%), atelectasis of the lobe (2,7%), thrombosis of arterial anastomosis (2.7%), required reoperation. There were no postoperative deaths. No recurrence or stenosis has occurred at the sites of bronchoplasty so far.

Conclusion

Bronchoplastic resection for carcinoid tumors is safe and feasible with minimal risks of complications.

Robotic Surgery Increases Rates of Minimally Invasive Mediastinal Mass Resection

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Objectives

Our primary objective was to compare outcomes of mediastinal mass resection in our pre-robotic and robotic eras, looking at rates of minimally invasive surgery, length of hospital stay and post-operative admission to critical care. Secondary objectives were to compare in-hospital outcomes between the VATS and robotic techniques.

Methods

Retrospective case note analysis was undertaken from November 2017 to September 2019. All biopsies, mediastinoscopies, thyroidectomies and thymectomies for non-thymomatous myasthenia gravis were excluded.

Results

51 operations in the pre-robotic era and 42 in the robotic era were identified. There was an increase in minimally invasive mediastinal mass resections from 20% in the pre-robotic era to 45% in the robotic era ($p=0.0079$) (Figure 1). Median length of stay was shorter following the introduction of robotic surgery (3 days (IQR 2-5) v 4 days (IQR 3-5), $p=0.068$). Fewer minimally invasive cases went to critical care post-operatively compared to open (88.64% v 27.59%, $p<0.0001$).

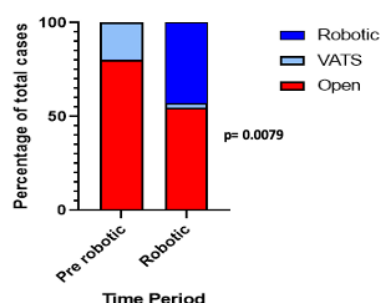


Figure 1: Bar chart showing different operative approaches in the pre-robotic and robotic periods

We found no difference in post-operative critical care use, size of lesion removed or incomplete resections between robotic and VATS. We observed a trend towards less post-operative strong opioid use in the robotic group (median 24mg [IQR 4-33mg]) versus the VATS group (median 32mg [IQR 18-40mg]) ($p=0.073$). When comparing open, VATS and robotic mediastinal mass excision, both VATS ($p<0.0001$) and robotic ($p<0.0001$) had significantly shorter length of hospital stay than open surgery, but there was no significant difference between VATS and robotic.

Conclusions

The introduction of robotic surgery at our institution has led to more patients receiving a minimally invasive mediastinal resection. Minimally invasive resection results in a shorter median length of stay and less routine critical care use compared to open.

Intra-operative Identification of Small Pulmonary Nodules -- A Novel Translobar and Transfissural Technique

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Norfolk and Norwich University Hospitals NHS Foundation Trust

Objectives

Most lung resections are now carried out via video-assisted thoracoscopic surgery. However, wedge resections or limited resections are often dependent on the identification of the lesion by the surgeon. Pre-operative computer tomography (CT)-guided identification using a coil or a hook and wire has been around for a number of years. We describe a new technique of identifying lesions, using translobar coil insertion.

Methods

Our technique consists of inserting a single 8 x 90 mm Tornado® Embolization Microcoil™ through a 20G BD Spinal Needle under CT guidance via a translobar approach. Once the needle is within the lesion, the coil is then deployed such that approximately the final 2 cm sits within the fissure on the visceral pleura. This allowed easy identification of the lesion and allowed easy manipulation of the lesion. Criteria for undergoing this technique included no conventional alternatives for pre-operative identification of the lesion because of location.

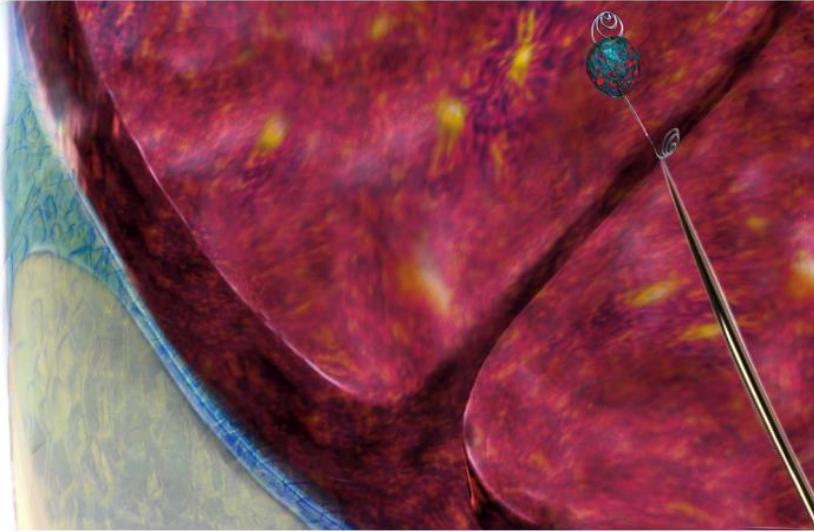
Results

Between 2018 and 2020, 6 patients underwent this technique of coil insertion. None of the lesions were attainable via conventional methods of coil insertion and were all deemed to be potentially unidentifiable intra-operatively. All lesions were easily identified with the coil from the fissure and resected with minimal difficulty. No manual palpation of the lesion was required. All lesions were removed with good margin. There were no complications post-procedurally, intra and post-operatively. Unlike other methods of coil insertion, no intra-operative radiography was required to confirm that the lesion had been excised.

Conclusion

This is a novel technique of coil insertion with minimal parenchymal damage and easy intra-operative identification, for lesions where intra-operative manual palpation and conventional coil insertion are not an option.

Figure 1. Diagram depicting the insertion of the coil through the adjacent lobe and the position of the coil



Subxiphoid, Non-intubated Video-assisted Pneumonectomy (Video)

Nizami, M; Hogan, J; Williams, L; Pradeed, S; Peryt, A; Coonar, A; Patvardhan, C; Aresu, G

Royal Papworth Hospital

LigaSure Device (Maryland) Used to Remove a Tracheal Tumour in a Centre with no Laser Facilities

Williams, J; Combellack, T; Pirtnieks, A; Kornaszewska, M; Valtzoglou, V

University Hospital of Wales

Objective

To describe the first reported case of using a electrosurgical device (Maryland) to remove a tracheal tumour. Due to the coronavirus pandemic our single centre relocated to a green hospital to ensure time-sensitive operations were performed. Unfortunately, this meant we were unable to have access to laser facilities, previously used for our tracheal and bronchial tumours. This case describes an 80 year old male who previously underwent a right upper lobectomy for a squamous cell carcinoma. On surveillance imaging, a rapidly growing mid-tracheal tumour was noted (see image). Following MDT discussion it was decided urgent debulking was required and oncology requested if a stent could be avoided to prevent radiotherapy complications.

Method

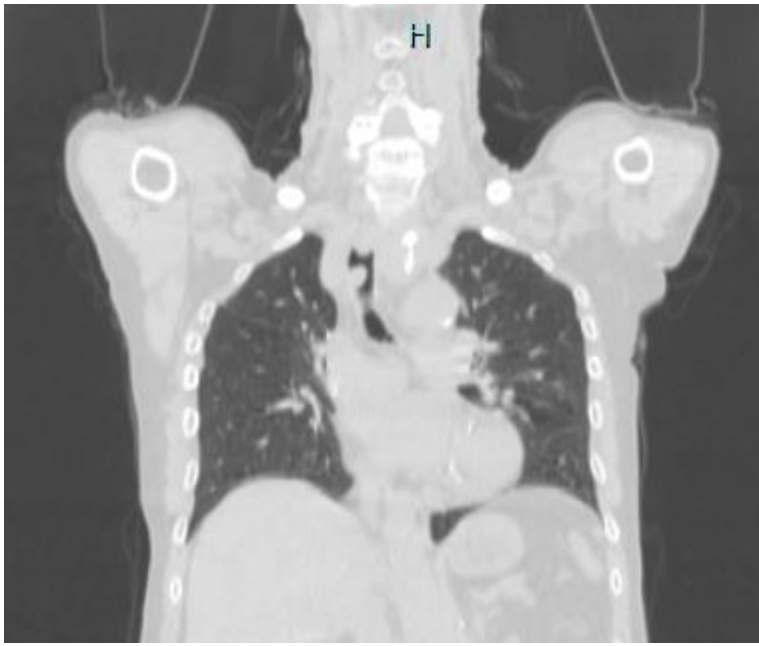
Using a tracheoscope and 450mm Maryland the squamous cell carcinoma, which had occluded 85% of the mid-trachea was removed in bulk. This meant a tracheal stent did not need to be inserted, enabling radiotherapy to be commenced.

Results

Following an extensive literature search there is no documented cases of using a Maryland to remove a tracheal or bronchial tumour in bulk. It is known laser and argon therapy can be used to remove Tracheal tumours or Tracheal stents can be inserted for palliative support in protecting a patient's airway. This case is therefore the first known successful removal of a tumour in bulk by using a Maryland.

Conclusion

Electrosurgical devices can be used in centres which do not have access to laser or argon therapy, to successfully remove a tracheal tumour. A tracheoscope is required rather than a rigid bronchoscopy to be able to pass the Maryland and comfortably remove a tracheal tumour.



A Contemporary Analysis of Chest Wall Resection and Reconstruction: The Multidisciplinary Approach

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Background

Surgical treatment of chest wall tumours often requires complex resection and reconstruction techniques undertaken by multidisciplinary teams including both thoracic & plastic surgeons. The aim of this study was to review our contemporary experience of multidisciplinary surgical management of chest wall pathology.

Methods

A single-centre retrospective review of all consecutive patients undergoing chest wall resections from February 2012 to April 2020 was undertaken. Pre-operative characteristics, surgical techniques & post-operative outcomes were reported.

Results

70 patients underwent surgery during the study period. 51.4% (n=36) were male. Tumours were classified as primary lung cancer (70.0%, n=49), secondary lung cancer (5.7%, n=4), sarcoma (21.4%, n=15) and benign (2.9%, n=2). Plastic surgeons and spinal surgeons were involved in 46.8% (n=33) and 11.4% (n=8) of cases, respectively. The mean number of ribs resected was 2.7 (\pm standard deviation [SD] 1.2) and 68.6% (n=48) of patients underwent concomitant reconstruction. Techniques for reconstruction included the use of either mesh alone (52.1%, n=25/48) or a mesh and methyl methacrylate sandwich (43.8%, n=21/48). Concomitant flaps were performed in 41.7% (20/48) of reconstructions. Post-operative complications included lower respiratory tract infection (LRTI) (7.1%, n=5), atrial fibrillation (AF) (2.9%, n=2), prolonged air leak (2.9%, n=2) and reintubation (5.7%, n=4). 30 and 90-day mortality was 2.9% (n=2) and 8.6% (n=6), respectively. Median post-operative length of stay (PLOS) was 8.0 days (\pm interquartile range [IQR] 6.0-16.5 days).

Conclusions

This study has shown that complex chest wall resections frequently require multidisciplinary input (almost 60% in this experience). Undertaking these procedures in high-volume centres with access to these appropriate specialist multidisciplinary teams allows these complex procedures to be carried out safely with acceptable rates of morbidity and mortality.

Mechanical Circulatory Support for Cardiogenic Shock After Acute Myocardial Infarction: A Bridge too Far?

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¹Golden Jubilee National Hospital; ²Royal Infirmary of Edinburgh

Objective

Cardiogenic shock is a sinister sequelae that complicates between 5-15% of ST elevation acute myocardial infarctions (STEMIs) and may be refractory to inotropic support. Outcomes are variable but mortalities of up to 90% are reported in the absence of experienced care. Mechanical circulatory support (MCS) can potentially improve survival. However, it is associated with significant costs, morbidity and mortality. We report our experience as the tertiary referral centre over 10 years (2010-2020).

Methods

A retrospective review was undertaken on all patients registered to the MCS service. The database was interrogated for patient demographics, type and duration of MCS support, PCI-outcomes and survival to 30-days. A time-to-event analysis was performed using patient survival as the primary outcome measure.

Results

Thirty-six patients were included. The median age of the patients as 50 years (45-55 years). VA-ECMO was the initial MCS of choice in 26 (72.2%) patients with BIVAD in 4 (11.1%) patients and LVAD for 6 (16.7%) patients. 20 (55.6%) of these patients received active CPR prior to revascularization. 30-day mortality was 33.3% in this cohort, survival to discharge was 44.4%.

For survivors, the median length of MCS support was 7 days with a median in-hospital stay of 28.5 days. Univariable analysis revealed a trend of lower pre-intervention Charlson Comorbidity index($p=0.18$), post-MCS implantation creatinine ($p=0.11$) and PaO₂/FiO₂($p=0.13$) in survivors. Long-term follow-up of up to 10 years demonstrates a high mortality beyond 30-days up to the first-year post MCS support.

Bilateral VATS and Trans-Cervical Approach for Total Thymectomy and Thyroidectomy: A Combined Thoracic and Endocrine Surgery Procedure (Video)

Kar, A; Santhirakumaran, G; Dent, P; Smelt, J

St George's Hospital

Readmission Rates Following Lung Resection for Malignancy: Has There Been a Change in Practice and Outcomes Following COVID-19?

Kar, A¹; Choi, J¹; Patel, J¹; Ghani, S²; Humphrys Eveleigh, A¹; Smelt, J¹; Hunt, I¹; Vaughan, P¹; Jenkins, M¹; Tan, C¹

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Objectives

30-day readmission rates for patients undergoing primary lung cancer resection is reported in the literature: 6.2%-12.8%. The 'Get it Right First Time' (GIRFT) report was published in 2018 outlining the quality of patient care in UK thoracic centres. We previously investigated the incidence and factors affecting readmissions for patients undergoing primary lung cancer resection within our institution (January-June 2019). The aim of this study was to evaluate our practice in the COVID-19 era, following the 'first wave', after resuming a full thoracic service in our unit.

Methods

36 consecutive patients who underwent elective primary lung cancer resection (August-September 2020) were identified from the hospital database. Data was collected on patient demographics, operative site, 30-day readmission and 30-day mortality.

Results

1/3 patients were female (n=12); mean age was 60.4 years. Cases performed included: 29 lobectomy; 3 wedge resection; 2 segmentectomy and 2 metastasectomy. 25% of all operations required thoracotomy. 11.1% of patients (n=4) were re-admitted within 30 days of discharge; 1 required re-operation for empyema. There was no mortality at 30 days. Other reasons for re-admission were pneumonia requiring IV antibiotics (n=2) and shortness of breath requiring pulmonary embolism to be excluded (n=1). We previously reported a 9.71% rate of re-admission at 30 days for 103 patients in a six-month period in 2019.

Conclusions

Our 30-day re-admission rate following primary lung cancer resection is consistent with current literature and COVID-19 did not affect early outcomes. Earlier virtual clinic consultation and thoracic nurse specialist follow-up to check on patient progress on discharge may have long-term impact on 90-day readmission rates, with associated financial implications. Although COVID-19 has impacted thoracic surgical practice, perhaps there are lessons to be learnt in altering future postoperative follow-up to improve patient outcomes.

Cardiopulmonary Bypass Use in Thoracic Surgery - A Ten-year Review: Meticulous Plans and Emergency Escapes in Two Centres

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¹Freeman Hospital, Newcastle-upon-Tyne; ²James Cook University Hospital, Middlesbrough

Objectives

Cardiopulmonary bypass (CPB) is rarely used in general thoracic surgery for planned complex resections and emergently for catastrophic haemorrhage. Incidence and outcomes are not well described in either group. We reviewed the use of CPB in thoracic patients including the impact on short term post-operative and long-term oncological outcomes.

Methods

Data were prospectively recorded in two centres from 2010-2020. Demographics, planned operation, pathology with staging, and CPB details (cannulation approach, bypass times and cross-clamp) were recorded. The primary endpoint was 30-day mortality, with secondary outcomes of 5-year survival, resection margin, recurrence or metastasis, hospital/ICU length of stay (LOS) and post-operative complications.

Results

CPB was required in 12 patients (4 emergencies), representing 0.13% of 9556 cases. Median age was 60 years, with 6 pneumonectomies, 5 lobectomies, and 1 thymectomy with pneumonectomy performed, of which 8 were planned: 6 for NSCLC (T3-T4), 1 thymic carcinoma, and 1 sarcoma. 9 were via central cannulation and mean bypass time was 74.5min (24.3min in emergencies). 30-day mortality was 8.3% (0% in emergencies). 1, and 5-year mortality were 25% and 56% respectively. We found 1 incomplete resection in both the planned and emergency group, but lymph nodes were sampled appropriately in all patients. 2 patients had local recurrence and 4 metastases (vertebral, brain and kidney). Median ICU and total LOS were 3 (1-29) and 12.5 (4-45) days, with low rates of post-operative complications.

Conclusions

CPB use was infrequent, with only 12 cases over 10 years in two large centres. When used, it was associated with an increased LOS and ITU LOS compared with typical resections (median of 3 days), but only one mortality within 30 days. Planned use of CPB occurred in more advanced stage NSCLC (IIIA/IIIB), but 5-year survival was comparable to that expected for this patient cohort.

	Emergency CPB (4)	Elective CPB (8)
Stroke	0	0
Return to theatre for bleeding	0	2
Acute Kidney Injury (CVVH)	1 (0)	3 (2)

Have I Got the Correct Rib? Image-guided Chest Wall Resection Enables Accurate, Minimally Invasive Resection of Non-palpable Rib Lesions

Ike, D; Baranowski, R; Szczeklik, M; Lau, K

St Bartholomew's Hospital

Objective

Surgeons are increasingly asked to resect small, impalpable rib lesions for tissue confirmation and as radical treatment of oligometastases. Incidences of resecting the wrong rib has been reported.

We describe the use of intraoperative cone-beam CT (CBCT) to localise rib lesions accurately, guide incision placement and confirm resection at the end of procedure.

Methods

A CT covering the first rib to the target lesion is acquired to allow rib counting. The location of the lesion is then known with certainty. The limits of resection including a margin are marked with 21G needles (image 1). An incision is made between these two needles and the segment of rib between the needles is resected. A CT is then carried out to confirm the lesion and its margins have been adequately resected.

Results

3 females (mean age 43.7) with oligometastatic breast cancer underwent image-guided rib resection. One patient underwent concurrent mastectomy. Two lesions were confirmed breast cancer metastases, completely resected. The third lesion showed fibrosis and sclerosis consistent with a treated breast metastasis following adjuvant chemoradiotherapy. There were no complications and patients were discharged on day 1.

Conclusions

Cone-beam CT enables:

- rapid and accurate localisation of rib lesions and margins
- accurate placement of incision to minimise unnecessary and exploratory incisions
- confirmatory documentation the correct segment of rib was resected



Thymectomy for Thymoma: When do we Perform Open Surgery?

Taberham, R; Stavroulias, D

Oxford University Hospitals NHS Foundation Trust

Objectives

Resection of anterior mediastinal lesions are increasingly performed via minimally invasive techniques. We sought to determine our minimally invasive versus open resection rate and the factors influencing intra-operative conversion from VATS to sternotomy.

Methods

We retrospectively reviewed the outcomes of consecutive patients undergoing resection of an anterior mediastinal mass, radiologically consistent with thymoma between January 2014 and October 2020. Electronic patient records were examined for surgical approach, requirement for conversion to open surgery and indication for conversion. Presence or absence of myasthenia gravis was documented and final pathology results were evaluated. Where thymoma was confirmed, pathological stage was reviewed by TNM 8 and Masaoka-Koga staging.

Results

57 patients underwent resection of a radiologically detected anterior mediastinal lesion. 35 patients (61.4%) underwent VATS resection, 22 patients (38.6%) underwent resection via sternotomy, of which 5 were converted from VATS to sternotomy. All 5 patients converted from VATS to sternotomy had myasthenia gravis. 3 had confirmed thymomas, and these were unexpectedly invading other structures. 2 cases were converted due to haemodynamic instability after carbon dioxide insufflation. All patients with left brachiocephalic vein involvement underwent open resection. 35 (61.4%) patients were confirmed to have a thymoma histologically.

Conclusions

The majority of anterior mediastinal lesion resections at our institution are performed via a minimally invasive approach. Myasthenia gravis and unexpected invasion of surrounding structures may be risk factors for conversion to open surgery.

Subxiphoid, Non-intubated Right Bilobectomy - Resection of the Right Upper and Middle Lobe (Video)

Nizami, M; Hogan, J; Williams, L; Pradeed, S; Patvardhan, C; Peryt, A; Coonar, A; Aresu, G

Royal Papworth Hospital

Outcomes in Lung Cancer Patients with Central Airways Obstruction With or Without Interventional Bronchoscopic Treatment

Miller, D; Crowle, D; Marchbank, A; Daneshvar, C

Derriford Hospital

Introduction

Central airways obstruction (CAO) in lung cancer is a common and poorly prognostic presentation of lung cancer. Most interventional studies of patients with central airways disease do not include patients who do not undergo bronchoscopic intervention, and without good controls, risk of bias in case selection is high.

Methods

Combining two audit cohorts of patients, the first from 2014-2015 retrospectively identified, and 2019 to 2020 prospectively collected, we extracted patients with a histological or clinico-radiological diagnosis of primary lung cancer with central airways obstruction (CAO) of $\geq 50\%$ to describe interventions and outcomes.

Results

Of 57 patients with CAO of $\geq 50\%$, 22/57 (36.1%) were male and the median [IQR] age was 71 [63.5-75] years. CAO was the index presentation in 51/57 (89.5%) of patients. Symptomatic disease was present in 41/57 (71.9%) patients. Performance status was recorded in 51/57 (89%), with 14/51 (27%) having a performance status of ≥ 3 . Imaging revealed 48/57 (84.2%) had distal viable lung. Tissue was confirmed in 47/57 patients, with NSCLC –adenocarcinoma and squamous, representing 18/47 (38.2%) and 17/47 (36%) of histologically confirmed cases respectively. Rigid bronchoscopy was performed in 20/57 (35.1%) of patients. Outcomes – at 30 and 90 days, 9/57 (15.8%) and 22/57 (38.6%) had died. In those patients undergoing rigid bronchoscopy, 2/20 (10%) versus 7/37 (18.9%) and 8/20 (40%) versus 14/37 (38%) had died at 30 and 90 days respectively (no significant difference). A marginal separation in the survival curves was noted, however again this did not reach significance ($p=0.361$).

Conclusion

With only 1 in 3 patients undergoing intervention, and no clear difference in survival between those patients undergoing rigid bronchoscopy, prospective studies are required to clearly understand the optimal management of central airways obstruction in primary lung cancer patients, a cohort with poor prognosis.

Laser Assisted Extended Pleurectomy Decortication for Malignant Pleural Mesothelioma (Video)

Kutywayo, K; Acharya, M; Nakas, A

Glenfield Hospital University Hospitals of Leicester NHS Trust

Does the Number of Ports Really Matter? A Propensity Score Analysis After Video-assisted Thoracoscopic Surgery for Lung Cancer in High-risk Patients

Budacan, A; Abiuso, V; Mahendran, K; Fallouh, H; Steyn, R; Bishay, E; Naidu, B; Kalkat, M; Hernandez, L

UHB NHS trust

Objectives

Evidence on the potential benefit of Uniportal video-assisted thoracoscopic surgery (UVATS) in high-risk patients undergoing lung cancer surgery is lacking. This study aimed to compare the outcomes of high-risk patients undergoing UVATS versus conventional multiport approach(M-VATS).

Methods

All patients who underwent VATs anatomical lung resections for early-stage lung cancer between May 2015-March 2020, with a predicted post-operative FEV1 or transfer factor <40% were included. Propensity score was created to adjust for baseline differences (age, smoking, BMI, procedure and incision) and data on outcomes was collected.

Results

Eleven patients were included in each group; table 1 shows patient characteristics. Median drainage time in U-VATs was higher than in M-VATS, but this difference was not statistically significant; median length of stay was similar between groups. Two cases returned to theatre in UVATS group for bleeding and for closure of air leak. Two patients died in the M-VATS group vs one death in the UVATS group.

Conclusion

The lack of significantly statistical difference in outcomes between groups and no 30-day mortality suggest that UVATs is a safe and feasible alternative. This needs to be investigated in prospective, randomised controlled trials, as this was a small sample and might not be representative.

Parameter	UVATS(n=11)	Multiport VATS(n=11)
Age (years)*	63 [39-79]	69 [56-77]
Smoking status		
Current **	1	3
Ex-smoker **	10	8
Pack-year	48[17-102]	42[0-60]
Size (mm)*	30 [12-55]	26 [15-40]
PPO FEV1 (% predicted)*	42.9 [21-73.2]	45.7 [16.2-75.1]
PPO transfer factor(% predicted)*	37.8 [28.7-71.5]	37.5 [22.8-50.1]
Complications**	7	4

Prolonged air leak	6	3
Bleeding requiring return to theatre	1	0
Infection causing prolonged hospital stay ***	0	2
Re-operation, n (%)**	2 (18)	0
Days of drainage*	14 [1-56]	4 [2-82]
Length of stay(days)*	7 [4-38]	7 [3-52]

Table 1. *Results presented as median [interquartile range]; **Results presented as number of patients; ***Empyema or hospital acquired pneumonia; PPO= Predicted Post-Operative.

Analysing Incidental Findings of Tuberculosis (TB) on Surgical Resection of PET-positive Lung Nodules on the Suspicion of Cancer

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¹Hull York Medical School; ²Hull University Teaching Hospitals

Background

FDG-PET/CT has been reported to have lower specificity in differentiating malignant and benign pulmonary nodules in populations with endemic infectious lung diseases. Active tuberculous lesions have high FDG tracer uptake and can cause false positive FDG-PET results for suspected pulmonary malignancy. Patients who undergo surgical resection on the basis of positive PET findings can have inflammatory or benign disease on post-operative histopathological examination.

Study design

Single-centre, retrospective observational study.

Methods

Data was retrieved from digital records at Castle Hill Hospital. Patients who underwent surgical resection of suspected primary lung cancer (2013-2020) for diagnostic, staging or therapeutic purposes were included. Patients who had positive PET results due to non-cancerous causes were analysed further. We evaluated and compared specific patient characteristics, symptoms, investigation results, post-operative complications and prognoses. These were used to identify potential factors which may predispose patients to having TB, as opposed to a malignancy requiring surgical resection.

Results

Out of the 1778 included patients, 312 (~18%) had PET-positive non-cancerous lesions. Of these, 13 patients (4%) had caseating granulomas/inflammation consistent with tuberculosis. 2 of the 13 tuberculosis patients were negative for TB on blood cultures/ PCR, indicating possible latent TB. 6 patients developed post-operative complications or morbidities; while one had an in-hospital arrest and death due to bilateral PE. Patients presented with varying symptoms such as cough, weight loss and chest tightness.

Conclusion

This study highlights the importance of recognising clinical and investigative features of TB, in order to avoid unnecessary surgical intervention and risk of patient morbidity and mortality. Alternative diagnostic approaches could improve clinical decision-making and management of suspected cancerous nodules.

COVID-19 Post Thoracic Surgery; Discussion of Cases

Badran, A¹; Abuseedou, R²; Amer, K²

¹University Hospital Southampton NHS Foundation Trust; ²University Hospital Southampton

The COVID-19 pandemic has affected provisions and delivery of thoracic surgery internationally. With an initial pause of all surgical activity, followed by prioritisation for emergency thoracic and cancer operations.

We review our experience of COVID infections in thoracic surgery and outcomes as we prepare for a second wave of the pandemic:

A 75-year-old male admitted for right lower lobe adenocarcinoma with involved hilar node under the bronchus intermedius. Following open lower lobectomy he had rehabilitation for a week post-op and went home 2 days after. On day 22 he represented with abdominal pain and loose bowel motions. Admission CT-chest showed consolidative changes.

A 74-year-old female previously admitted with shortness of breath for bronchoscopy and left lower lobe bronchus stenting on a background of right post pneumonectomy syndrome. She was discharged a day post procedure after a good recovery. She re-presented 2 months later with dyspnoea and a productive cough.

Both patients had a positive COVID swab and died despite non-invasive ventilation and antimicrobial therapy.

COVID-19 has a high mortality in thoracic surgical patients. Better characterisation of cases as well as shared reporting is needed to better risk stratify patients.

Video Assisted Thoracoscopic, Parenchymal Sparing 'Rotational' Bronchoplasty for Managing Bronchial Carcinoid Tumour (Video)

Asemota, N; Ike, D; Baranowski, R; Azari, M

St Bartholomew's Hospital

Analysis of Patients Who had PET Positive Nodules Resected, but had Non-malignant Diagnoses on Histology: A Single Centre Audit Study

Veerappan, V¹; Burway, S¹; Hussain, A²; Ajab, S²; Loubani, M²; Tentzeris, V²; Cowen, M²; Qadri, S²

¹Hull York Medical School; ²Hull University Teaching Hospitals

Introduction

FDG-PET/CT is an important imaging tool used to inform surgeons whether to surgically treat a pulmonary lesion. However, due to PET/CT's specificity, some patients are identified to have PET-positive lesions but histologically have conditions that do not require surgical intervention post-surgery.

Study design

Retrospective single centre study from 2013-2019

Methodology

Data was collected through Hull University Teaching Hospitals in concordance with audit guidelines. 254 patients were identified who had surgical lung resection but benign conditions through histology. Data on type of surgery and patients' perioperative hospital stay was collected. Patients were grouped based on their histological diagnosis.

Results

14% (254) of all patients who underwent surgical resection for suspected pulmonary cancer had a PET-positive scan but histologically a condition that did not require surgical intervention. Of 254 patients, 12.6% (32) underwent a bilobectomy, 12.2% (31) underwent segmentectomy, 17.3% (44) underwent a lobectomy, 56.7% (144) underwent a wedge resection and 1.2% (3) underwent a sleeve resection. 18.9 % (48) all patients had perioperative complications, 9 of these patients had to be re-admitted to ITU, while 1 died in hospital.

83.5% had non-infective conditions, while 16.5% had infectious conditions histologically. The predominant types of infective conditions were TB and aspergillosis, with 12 patients each. Abscesses, bronchiectasis, and pneumonia were common finding in these patients.

Most common non-infective condition was interstitial lung disease (21.3%). Lymphoid disorders, amyloid deposits, fibrosis, emphysema, interstitial inflammation were other non-infective conditions.

Conclusion

These surgeries still carry a huge burden to both hospitals and patients. As such, it is paramount that statistics of these cases are reported, but more importantly, that these patients are identified before surgery and appropriately treated.

Segmentectomy or Wedge Resection in Pulmonary Metastatectomy

Badran, A; Talbot, T; Amer, K

University Hospital Southampton NHS Foundation Trust

Objectives

Wedge resection is the most common operation for pulmonary metastases. Segmentectomy can be used when a wedge will not provide complete oncological clearance. We reviewed pulmonary metastatectomy practices and outcomes in our unit.

Methods

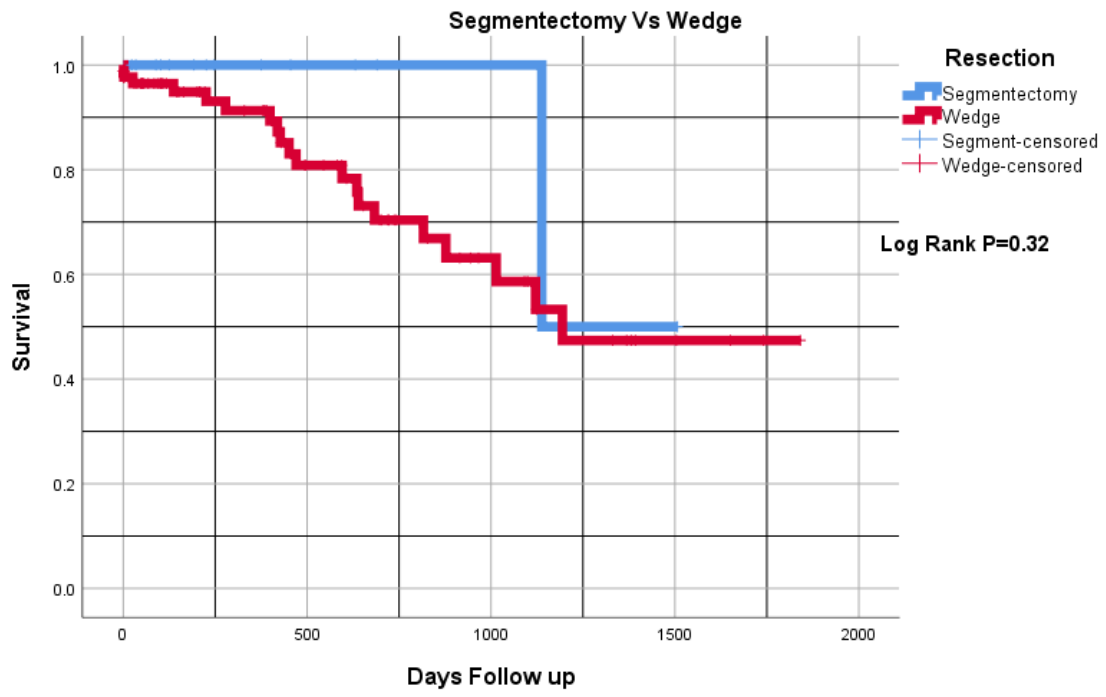
Our study included 104 patients who underwent segmentectomy (n = 14) or wedge resections (n = 104) without preoperative chemotherapy for pulmonary metastases from a distant primary between January 2015 and December 2019.

Results

Patients that underwent segmentectomies were similar age (mean 69 years) to those who had wedge resection (mean 61 years), with no significant difference in disease (n=2 vs n=36, P=0.07), diabetes (n=2 vs n=10, P=0.5) and COPD (n=1 vs n=2, P=0.36). Patients who had segmentectomy had longer average length of in-hospital stay (4 days) compared to those who had a wedge resection (mean=3 days). There was a higher average blood loss with segmentectomies (82ml) than wedge (40ml) P<0.05. Reviewing survival there is an apparent advantage with segmentectomy particularly in the mid-term follow up although this did not reach

Conclusions

Wedge resection is the mainstay of pulmonary metastatectomy. Segmentectomy seems to confer a survival benefit compared to wedge resection, although this was not statistically significant.



EARL: A Multicentre Phase III Randomised Trial to Evaluate the Efficacy of Endobronchial Electrocautery in High-grade Bronchial Dysplasia

Kalinke, L; Thakrar, R; Janes, S

University College London Hospital

Objectives

Bronchial high-grade preinvasive lesions (severe dysplasia or carcinoma in situ (CIS)) are precursors of squamous cell cancer. CIS is found at the lobectomy resection margin in up to 2.5% of cases. We have found that 85% of CIS at resection margins progress to cancer over a median interval of 37 months. Additionally, 40% of such patients had CIS lesions detected in another part of the bronchial tree. These lesions are readily identified using autofluorescence bronchoscopy (AFB) but not using traditional bronchoscopy. Low-level evidence suggests lesions be managed surgically which is often unnecessary as some will spontaneously regress. A tissue sparing strategy is needed.

We are conducting a Cancer Research UK funded, randomised trial to examine whether bronchoscopic electrocautery of high-grade lesions prevents their progression. Electrocautery (EC) is a thermal ablative therapy. Case series reports in treating early lung cancer have shown response rates as high as 97% at five years.

Methods

Participants who have ≥ 1 high-grade lesions will be randomised 2:1 to electrocautery and AFB surveillance or AFB surveillance alone. The trial will run across 6 centres (UCLH, Wythenshawe, Papworth, Glasgow, Nottingham and VUmc, Amsterdam). Referral criteria are:

1. Individuals with dysplasia or CIS found at the resection margin post-operatively or incidentally on bronchial biopsy (including participants seen up to a year previously)
2. Individuals with abnormal sputum cytology, but a normal CT or bronchoscopy

All participants will have a baseline chest CT and AFB and then AFB at six, 12, 24 and 36 months. Participants can receive two EC treatments per year for the three-year trial period. The primary endpoint is a patient's time to progression of any index HGL to lung cancer.

Results

The trial opens in November 2020. We are aiming to recruit 106 patients.

Conclusions

If successful, this trial will address an unmet clinical need for a proven tissue sparing therapy.

Image-guided Combined Resection and Ablation in Thoracic Surgery (iCART) for the Management of Multiple Pulmonary Modules

Harrison, O; Sarvananthan, S; Tamburrini, A; Peebles, C; Alzetani, A

University Hospital Southampton

Objectives

To demonstrate the feasibility and preliminary outcomes of a novel hybrid technique combining percutaneous microwave ablation and wire-assisted wedge resection for managing patients with multiple pulmonary nodules using intra-operative imaging.

Methods

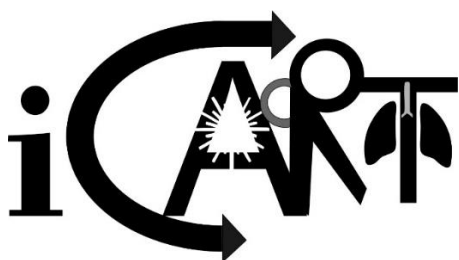
We describe our hybrid approach and present a prospective review of patients undergoing iCART at our institution between August 2018 – January 2020. Procedures were performed in the hybrid operating suite using the Siemens ARTIS Pheno® cone-beam CT scanner. Data points included lesion size, depth, location and histological result, surgical complications and length of stay. Median values are given \pm interquartile range.

Results

Five procedures were performed with 1 patient undergoing staged bilateral procedures. All underwent at least 1 ablation and 1 wedge resection during the procedure. Median age was 54(\pm 16) years and 75% were male. All had a past history of cancer. Lesions were treated in every lobe. Median size and depth were 8(\pm 15) mm and 29(\pm 9)mm respectively for ablated nodules and 13(\pm 18)mm and 6(\pm 14.5)mm respectively for the wedge resected nodules. Three procedures were completed uniportal and median operative time was 152(\pm 127) minutes. All cases sustained <10ml blood loss. There were two intra-operative pneumothorax, one prevented successful completion of the ablation. One patient required a prolonged period of post-operative physiotherapy and was discharged on day 6. Median length of stay was 3(\pm 3) days. All 5 histological specimens confirmed metastatic disease.

Conclusions

With the introduction of lung cancer screening in the UK, the diagnosis of multiple pulmonary nodules is likely to increase. Our hybrid approach provides a minimally-invasive and comprehensive personalized therapy for patients with multiple pulmonary nodules under a single general anesthetic. It provides histological diagnosis whilst minimizing lung tissue loss and removes the need for transfer from radiology to theatre.



The Delay Between Staging PET and Resection of Lung Cancer -- Does Extra Theatre Capacity Make a Difference?

Purmessur, R; Page, A; Bartnik, A; Kouritas, V; Bartosik, W; Van Tornout, F; Kadlec, J

Norfolk and Norwich University Hospitals NHS Foundation Trust

Introduction

In 2010, a target of 62 days between GP referral and curative treatment was introduced by the NHS for cancer patients and the British Thoracic Society recommended ≤ 4 weeks between the last imaging and surgery. The aim of this study was to determine whether increasing the number of theatre slots and earlier scheduling of patients for surgery impacted positively on predicted long-term survival.

Methods

The initial observational audit between January and August 2018, previously presented at the SCTS Annual meeting in 2019, demonstrated that there was a delay of at least 60 days between the staging PET (Positive Emission Tomography) scan and surgery in 70% of cases and pathological upstaging in 59% of cases. As a result, the theatre slots available to the Thoracic Surgeons were increased by the hospital by 31%. The delay between staging PET scan and surgery and its impact on predicted survival was re-audited between May and December 2019. As with the previous study, the statistical analysis was performed using t-test, ANOVA, Kruskal-Wallis and Fisher test.

Results/Discussion

There was an overall improvement in the delay between staging PET scan and surgery, with a significant decrease of patients having surgery >60 days after PET (70% vs 52%, $p=0.01$) and an increase in group of patients scheduled for surgery ≤ 30 days from PET (2% vs 13%, $p=0.005$). This also resulted in a reduction in the number of tumours upstaged (59% vs 31%, $p=0.0001$). Predicted 5-year mortality for all patients decreased from 10% to 4% and for upstaged patients from 17% to 14%.

Conclusion

The delay between staging PET scan and surgery has a significant impact on predicted long-term survival. The provision of additional theatre allocations improved the predicted long-term mortality for patients undergoing lung resection for cancer, while also improving the compliance with the 62-day wait target.

A Prospective Observational Study to Elucidate the Role of Intra-operative Imaging in the Management of Pulmonary Nodules

Bakir, A; Alzetani, A; Harrison, O

University Hospital Southampton

Objective

Cone Beam Computed Tomography (CBCT), has revolutionised intra-operative visualisation of pulmonary nodules facilitating biopsy and resection of smaller, deeper lesions. Our objective was to demonstrate the feasibility and outcomes of patients undergoing image-guided navigational bronchoscopy or wedge resection in the hybrid theatre at our institution between December 2017– September 2019.

Methods

All patients referred through the lung Multi-Disciplinary Team (MDT) for image-guided navigational bronchoscopy or wedge resection were identified and observed prospectively. Procedures were performed in the purpose-built hybrid theatre at our institution using the Siemens ARTIS pheno® CBCT. Data points included lesion size, depth and location. Outcomes included surgical complications, length of stay and positive histology. Data were analysed with SPSS statistics.

Results

Twenty-nine patients were included with a mean age of 64 (range 26-85) and the majority (17; 58.6%) were male. Image-guided procedures included navigational bronchoscopy (19; 65.6%) and wedge resection (10; 34.4%). Average nodule size was 25 ± 18 (mm; mean \pm SD) and average depth was 22 ± 17 (mm; mean \pm SD). Most lesions were in the right upper lobe (12; 41.4%). One procedure was abandoned due to the failure to localise the lesion. There were no postoperative complications. The median length of stay was 1 day. Positive histology was obtained in 24 (85.7%) of cases, 17(68%) were malignant, 7 (25%) were benign and 4 patients (14.3%) had a biopsy which was inadequate for assessment.

Conclusions

Intra-operative CBCT allows localisation and resection of small, deep lesions and negates the need for transfer under anaesthesia from the radiology department to theatre. Despite its infancy, the technique demonstrates a low failure rate, a very low complication rate and offers an acceptable positive histology rate.

Selective Perform Chest X-ray Post Chest Drain Removal Following Lung Resection is Safe and Cost-effective.

Liu, X

University Hospital Southampton

Objective

The purpose of this retrospective study is to determine the safety and efficacy of selectively performing a chest X-ray (CXR) post chest drain (CD) removal following lung resection. In a large thoracic centre in the south of England, there were four surgeons. One of them did not perform a routine CXR following a CD removal for the patients who were under his care unless clinical signs and/or symptoms indicated it was necessary, but three other surgeons performed CXR routinely after the CD removal regardless of the patients' clinical presentation.

Methods

A retrospective quantitative review of medical records from the hospital e-document database was conducted on all adult thoracic patients with a CD placed following their lung resection in a five-year period. A total of 2083 patients were identified within this study and they were divided into two groups. Those who were selective to perform a CXR (Group 1, n = 444, 1 surgeon) and those who had a routine CXR (Group 2, n = 1639, 3 surgeons).

Results

Twenty-one (1%) patients (8 in Group 1 & 13 in Group 2) needed a CD reinsertion. Twenty (95%) out of those 21 patients developed some degree of respiratory difficulties and/or haemodynamic instabilities. A total of £99,078.96 would have been saved within those five-year periods. A total of 321.64 days of hospital beds would be saved and 178 patients could have had their operations earlier if the surgeons in group 2 did not perform the CXR routinely.

Conclusion

Thoracic patients requiring CD reinsertion were found to be relatively rare and the CD reinsertion was secondary to clinical signs, symptoms of patients and the surgeon's clinical judgement. A CXR should be a guide for clinicians to use to confirm their clinical suspicion and to quantify the size of the pneumothorax/pleural effusion/surgical emphysema but not a routine practice.

PreVid: The Electronic End-o-bed-o-gram: Successful Videoclips Taken and Uploaded by Thoracic Patients for Preoperative Assessment

Chen, K¹; Craig, C²; Harris, W²; Shaju, A²; Burdass, E²; Joshi, N¹; Molyneux, M¹

¹University Hospitals Bristol NHS Foundation Trust; ²University of Bristol

PreVid is a project where thoracic patients take and upload their own preoperative videos. PreVid is a short video of patients performing simple exercises, these videos can be uploaded onto a secure NHS server. Clinicians can view these videos before meeting the patients and use them to evaluate the patient's functional capacity and frailty, especially for the Complex Case Review Meeting (CCRM). This facilitates planning of more complex thoracic patients who have higher mortality and morbidity risks. Prior to the Covid-19 outbreak, videos were taken by preoperative nurses in clinics. Through PreVid, they can now be taken remotely by patients and minimise Covid-19 transmission risks.

The pilot has successfully recruited thoracic patients. Eight patients have completed the process so far. Seven patients submitted videos that clinicians found useful. All of the patients felt safe and comfortable completing a PreVid video. The majority of the patients found the experience easy. 57% of the patients did not require help from a friend or relative.

Given the successes of the project we will continue to expand PreVid. PreVid is a safe tool that will improve surgical risk management. The process of video recording and uploading increases patients' engagement with their treatment. Other practical benefits for patients include minimising hospital trips for those who are shielding or live-in remote areas. To see the project in action and upload a preoperative video, please visit <http://www.previd.co.uk>.

Time from Referral to Treatment. Does it Affect the Outcome of Lung Cancer Patients Undergoing Surgery?

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Objectives

The National optimal lung cancer pathway is to be implemented across the UK aiming at reducing the time of management of lung cancer patients. We studied the effect of referral to treatment time (RTT) on our group of lung cancer patients who were surgically treated.

Methods

A retrospective study of prospectively collected data included 700 patients diagnosed with lung cancer who underwent surgical resection between 2011-2019 referred to us from one centre. RTT was categorized into; group A ≤ 49 and group B >49 days. Analysis was performed to evaluate the effect of RTT on overall survival (OS), disease-free survival (DFS) and development of recurrence.

Results

Mean of RTT was 79.57 ± 42.16 days. 140 and 560 patients were operated on within ≤ 49 , and >49 days, respectively. Group A had 59.2% of patients with stage I, 22.9% stage II and 17.9% stage III, while group B had 54.9% with stage I, 23.9% stage II, 20.7% stage III and 0.5% stage IV. OS in group A was 85.1 ± 5.1 months while in Group B 71.6 ± 2.5 months and 5-year survival was 69% in Group A and 52.5% in group B ($p = 0.009$). In stage I lung cancer 5-year survival was 73.8% and 64.1% for group A and B respectively ($p = 0.148$). In stage II, 5-year survival was 63.8% and 49.6% for group A and B respectively ($p = 0.95$). In stage III, 5-year survival was 61.7% and 26.5% for group A and B respectively ($p = 0.007$). There was no significant difference in DFS between the two groups ($p = 0.5$). Recurrence occurred in 20.9% in group A and 27% in group B ($p = 0.084$).

Conclusions

Operating on patients within 49 days from referral resulted in favourable longer-term survival particularly in patients with pathological stage III non-small cell lung cancer. In our cohort as well there was a tendency to less recurrence of cancer in the group of patients who were treated early. These results support the implementation of the new optimal lung cancer pathway and make a case for prioritising operating on stage III patients.

Outcomes of Synchronous and Metachronous Lung Cancers Treated Surgically

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Objectives

Currently there are no explicit guidelines aimed at the selection and treatment of patients with multiple primary lung cancers (MPLCs). However, surgical resection is commonly accepted as the optimal treatment choice for such patients. Our aim is to evaluate the outcomes of surgically resected MPLCs and determine what factors may alter prognosis.

Methods

Retrospective review of patients with synchronous or metachronous lung cancers according to the Martini and Melamed criterion who were resected at the centre.

Results

There were 40 patients with MPLCs, 22 had synchronous, 16 metachronous and 2 had both. A total of 76 surgical procedures were performed, 62 VATS and 14 open. Most operations were staged with mean interval between the two surgeries of 21.2 months. 83 lesions were resected with R0 in 97%. 30/76 procedures resulted in postoperative complications, 5 of which required ITU admission. Cumulative 5-year survival for synchronous and metachronous patients from the date of the initial surgery was 64.9% and 81.3%, respectively. 30-day postoperative mortality was noted in one patient who died 20 days after their second surgery. Follow-up identified local (n=9), regional (n=6) or distant (n=4) recurrences in 13 patients. The mean progression-free survival of all patients was 24.18 months (range = 0.63-79.50). Mortality rate within 5 years after the last surgery was 22.5% (9/40). The mean overall survival from the date of the first surgery was 48.94 months (range 17.1-118.3). Lobectomies affected the overall survival adversely (p=0.015).

Conclusion

Surgical resection remains a feasible and safe treatment option for multiple primary lung cancers. Bigger resections such as lobectomies may incur a less favourable survival outcome which could reflect a more advanced stage of disease.

The Value of a Screening Protocol for Thoracic Surgery During the COVID-19 Pandemic

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Introduction

To ensure the safe provision of essential thoracic surgical services during the COVID-19 pandemic, a COVID-19 screening protocol was initiated in May 2020. The aim of this study was to assess the value of this in minimising COVID-19 infection in our services.

Methods

Patients admitted between May-July 2020 were prospectively analysed. As part of the screening protocol, patients were told to self-isolate before surgery, and had a pre-admission COVID-19 nasopharyngeal swab (NPS) plus CT chest on admission. A bronchoalveolar lavage (BAL) was obtained during surgery. NPS was also taken every 5 days during their inpatient stay. These results along with demographic, post-operative complications, hospital stay and mortality were collected. Descriptive statistics were used for demographic variables. Categorical variables were analysed using a Pearson Chi-Square and continuous data was analysed using the Mann-Whitney U test. A $p < 0.05$ was considered to be statistically significant.

Results

Even though pre-operative CT did not detect any COVID-19, 4 patients had their operative plan changed because of other new CT findings. 136 patients (82 male (60%); median age of 67 years (IQR: 48-75 years); a median body mass index of 25 kg/m² (IQR: 22-29 kg/m²); 74% has performance status of 0-1] with negative pre-operative COVID-19 tests underwent surgery. The median length of chest drain insertion and hospital stay was 2 days (IQR: 1-5 days) and 5 days (IQR: 3-9 days), respectively. 46 patients had complications (34%), with 4 patients (3%) requiring intensive care. In the postoperative period, 4 patients (3%) were found to have COVID-19: 2 patients from NPS; 2 from BAL. They had a significantly longer hospital stay than non-COVID-19 patients ($p = 0.042$). There were no COVID-19 in-hospital deaths.

Conclusion

Using this protocol, we were able to maintain essential thoracic surgical services with minimal COVID-19 infections.

The Utility of Perioperative Bronchoalveolar Lavage in Thoracic Surgery

Qsous, G; Tolan, M; Healy, D

St. Vincent's University Hospital

Objective

Lung infection post thoracic surgeries are one of the most common complications that can lead to an increase in the length of hospital stay. We aimed to investigate whether perioperative bronchoalveolar lavage can decrease postoperative lung infection.

Methods

This is a retrospective study including 194 patients who underwent different thoracic surgeries from June 2013 to March 2020. Patients were divided into two groups. The first group is the standard group included 94 patients, while the second group included 100 patients who had perioperative bronchoalveolar lavage. Data were collected from patient's files.

Results

The bronchoalveolar lavage group (n=100) had a significantly lower incidence of postoperative lung infection (11%) compared to the standard group (22.3%) P value = 0.033. Also, the length of hospital stay was significantly shorter in the bronchoalveolar lavage (5.6 days) compared to the standard group (9.4 days) P value = 0.000. Moreover, the bronchoalveolar lavage showed a useful diagnostic side when (73%) of patients who developed chest infection had a positive culture from the bronchial washing. Multivariate analysis showed that the bronchoalveolar lavage significantly decrease the length of hospital stay.

Conclusion

Bronchoalveolar lavage decreases the risk of post-operative chest infection. As a result, decrease the length of hospital stay. Also, it can use as diagnostic methods to treat patients with a chest infection.

Regional Variation in Lung Cancer Stage at an Irish Rapid Access Lung Clinic

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St. Vincent's University Hospital

Objective

Regional variation in cancer outcomes is undesirable. Efforts to understand and neutralize such variation are important. Our study aims to evaluate regional variation in lung cancer in Ireland focusing on stage at presentation.

Methods

A retrospective study was performed on patients who underwent surgical resection of primary lung cancer from June 2013 to March 2020. Patients included attended the rapid access lung clinic (RALC). Patients were divided into two groups depending on regional variability with Dublin and Wicklow assigned as Group 1 and the remainder assigned to Group 2. Pathological tumor size and lymph nodes status were compared between the two groups. Data was collected from patient's records.

Results

Complete data was available on 152 patients. Group 1 (n=97) had significantly lower median tumor size (24.74 mm) compared to group 2 (31.72 mm) (P = 0.026). A more advanced lymph node stage was seen in group 1 (N1: 9.2%, N2: 4.2%) compared to group 2 (N1: 14.5%, N2: 9.1%) but did not reach statistical significance (P = 0.049). Patients in group 1 had significantly lower stage (stage II 13.4%, stage III 9.3%) compared to group 2 (stage II 29%, stage III 16.3%) (P = 0.013). Group 1 showed a lower incidence of squamous cell carcinoma (21.6%) compared to group 2 (30.9%).

Conclusion

Regional variation in cancer presentation is evident in this study. Larger tumors and more advanced stages are associated with a more rural location. This is seen in the clinic service with equal access to diagnostic and treatment, suggesting differences at presentation rather than evaluation.

Robotic Assisted Surgery for Early Stage Lung Cancer: A Return on an Investment?

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Objectives

Following the introduction of robotic surgery for lung cancer resection at Liverpool Heart & Chest Hospital, we evaluate the efficacy of robotic versus VATS lobectomy.

Methods

We retrospectively identified 58 robotic lobectomy cases which took place since its introduction in 2017. Using data from our prospectively filled database from 2013 to 2018, comparison was made with 895 VATS lobectomy cases. On discussion with the statistician, propensity matching was thought to add little value as pre-operative characteristics were similar between the groups.

Results

The robotic lobectomy group had a significantly shorter length of stay (4 v 3 days, $p=0.0063$) and required significantly less critical care admissions post-operatively (85.5% v 19.0%, $p<0.0001$) compared to VATS lobectomy. There was a lower overall complication rate in the robotic group (25.0% v 17.2%, $p=0.0093$), suggesting the potential benefit of robotic surgery. Rates of in-hospital mortality were low and similar between groups. These results may reflect the reduced tissue trauma and blood loss with robotic surgery, although there has been a move in thoracic surgery towards enhanced recovery programmes in the last few years, which may account for this difference. With an already short length of post-operative stay seen with VATS, any improvement should be seen as considerable. There were also more lower lobectomies in the robotic group (72.4% v 28.8%) and this may be one of the selection criteria for performing a robotic rather than a VATS lobectomy.

Conclusions

Robotic lobectomy programme can be introduced safely with similar results to VATS lobectomy. There is a need for well-designed prospective trial to provide the evidence base for the uptake and delivery of this surgical approach.

Setting up a Robotic Thoracic Surgical Training Programme -- A single Institution Experience

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Objective

Training in robotic thoracic surgery currently focuses on consultant surgeons, through a combination of simulation and proctored cases. Our dedicated in-house training programme allows senior trainees to attain robotic skills in a supervised environment, overcoming the initial learning curve and supporting independence at consultant level.

Methods

All robotic thoracic surgical cases from December 2018-October 2019 were retrospectively reviewed. Trainees completed bedside assistant training and simulation modules on the DaVinci Xi console prior to commencing patient cases. Training was structured based on trainee operative experience. Outcomes of both training and consultant-led cases were assessed.

Results

Two trainees participated in this pilot, both of whom had performed over 100 anatomical lung resections (VATS/open). 47 of 172 cases were performed with trainee as primary operator, 47% of which were anatomical resections. No significant differences were observed in length of stay between trainee (3 (0-17) days) and consultant (4 (1-37), $p=0.31$). There was no trainee associated conversion or in-hospital mortality. Complications occurred in 40/125(32%) consultant cases and 8/47(17%) trainee cases ($p=0.04$). All trainee complications were Calvien-Dindo grades I-II, compared to 28/40(70%) consultant complications ($p=0.44$). Training cases did not reduce operative capacity or limit the total number of cases performed.

Conclusions

Through structured simulation and bedside teaching it is possible to safely integrate robotic surgery into thoracic training without impact on patient outcomes or operative capacity. A stepwise approach allows for a diversity of cases to be performed by the trainee, improving training experience and better preparing trainees for consultant posts.

Are Routine Outpatient CXRs Following Lung Resection Necessary?

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Liverpool Heart & Chest Hospital

Objectives

Prior to Covid-19, our routine practice was to review all patients following lung resection in the outpatient department 2 to 6 weeks after discharge and perform a CXR. In the Covid-19 era we switched to telephone clinic where possible, no longer performing this routine CXR. We sought to compare the outcomes of this first outpatient review in both these periods to determine if routine CXRs were necessary.

Methods

Retrospective case note analysis of 82 patients who had undergone lung resection for cancer in the period October – December 2019 (pre Covid cohort) compared to 82 in the period April -June 2020 (Covid era cohort).

Results

In our pre Covid cohort, 98.3% of initial post-operative consultations were face-to-face. 93.3% of them were deemed to have satisfactory progress and CXR so placed under routine surveillance. 4 patients (6.7%) had an abnormality noted on their CXR but none required a significant change in management. There were 4 readmissions (4.8%) to our unit or peripheral hospitals, and 2 deaths (2.4%) to date in this cohort but all in the period prior to their 1st follow-up appointment.

In our Covid era cohort, 92.2% of patients received telephone initial post-operative consultations. 97.5% of them were deemed to have made satisfactory progress and placed under routine surveillance. 2 patients (2.6%) were felt to warrant further review face to face where they received a CXR and a change in management. There were 4 readmissions (4.8%) in this cohort to date, with 3 occurring prior to follow-up clinic and one 2 weeks after the follow-up date which was unlikely to have been avoidable by prior routine CXR. 2 patients died prior to any follow-up, and 2 patients have since died from disease progression.

Conclusions

We suggest that a routine CXR at the first following up appointment after lung resection for cancer is not necessary. We advocate continuing our new strategy of performing a 'targeted CXR if indicated', which appears safe.

Does Sparing the Diaphragm Improve Early Outcome from Radical Surgery For Malignant Pleural Mesothelioma?

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Objectives

Radical surgery for malignant pleural mesothelioma (MPM) faces the challenge of prolonging survival by obtaining macroscopic complete resection (MCR) but also reducing perioperative morbidity. Complete excision of the diaphragm (phrenectomy) can be technically demanding but muscle-sparing complete excision of diaphragmatic pleura may be even more difficult. Some surgeons argue for phrenectomy in most cases, some for diaphragm sparing even at the expense of a R2 resection. We aimed to evaluate the benefit of diaphragm-sparing MCR as the treatment of choice.

Methods

From a consecutive series of 100 patients [86M:14F, age 68(33-79)] undergoing radical surgery by pleurectomy/decortication for MPM by a single-surgeon at one institution we identified 17 patients [16M:1F, age 67 (45-77)] in whom MCR had been achieved without phrenectomy. We compared their perioperative outcomes with a control group of 15 patients [14M:1F, age 70 (57-78)] in whom MCR had been achieved with phrenectomy but in whom there was no histological evidence of diaphragm muscle invasion. This group could have undergone muscle-sparing MCR if it had been attempted.

Results

	EPD (n=15) Median(range)	PD (n=17) Median(range)	P Value
Age	70(57-78)	67(45-77)	NS
Gender (M:F)	14M:1F	16M:1F	NS
Tumour Characteristics - Epithelioid:Non-Epithelioid	12:3	11:4	NS
Tumour Characteristics - N0:N1	10:5	11:6	NS
Operation Time (hr)	4.1(3.6-8.9)	4.8(3.4-6.5)	0.20
Post-Operative Critical Care Stay (days)	3(2-31)	3(2-9)	0.15
Post-Operative Stay (days)	13(5-34)	8(4-13)	0.03
Post-Operative Complications - In-Hospital Air Leak (days)	9(4-31)	5(14-38)	0.01
Post-Operative Complications - Hospital Acquired Pneumonia	4(27%)	4(24%)	NS

Reoperation for non-diaphragm related complications (chylothorax, PFO) was required in 3 patients. In the remainder diaphragm preservation was associated with shorter air leak and postoperative stay whilst not increasing operating time.

Conclusions

Sparing the diaphragm whilst achieving MCR wherever possible *does* improve perioperative outcomes from pleurectomy/decortication and therefore should be the intention of surgery.

Should All Patients Receive Extended Chemical Thromboprophylaxis After Resection of Primary Lung Cancer?

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Objective

Patients undergoing lung cancer resection are at increased risk of venous thromboembolism (VTE). The Caprini Risk Assessment Model (RAM) may be used to risk stratify these patients. We investigated risk of postoperative VTE in patients undergoing resection of primary lung cancer with reference to the Caprini RAM and evaluated the safety and efficacy of extended chemical VTE prophylaxis in this group.

Methods

A change in protocol from inpatient only to extended VTE prophylaxis with 28-day dalteparin in patients undergoing resection for primary lung cancer was instituted in July 2016. We retrospectively reviewed the outcomes of consecutive patients who underwent resection of early-stage primary lung cancer between July 2016 and December 2017. Confirmation of length of treatment was sought from patient records and diagnosis of pulmonary emboli (PE) was made on either routine postoperative follow-up computed tomography (CT) chest, abdomen and pelvis at 6 months or CT pulmonary angiogram. Patients on long-term anticoagulation were excluded.

Results

204 consecutive patients underwent curative intent resection of primary lung cancer. CT data was available for 171 (83.8%) patients. Of these, median Caprini score was 6 ± 1 . 154 (90%) patients received extended prophylaxis. No complications occurred in patients receiving extended VTE prophylaxis however one patient developed upper gastrointestinal bleeding one-week post-discharge which ceased spontaneously and dalteparin was restarted following temporary cessation. Two patients (1.3%) (Caprini scores 6 and 10) receiving extended prophylaxis developed PE at one and two months postoperatively. Of the remaining 17 who did not receive extended dalteparin, 1 patient (Caprini score 5) developed PE one month postoperatively.

Conclusion

The risk of VTE calculated by Caprini RAM is moderate or high in 88% of patients undergoing lung cancer resection. We demonstrated that extended chemical thromboprophylaxis is feasible and safe.

A Single-centre Contemporary Experience of Outcomes for Patients with Oligometastatic Lung Cancer Undergoing Thoracic Resection

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Background

Traditionally there have been very few radical surgical options available to patients with stage IV lung cancer, regardless of the extent of metastatic disease. An increasing number of patients with oligometastatic disease have been undergoing radical lung resection recently, although long-term data remains limited. We have undertaken a review of outcomes in patients with oligometastatic disease undergoing resection in our centre.

Methods

A single-centre retrospective review of consecutive patients with oligometastatic lung cancer who underwent resection between January 2012 and December 2018 was undertaken. Post-operative outcomes were reviewed. The Log rank test was performed to assess the impact of variables on overall survival.

Results

20 patients underwent surgery during the study period. Location of metastases were liver (10.0%, n=2), brain (15.0%, n=3), adrenal gland (25.0%, n=5), spinal column (10.0%, n=2) and thorax (40.0%, n=8). 25.0% (n=4) of patients had pre-operative resection of oligometastatic disease and 65.0% (n=13) had undergone neoadjuvant chemoradiotherapy. 30-day, 90-day and 1-year mortality were 0% (n=0), 0% (n=0) and 25.0% (n=5), respectively. Median post-operative length of stay (PLOS) was 5.0 days (\pm interquartile range [IQR] 3.3-7.0 days). Age, advanced T stage (III&IV), presence of nodal disease, extent of metastatic disease (M1a vs M1b) previous resection, neoadjuvant chemoradiotherapy, approach and laterality were all found not to affect overall survival after log rank analysis (p values >0.05).

Conclusion

Results from this small cohort of patients demonstrate that undertaking lung resection in patients with oligometastatic disease is associated with minimal peri-operative risk. 1-year survival of 75% is significantly better than overall outcomes for patients with stage IV lung cancer. This small study demonstrates that radical resection in select patients with stage IV lung cancer is a safe and effective treatment option.

Can Measures of Systemic Inflammation Accurately Predict Short and Long-term Outcomes After Lung Cancer Resection?

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Background

Previous studies have identified that measures of systemic inflammation can be used to predict both peri-operative risk and overall survival after cancer surgery. The objective of this study was to analyse whether any of these measures can effectively predict short and long-term outcomes after surgical resection of primary lung cancer.

Methods

A multi-centre retrospective review of 5029 patients undergoing thoracic resection for primary lung cancer between January 2012 and December 2018 was undertaken. White cell count (WCC), neutrophil to lymphocyte ratio (NLR), platelet to lymphocyte ratio (PLR), advanced lung cancer inflammation index (ALI), prognostic nutritional index (PNI) and modified albumin neutrophil prognostic grade (mANPG) were measured. Multivariable logistic and Cox regression analyses were used to assess the impact of these measures on 90-day mortality and overall survival, respectively.

Results

90-day mortality was 3.7% (n=185). After multivariable analysis higher NLR and PLR were associated with higher 90-day mortality (NLR: OR 1.097, 95% CI 1.053-1.144, p<0.001, PLR: OR 1.003, 95% CI 1.002-1.004, p<0.001) and reduced overall survival (NLR: HR 1.041, 95% CI 1.025-1.059, p<0.001, PLR: HR 1.001, 95% CI 1.000-1.001, p=0.002). Higher WCC was associated with reduced overall survival (HR 1.008, 95% CI 1.003-1.013, p=0.001) but not with higher 90-day mortality. Lower ALI and PNI were associated with higher 90-day mortality (ALI: OR 0.999, 95% CI 0.998-1.000, p=0.009, PNI: OR 0.248, 95% CI 0.087-0.708, p=0.009) but not with reduced overall survival. Higher mANPG score was associated with reduced overall survival (HR 1.079, 95% CI 1.011-1.153, p=0.023) but not with higher 90-day mortality.

Conclusions

Of the six measures of inflammation analysed, only NLR and PLR have emerged as significantly associated with both short and long-term outcomes. Inclusion of these variables in decision-making and risk-prediction tools should be considered.

The Role of Surgery in Oligometastatic Non-Small Cell Lung Cancer: A Systematic Review of the Literature

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Objective

Single extra-thoracic metastasis was a new descriptor (M1b) in the 8th Edition of the IASLC Staging Classification for non-small-cell lung cancer (NSCLC). The goal was to better define oligometastatic NSCLC and identify patients who may benefit from more aggressive local therapy. Recent studies have demonstrated survival benefits with local consolidative treatment for solitary metastasis. We sought to consolidate the evidence investigating the role of surgery in this patient group.

Methods

A systematic search algorithm was created to interrogate MEDLINE, CENTRAL and LILACS databases. We manually screened retrieved references and systematic reviews to identify all studies reporting on role of any surgical intervention in the setting of oligometastatic NSCLC. 3 reviewers independently screened studies for eligibility and extracted data using the Cochrane Risk of Bias tool.

Results

11 studies identified including 2 RCTs; 62 were excluded from analysis as these did not include outcomes for patients undergoing surgery. Key findings are summarised in Table 1. Very few papers reported outcomes from surgical treatment as part of multi-modality treatment, rather than salvage therapy. Moreover, the definition of 'Oligometastatic disease' was heterogenous; many papers report outcomes from up to 5 extra-thoracic sites.

Conclusions

Few studies in the literature are Level 1-2 evidence. Multi-modality treatment including surgical resection as part of local consolidative therapy or salvage surgery will continue to become more prevalent, with increased use of targeted molecular chemotherapy and immunotherapy; survival outcomes for this heterogenous patient group is highly variable. Algorithms and models that can predict which patients may benefit from surgical resection of the primary tumour will be key to improving patient survival. There is a need for high-quality, multi-centre clinical trials to provide a robust evidence base for contemporary surgical practice.

Table 1.

First Author	Date	Study	Cancer	Metastases	Therapy	Patients (n)	Median OS (months)	Median PFS (months)
<i>De Busscher</i>	2018	Randomized	NSCLC	<5	SBRT or Surgery after Chemotherapy	40	13.5	12.1
<i>Lel</i>	2019	Retrospective	OM NSCLC	<5	Surgery	51	NR	NR
<i>Cheufou</i>	2014	Retrospective	NSCLC	<1	Surgery	37	NR	NR
<i>Kwint</i>	2017	Observational	NSCLC	<5	Systemic/Radical Therapy	91	32	14
<i>Fleckenstein</i>	2016	Retrospective	OM NSCLC	<2	Surgery/Chemoradiation	57	21.8	13.7
<i>Gomez</i>	2019	Randomized	NSCLC	<3	LCT with Surgery/Radiotherapy	49	41.2	14.2
<i>Casiraghi</i>	2020	Retrospective	OM NSCLC	<3	Surgery/Chemotherapy	57	30	NR
<i>Wang</i>	2018	Retrospective	OM NSCLC	<3	Surgery/Chemotherapy	172	NR	NR
<i>Mitchell</i>	2020	Retrospective	NSCLC	<3	LCT	194	NR	NR
<i>Uhlig</i>	2019	Retrospective	NSCLC	<1	Surgery/EBRT/TA/Systemic	34887	NR	NR
<i>Arrieta</i>	2019	Prospective	OM NSCLC	<5	RCT	37	NR	23.5

NR – Not Recorded

Conversion From VATS to Open Lobectomy is Safe and has no Adverse Effects on Patient Outcomes

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Liverpool Heart & Chest Hospital NHS Foundation Trust

Objectives

VATS lobectomy rates in the UK vary widely according to surgeon preference and experience. A high rate of VATS lobectomies in any given centre may be associated with an increased rate of conversion to an 'open' operation and thus may impact patient morbidity and mortality. This study sought to examine the reasons for conversion from VATS to open in a large cohort of patients and to determine the effect of conversion on patient outcomes.

Methods

We retrospectively reviewed all patients who underwent an open or VATS lobectomy between 2013-2019 in our institution and collected data on a range of patient characteristics and postoperative outcome measures.

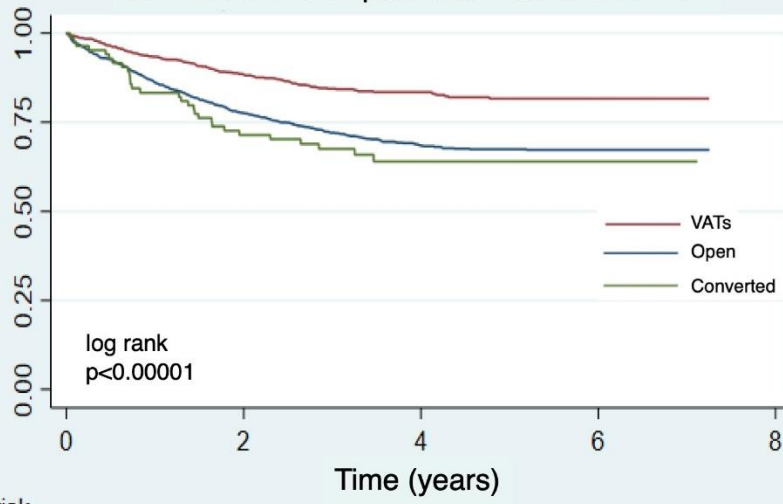
Results

A total of 2015 lobectomies were included; 1118 open, 813 successful VATS and 84 planned VATS that were converted to open (9.4%). The most common reasons for conversion were adhesions (28.5%) and bleeding (28.5%), followed by inability to dissect out the pulmonary artery (14.3%). 5 patients (5.9%) required emergency conversion for significant bleeding. Patients with higher NYHA dyspnoea score, male sex, COPD and a lower TLCO were more likely to be converted. A posterior VATS approach was also found to be more frequently associated with conversion ($p=0.015$). Median postoperative length of stay was significantly lower with VATS, at 4 days (range: 3-7) compared to 6 days (4-9) with open ($p<0.0001$). Converted patients had the same length of stay as those in the 'planned' open group (6 (4-9) days ($p=0.8595$)). 30-day mortality was significantly lower with VATS compared to open ($p<0.0001$), but no such difference was found between converted and 'planned' open patients ($p=0.3969$).

Conclusion

Converted patients perform similarly to those undergoing planned open lobectomies. These patient groups are eminently comparable in terms of postoperative length of stay and 30-day mortality. As such there do not appear to be any detrimental effects of conversion from VATS to open lobectomy.

Overall cohort: Kaplan Meier survival curve



Number at risk		0	2	4	6	8
Open	1118	868	531	179	0	0
VATs	813	718	316	93	0	0
Converted	84	60	24	9	0	0

Subxiphoid Non-Intubated Opioid Free Lung Resection - Initial Assessment of Feasibility and Safety.

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Objectives

Invasive surgical approaches and opioids are thought to play key roles in delayed post-operative recovery and excess morbidity when undergoing lung resection. Surgical approaches have evolved from multiportal thoracoscopy to uniportal thoracoscopy and more recently subxiphoid thoracoscopy. Non intubated opioid free anaesthesia enhances recovery by avoiding muscle relaxants and opioids reducing postoperative respiratory complications. The following case series aims to demonstrate 1) technical feasibility, 2) safety and 3) adequacy of oncological resection utilising a subxiphoid non-intubated opioid free technique in patients undergoing lung resection.

Methods

Spontaneous breathing was maintained with oxygen/air and sevoflurane. Paravertebral, rectus sheath, intercostal, phrenic and vagal nerve blocks were employed to maintain analgesia. Consecutive patients undergoing surgery in this manner were reviewed retrospectively and outcomes assessed.

Results

Eight patients were included in the analysis (March 2019 to May 2020), two benign and four malignant. Four underwent lower lobectomy, one upper lobe trisegmentectomy, two bilobectomies and one upper lobectomy. Five were ASA three and three were ASA two. Median length of stay was 3.5 days (malignant cases, n = 6) and 18 days (benign cases, n = 2). With respect to malignant cases, two N2 stations were retrieved in one case, three N2 stations were retrieved in three cases, five N2 stations in one case and six N2 stations in one case. Pathological N2 disease was reported in one case. Pathological assessment demonstrated one T1b, three T1c, one T2a and one T2b tumors. Two patients reported mild pain at one month, two at three months and no patient-reported pain at six months. No patient developed respiratory failure.

Conclusions

Initial assessment of this novel surgical approach suggests it is safe, technically feasible with adequate oncological resection.

Synchronous Bilateral Primary Non-small Cell Lung Cancers – Is Radical Single-stage Resection Safe and Feasible?

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Objective

The incidence of synchronous primary NSCLC has increased in recent years due to better imaging and staging techniques. However, performing a single-stage bilateral lobectomy with curative intent has only been performed in 2 reported cases worldwide.

Methods

We report here the case of a patient who underwent single-stage bilateral lobectomies for synchronous bilateral NSCLC.

Results

An otherwise fit 48-year-old woman with a background of heavy smoking was diagnosed with bilateral PET avid upper lobe lesions. The right-side lesion was proven to be adenocarcinoma on transbronchial lung biopsy. Following staging, there was no evidence of distal metastatic disease and the two lesions in the right and left upper lobes were considered to be synchronous primary tumours (T2aN0M0 on the right and T1bN0M0 on the left). Pre-operative pulmonary function tests (PFTs) showed an FEV1 of 1.52 L (63% predicted), FEV1/FVC of 56% and a TLCO of 58% predicted. She was taken to theatre and a right VATS upper lobectomy was performed first. Following this, after careful anaesthetic assessment she was turned on the opposite side and a left VATS upper lobectomy was performed. Both procedures were accompanied by systematic nodal dissection. She had an uneventful recovery and was discharged home on the 4th postoperative day. The final pathology confirmed two synchronous primary adenocarcinomas which were completely excised. However, station 4R and 10R were involved and she went on to have adjuvant chemotherapy. She made a full recovery and PFTs done 3 months post resection were similar to preoperative results. There was no evidence of recurrence 12 months post resection.

Conclusion

Single-stage bilateral lobectomies can be performed safely in suitably selected patients as long as there is adequate planning, efficient communication within the team and accurate intraoperative monitoring.

The Effectiveness of Enhanced Recovery After Surgery (ERAS) Protocols in Elderly Patients Undergoing Resection of Primary Lung Cancer

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Objectives

Compliance with ERAS protocols is known to improve patient outcomes following thoracic surgery. There is, however, limited evidence regarding the safety and effectiveness of ERAS protocols in the elderly population. The aim of this study was to determine the effect of age on protocol compliance, morbidity and length of stay (LOS) in patients undergoing resection of primary lung cancer.

Methods

Prospective data were collected on consecutive patients undergoing elective lung cancer resection between April 2012 and April 2019. All patients were managed within a multi-modality ERAS programme, and compliance was recorded against 15 standardised ERAS elements. Compliance with individual elements and the overall protocol was recorded. Patients were divided into four age categories. 30-day morbidity and delayed discharge (LOS >5 days) were the co-primary endpoints.

Results

Of the 1537 patients in the study cohort, 247 (16.1%) were <60 years, 505 (32.9%) were 60-69 years, 624 (40.6%) were 70-79 years and 161 (10.4%) were >80 years. There was no correlation between age and overall compliance with the ERAS protocol ($p=0.04$, $p=0.129$). Older age was associated with reduced requirements for post-operative intravenous opioids ($p=0.003$) and earlier resumption of oral intake ($p=0.002$). On logistic regression analysis, older age was associated with an increased risk of morbidity [Odds ratio (>80 vs. <60 years) = 1.75 (95%CI 1.11-2.74), $p=0.015$], but not delayed discharge [OR (>80 vs. <60 years) = 1.43 (95%CI 0.81-2.55), $p=0.217$].

Conclusions

ERAS protocols can be safely implemented in older patients with comparable levels of overall compliance across age groups. Increased morbidity in older patients may be related to physiological factors, but not ERAS protocol compliance.

The Effect of Conversion from Video-assisted Thoracoscopic Surgery to Open Surgery on Short-term Outcomes in Primary Lung Cancer Resection

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Objectives

Video-assisted thoracoscopic surgery (VATS) has become the standard of care for early-stage lung cancer over the last decade. Conversion from a minimally invasive to open approach may be associated with poorer outcomes in gastrointestinal and thoracic procedures. The aim of this study was to determine the effect of VATS conversion on morbidity and length of stay (LOS) in patients undergoing resection of primary lung cancer within an Enhanced Recovery after Surgery (ERAS) programme.

Methods

Prospective data were collected on consecutive patients undergoing resection between April 2012 and April 2019 at a UK specialist centre. Key data fields included ERAS protocol compliance, pathophysiology and operative factors. 30-day morbidity and delayed discharge (LOS >5 days) were the co-primary endpoints.

Results

Of the 1537 patients in the study cohort, 1174 (76.4%) underwent VATS, 133 (8.6%) required conversion and 230 (15.0%) underwent open surgery. On logistic regression analysis, all-cause morbidity was higher in converted procedures [Odds Ratio = 1.58 (95%CI 1.07-2.33), $p=0.02$], but not open surgery [OR = 0.96 (95%CI 0.70-1.32), $p=0.808$], when compared to VATS. Increased major morbidity (Clavien-Dindo ≥ 3) was only noted in open procedures [OR = 2.84 (95%CI 1.33-6.06), $p<0.001$]. The risk of delayed discharge was increased for both converted procedures [OR = 2.55 (95%CI 1.42-4.58), $p=0.002$] and open surgery [OR = 3.24 (95%CI 2.06-5.09), $p<0.001$].

Conclusions

Patients requiring VATS conversion experienced more all-cause morbidity than those undergoing either VATS or open surgery, although this was not associated with an increased risk of major morbidity.

Patient experience of virtual clinics in thoracic surgery. Should we continue following the pandemic?

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Objectives

The Covid-19 pandemic has driven change in social aspects of clinical care. Social distancing to reduce virus transmission has led to the widespread adoption of telephone/video (virtual) outpatient clinics in favour of “face to face”. This change could be beneficial via time and cost-saving, as well as improving workforce productivity and access for patients. Studies have shown a positive association between patient experience, patient safety and clinical effectiveness, hence, it is important to seek their opinions regarding this significant change.

We therefore conducted a qualitative patient survey to assess the impact of this change on the patients.

Methods

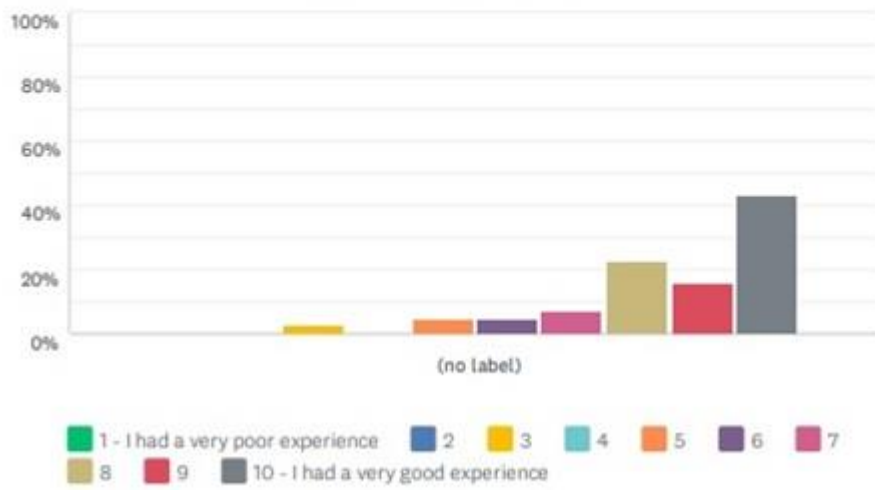
Patients who had virtual clinic that underwent elective thoracic surgery between July 2020 and October 2020 were invited to complete a patient satisfaction survey post-operatively. The survey results were collated and analysed using SurveyMonkey.

Results

47 of 51 (92.2%) contacted patients completed the survey. 13 (27.66%) of these were video, 34 (72.34%) via telephone. 41 (87%) of patients felt they were provided with adequate information to be able to access the appointment. > 95% of patient agreed with statements that they felt listened to and were able to ask questions. 12 (26%) patients had technical difficulties. 60% preferred virtual clinic due stating time and cost savings as the main reason. Whilst 20% favoured a hospital clinic feeling face to face interaction was important. 50% would like to continue with virtual clinic following the pandemic. The overall satisfaction rating is shown in Fig 1.

Figure 1: On a scale of 1 - 10, with 1 being "very poor" and 10 being "excellent", how would you rate the experience of having you appointment by telephone or video? Please Circle

Answered: 44 Skipped: 3



Conclusion

Overall, patients were pleased with their virtual clinic experience. They received all the necessary information prior to surgery. However, many patients felt face to face contact was essential; some felt their telephone appointment may have been improved by a video call.

Initial Experience of Electromagnetic Navigation Bronchoscopy Guided Microwave Ablation of Lung Nodules

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Objectives

Microwave ablation of lung nodules produces faster and larger ablation zones than other energy sources, while bronchoscopic route of access may avoid pleural-based complications associated with traditional percutaneous access. The combination of both is a novel approach in management of suspicious or malignant lung nodules.

Methods

Lung nodule microwave ablation was performed in hybrid operating room under electromagnetic navigation bronchoscopy guidance. Our center's experience between March 2019 and October 2020 was retrospectively analyzed. Patients had high surgical risks while lung nodules were either proven malignant or radiologically suspicious. Technical feasibility and safety were primarily evaluated.

Results

Total of 40 lung nodules from 34 patients were treated. Mean nodule size was 15.2mm. Technical success rate was 100%, although some nodules required double ablation for adequate coverage. Mean minimal ablation margin was 5.79mm. The mean actual ablation zone volume was -20.9% compared to predicted, likely due to significant tissue contraction ranging from 0-43%. There was no significant heat sink effect. Mean hospital stay was 1.93 days, and only 2 patients stayed for more than 3 days. Complications included pneumothorax requiring drainage (7.5%), post-ablation reaction (5%), pleural effusion (5%), hemoptysis (2.5%) and bronchopleural fistula (2.5%). After median follow-up of 6 months, none of the nodules had evidence of progression.

Conclusions

Bronchoscopic microwave ablation is a novel, feasible and safe technique for treatment of early-stage lung cancers, lung metastases or highly suspicious lung nodules. Compared to percutaneous ablation, it has fewer pleural-based complications and has comparable mid-term local control rates.

Defining the Role of a Navigational Bronchoscopy Service in the Diagnosis of Lung Cancer Within the NHS -- A Single Centre Experience

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Electromagnetic navigation bronchoscopy (ENB) is a relatively new way of obtaining lung biopsies using electromagnetic waves. Our policy is to accept only those patients who have lesions not accessible or have had a failed CT biopsy.

Over a period of 19 months we performed ENB in 183 patients (92 male and 91 female). Mean age was 75.3 ± 0.8 years old (43 to 89). 31 patients had a prior attempt at CT guided biopsy. In 34% of the cases we used fluoroscopy as an adjuvant strategy to improve targeting. We had to abandon 4 cases (2 due to safety issues, and 2 due to technical issues). We obtained a diagnosis in 62.6% cases. 72 cases (40.2%) had a confirmed malignancy and in 40 cases (22.3%) cancer was ruled out. In 24 patients (13.4%) the result was inconclusive, whereas in 9 (5.0%) the sample was insufficient for diagnosis. The false negative rate was 12.3%(22/179). Median number of targets was 2 (range 1-7). Left upper lobe was the primary lobe in 30% of the cases followed by the right upper lobe in 25.7%. There were no deaths and 7 pneumothoraces (3.8%), 1 treated with a chest drain. The median length of stay was 0 days with the day of procedure to be the day of discharge, apart from those with pneumothoraces and no social support who had an overnight hospital stay.

Differences noted in success rates between needle aspiration, brush cytology and biopsies of individual targets. Post ENB management included surgical resection (60), radiotherapy (41), chemotherapy (17) and palliative care (3). 18 patients from outside our area were lost to further follow-up. ENB is a safe method of obtaining tissue diagnosis in suspected lung cancer. In a significant proportion of patients, it avoids the morbidity of unnecessary surgery or radiotherapy once cancer is ruled out. As we accepted cases not amenable to or failed CT biopsy lowered our success rate. Accuracy increased with the volume of cases undertaken and after overcoming individual learning curves.

Subxiphoid Non-Intubated Thymectomy - Initial Assessment of Safety and Efficacy

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Royal Papworth Hospital

Objectives

Subxiphoid thoracoscopy may be associated with less pain and subsequent opioid requirements. Furthermore, a non-intubated approach reduces sedatives required and may also enhance recovery. The current case series aimed to assess technical feasibility, safety and adequacy of oncological resection in patients undergoing subxiphoid non-intubated thymectomy.

Methods

All cases undergoing subxiphoid non-intubated thymectomy were reviewed retrospectively. Spontaneous breathing was maintained throughout with air/sevoflurane. A multitude of nerve blocks were employed including phrenic, vagal. Short-term outcomes and adequacy of oncological resection were assessed.

Results

Fifteen patients underwent subxiphoid non-intubated thymectomy between October 2018 and July 2020. Mean age was 56. 2/15 (13%) were converted. One was converted to intubation/mini-sternotomy for bleeding. The second was converted to intubation but continued via subxiphoid VATS. Complications included intraoperative bleeding mandating conversion (1/15), chylothorax (2/15), acute kidney injury (2/15), prolonged air leak (1/15) and bilateral pleural effusions (1/15). Mean length of stay was 4.5 days (one patient stayed for 28 days for management of chylothorax). ASA grades were ASA 4 (n = 1), ASA 3 (n = 4) and ASA 2 (n = 9). Six were ex-smokers. Six had myasthenia gravis. Histology demonstrated thymoma in five cases (T1a in two cases, T1b in three cases). All malignant cases were pathologically N0. R0 resection was achieved in all cases.

Conclusion

Subxiphoid non intubated thymectomy is safe and associated with adequate oncological resection. Both pleural cavities are accessible to the surgeon facilitating exposure and protection of the phrenic nerve. Reduced sedation and opioid requirement are associated with reduced incidence of respiratory failure. Larger studies are required to confirm this hypothesis.

Implementation of Pre-operative COVID-19 Testing Allows Safe Continuation of Surgery in a Tertiary Thoracic Surgical Unit

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Liverpool Heart & Chest Hospital

Objectives

The COVID-19 pandemic presents significant ongoing challenges to the safe delivery of thoracic surgery services. At our hospital, during March 2020 five thoracic patients (of 105 patients undergoing surgery, 4.8%), died after a positive COVID-19 test in the post-operative period or following discharge. Consequently, new policies were introduced for pre-operative investigations (nasal swab, non-contrast CT scan, blood tests including CRP and LDH and a peri-operative bronchoalveolar lavage (BAL)) and the effects on patient outcomes were evaluated.

Method

Prospective collection of data on all patients admitted for thoracic surgery between 1st April and 30th June 2020.

Results

During the study period 145 patients were admitted for thoracic surgery. Twelve patients were cancelled for reasons shown in table 1(8.3%). No patients were cancelled on the basis of blood results. Suitable patients (n=11) were re-swabbed after 2 weeks, all but 4 cancelled patients underwent planned procedures following a negative COVID swab. Causes for repeat cancellation included: one patient was cancelled due to a persistent positive swab result, two were referred to oncology due to disease progression and one patient's pericardial effusion no longer required surgical intervention.

Of the 140 patients proceeding to surgery, seven tested positive in the post-operative period (6 asymptomatic positive BAL results, 1 symptomatic nasal swab). Mortality during this period was 1.4% (n=2), one of which was due to COVID-19 pneumonia. Average post-op length-of-stay (LOS) was 4.22 days (range 0-70 days). Patients with a positive BAL or nasal swab had an increased LOS of 6 days (range 3-9), due to a longer observation period prior to discharge.

Conclusion

Despite rising numbers of COVID-19 cases in the region, thoracic surgery was performed safely after the introduction of a robust new pre-operative protocol with acceptable LOS and mortality risk.

Reason for cancellation	Number
Positive swab	1
CT scan with positive findings	2
Positive swab + CT scan findings	1
CT scan with suspicious for COVID-19	6
Other causes	2

Should Trainees Perform High T Stage Lung Resections? A Single Centre Experience

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University Hospital of Wales

Objectives

We have a strong training ethos in our centre and we hypothesised that even relatively junior trainees – NTN (National Training Number) and non-NTN – performed satisfactory lung resections in advanced tumours with the appropriate supervision and training. The purpose of our study was to assess whether patients who have operations performed by trainees experience worse outcomes relative to those completed by consultants.

Methods

We performed a retrospective review of patients who underwent thoracic surgery from October 2017 to October 2019 in our centre. We identified patient episodes from PATS (Patient Advanced Tracking System) and retrieved corresponding data from our theatre system, TheatreMan. We assessed pre-operative stage, thoracscore, operation, operative time, length of stay and mortality.

Results

We identified 1110 procedures via PATS. Of these there were 258 anatomical lung resections for primary lung cancer. Please see the results table.

	T1	T2	T3	T4
Total number, N	108	93	44	13
- Pneumonectomy	1	0	0	1
- <u>Bilobectomy</u>	1	4	0	3
- <u>Segmentectomy</u>	21	5	2	0
- Lobectomy	85	84	42	9
- Frozen section, %	38%	16%	14%	0%
- Consultant, n (%)	43 (40%)	38 (41%)	15 (33%)	6 (46%)
- Trainee, n (%)	65 (60%)	55 (59%)	29 (66%)	7 (54%)
VATS, %				
- Consultant	81%	76%	80%	17%
- trainee	91%	87%	69%	14%
Time, h:mm mean +- <u>st.dev</u>				
- consultant	3:11 ± 1:10	3:09 ± 0:41	3:25 ± 0:42	3:43 ± 0:38
- trainee	2:40 ± 0:37	2:30 ± 0:44	2:47 ± 0:40	3:28 ± 1:02
Length of stay, days median (quartiles)				
- consultant	5 (6.5, 10.0)	7.0 (4.0, 10.0)	5.0 (4.0, 9.0)	9.0 (6.5, 22.0)
- trainee	5 (4.0, 9.0)	5.0 (4.0, 8.0)	5.0 (4.0, 7.0)	7.0 (4.5, 7.5)
30 day mortality, n				
- consultant	0	1	0	1
- trainee	0	1	0	0
<u>Thoracscore</u> , % median (quartiles)				
- consultant	1.97 (0.99, 2.92)	1.97 (1.25, 3.51)	2.29 (1.25, 3.43)	4.00 (2.59, 5.18)
- trainee	2.92 (1.32, 3.60)	2.92 (2.02, 4.08)	2.31 (1.25, 3.60)	4.23 (2.16, 4.49)

Conclusions

The results support the notion that under appropriate supervision, trainee led operations do not lead to worse outcomes, even with high T stage. When outcomes for trainee led operations appeared to be better than non-trainee led operations we hypothesise that this is due to selection bias and technically challenging operations whereby a trainee has started, run into difficulty and the procedure has been completed by a consultant.

Improved Bed Utilisation and Cost-saving Impact of a Specialist Nurse-Led Ambulatory Chest Drain Clinic (AC-DC)

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¹Manchester University NHS Foundation Trust, Wythenshawe Hospital; ²University of Manchester Medical School

Objectives

Prolonged air leak (PAL) after lung resection remains one of the most common postoperative complications with rates varying from 6-12%. PAL increases hospital length of stay (LOS), raises the risk of post-operative complications including empyema, and adds significantly to health care costs. Our Thoracic surgical department pioneered a Specialist Nurse-led Ambulatory Chest Drain Clinic (AC-DC) in order to facilitate earlier discharge for patients with indwelling chest drains. Patients were trained to monitor for drain-related complications in the community, with regular follow-up by our Specialist nurses. Dedicated Drain clinic appointments were made to assess and decide on Chest drain management. We reviewed the data to determine the bed days and cost savings delivered by this novel model.

Methods

Electronic records of patients who attended nurse-led drain clinic over a 12-month period (01/10/2019 – 30/09/2020) were reviewed. The number of clinics attended and time interval between discharge and drain removal were recorded. Estimated cost per visit to the drain clinic was calculated following consultation with senior hospital management and estimated at £75. The cost of a hospital bed day on the ward at our centre is estimated to be £250.

Results

There were 132 clinic appointments during the study period, 80 patients were discharged with an ambulatory chest drain in-situ. They were managed in the outpatient clinic until drain removal. Median duration from discharge to drain removal was 10.5 days (IQR 8.5). This accounted for a total of 1070 inpatient days saved. Total financial savings were estimated to be £257,750.

Conclusion

Nurse-led chest drain clinics have proved to be a highly cost-effective way of managing patients requiring a prolonged chest drain. In addition to the financial benefits, it also plays a key role in facilitating patient flow and allowing early discharge of patients home.

Pulmonary Resection Outcome for Lung Cancer in Patients with Borderline Lung Function

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Nottingham City Hospital

Objectives

To evaluate outcome of patients with borderline lung function who underwent pulmonary resection for primary non-small cell lung cancer.

Methods

In this retrospective study, NSCLC patients for surgery with pre-operative FEV1<50% were enrolled. Primary outcome was post-operative all-cause mortality.

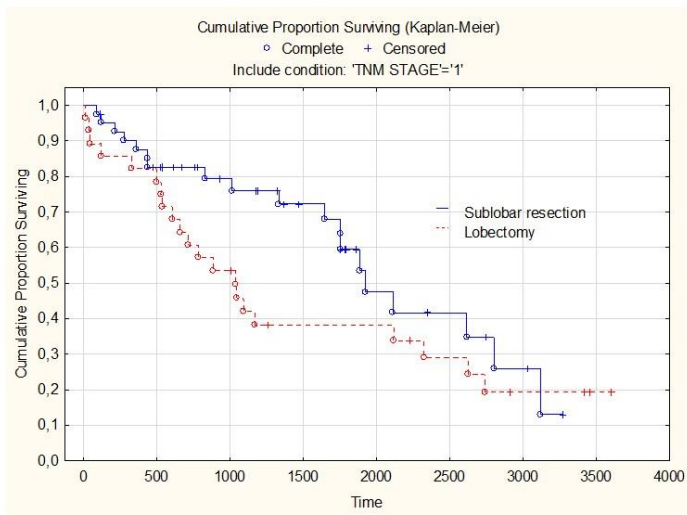
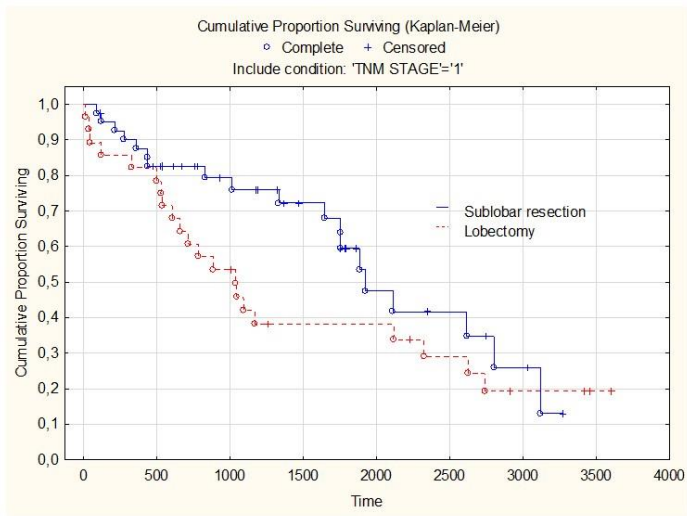
Results

Between 2010 and 2020, 109 patients with FEV1<50% underwent first-time surgery for NSCLC. Mean age was 69±8 years and 80(66%) were male. Mean FEV1 was 41.13±5.7% with mean DLCO 42.13%. Out of 109, 58(53%) underwent lobectomy and remaining 51(47%) sub-lobar resections with 36.7% wedge resections and 9.2% segmentectomies. Post-operative TNM staging showed 68(62%) patients in Stage-I, 25(23%) patients in stage-II and 16(14%) in stage-III disease.

Patients with stage-I disease who underwent lobectomy experienced worse survival than those with sub-lobar resection ($p=0.049$) with 1, 3 and 5 years survival at 82% vs 88%, 42% vs 76% and 34% vs 60% respectively. Cox regression revealed that factors including age and lobectomy had significant influence on long term survival following surgery for lung cancer. TNM Stage, tumour size and nodal disease showed no impact on long-term survival. Patient treated with lobectomy had higher probability of all-cause mortality ($RR=1.72, p=0.035$) than those with sub-lobar resection.

Conclusion

Sub-lobar resection for lung cancer patients with borderline lung function may have better survival outcome as compared to lobectomy.



Metastasising Pleomorphic Adenoma; Lung Manifestations and Management

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Background

Metastasising pleomorphic adenoma (MPA) is a benign metastasising salivary gland tumor with malignant characteristics. Metastases from such tumors have been reported in distant sites including bone, lung and liver. Metastatic Lung (MPA) lesions are usually detected in surveillance imaging. We aimed to systematically review the literature for all reported cases of metastatic lung MPA. Their management and prognosis were explored.

Methods

We searched Pubmed for case reports/series with metastasizing/metastasising AND pleomorphic adenoma. We have identified cases showing lung manifestations and their managements. An author's own case has also been included.

Results

18 published reports including the author's own were reviewed (23 individual cases) covering extending from 1978-2018. Median age at the time of diagnosis of the metastasising pleomorphic adenoma was 61.0yrs (range 33-76) Male to Female ratio was (1:1). The commonest primary site was the parotid gland (72.2%). The mean period between diagnosis of the primary and the metastasising pleomorphic adenoma was 10.52 years range (11months -13years). 50% of the cases had extrathoracic metastasis, bone being the commonest site (38,9%). There was bilateral lung involvement in 55.6% of the cases. Surgical resection was performed in 7/18 cases (38.9%) with only 1 documented case receiving radiotherapy. 55.6% were monitored for the lung metastasis. Long term outcome was poorly reported as most published case reports were published soon after initial management of the metastasis.

Conclusion

Metastasising pleomorphic adenoma is a rare entity. Lung manifestations are the 2nd commonest metastatic site after bone. Though optimum management is not known, limited lung resection appears to be a reasonable treatment option particularly in patients with oligometastasis. Surveillance is also a reasonable consideration in patients more so as long-term outcomes are yet unknown in this cohort.

Quality of Life Following Lung Resection Surgery

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University Hospitals Birmingham

Objectives

Quality of life (QoL) assessment plays an important role when evaluating patients following lung resection surgery, but can be overlooked in favour of clinical outcomes including tumour clearance and survival. This is significant as the likely effect of surgery on a patient's QoL should form part of the pre-operative consent process. We evaluate the short-term impact of thoracic surgery on QoL over a five-year period.

Methods

Health-related QoL was assessed prospectively in patients undergoing lung resection surgery at Birmingham Heartlands Hospital, UK, between 2015 and 2020. Assessment involved completion of the EORTC QLQ-C30 and LC13 questionnaires pre-operatively and post-operatively at six weeks and five months. Further information was collected retrospectively on patient demographics, pre-operative investigations, operation details and surgical complications. Relevant factors were included in a multivariate analysis.

Results

Pre- and post-operative data was collected from 746 patients, of whom 563 completed all three questionnaires. Median age was 70 years (IQR 63 – 75). Lobectomies were performed in 70% of cases and 62% of all operations were completed via VATS. Patients reported a deterioration in global QoL in the six weeks following surgery, which was maintained at five months post-operatively. A significant decline in both role and social functioning was seen at six weeks, and although this improved by five months, remained below pre-operative levels. Symptoms of dyspnoea and fatigue worsened following surgery, however pain was found to improve in the longer term.

Conclusions

Lung resection has a significant impact on post-operative QoL for patients. It is important to accurately counsel patients on this perceived deterioration, especially with regards to daily functioning, when consenting patients pre-operatively for surgery. Further research is required to see whether this deterioration in QoL improves over a longer follow-up period.

Systematic Review of the Reported Outcomes in Invasive Management of Malignant Pleural Mesothelioma: The COS-iMeso Initiative

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Objectives

Heterogeneity in outcome measurement and reporting renders meaningful literature synthesis challenging, and contributes to research waste. We sought to systematically evaluate the outcomes reported to date in studies of invasive management of malignant pleural mesothelioma (MPM).

Methods

Eligible studies and protocols (2010 to 2020) were identified from electronic databases (Medline, Embase, Cochrane) and clinical trial registries (ClinicalTrials.gov, EU Clinical Trials Register, ISRCTN). Data was extracted for all clinical primary and secondary outcomes, and associated measures. COS iMeso was registered with COMET (Core Outcome Measures for Effectiveness Trials) in November 2019 (<http://www.comet-initiative.org/studies/details/1426>) and is funded by a BASO~ACS (NIHR) Project Grant.

Results

Literature searching returned 2,636 abstracts, of which 88 papers underwent full-text review, and 10 were included in final analysis. An additional 5 studies were included from clinical trial registries.

The most frequently-reported endpoints were: survival in 87% (13/15) of the studies, adverse events and perioperative morbidity in 73% (11/15), quality of life (QoL) in 60% (9/15), disease progression in 53% (8/15), length of hospital stay in 20% (3/15) and health economic outcomes in 13% (2/15).

There were significant discrepancies in the intervals for which survival was reported, ranging from perioperative period to 5 years, with minimal overlap or consistency between studies.

QoL was assessed by 19 different tools, with the most frequently monitored time interval being at 3 and 6 months in 39% of studies reporting QoL assessments.

Conclusions

Outcome reporting in studies on the invasive management for malignant pleural mesothelioma is highly variable. This review reinforces the need to define a core outcome set which will allow meaningful comparison and analysis across studies in this field.

The Impact of the Presence of COVID-19 on Outcomes in Thoracic Surgery Services in a Large Tertiary Centre

Garner, M; Khan, H; Wotton, R; Marsh, L; Walthew, A; Thekkudan, J; Shackcloth, M; Asante-Siaw, J; Woolley, S; Page, R

Liverpool Heart & Chest Hospital

Objectives

The COVID-19 pandemic presents significant ongoing challenges to the way in which thoracic surgery services are delivered. Numerous changes to hospital policies, ward allocations and pre and post-operative tests occurred as services were reconfigured due to the presence of COVID-19 in our hospital. We aimed to examine how this affected our practice in terms of length of stay as well as post-operative complications and re-admissions.

Methodology

Retrospective collection of data of all patients undergoing anatomical lung resection. Patients were split into two groups: Group 1 were admitted between 1st March and 5th June 2020 (n=115) when we had inpatients with COVID-19 in our hospital and Group 2 (n=64) admitted between 6th June and 31st July 2020 where there were no inpatients with COVID-19.

Results

There was no difference in the age or the gender of the patients admitted during this period. The median length of stay for both groups was 4 days, when split into surgical approach again there was no difference (3 days for VATS patients and 5 days for thoracotomy patients). The in-hospital mortality rate was comparable at 1.7%, however, there were 2 deaths due to COVID-19 following discharge in group 1. In addition there was no difference in readmission rates between either group. We did see a small increase in the number of complications reported at follow-up in group 2 however these were largely wound or chest infections.

Conclusion

Despite numerous changes to department policies and caring for COVID-19 patients within our hospital we have demonstrated comparable outcomes in terms of length of stay, mortality and re-admission rates.

	Group 1	Group 2
Age (years)	67.4	66.5
Male	57 (49.5%)	29 (45.3%)
Median length of stay (IQR)	4 days	4 days
Median PCA duration	1.1 days	1.06 days
In-hospital mortality	2 (1.7%)	1 (1.6%)
Readmission	6 (5.2%)	3 (4.7%)
Complication at follow up	5 (4.3%)	8 (12.5%)

Navigation Bronchoscopy Accuracy is Improved with Correction of CT-to-body Divergence

Baranowski, R; Temov, K; Lau, K

Barts Thorax Centre, St Bartholomew's Hospital

Objective

Electromagnetic navigation bronchoscopy (ENB) is a safe way to diagnose lung lesions without puncturing the pleura. The diagnostic yield of ENB is approximately 70%, in part due to CT-to-body divergence, which is the mismatch of the target lesion position at the time of the CT vs during the procedure. We report the first experience of next-generation ENB which corrects for this divergence, using fluoroscopic tomosynthesis (FT) to update lesion position, and continuous guidance (CG) disclosing real-time position at the moment of biopsy.

Methods

Prospective study of 27 patients undergoing 28 biopsies using next-generation ENB with and without cone-beam-CT (CBCT) between Jan and Feb 2020, compared to a historical cohort of 60 patients in 2018 before and after the introduction of CBCT.

Results

15 patients underwent 14 biopsies and 3 fiducial placements using FT and CG. Mean lesion size was 21mm. Mean procedure time 41min. 1 lesion could not be reached. 9 (64%) lesions had a malignant diagnosis.

12 patients underwent 14 biopsies with CG and CBCT without FT. 4 patients had concurrent EBUS. Mean lesion size was 25mm. Mean procedure time 36 min. Mean number of CBCT scans was 3, mean radiation exposure 2.85mSv per case. The diagnostic yield was 86% (9 malignant, 1 atypical cell, 2 confirmed benign diagnoses (1 actinomyces, 1 inflammatory infiltrate confirmed resolved on subsequent CT).

This represents a 23% improvement in yield compared to ENB without CBCT, and 15% improvement compared to ENB with CBCT (table 1).

There were no pneumothorax or other complications.

Conclusions

Correction of CT-to-body divergence with FT and CG improves accuracy of ENB.

Modality	Diagnostic Yield
2018 ENB without CBCT	52%
Next Generation ENB without CBCT	64%
2018 ENB with CBCT	75%
Next Generation ENB with CBCT	86%

Transplant & Failure

Impact of COVID-19 Pandemic on the Mortality of the Patients in Cardiothoracic Transplant Pathway: Single-Center Review

Pingle, V; Clark, S; Parry, G

Freeman Hospital

Introduction

The coronavirus pandemic has adversely affected the world infecting more than 40 million people and leading to almost 1 million deaths. Preexisting conditions like hypertension and diabetes have been associated with increased risk of coronavirus infection and also poorer outcomes. So, we decided to look into the impact of coronavirus on our transplant program. The main aim of this study was to review if the Coronavirus pandemic has increased the mortality in the pre and post cardiothoracic transplant patients.

Method

We retrospectively reviewed deaths in cardiothoracic transplant pathway. We categorized them into pre and post-transplant patients. The pre-transplant patients were further categorized depending upon the stage of the assessment. The deaths that occurred in this cohort of patients between January 2020 to June 2020, irrespective of the time since transplant or assessment, were considered in the study. We compared the deaths during the same time interval in the last 4 years with the deaths during pandemic.

Results

The review of our data showed that 19 patients in heart transplant pathway died during Jan 2020 to June 2020. 4 of which were from pediatric group. Out of total deaths, 10 were post transplant and 4 on the active list. 1 patient from the post transplants group and one in the pre transplant group died of covid. The total number of deaths during the same period were 19, 24, 20, 32 in the year 2019, 2018, 2017 and 2016 respectively.

The lung transplant pathway had 41 deaths during the pandemic. 11 of which were awaiting transplant and 19 were post-transplant. Of these deaths only one patient had positive COVID swab. The corresponding deaths during year 2019, 2018, 2017 and 2016 were 46, 51, 49, 46 respectively.

Conclusion

COVID pandemic has not led to significant increased in the mortality in the patients in pre and post cardiothoracic transplant patients.

Role of Tricuspid Valve Intervention at the Time of Left Ventricular Assist Device Implantation: A Systematic Review

Khan, N¹; Casey, L²; Mellon, L³; McGuinness, J²

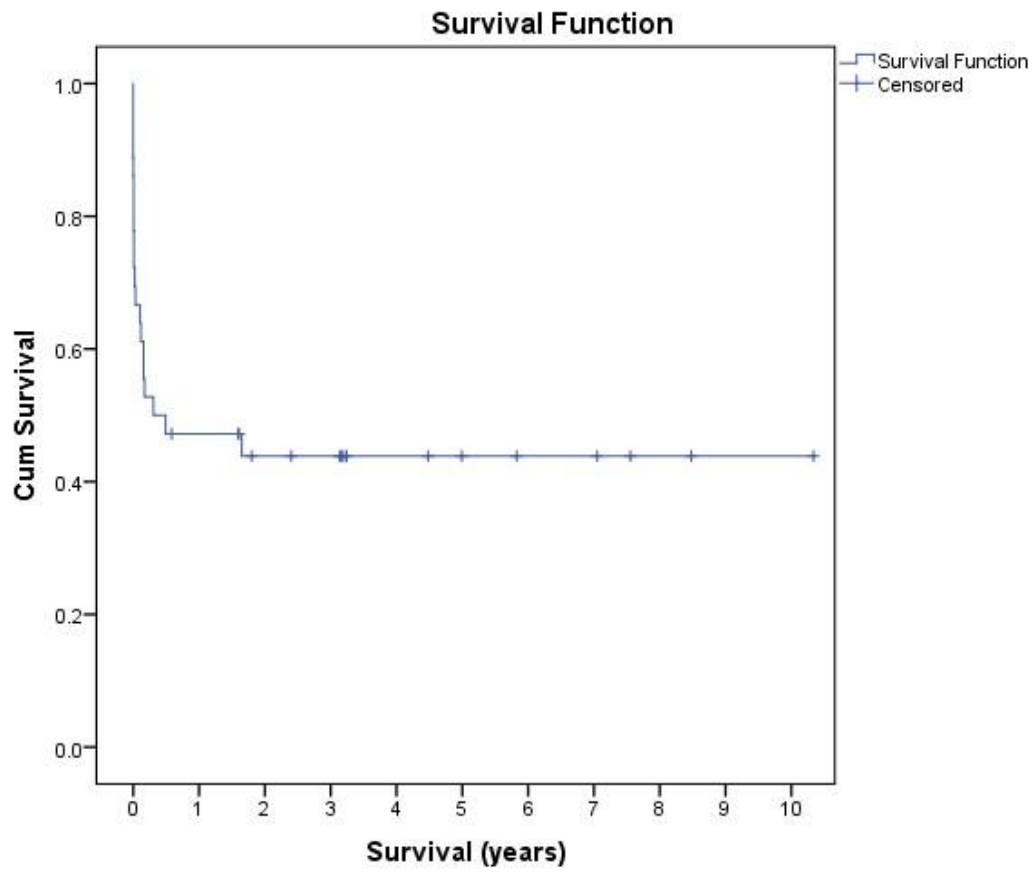
¹Our Lady's Children's Hospital, Crumlin; ²Mater Misericordiae University Hospital, Dublin; ³RCSI

Right ventricular failure is found in up to 40% of individuals referred for LVAD implantation, representing the primary cause of mortality in this cohort. Tricuspid regurgitation is intimately related to RV failure, both contributing to and being aggravated by the condition. In this context, the role of concomitant tricuspid valve procedure at time of LVAD implantation is unclear.

This systematic review assessed peer-reviewed literature which directly compared individuals undergoing LVAD implantation alone against individuals undergoing LVAD implantation with concurrent tricuspid valve procedures, with respect to short and long-term outcomes.

4236 records were screened, of which 20 were ultimately assessed. Seven studies were then excluded after being deemed to represent unacceptable risk of bias. Thirteen studies were thus included. Reported outcomes varied and no significant trend was noted in favour of either group.

Considerable shortcomings were observed in existing data, including small study numbers, and inherent risks for confounding with non-randomised studies. Overall, few differences were noted in long-term outcomes between groups. Some adverse associations were noted with respect to early outcomes, including increased incidence of post-operative renal dysfunction. Available data are insufficient to support or refute the routine practice of concurrent tricuspid procedures. Prospective, randomised studies are warranted in this field of emerging relevance.



Conclusion

MCS usage in these patients carries a high mortality in the early post-implantation period. However, there is a significant benefit to patients who survive the initial bridging period to recovery or destination therapy.

A Simplified Temporary Right Ventricular Assist Device (RVAD) During LVAD Implantation - Low Risk, Easy to do and Ideal for Patient Rehabilitation

Mydin, M; Woods, A; Pathania, V; Pingle, V; Robinson-Smith, N; Tovey, S; Jungschleger, J; Butt, T; Shah, A; McDiarmid, A; MacGowan, G; Schueler, S

Freeman Hospital

Introduction

Planned RVAD implantation for severe RV failure at the time of LVADs implantation can improve the poor outcomes associated with emergency/delayed RVAD support.

Objectives

To share our experience of a simplified, less traumatic temporary surgical RVAD support.

Methods

Between 2012-2020, our unit performed 178 LVAD implantations. Temporary RVAD support was performed in 41 patients (23%).

An 8mm RVAD outflow graft was via the main pulmonary artery, and venous inflow was via the sapheno-femoral junction.

Results

A total of 29 patients were included - 23 males and 6 females. Mean age was 51.1 years (range 12-68). Median INTERMACS was 2.

Post-operative complications occurred in 20/29 patients (68.9%). Bleeding/tamponade occurred in 11/29 patients (37.9%) including one who bled from the PA anastomosis.

22/29 patients (75.8%) were weaned from RVAD support. Five (17.2%) were super-urgently transplanted while two (6.9%) died of multi-organ failure.

Median RVAD support was 7 days (range 3-28). Median ICU and hospital LOS was 12 days (range 5-33) and 40 days (range 5-149) respectively. The 30-day survival was 89.6%.

Conclusion

Our simplified temporary RVAD technique is a safe and less invasive surgical approach with low complication rates and removal under LA enabling significant improvement in post-operative care and rehabilitation.

Outcomes Following Elective Temporary RVAD Support in Patients who are Undergoing Heartware LVAD (HVAD) Implantation: A Bridge too Far?

Mydin, M; Balasubramanian, S; Woods, A; Pathania, V; Robinson-Smith, N; Tovey, S; Jungschleger, J; Butt, T; Shah, A; McDiarmid, A; MacGowan, G; Schueler, S

Freeman Hospital

Introduction

Severe RV failure following LVAD implantation leads to poor outcomes, and planned RVAD support should be initiated early. There is a paucity of evidence in the literature presently.

Objectives

We present our single centre experience of performing planned RVAD support for severe RV failure at the time of LVAD implantation. Between 2012-2020, our unit performed 178 LVAD implantations. Temporary RVAD support was performed in 41 patients (23%).

Results

A total of 29 patients were included in this study - 23 males and 6 females. Mean age was 51.1 years (range 12-68). The median INTERMACS was 2.

22/29 patients (75.8%) were successfully weaned from RVAD. Five (17.2%) were transplanted while two (6.9%) died of multi-organ failure. Median RVAD support was 7 days (range 3-28).

Post-operative complications occurred in 20 patients (68.9%) including bleeding/tamponade in 37.9%, renal failure in 20.7%, arrhythmias in 17.2% and pulmonary in 10.3%.

Median ICU and hospital LOS was 12 days (range 5-33) and 40 days (range 5-149) respectively.

30-day survival was 89.6%. One-year survival was 62.0%.

Conclusion

Planned RVAD support during LVAD implantation can be done in a safe, less invasive and simplified fashion in our experience – our results are comparable to what is reported in the literature.

Introduction of a Pulmonary Artery Catheter Transducer Guide to Support Training of Transplant Practitioners

Gusa, M; Quigley, R; Kaul, P; Berman, M; Baxter, J

Royal Papworth Hospital

Objectives

Alongside Transoesophageal Echo (TOE) and visual inspection, Pulmonary Artery Catheterisation is a valuable diagnostic tool in DBD Heart retrievals. The purpose is to obtain haemodynamic measurements to indicate efficiency of the heart function in order to help the accepting centre to make an informed decision on whether to accept the organ.

In order to obtain this measurement an additional transducer and specific monitoring system is required. The Transplant Practitioner (TP) role is to support the Donor Care Physiologist by assembling the transducer sets prior to floating the Pulmonary Artery Catheter.

Methods

To ensure standardised practice, as well as a thorough understanding of equipment, procedure and appropriate interpretation of the results, a step-by-step guide has been produced to support learning. This ensures that any confusion is avoided, and each member of staff will benefit from the same training package and information.

The guide that has been created for the TP team includes the indications of this procedure, the equipment required, and an illustrated step-by-step guide of the process to assemble the required equipment.

Results

Following the implementation of this training tool, its use has been utilised throughout our NORS team, including Transplant Practitioners, Trainee Donor Care Physiologists and Surgical Fellows. It has eliminated misunderstanding and uncertainty when the Pulmonary Artery Catheter has been used as all members of the team are following the same standardised format. The educators have confirmed that this creates better understanding of the procedure and a robust understanding of the set-up following this training tool being implemented.

Conclusions

Having a protocol for this procedure as well as theoretical reasoning has helped the service by reducing the number of errors, increasing the efficiency of the staff and offering an organised structured approach of training.

The Vroom-Yetton Model in Transplantation - Deciding How to Decide

McPherson, I¹; Chilvers, N²; Diyab, Y¹; Birla, R¹; Clark, S¹

¹Freeman Hospital, Newcastle-upon-Tyne; ²James Cook University Hospital, Middlesbrough

Objectives

Organ acceptance decisions in transplantation should not be autocratic and are best with group consensus. We reviewed the use of the Vroom-Yetton model to identify the best decision-making approach and leadership style to take on receipt of an offer. The aim was to help bring consistency and order to a process that is idiosyncratic and instinctive.

Methods

62 donor offers for heart/lung transplantation were considered in real-time. The Vroom-Yetton model was applied. Factors taken into account included donor and recipient clinical status, time constraints, transportation, resources and risk.

Results

The algorithm classified 46 (74%) of donor offer decisions as Autocratic(A1) requiring no further input from the team. 10% were A2. In 6 (10%) Consultative(C1) decisions were required with opinions from individual team members without full team involvement. No C2 decisions occurred. In 6 (10%) Collaborative(G2) decisions were made with a facilitative surgeon and team members reaching a conclusion together.

Conclusions

The Vroom-Yetton model worked well prospectively. The majority of decisions were autocratic. Only 10% involved full collaboration and agreement. In modern practice, this reflects badly but practical constraints such as team availability and sufficient time are a problem. Autocracy may be influenced by individual expertise/confidence but does not necessarily produce correct decisions.

The Impact of COVID-19 on the Cardiopulmonary Transplant Journey

Khoshbin, E; Pingle, V; Parry, G; Clark, S

Freeman Hospital

Introduction

The effect of the COVID-19 pandemic had the potential to have a major impact on patients during their journey through transplant assessment and heart or lung transplantation. Patients awaiting cardiopulmonary transplantation form a vulnerable group at increased risk because of their end-stage cardiovascular or respiratory disease. We evaluated the impact of COVID pandemic on our transplant program.

Methods

We retrospectively reviewed our adult and pediatric heart and lung transplant activity from 2015. We assessed deaths on the active waiting list between Jan-27th May for each yearly period and compared our transplant activity for each financial year up to April 2020 and our activity between Jan-27th May 2020 (the first UK pandemic peak) comparing this to the same period over the last five years. This allowed us to directly compare the effect of COVID with previous years' activity.

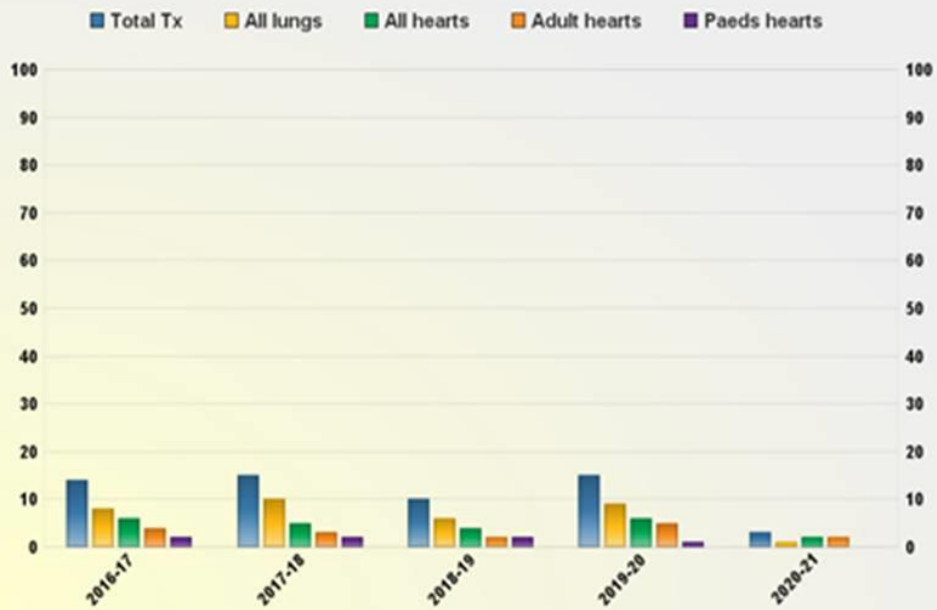
Results

A total of 19 heart patients died during Jan-27th May 2020. Out of the total, 11 were post-transplant and 5 on the active list. There were no cardiac deaths related to COVID-19. The total deaths during the same period were 19, 24, 20 and 32 in the years 2019, 2018, 2017 and 2016 respectively. A total of 41 lung patients died during Jan-27th May 2020. Out of the total 11 were on the active list and 19 were post-transplant deaths. Of these only 2 patients were COVID deaths. The corresponding deaths during year 2019, 2018, 2017 and 2016 were 46, 51, 49 and 46 respectively. Transplant activity from Jan-27th May in 2016-19 averaged 32 (16 hearts, 16 lungs); activity during the same time period in 2020 was 13 hearts and 4 lungs, clearly affected by reduced activity due to COVID-19.

Conclusion

This audit does not suggest a significant rise in mortality due to the COVID-19 pandemic in vulnerable patients either pre or post-transplantation. Measures such as shielding were highly effective in this population. Transplant activity for the year was affected.

Transplants by Year Jan-27thMay



printed 27/5/2020

Transmedics Organ Care System in Heart Transplantation for Congenital Heart Disease

Pingle, V; Clark, S; Jungschleger, J; Butt, T; Davidson, A; De Rita, F; Mohamed, N; Hasan, A

Freeman Hospital

Objective

The availability of suitable organs has always been an Achilles' heel in the transplant surgery. The advent of Transmedics Organ Care system (OCS) has ushered in a revolution in organ preservation. During perfusion, lactate consumption is a reliable indicator of cardiac metabolism but there is no objective parameter to measure cardiac function. ACHD is an independent predictor of higher mortality after transplantation, with a 2 to 3-fold increase in relative risk of mortality within the 1st -year post-transplantation. We report the first series of heart transplants using this OCS technology exclusively for adult congenital heart disease.

Method

From September 2017 to May 2020, Freeman Hospital performed 11 heart transplants in adults with congenital heart disease using OCS technique for organ preservation. Outcomes were retrospectively analysed.

Results

All except one, all had multiple previous surgical interventions. The average number of previous cardiac surgical procedures was 4. Preoperative recipient surgery included Mustard (1), Sennings (2), Norwood (1), Fontan (3) and Ventricular septal defect (VSD) and Mitral valve replacement (MVR) (1). 1 patient had RV dysplasia. All underwent orthotopic heart transplantation. One patient underwent combined heart and liver transplant.

Median OCS perfusion time was 340 min (194-916 minutes). Three patient required extra-corporal Membrane Oxygenator (ECMO) during the post-operative period.

There were 3 mortalities giving a 30-day survival of 66.6%. OCS time was a mean of 295 mins in survivors and 515 mins in non-survivors. Median perfusion peak lactate was 3.55 (1.8-5.4). There was no correlation between OCS time and death.

Conclusion

In this first world experience of OCS use for adult congenital heart disease, results in this challenging group were satisfactory and allowed for long periods of preservation in this challenging surgical cohort. OCS perfusion time and peak lactate were not associated with poor outcome.

Extending the Role of the Transplant Practitioner Within the NORS as Organ Care Practitioner

Olano, F; Quigley, R; Kaul, P; Berman, M; Pettit, S; Baxter, J

Royal Papworth Hospital

Objectives

The Transplant Practitioner (TP) has been an established member of the National Organ Retrieval Service (NORS) at one of the UK Transplant Centres for some time. The TP is a registered nurse who is a competent in perfusion and preservation of retrieved cardiothoracic organs. With the advent of novel technology such as the Organ Care System (OCS) following donation after circulatory death (DCD) the need to expand the role of a senior TP to become Organ Care Practitioner (OCP) offered a solution to the skills shortfall.

Methods

The OCS is a portable ex-vivo organ perfusion system which is utilised from retrieval until the heart is disconnected for transplant. In order to develop the skills and expertise on how to use this technology effectively and safely, external training was necessary to extend the TP's scope of practice. The trainees were given the valuable opportunity to undergo an intensive, week-long training to Boston, Massachusetts where the innovative technology has been developed. In-house teaching sessions were also undertaken by other competent and skilled members of the NORS team. Moreover, the trainees were provided further exposure peri-operatively during heart and lung retrievals whenever the machine was being utilised to develop confidence and competence with the machine as well as maintain skills.

Results

This additional competency to the role of the TP has allowed role progression and increased expertise responsibilities for non-medical nursing staff. This advanced skill has allowed our centre to be fit for purpose prior to the introduction of the National DCD Retrieval Service in September 2020.

Conclusion

The extended role of the TP as both Organ Preservation and Organ Care Practitioners continues to ensure that non-medics help to ensure that a NORS team maintains resilience.

Paediatric Organ Retrieval and the Emotional Impact this has on the National Organ Retrieval Service (NORS) Team Members

Lord, B; Quigley, R; Kaul, P; Berman, M; Gilchrist, E; Baxter, J

Royal Papworth Hospital NHS Foundation Trust

Objective

Donor Organ retrieval is an incredibly specialised role which requires a specialised team.

Paediatric retrievals are significantly less frequent and despite being extremely rewarding, they can be psychologically challenging. Surgeons and retrieval teams might benefit from additional support after such experiences.

Method

A survey was widely distributed to a NORS team asking questions relating to paediatric organ retrieval. Staffs were asked pertinent questions which could be analysed and a plan formulated so that additional support could be instigated if required.

Results

The survey had 22 respondents.

More than half of the respondents had undergone between 1 and 3 paediatric organ retrievals, only 13% of the team more than 10.

90 percent of the staff questioned stated that all paediatric organ retrievals are emotionally difficult and have developed personal coping strategies.

All staff agreed that debrief following paediatric organ retrieval is important but depends on the individual.

The results from questions asked throughout the survey have highlighted the importance of team support, as well as the necessity for a formalised, debrief within MDT meetings.

Conclusion

Paediatric organ retrieval is extremely specialised and evidently emotionally challenging. This survey has highlighted there is a need to ensure NORS teams remain emotionally supported both during and following paediatric organ retrievals depending on individual need.

Individuals should be encouraged to debrief as soon as possible following paediatric organ retrieval. The survey feedback has suggested some processes to support the wider retrieval team after paediatric retrieval, however, it is evident that more work can be done in this area.

Outcomes After Heart Re-transplantation at a Single UK Centre

Osman, M; Hogan, J; Adams, T; Nachum, E; Andal, R; Messer, S; Lewis, C; Kydd, A; Bhagra, S; Quigley, R; Baxter, J; Catarino, P; Jenkins, D; Tsui, S; Sudarshan, C; Kaul, P; Large, S; Berman, M; Hogan, J

Royal Papworth Hospital NHS Foundation Trust

Objectives

Heart re-transplantation is the only long-term treatment option for end-stage allograft failure after heart transplant. Only 100 to 120 heart re-transplants occur per year worldwide and they represent a very small proportion of all heart transplants (2.2% in 2016) 2. As a result, many institutions are unfamiliar with the risks and benefits for heart re-transplantation. We have reviewed the short and long-term outcomes after heart re-transplantation at Royal Papworth Hospital.

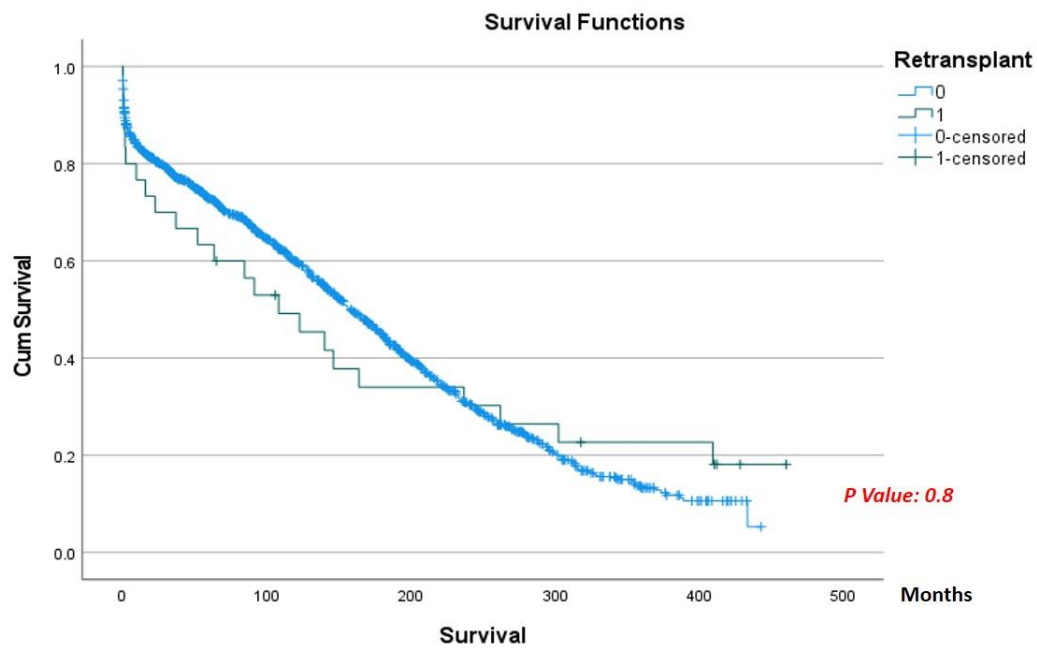
Methods

This observational single-centre study included consecutive patients who underwent heart transplantation from January 1979 to September 2020. Patients were categorised according to their status (first heart transplant or re-transplant). Baseline characteristics were obtained from the unit database. Vital status was ascertained at 30 days and long-term survival was estimated using Kaplan-Meier analysis.

Results

1574 patients underwent heart transplantation during the study period, of whom 1543 (98%) patients underwent their first heart transplant and 31 (2%) patients underwent re-transplantation. Twelve (38.7%) patients underwent acute re-transplantation, during the same hospital admission as their first heart transplant. Time to re-transplantation ranged from 1 to 8299 days (median 961.5 days). Age and survival are presented in the table. There was no difference in post-transplant survival at 30 days and 10 years. Kaplan-Meier estimate of survival is presented in the figure.

	Single transplant group	Re-transplant group
Age at transplant (mean +/- SD)	48 +/- 11.7 years	41.5 +/- 11.5 years
30 day mortality	128/1543 (8.3 %)	3/31 (9.8%)
10 year mortality	888 patients (57.6 %)	17 patients (54.8 %)



Conclusion

Carefully selected patients may have reasonable short-term and long-term survival after heart re-transplantation. Future work should examine the risk factors for early mortality after heart re-transplantation so that centres can refine their selection of individuals who represent acceptable candidates for re-transplantation

Pediatric Heart Transplantation Following Donation After Circulatory Death, Distant Procurement and Ex-situ Perfusion

Nachum, E¹; Laurence, C²; Osman, M¹; Hogan, J¹; Baxter, J¹; Quigley, R¹; Messer, S¹; Large, S¹; Kaul, P¹; Forsythe, J³; Henwood, S²; Fenton, M²; Davies, B⁴; Berman, M¹; Simmonds, J²

¹Department of Transplantation, Royal Papworth Hospital NHS Foundation Trust, Cambridge, UK; ²Division of Cardiology, Great Ormond Street Hospital for Children, London, UK; ³Organ Donation & Transplantation, NHS Blood and Transplant, Stoke Gifford, Bristol, UK; ⁴Department of Cardiac Surgery, Great Ormond Street Hospital, London, UK

Introduction

There remains a significant shortage of organs for children listed for heart transplant. This may be ameliorated by controlled donation after circulatory death (DCD), which has proven success in adults. However, there are numerous challenges in retrieval, assessment and transportation of DCD hearts. We report a unique collaboration between 2 centres, combining expertise in DCD organ retrieval and paediatric transplantation.

Methods

All families of children over 20 kg listed for heart transplantation were approached for DCD listing; all consented (n = 20). DCD hearts were procured by direct retrieval and perfusion, and then mounted, perfused and assessed on an ex-situ cardiac perfusion machine (Organ Care System (OCS), TransMedics, Inc., Andover, MA), before transfer to the implanting unit.

Results

Between 1 Feb and 30 Jun 2020, 5 children received a DCD heart (aged 12 to 16 years; two female). Two had previous cardiac surgery. Donor median age was 19.5 years (15-43); three were male. Donor heart mean functional warm ischaemic time was 25 minutes (22 - 28). Mean travel distance was 150 miles (40 - 220) and mean ex-situ perfusion time was 266 minutes (192 - 325). Initial arterial lactate on the OCS was 8.8 mmol/l (4.7-11.7) and venous 8.0 mmol/l (4.7 - 10.1); these fell to 4.7 mmol/l (2.2 - 7.4) and 4.4 mmol/L (2 - 7.1) respectively during transport. No recipients required post-operative mechanical support. Median ITU stay was 8 days (7 - 11) and total hospital stay was 16 days (12 - 21). Pre-discharge echocardiography showed good biventricular function in all recipients except one; all now have excellent function.

Conclusion

The use of previously unavailable DCD hearts has increased transplant activity by 83% in children > 20 kg in this early series. By combining the expertise of one unit in organ retrieval using novel technologies with another in paediatric transplantation, all patients had excellent short-term outcomes.

Impact of Donor and Recipient Age on 5-year Survival Following Heart Transplantation: A 24-Year National Analysis from the United Kingdom

Ali, J¹; Mumford, L²; Smith, F²; Stock, U³; Mascaro, J⁴; Curry, P⁵; Venkateswaran, R⁶; Clark, S⁷; Parameshwar, J⁸; Berman, M¹

¹Royal Papworth Hospital NHS Foundation Trust; ²NHS Blood and Transplantation; ³Royal Brompton & Harefield NHS Trust; ⁴Universities Hospital Birmingham; ⁵Golden Jubilee National Hospital Glasgow; ⁶Manchester University NHS Trust; ⁷Newcastle Upon Tyne Hospitals NHS Foundation Trust; ⁸Royal Papworth Hospital

Introduction

The impact of donor and recipient age on outcomes following heart transplantation remains controversial. The aim was to evaluate the impact of donor and recipient age on 5-year survival following heart transplantation in the UK.

Methods

Data were extracted from the UK Transplant Registry held by NHS Blood and Transplant on 3192 adult (≥ 18) DBD heart transplants in the UK between 1995 and 2018 inclusive. Donors and recipients were divided into 3 age groups (18-40, 41-50, 51+ years) for analysis. Kaplan-Meier survival curves and Cox-proportional hazards models (adjusted for donor cause of death, donor BMI, recipient BMI, creatinine, VAD status, primary disease, sex mismatch, ischemia time, and OCS use) were used to estimate the effect of recipient and donor age on 5-year patient survival and survival conditional on 90-days.

Results

The overall median recipient and donor age was 50 years and 38 years, respectively, with donor age increasing over time.

Unadjusted analysis showed a significant difference in 5-year survival for both donor and recipient age groups, $p < 0.001$ and $p = 0.005$, respectively. After excluding patients who died within 90-days of surgery there was no longer a difference in outcome (Fig)

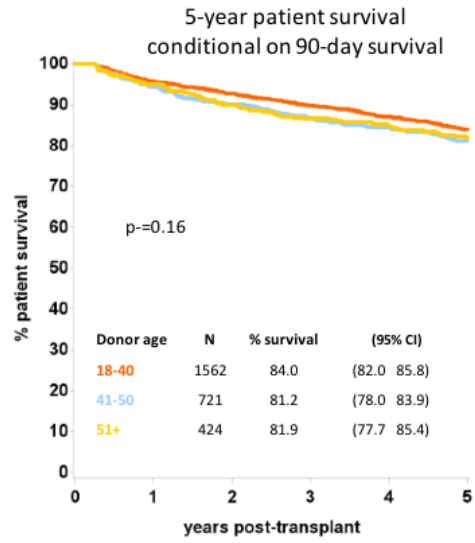
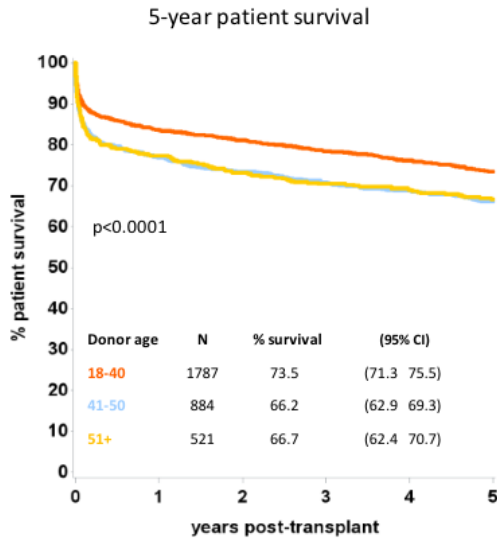
Donor age, but not recipient age, was a predictor of inferior 5-year survival once added to a risk-adjusted model ($p = 0.008$). A recipient receiving a heart from a donor aged 51+ had a 1.2 times higher risk of death than a recipient receiving an organ from a donor aged < 40 . After removing patients that had died within 90-days of transplant from the model, there was no longer a significant difference, indicating that the effect of donor age is only important short-term.

Conclusion

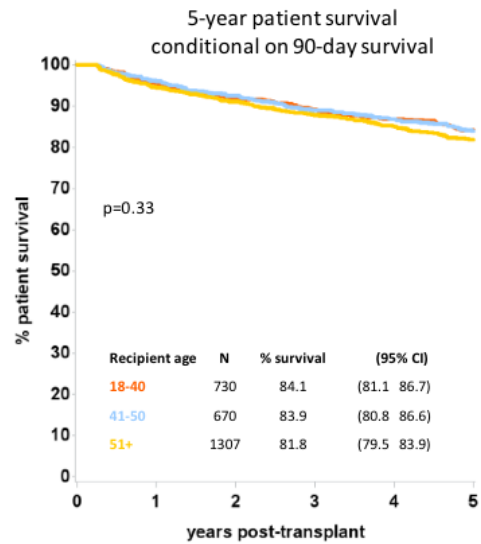
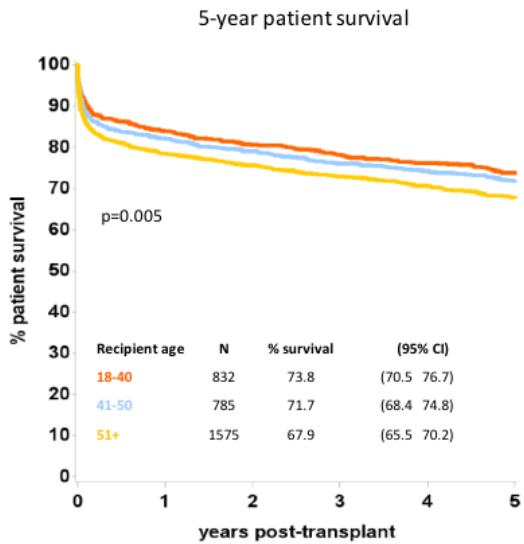
We have demonstrated that donor age is a statistically significant variable in modeling post heart transplant survival at 5 years. However, once a patient has survived the first three months post-transplant, donor age no longer significantly impacts on longer-term outcomes.

Figure 1 5-year patient survival following DBD heart transplant in the UK, 1995 - 2018

Donor Age



Recipient Age



Surgical Palpation to Exclude Donor Transmitted Coronary Disease: A Single Centre Experience

Vokshi, J; Ali, J; Ansaripour, A; Woolcock, E; Cheshire, C; Parameshwar, J; Kydd, A; Lewis, C; Jenkins, D; Tsui, S; Kaul, P; Large, S; Berman, M; Pettit, S; Bhagra, S

Royal Papworth Hospital

Objectives

The 2020 ISHLT consensus statement recommends coronary angiography in potential heart donors with risk factors for coronary disease (CAD) or aged >40yrs. Angiography is not commonly available for donors in the UK. At retrieval, donor hearts without palpable CAD are offered for transplantation. The accuracy of this in detecting underlying CAD is unreliable. We examined the incidence of occult donor transmitted (dt)CAD and its impact on long-term survival in our heart transplant (HTx) recipients.

Methods

All adult patients undergoing HTx Jan'08-Dec'18, who had coronary angiography post HTx by left-heart catheterization or computed tomography included. Angiograms were graded by 2 observers, according to ISHLT classification. Significant dtCAD was defined as evidence of CAV grade 2, 3 or focal lesion >50% in a main artery at first angiogram.

Results

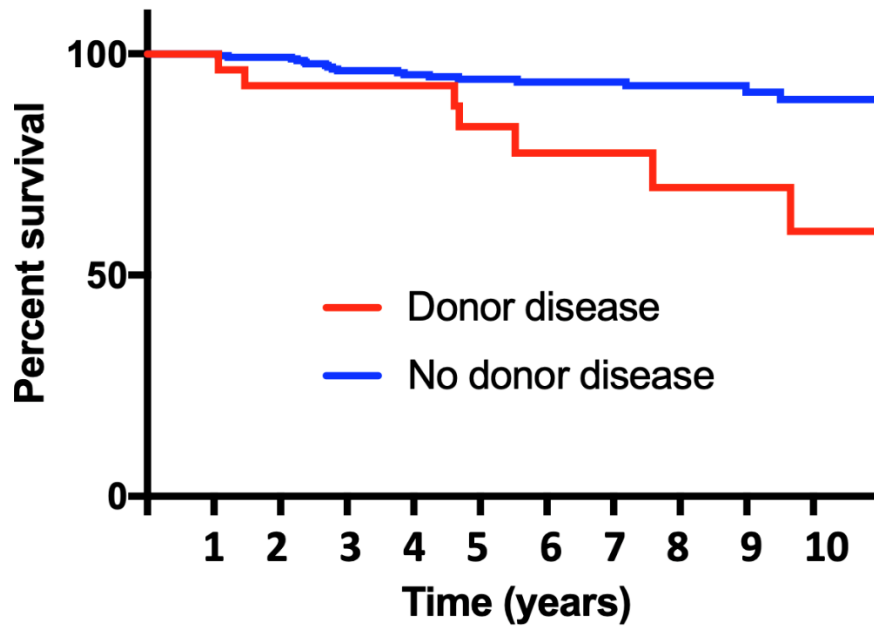
Over the 11-year period 389 HTx performed, 302 met inclusion criteria. Mean recipient age 48.8yrs, 77.8% male, donor age 38.2yrs, 64.6% male, BMI 26.6kg/m². 28 recipients (9%) had evidence of dtCAD. This was associated with a significant reduction in long-term survival (Figure 1, p=0.002).

No significant difference in dtCAD in hearts from donors >40yrs vs donors ≤40yrs (10.3% vs 8.3%, p=0.99). In donors >40yrs, neither a history of smoking (p=0.18), diabetes (p=0.36) or hypertension (p=0.55) were associated with significant CAD in isolation. The presence of 2 or more of the aforementioned risk factors in those >40yrs was associated with a higher incidence of dtCAD (25.0% vs 8.0% p=0.05).

Conclusion

In this single-center cohort, dtCAD was associated with a reduction in long-term conditional survival following HTx. Donor age of >40yrs alone was not predictive of significant dtCAD. Donor age >40 along with a history of 2 or more of hypertension, smoking or diabetes was found to be predictive of a higher risk of dtCAD. In such donors, surgical palpation alone may be insufficient to exclude significant CAD.

Figure 1: Long term survival in those with dtCAD vs. No dtCAD



Three Dimensional Printed Lung/Thorax Models -- An Aid to Lung Transplant Size Matching in Fibrotic Lung Disease.

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¹Freeman Hospital; ²St. George's University

Background

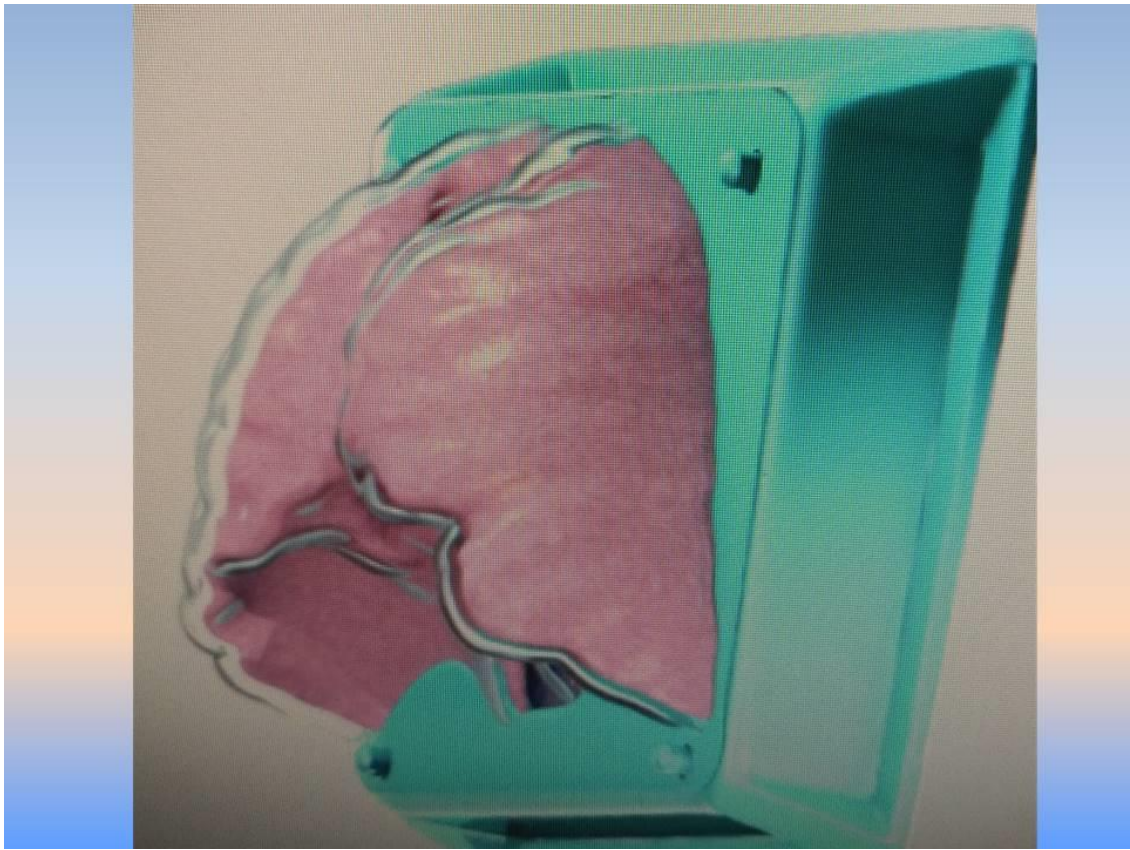
Patients with interstitial lung fibrosis have a small chest cavity and present a challenge for accurate size matching of donor lungs to the recipient. Presently donor-recipient size matching relies on clinical judgement and experience to avoid under or over sizing. Both are associated with poorer clinical outcomes in recipients. We have therefore developed a three dimensional (3D) printed objective aid to lung procurement for use in this group of patients.

Objectives

The objective of this project was to produce a patient specific 3D model of the recipients lungs and thorax for patients with interstitial lung fibrosis awaiting lung transplantation. This 3D model would be then sterilised and taken to the procurement in order to directly aid size matching of donor to recipient. Recipients CT scans were subjected to data transformation to produce a 3D printing file. This involved tracing of the CT images using Osirix software. This allowed the 3D printing of an actual size model of the individual patients lungs. A vacuum moulding of the anterior and posterior halves of the lungs was then be cast to replicate the patients thorax to assist with onsite size matching of donor to recipient lungs (Pictures). Chemical sterilisation tests have been successful allowing us to take a specific patient model to organ procurement. This would allow direct assessment of the organs size at the time of retrieval and a reduction in the incidence of size mismatching and better clinical outcomes.

Potential benefits

The subjective and real-time assessment of the lung volume adds another dimension to make the assessment of lung volumes more accurate. This objective tool supplements lung volume measurements currently used and helps the implanting surgeon in deciding on risk of lung volume reduction surgery for a particular recipient or to offer the lungs to either another recipient or potentially to another transplant centre.



Cardiopulmonary Transplant Surgery: A bedtime story

Chilvers, N; Birla, R; Clark, A; Clark, S

Freeman Hospital

Objectives

Transplant surgeons appreciate its nocturnal nature. However, human factors research suggests that fatigue has adverse effects on technical ability and patient safety. We sought to investigate the impact of out-of-hours on-call rotas.

Methods

Continuous sleep monitoring was performed for 43 working weeks using an iWatch running Sleepwatch (Bodymatter Inc). This produced automatic logs of sleep time, heart rate variability (HRV) and disruption.

The Chalder Scale was completed on waking to evaluate perceived fatigue. Dexterity was assessed using dominant hand tracking accuracy and sequence reaction/accuracy testing.

Results

23 nights required hospital return (OCI), 37 on call nights did not (OCH) and 241 off duty (OD). Median 3.7 disruptions per OCH night and 7.1 for OCI were recorded ($p < 0.001$ compared to OD). OCI sleep disruption was 15.3%. Sleep initiation was significantly longer (75min) than OD nights. OCI median total sleep time was 3hr 20min. OCI restful sleep was 75 mins, 139 mins OCH. Average OD heart rate was 56bpm, 65bpm OCI/OCH. OCH/OCI HRV was 49ms improving to 59ms for OD ($p < 0.001$).

OCI/OCH tracing accuracy and reaction time was significantly worse than OD ($p < 0.001$). Chalder analysis showed no OD/OCI/OCH difference.

Conclusions

On call sleep disturbance is associated with loss of heart rate variability suggesting adverse health effects. Reduced dexterity/reaction times are concerning for surgeons expected to operate subsequently. Chalder analysis suggests a lack of awareness by the surgeon of the effects of sleep deprivation and on their technical skill levels when patient safety during complex operations of long duration is paramount.

Further study is urgently warranted on the health effects of transplant on call for surgeons, the effects of fatigue on technical ability and patient safety as surgeons seem unaware of these objectively measured and concerning effects.

The Insertion Technique and Use of Impella 5.0 Device in the COVID-19 Era (Video)

Nachum, E; Osman, M; Hogan, J; Kaul, P; Stephen, P; Kydd, A; Bhagra, S; Lewis, C; Hoole, S; Catarino, P; Berman, M

Royal Papworth Hospital

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