Welcome to the 32nd EACTS Annual Meeting

Benvenuti a Milano!
Welcome to the 32nd EACTS Annual Meeting

I welcome all of you to this outstanding meeting and to this fashionable city. This is the first time for our new three-day Annual Meeting, and three sessions will be streamed live through our website, through CTS-net and at #eactslive, with a dedicated Twitter feed for truly global interaction.

In order to cater for all in attendance, the programme is varied, including several sessions on coronary surgery, valve surgery, innovative techniques and even a session on rare and uncommon diseases. I encourage you to download the EACTS App so you can create your own personal schedule, and we can keep you up to date throughout the meeting.

I do hope that in addition to the educational opportunities, you will spend three wonderful days in this vibrant city. I wish you an enjoyable and enlightening Annual Meeting, and I look forward to seeing you at the party on Saturday evening at the Alfa Romeo museum in Arese.

Marian Zembala
Secretary General
EACTS

Interview: Marian Zembala

Marian Zembala, head of the Annual Meeting, Marian Zembala (Silesian Center for Heart Diseases, and Medical University of Silesia, Zabrze, Poland) joined EACTS Daily News to discuss the landmarks of his life and the importance of partnership in his mission as EACTS President.

The author of nearly 700 papers and 92 book chapters, Professor Zembala was involved in numerous clinical trials in Poland, including arterial revascularisation with the use of both internal thoracic arteries, the surgical treatment of arrhythmias (including ventricular tachycardia and atrial fibrillation), procedures in chronic pulmonary embolism, endocardial ablation, and heart and lung transplantation.

After receiving his training at Poland’s historically renowned Medical Academy of Wrocław, he built his experience in Belgium, the Netherlands, the US and the UK, as well as in Poland. Immediately after graduating from medical school he spent time at the Catholic University of Louvain (Belgium), before beginning a residency position at St Antonius Hospital Utrecht (the Netherlands). Here he developed, amongst other things, an interest in arrhythmia surgery. “In St Antonius I learned very modern coronary surgery,” he explained. “And I also learned organisation – this was very important for me. During this time I had very many duties.”

This period in Utrecht, he explained, also delivered a lesson on the impact of cross-border collaboration in raising international standards: “During my work at St Antonius hospital, I was fortunate to meet cardiac surgeon Professor Francois Hitchcock. At that time, we regularly (about once a week) operated on children from abroad for charity. I asked them to consider operating on some Polish children – we had a lot of Polish children with congenital defects who could not be operated on at that time (due to lack of local experience). Dr Hitchcock responded positively. So, between 1983 and 1990, 427 Polish children with congenital malformation were operated on in Utrecht’s Wilhelmina Children’s Hospital. My Dutch colleagues also accepted 16 people from Poland on training programmes – mainly cardiac surgeons, cardiologists, perfusionists. It was fascinating.”

The charitable project undertaken by the cardiology and cardiac surgery community in Utrecht was honoured in 2013 when over 80 cardiologists and cardiac surgeons from all over Poland were operated on in Utrecht’s Wilhelmina Children’s Hospital. My Dutch colleagues also accepted 16 people from Poland on training programmes – mainly cardiac surgeons, cardiologists, perfusionists. It was fascinating.

After St Antonius, Professor Zembala moved back to Poland, to the Silesian Medical Academy in Zabrze. Alongside mentor Zbigniew Rultag, in 1985 he conducted the first successful heart transplantation in Poland. More than 1,500 heart transplantations have been carried out since. He also carried out the country’s first successful heart-lung transplantation (this patient remains alive today), as well as the first lung transplantation for chronic pulmonary embolism, and pioneering methods in arterial revascularisation, transcatheter aortic valve implantation (TAVI) and extracorporeal membrane organisation (ECMO).

As well as his clinical achievements, Professor Zembala has served as the Polish National Consultant in Cardiac Surgery and as Minister of Health in 2015. He was European Society of Cardiovascular and Endovascular Surgeons (EESVE) President from 2010 to 2012, and is President-elect of the Polish Society of Cardiac and Thoracic Surgeons.

Commenting on his EACTS presidency, Professor Zembala said: “I never expected that I could be a president of this outstanding, important organisation, because I was not a council member.”

“Peter Kappetein visited my institution and he saw how I built a new hospital. He saw a very modern, well organised department, which I have chaired for many years. At this department we do 2,000 cardiac operations a year. He was impressed by the quality of work and organisation.”

“Then, I received a call from Friedrich Mohr informing me [of my candidacy]. The reasons were three-fold – my achievements as a cardiac surgeon, my achievements as a leader (especially focussing on the building of bridges between countries) – that is why I decided to accept the offer.”

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Marian Zembala

Continued on page 2

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Marian Zembala

Continued on page 2
Aortic valve repair, “let’s standardise it”

Interview: Marian Zembala

Continued from page 1: between four different people, and the training programme I established, I was speechless.”

Describing how his ambitions for the role have taken shape, he continued: “We try step by step to make new achievements. My dream is much greater integration of the EACTS with other European organisations, such as the ESCOS but also the European Society of Cardiology (ESC).”

“Why? Because in the global world, you need to make a strong voice and partnership. War is devastating, we need peace and pragmatism. That is my message – peace and pragmatism.”

A key example works of partnership and pragmatism in the clinical sphere, explained Professor Zembala, is described in the recently published consensus statement on TAVI by the Association of Cardiovascular Interventions of the Polish Cardiac Society and the Polish Society of Cardio-Thoracic surgeons, which legitimise the active participation of cardiac surgeons in TAVI procedures, from any approach, as an operator. The paper also highlights the importance of the multidisciplinary TAVI team in facilitating optimal patient selection, organisation and treatment. This notion is underscored by recent evidence published by Zembala and colleagues, demonstrating the feasibility and efficaciousness of a hybrid approach to revascularisation in selected cases of severe multivessel coronary disease10-11.

“When you have experienced cardiac surgeons, you have a much better result in TAVI than without them,” explained Professor Zembala. “The focus is on partnership, with an active role by cardiac surgeons. This is a very fresh, very new idea crucial for the development of our specialty and its future.”

Professor Zembala also spoke of the importance of transatlantic partnership, as epitomised by Hans Bonn’s 1985 paper, ‘Hands across the ocean’: “I very much like cooperation with the American societies,” he commented. “They are very dynamic, and very focused on new research and new technology, and working together with companies. We adopted many American methods for education and science, and have incorporated much of that into our work.”

In contrast, literature on aortic valve repair has been sparser. “There are more papers coming out reporting on the results of aortic valve repair, so this is why it has been limited to a few capable surgeons,” he explained.

Because aortic valves have traditionally been repaired rather than replaced, knowledge and expertise on the procedure is much thinner on the ground compared with the repair of other valves, said Dr Sádaba. “For example, mitral valve repair has been performed for a long time now, and has been standardised in the clinical sphere.”

In contrast, literature on aortic valve repair has been sparser. “The results have not been as solid or robust as the mitral valve,” he added. “The argument for aortic valve repair over replacement has not been made clearly until recently.”

However, times are changing, noted Dr Sádaba, adding that in recent years, aortic valve repair has become more and more popular, with increasing uptake. “There are more papers coming out reporting on the results of aortic valve repair, so this is why it is an important subject,” he said.

Today’s session will deal with some of the most important issues surrounding aortic valve repair, including what the clinical guidelines say regarding the treatment of patients, the different techniques that are used, what we understand about the indications for aortic valve repair in patients with aortic regurgitation, and a closer look at annuloplasty and when it is appropriate. “Clearly, said Dr Sádaba, “the session will include several step-by-step accounts of different techniques that can be used. The presentation ‘Standard surgical steps to repair an aortic valve – Iwama’ by Munir Bouchriha [Associate Professor in the Division of Cardio-Surgery at the University of Ottawa Heart Institute, Canada] is but one example. In these presentations the objective is to standardise the technique, step by step, rather than leaving it more to art,” explained Dr Sádaba. “It’s about establishing a proper technique.”

“We will take a comprehensive look at all of the technical aspects of aortic valve repair for those surgeons who may be interested in developing a programme in their centres, and would like to start performing this technique.”

J. Rafael Sádaba

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Steps to strengthen bonds within Europe recently took shape at a meeting of the European Commissioner for Health and Food Safety and representatives of the ESC, EACTS, and ESCVS in May of this year. These parties discussed strengthening the role of the European medical registries, to improve the monitoring of the availability and effectiveness of treatments as well as to improve scientific and clinical data. Also addressed was the importance and value of multicentre, European, non-commercial scientific and clinical research and its role in the further development of modern evidence-based European cardiovascular medicine. Lastly, prevention was discussed, including the need for an EU structural framework for cardiovascular disease prevention, to parallel those already in place for cancer prevention.

The cooperation of the ESC, EACTS and ESCVS underscored the importance of EU Commission support in conducting and funding such research, explained Professor Zembala. “We have many opportunities from this – the Commissioner told us that he appreciates tremendously this kind of power from the societies. If we work together, in a strong voice, forces from all societies will have a big influence on the outcome. This is the pragmatist approach.”

References

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The evolution of oxygenation.

The Capiox® NX19 oxygenator with UltraPrime™ Technology is our smallest, most advanced full-size adult oxygenator to date. Building on Terumo’s oxygenator legacy, the Capiox NX19 oxygenator features high gas transfer utilizing new-proprietary hollow fiber, enhanced GME removal technology, and a highly efficient heat exchanger that delivers the standard of safety and performance that you trust from Terumo Cardiovascular Group®. By uniquely combining materials and technologies engineered to optimally deliver ultra performance, the Capiox NX19 oxygenator is, once again, taking oxygenation to the next level.

Ultra performance. No compromise.™

Visit South Hall, Booth # 22 and learn more about the Capiox® NX19 Oxygenator

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CE Mark coming soon!
New technology meets common practice, how to enhance your surgical portfolio

Hendrik Treede, Director of Cardiac Surgery at the Mid German Heart Centre at University Hospital, Halle, Germany, spoke to EACTS Daily News to offer some of the highlights of the Techno-College sessions at this year’s meeting.

“This year’s Techno-College programme has a new format, spanning all three days of the EACTS Meeting, but with the same clear message: learn new techniques to develop your skills portfolio. "New approaches can make your life even easier and maybe achieve similar results to complex surgery," noted Professor Treede. One of the Techno-College sessions held this morning, beginning at 9.30 am in the Auditorium, will focus on how new technology can enhance your surgical portfolio. "The Techno-College is in contrast to the rest of the very scientific EACTS meeting; it’s more liberal, more future-centric, where we show the newest ideas and data," explained Professor Treede. "It should allow us a glimpse into the future of our profession, so we can see what’s coming up next, and where we are heading. It’s also educational – a chance for younger surgeons to learn tips and tricks from experienced surgeons about performing particular techniques, and for experienced surgeons to learn about the latest developments. There is something for everyone, whatever their level of experience.

“Overall, it is all about showing that as surgeons of the future, we should look towards minimally invasive technology and understand that minimally-invasive techniques are as safe, and simple, and do-able as more complex surgical procedures. These new approaches can make your life even easier and maybe achieve comparable results to complex surgery. However, new techniques can still take a long time to get into common practice: "For example, we have performed minimally invasive mitral valve repair surgery for 20 years now, but it is not being offered by every centre. There is a clear need to get information out there. Of course, the numbers are increasing – but you can’t do-able as more complex surgical procedures. These new approaches can make your life even easier and maybe achieve comparable results to complex surgery. However, new techniques can still take a long time to get into common practice: "For example, we have performed minimally invasive mitral valve repair surgery for 20 years now, but it is not being offered by every centre. There is a clear need to get information out there. Of course, the numbers are increasing – but you can’t"

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Investigator Meeting

The road to ROMA

Enrolment continues in the ROMA trial (Randomized Comparison of the Clinical Outcome of Single versus Multiple Arterial Grafts), with the hope that it will outstrip its predecessors in terms of clarity of findings. Co-principal investigator Mario Gaudino (Well Cornell Medicine | New York – Presbyterian Hospital, USA) will be presenting an update on ROMA at the annual Meeting.

"The prospective, unblinded, randomised event-driven multicentre ROMA trial will include at least 4,300 subjects, with the primary hypothesis that in patients undergoing primary isolated non-emergent CABG surgery, two or more arterial grafts are associated with a reduction in the composite outcome of death from any cause, heart failure admission, stroke, and renal failure compared to a single arterial graft. Inclusion criteria involve the entire spectrum of patients, including those over 70 years; and patients undergoing off-pump primary isolated non-emergent coronary artery bypass grafting (CABG), the use of two or more arterial grafts compared with a single arterial graft is associated with a reduction in the composite outcome of death from any cause, any stroke, post-discharge myocardial infarction and/or repeat revascularisation. Commencing in January 2018, its pilot phase (which included 430 patients) was completed in early September. In the continuing full trial phase, the number of participating centres will be expanded from 25 to more than 50."

A summary of current evidence on the clinical outcome associated with the use of single and multiple arterial grafts for CABG was recently published by Gaudino et al. in 2018. The paper underscores the need for the ROMA trial, given the inconclusiveness of randomised trial data to date – including the most recent, the ART trial, where possible methodological limitations may explain neutral results to date – and the difficulty in interpreting findings from observational studies. Gaudino et al. contrast ART and ROMA, noting differences in important aspects such as coronary disease, which was overall survival in ART, and major adverse cardiovascular and cerebrovascular events in ROMA; age cut-off, of which there was none in ART, and 70 years in ROMA; and pilot phase assessment of crossover and protocol adherence, which was carried out in ROMA but not in ART.

In conversation with EACTS Daily News, Dr Gaudino commented: "Even though it is probably a bold statement, I think ART has served as a proof-of-concept or a preliminary trial in order to design ROMA. Not only that, but the analysis of the ART trial (which was presented at the European Society of Cardiology in August by Davide Taggart and will be presented again in Milan) gives even more support to the rationale of ROMA by showing that the second arterial graft can be either the radial artery or the right internal thoracic artery (RITA)."

He cautioned, however, that new techniques can still take a long time to get into common practice: "For example, we have performed minimally invasive mitral valve repair surgery for 20 years now, but it is not being offered by every centre. There is a clear need to get information out there. Of course, the numbers are increasing – but you can’t"

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Mario Gaudino

ROMA is the first trial I have ever seen where the observed enrolment rate was higher than the expected rate.

Mario Gaudino

Terumo launches new oxygenator with innovative UltraPrime™ Technology

With the launch of the new Capiox® NX19 oxygenator, Terumo continues its long history of oxygenator innovations from the launch of the world’s first hollow fibre oxygenator (Capiox FX) in 1982 to the world’s first oxygenator with fully integrated arterial filter (Capiox FXI) in 2008. The new Capiox NX19 oxygenator with UltraPrime™ Technology is Terumo’s smallest, most advanced full size adult oxygenator to date. Building on Terumo’s oxygenator legacy, the Capiox NX19 oxygenator features high gas transfer utilizing new proprietary hollow fiber, enhanced GME removal technology, and a highly efficient heat exchanger that delivers the standard of safety that you trust from Terumo. The new UltraPrime Technology combines proprietary materials with engineering expertise to deliver a priming volume of just 185 mL and a maximum blood flow of up to 8 L/min. The integrated PET heat exchanger offers significantly higher efficiency compared to the stainless steel heat exchangers used in previous Capiox® generations and is compatible with new heater cooler cleaning protocols. Leveraging Terumo’s own hollow fiber technology, a new patented pre-heater-exchanger air removal technology removes air before it enters the heat exchanger. This in combination with Terumo’s original self-venting technology and new Prime Assist feature instills confidence in GME removal. Capiox NX19 oxygenator is already FDA 510K cleared and will soon receive CE mark. Commercial availability in the USA and EU is expected in Fall 2018.
The quiet TEVAR revolution

There's a slow revolution in endovascular solutions for proximal thoracic aortic disease according to Joseph E. Bavaria, a surgeon at the Penn Medicine, Philadelphia, PA, USA who will be speaking in a presentation dedicated to the open vs. endovascular solutions in the future.

Dr Bavaria has 25 years of experience in the thoracic surgical space, extensive endovascular experience and is a past president of the Society of Thoracic Surgeons (STS) and an EACTS Vascular Domain member. He told EACTS Daily News that an enormous amount of investment has been made in endovascular solutions between 2000 and 90% of funding by industry is focused on proximal thoracic aortic conditions at the moment.

"It is a very rich and creative time where exciting innovation is ongoing in the endovascular thoracic aortic arena, Dr Bavaria said.

Early emerging devices and the treatment of isolated ascending aortic disease, including Type A aortic dissection will also be discussed. It is not just important to have a landing zone in the ascending aorta, but actually to treat ascending aortic conditions that are primary to the ascending aorta," he explained. "This is really a very big difference.

But although so much innovation is ongoing within the endovascular thoracic aortic arena, Dr Bavaria said it is still preferable to have hybrid solutions of both open aortic and endovascular surgery for the proximal aortic disease in both aneurysms and dissection. Despite the advances in endovascular surgery there are significant hurdles that need to still be overcome. They include stroke risk associated with aortic arch repair of aortic arch branched TEVAR, and also the spectre of retrograde Type A aortic dissection when utilising a native ascending aortic landing zone for proximal TEVAR," he said.

Interestingly, noted Dr Bavaria, surgeons will have to design new operations and new approaches from an open aortic standpoint, based on the availability of new TEVARs.

"This is a big step," he cautioned. "Before, we never designed operations based on the availability of new devices. We just designed operations based on disease process and our knowledge of that disease process.

"We are moving towards Zone One and Zone Two arch procedures in all directions. In other words, we are doing less and Zone Three arches and more Zone One and Zone Two arches. We are coalescing towards this concept," he added. These strategies have shared as a concept that we need to save the patient's life and think about how we and why we do proximal thoracic aortic procedures," he said.

So the big picture is that cardiovascular surgeons need to be a major part of this. They need to be aware of this revolution that is beginning.

Traditionally, endovascular solutions have not successfully reached the proximal aorta, so the two techniques have been separated, he said. "There was kind of a divide between open surgery and endovascular surgery," said Dr Bavaria, but with these never devices the natural frontier is the sea change. "Now for the first time we are able to stretch the aorta closer to the heart in the aortic arch and the ascending aorta." Dr Bavaria will explain how thoracic endovascular aortic repair (TEVAR) devices are improving matters. "We will talk about classic proximal aorta repair, which allows you to use TEVAR distally. We also have new branched aortic arch TEVAR devices that are now becoming more widely available, and achieving approval for clinical use in both North America and Europe," he explained. "This is going to change the way we think about open thoracic aortic surgery for both dissections and aneurysms."

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"So the big picture is that cardiovascular surgeons need to be a major part of this. They need to be aware of this revolution that is beginning." Joseph E. Bavaria

"This is a very rich and creative time where we are trying to figure out what we can do, how far we can take it, what's safe and what's not." Joseph E. Bavaria

Annual Meeting may believe this concept to be slightly controversial. There is one camp that says our major job is to save the patient's life and not worry about anything else. And I think you know what? That is a very, very reasonable approach. There's a certain truth to that," he said. "But I maintain that we are now good enough to both save the patient's life, and think about the patient's future interventions – the patient's future residual aortic disease." Dr Bavaria believes better index operations can be done with no change in mortality and morbidity rates in the older operation; "My thesis is that we are ready for that now. While it is true that we need to save the patient's life from these catastrophic events, we are at the stage in our development when we can do both. We can save the patient's life and we can look out for their future better than we did in the past, sometimes without classic operations.

"We used to always say we are doing the proximal operation and we are just going to leave the rest of the aorta to its own devices and fate. And sure enough, eventually, it would become degenerated and we would have to go back and do a secondary or tertiary operation," he said. "But that's not necessarily the way it should be done now." He instead recommended safer and sophisticated index procedures with an algorithm that allows for earlier treatment – an ability to use a TEVAR solution at the second stage, or downstream, instead of another bypass operation.

"Type A Aortic dissection is a total catastrophic event, not just a catastrophic ascending aortic event. It is a more robust and more definitive solution than the present index procedures," he said. "So the way to do this as an open operation as an emergency, but also to prepare that patient so that early endovascular dissection means then treatment of the aortic dissection, and then later, the way that the patient will be properly remodelled early and this will have a massive effect on the patient's lifespan and the patient's future.

The approach requires a change in attitude from surgeons, suggested Dr Bavaria. "We have to be self- critical and realise that many of the open operations that we've done in the past and are doing presently are simply inadequate for allowing the next procedure," he said. "And so what's happening is that we are changing the way we do things – we are doing a second and third operation as the disease progresses.

So the future for "Type A aortic dissection treatments, Dr Bavaria concluded that there will be a choice of three different approaches. "For patients older than then 65 or 70 – with less than or 15-year life expectancy – there will be the classic hybrid aortic arch procedures with a significant arch repair, or aortic dissection, which is critically significant, whereas there is an option to do this at the index procedure. And for everybody else, which is the majority of patients, who are less than 65 or 70 and stable, we will probably go to a Zone One or Two arch procedure with sequential arch branched TEVAR procedures for residual arch disease in the first eight weeks," he explained. "This will allow us to more definitively treat these patients for their long-term health. The controversy has been the idea that you go back and do an operation eight weeks later. Now it's possible, but it wasn't before."
Cardiac Surgeons should be involved in the management of large pulmonary embolism

Mark Newman, Jurgen Passage, Lucas Sanders, Pragnesh Joshi and Kaushal Rathedle
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Pulmonary embolism (PE) is a common condition estimated to cause 100,000–180,000 deaths per year in the US alone. The mortality from pulmonary embolism varies from 1% for small emboli to 50% for those with a massive PE. The intermediate or submassive group – defined as those who are haemodynamically unstable but have evidence of right ventricular strain – has a mortality of about 8%. The treatment of PE always involves anticoagulation. The addition of thrombolytic agents is recommended in massive PE, but it is still debated in submassive PE. The downside of thrombolytic agents is the significant incidence of major haemorrhagic complications – up to 20% with a 2–4% incidence of intracranial haemorrhage. The efficacy of thrombolytic agents in PE is also dubious, with no trial showing an improvement in mortality. This is not surprising due to the large size of pulmonary thromboembolism; restricted access of the agents to the thrombus in obstructed pulmonary arteries results in the relatively slow action (hours) of thrombolytic agents. The major cause of morbidity and death from pulmonary embolism is the mechanical obstruction of the pulmonary arteries. The right ventricle (RV) is a good volume pump, but it does not adapt well to an acute pressure load. In the case of a PE it fails, and pulmonary arteries. The right ventricle (RV) is a good volume pump, but it does not adapt well to an acute pressure load. In the case of a PE it fails, and patients after surgical embolectomy and showed that at 2–3 months, pulmonary artery pressure and RV function returned to normal, with no instances of late death or recurrent PE. In conclusion, we believe that as the cause of death in PE patients is an acute mechanical obstruction to the RV outflow, the best treatment is expeditious removal of this obstruction. This requires cardio-surgeons to be involved in the management of patients to appropriately select and treat patients who present with a large PE.

European study on decellularised homografts for pulmonary valve replacement: The prospective ESPOIR Trial initial results and ESPOIR Registry data

Samir Sarkouche Department for Cardio-Thoracic Surgery, Hannover Medical School, Hannover, Germany

Decellularised pulmonary homografts (DPH) have shown promising early- to mid-term results when used for pulmonary valve replacement in congenital heart disease. Several groups using different decellularisation protocols have described superior results of DPH to standard cryopreserved homografts (CH) and bovine jugular vein (BJV) conduits. However, to date, controlled prospective multicentre studies are lacking. The ESPOIR trial is the first prospective study worldwide evaluating cell-free homografts for pulmonary valve replacement. The study was performed at seven centres for congenital heart surgery in Europe (Hannover, London, Leicester, Leeds, Padua, Chisinau, Utrecht and Zurich) between August 2014 and December 2016, with support by the European Commission (Grant Agreement No. 279845). Indication for pulmonary valve replacement according to current clinical guidelines was the key inclusion criterion, with no age limit. Patients with active endocarditis and haemorrhagic risk were excluded. Early follow-up of 121 patients presented here at the 2018 EACTS Annual Meeting in Milan proves cell-free homografts as safe and effective in a multicentre setting. The mean age of the study participants was 21.3 ± 14.4 years, and the mean implanted DPH diameter was 24.4 ± 2.8 mm. After a mean of 2.2 ± 0.6 years, the primary efficacy endpoints of mean peak gradient (16.1 ± 12.1 mmHg) and mean regurgitation grade (0.25 ± 0.48; Grade 0–3) were excellent. One DPH without degenerative signs was explanted after 23 months for technical reasons during re-operation for recurrent subvalvular stenosis caused by a pericardial patch. Furthermore, one balloon dilatation was performed on a previously stented LPA, leading to a freedom from explantation and re-intervention of 98.3%. The early ESPOIR Trial data were combined with data from the ESPOIR Registry, which has a 100% follow-up of all DPH patients operated on since January 2005. A direct matched comparison to the most frequent alternative options for PVR – CH and BJV conduits (Contegra®) – was performed. Matching was performed on the basis of the patient’s age at implantation, diagnosis, number of previous operations and number of previous PVRs. The combined DPH cohort (n = 235), when matched to CH (n = 235) and BJV (n = 235), showed significantly better freedom from explantation (DPH 97.1 ± 2.1%, CH 84.4 ± 3.2%, p = 0.029; BJV 82.7 ± 3.2%, p = 0.012) and reduced structural valve degeneration at 10 years (DPH 61.4 ± 6.6%, CH 39.3 ± 4.4%, BJV 47.5 ± 4.5%). In conclusion, the initial results of the prospective European ESPOIR Trial up to three years proved DPH as safe and efficient in a multicentre setting with excellent short- and long-term haemodynamics. Follow-up over a period of at least 10–20 years is planned.

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Figure 1. Freedom from explantation and functional conduit status for decellularised pulmonary homografts (DPH), cryopreserved homografts (CH) and bovine jugular vein (BJV) conduits. Analysis of more than 700 patients following PVR showed superior DPH performance to other widely used options, such as BJV conduits (Contegra®) and standard CH in cohorts matched for age, type of congenital heart defect and number of previous procedures.
How to intervene in type B aortic dissection with arch involvement: The European point of view

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The treatment of an acute type B aortic dissection (DeBakey Type III), characterised by an entry tear distal to the left subclavian artery, is well investigated, having been evaluated in several studies and registries. After the principal discrimination between uncomplicated and complicated type B dissections, a decision between different treatment strategies has to be made. According to the ESC-Aortic Disease Guidelines, a conservative approach with optimal medical therapy is a class I indication for uncomplicated type B dissections. However, based on the results of the INSTEAD XL trial, an endovascular treatment should also be considered for so-called uncomplicated dissections. This recommendation is based on superior five-year results with respect to re-intervention and mortality in the endovascular group.

Complicated type B dissections should be treated by endovascular stent-graft placement in order to cover the primary entry tear, which is commonly located close to the offspring of the left subclavian artery. This class I recommendation is based on several studies which showed significant mortality and morbidity rates for open surgery via posterolateral thoracotomy. However, retrograde Type A aortic dissection following stent-graft placement in the proximal descending aorta or in the distal aortic arch remains a significant and substantial problem. Parotidation of the intima-media layer of the aortic wall by the bare springs of the stent-graft, oversizing of the endovascular prosthesis, an increase in aortic wall shear stress in front of the rigid endovascular stent graft, and/or an increase in aortic wall shear stress in front of the rigid endovascular stent graft, and/or a non "healthy" proximal landing zone are several factors that will be discussed as potential causes of this serious complication. Weiss et al. demonstrated that for an ascending aortic diameter of more than 4 cm, the location of the primary entry tear at the concavity of the aortic arch and a haematoma within the arch are associated with an increased risk for a complicated course of the disease. In patients with a haematoma propagating into the aortic arch, or those with a small dissection flap between the left common carotid and subclavian artery, endovascular treatment should not be performed. One should discuss whether this type of dissection should be called "non A, non B" aortic dissection, with the consequence of an open surgical treatment strategy.

The European point of view favours the frozen elephant trunk operation as an excellent operative strategy to successfully treat patients with this specific pathology. Coverage of the entry tear with an endoprosthesis as well as replacement of the aortic arch is possible in a one-stage procedure using moderate hypothermic circulatory arrest and antegrade cerebral perfusion. Indeed, promising results are published, demonstrating low mortality and morbidity rates using this hybrid technique. In conclusion, patients suffering from an acute type B dissection with a retrogradely affected aortic arch should not be treated by an endovascular approach due to the high risk of retrograde type A dissection. The antegrade approach using a hybrid prosthesis offers a reliable and effective treatment option for acute complicated type B dissections with aortic arch involvement.

References

Figure 1: CT-scan showed a haematoma within the aortic arch
Figure 2: Retrograde type A aortic dissection after endovascular treatment for complicated type B aortic dissection
INSIDE MILAN

Where to go? What to do?

CATHEDRALS

THE DUOMO
This sublime Gothic cathedral is the prima donna of Milan, reflecting the beauty and ambition of the city. Six-hundred years in the making, 3,400 statues adorn its façade, with 135 spires reaching from its pink Candoglia marble construction. Inside it is no less impressive, with a vast and ornate space peppered with the largest stained-glass windows in Christendom.

GALLERIES

THE LAST SUPPER
One of the famous artworks in the world, Leonard da Vinci’s *The Last Supper* is at home on the wall of the refectory adjoining the Basilica di Santa Maria delle Grazie. Booking in advance is mandatory, or you can sign up to one of the guided tours on offer.

PINACOTECA DI BRERA
This modest-sized gallery started out as a study collection of drawings and plaster cases for students at the Accademia di Belle Arti. Now it houses some of the region’s finest collections – some apparently “borrowed” from Venice by famous scoundrels such as Napoleon – from as far back as the 13th century. Its most famous residents include Piero della Francesca’s *The Virgin with Child* and Gentile Bellini’s *St Mark Preaching in Alexandria*.

SHOPPING

GRAND GALLERIA VITTORIO EMANUELE II
Take your eyes, and your wallet, out for a stroll in the Grand Galleria and you won’t be disappointed. Located just opposite the Duomo, this extraordinary feat of architecture combines beauty, art and luxury shopping all under one sprawling and ornate glass roof.

OUTDOORS

PARCO SEMPIONE
The large park grounds were established in the late 1800s, offering the busy inhabitants of Milan the chance to relax in the lushly-kept green spaces. Within its extended borders are several must-see structures such as Acquario Civico Milano aquarium, the Arena Civica amphitheatre and the Arco della Pace archway.

OPERA

LA SCALA
The Teatro alla Scala opera house opened in 1778, replacing its fire-damaged predecessor, the Teatro Regio Ducali. Sit for an opera within the beautifully opulent 3,000-seat hall and you will see why the owners of this second incarnation wanted to keep it safe from fire, apparently placing 1,000 buckets of water on standby in the days when it was lit entirely by candlelight. If opera isn’t your thing, or you left it too late to get tickets, try one of the guided tours instead which definitely do not disappoint.
Time for surgeons to tackle ‘our most lethal human attachment’ with new surgical techniques for LAA closure in AF

New data has shown that surgical left atrial appendage (LAA) clip closure techniques can significantly lower stroke risk in atrial fibrillation (AF), delegates will hear today in a session held in room Amor 3 from 12:45 to 14:00.

AF patients are at higher risk of stroke and around 95% of clots originate in the LAA – sometimes referred to as ‘our most lethal human attachment.’

Speaking to EACTS Daily News, Thorsten Hanke (Department for Cardiac Surgery, Asklepios Klinik, Harburg-Hamburg, Germany), said that although LAA surgical closure techniques have been slow to take off, important new research published this year suggests that the time has now come for more surgeons to start using new techniques shown to reduce stroke risk. He added that key papers have been published in the past year showing a stroke risk reduction for patients undergoing surgical LAA-occlusion (S-LAAO).

“Our study concluded that LAA clipping during thoracoscopic ablation is a feasible and safe technique for the closure of LAA in patients with atrial fibrillation. One of the most important findings was the low stroke risk in follow-up... This is really the first paper that shows thoracoscopic AA closure reduces ischaemic stroke risk.”

Bart P. van Putte

“We have now a class I indication in the US to treat atrial fibrillation concomitantly but now we strongly believe that we have to address the LAA too.”

Thorsten Hanke

References
Is debranching thoracic endovascular aortic repair acceptable as the first choice for aortic arch aneurysm in the elderly (>75-years-old)?

Yoshimasa Seike1, Hiroaki Sasaki1 and Junjiro Kobayashi1

Lancellotti3, Marco Matteo Ciccone4, Paola Rizzo5, Francesco Marco Moscarelli1,5, Fiorella Devito1, Khalil Fattouch2, Patrizio The effect of surgical versus transcatheter aortic valve replacement (TAR) or debranching thoracic endovascular aortic repair (d-TEVAR) should be selected in accordance with the risk for open surgery and the anatomical features of the aorta. Advanced age is generally a powerful independent predictor for early postoperative complications after conventional TAR. In contrast, there is increasing evidence that TEVAR can provide acceptable early results in patients deemed to have a high risk for open surgery. Since 2008, we have applied d-TEVAR for treating aortic arch aneurysms mainly for selected elderly patients aged >75 years. However, of whom we should select is still a challenging issue when both techniques are equally available, especially in patients with poor vascular condition and/or the anatomical difficulty of a short landing zone for d-TEVAR.3 The aim of this study was to reveal the differences of mid-term outcomes between TAR and d-TEVAR, and to assess the validity of d-TEVAR as a first choice for aortic arch aneurysms in the elderly. In general, comparable study in these two groups is difficult due to the dissimilarity of patients’ backgrounds and biased surgical decision. In the present study, we compared propensity score-matched (PSM) groups to compensate for this insufficiency. We reviewed 86 patients with TAR (64 men; age 78 ± 2.9 years) and 121 with d-TEVAR (90 men; age 82 ± 4.5 years) between 2007 and 2017. A total of 50 patients from each group were matched by their propensity scores. Freedom from all-cause mortality at two- and four-years was similar between both groups (88% and 77% in TAR, 82% and 64% in d-TEVAR, p = 0.11). The rate of freedom from reintervention at 2- and 4-years was significantly higher in TAR (105/96%) than d-TEVAR (97/88%; p = 0.04). PSM yielded similar survival (86%/85% in TAR vs 86%/71% in d-TEVAR, p = 0.52) and comparable freedom from reintervention rates (100% and 97% in TAR, 98% and 92% in d-TEVAR, p = 0.16; Figure). Using Cox regression analysis, cardiac intervention (HR, 3.9; p = 0.005 in TAR/ HR, 3.1; p = 0.002 in d-TEVAR) was identified as an independent positive predictor of overall mortality in the both groups. In conclusion, mid-term outcomes after both TAR and d-TEVAR were satisfactory, and evaluation using PSM revealed no differences. D-TEVAR is acceptable as the first-choice procedure for aortic arch aneurysms in patients older than 75 years.

References

The data suggest that conventional surgical aortic valve replacement may be associated with an early and transient decrease in endocardial function, likely due to the use of CPB.

Cardiac | Abstract | Surgical aortic valve replacement from bench to bedside

The effect of surgical versus transcatheter aortic valve replacement on endothelial function

Marco Moscarelli1, Fiorella Devito1, Khalil Fattouch1, Patrizio Lanciotti1, Marco Matteo Ciccone1, Paola Rizzo1, Francesco Viceli Dallà Sega Francesco1, Alfredo Marchese1, Gianni Angelini1 and Giuseppe Speziale1

1. GVM Care & Research, Department of Cardiovascular Surgery, University Hospital, Bari, Italy; 2. GVM Care & Research, Department of Cardiovascular Surgery, Villa Maria, Palermo, Italy; 3. University of Liege, GIGA Institute, Belgium; 4. Department of Cardiology, University of Bari, Italy; 5. Department of Morphology, Surgery and Experimental Medicine, University of Ferrara, Italy; 6. Bristol Heart Institute, University of Bristol, UK

Aortic stenosis (AS) affects not only the left ventricle but also vascular and endothelial function. Patients with endothelial dysfunction have an increased risk of cardiovascular events, yet the influence of conventional surgical aortic valve surgery (SAVR) with the aid of cardiopulmonary bypass (CPB) and cardiopulmonary protection versus transcatheter aortic valve replacement (TAR) on endothelial function is unknown. TAR is indicated in high-risk patients, but growing evidence suggests that a percutaneous approach may be equally beneficial for intermediate-risk patients. Technique superiority is judged based on standard outcomes such as mortality, morbidity, and long-term freedom from reintervention; however, novel markers of haemodynamic performance such as flow-mediated dilation (FMD) and apoptosis rate in human umbilical vein endothelial cells (HUVECs) as a measure of endothelial dysfunction are increasing in popularity.

We investigated the effects of surgical and transcatheter aortic valve replacement on early and 90-day endothelial function measured by brachial FMD and apoptotic rate in HUVECs in patients with significant aortic stenosis, intermediate risk of surgery, and no coronary artery disease.

We conducted a prospective, observational case-control single-blind study at a single tertiary centre. Endothelial function was measured at baseline, early post-procedure (four days), and follow-up (90 days). A blood pressure cuff was used to elicit reactive hyperaemia for measuring brachial wall shear stress and FMD. The apoptosis rate was observed in the HUVECs after a 48-hour incubation with 20% serum (derived from the patient). The rate of apoptosis was assessed by determining the number of annexin V and propidium iodide positive cells by flow cytometry.

Early post-procedure flow dilation was significantly lower in the surgical group (p = 0.002). At follow-up, both groups showed incremental increases in FMD. The surgical group’s apoptotic rate did not significantly change, while the transcatheter apoptotic rate steadily decreased, suggesting a trend toward improved endothelial function.

The data suggest that conventional surgical aortic valve replacement may be associated with an early and transient decrease in endothelial function, likely due to the use of CPB.
**Risk factors and effects of conversion from VATS to open lobectomy: analysis from a national database**

**Stefano Bongiolatti**
Thoracic Surgery Unit, Careggi University Hospital, Florence, Italy

Vide-assisted thoracoscopic surgery lobectomy (VATS-L) has become a safe and effective alternative to conventional open lobectomy, associated with a shorter length of stay, reduced postoperative pain, preserved pulmonary function, fewer postoperative complications and better compliance with adjuvant chemotherapy. VATS-L is still considered a demanding procedure with potentially serious intra-operative complications that will require thoracotomy. Analyzing the literature, the unexpected conversion rate ranges from 2.5–23%, while the rate of emergent conversion is under 1%. However, there are a lack of multicentre studies investigating the risk factors, causes and effects of conversion on early post-operative outcomes.

We performed a retrospective study using the Italian VATS Group Database – a multicentre, web-based data system for collecting and reporting clinical characteristics, patterns of care and outcomes on VATS-L. Our study population consisted of patients who underwent VATS-L as the primary procedure for non-small-cell lung cancer (NSCLC) at VATS Group participating centres between 1 January 2014 and 31 December 2017. After exclusions, we identified 4,629 patients who underwent planned VATS-L for NSCLC, and of these 432 (9.3%) required conversion to thoracotomy.

Comparing the causes of conversion with the VATL classification system (V: vascular, A: anatomical, L: lymph nodes, T: technical), we observed that the higher percentage of conversions were due to anatomical reasons (45.1%) such as adhesions, fused fissure, anatomical anomalies and oncological findings. VATS uncontrollable bleeding was the second reason of conversion in about a third of cases, and in 23.9% the thoracotomy was due to the presence of fibro-calcified hilar lymph nodes. Although conversion is often unexpected, some studies have identified risk factors including older age, impaired lung function, male sex, presence of fibro-calcified lymph nodes, clinically node-positive disease, larger tumour size and use of induction therapy. In our study, the multivariable analysis clearly demonstrated the higher incidence of complications, more extensive blood loss and longer hospital stay. These results, while seemingly obvious, are corroborated and validated using an expansive data set collected via a national database.

**References**

**Complete left-atrial lesion set vs PVI only in patients with paroxysmal AF undergoing CABG or AVR**

**Simon Pecha**
University Heart Center Hamburg, Germany

**Introduction**
In patients with paroxysmal atrial fibrillation (AF) undergoing coronary artery bypass grafting (CABG) or aortic valve replacement (AVR), many surgeons are reluctant to open the left atrium to perform a complete left-sided Cox-Maze lesion set. Pulmonary vein isolation (PVI) is often preferred in those patients. Here we analysed rhythm course and outcome of patients with PVI compared to those receiving an extended left atrial (LA) lesion set.

**Methods**
Between 2003 and 2016, 817 patients underwent concomitant surgical AF ablation in our institution, with 294 patients with paroxysmal AF treated by surgical ablation concomitant to AVR or CABG. Ninety-eight patients received a complete Cox-Maze left atrial lesion set, while 196 patients were treated with an isolated PVI. The primary endpoint of the study was freedom from AF at 12 months follow-up.

**Results**
There were no statistically significant differences regarding baseline patient characteristics. No major ablation-related complications occurred in any of the groups. In the PVI group, two patients (2.0%) experienced an intraoperative stroke, while three (1.5%) patients had a stroke in the extended LA ablation group. In patients receiving an extended LA lesion set, mean cross clamp time was 21 ± 8.6 min longer when compared to the PVI group. In-hospital mortality was 3.3% in the PVI group, versus 2.7% in the extended LA group (p = 0.34). Freedom from AF at 12 months follow-up was 77% in the extended LA ablation group vs 70% in the PVI group, showing no statistically significant difference (p = 0.27).

**Conclusions**
Surgical AF ablation concomitant to CABG or AVR in patients with paroxysmal AF is safe and effective. There was no statistically significant difference between PVI and an extended LA lesion set in terms of freedom from AF after 12 months. Besides a longer cross-clamp time for patients in the extended LA group, there were no other differences between groups. Thus, PVI may be sufficient in this special patient population.

**References**
Artificial intelligence and machine learning

Shanda H. Blackmon
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In an increasingly complex world with more data, we must develop neural networks that empower us to process the cacophony into a symphony for the patient.

Shanda H. Blackmon

For machine learning to be effective, it must have a broad impact and be actionable. The Mayo Clinic has used AI in the development of rapid diagnosis tools for stroke, complete analysis of ECG data to predict underlying disease, analysis of pulmonary nodules, management of coronary artery bypass graft, and to predict changing patterns in the lung after surgery, to ultimately predict function. Each of these novel techniques will be described. For example, I will speak on artificial intelligence and machine learning during the EACTS Annual Conference.

Anything that allows us to get a faster and more complete diagnosis, triage patients in an efficient manner, or assess complex data into a concise narrative reliably can save lives. In an increasingly complex world with more data, we must develop neural networks that empower us to process the cacophony into a symphony for the patient.

The lowest-hanging fruit is to substitute slow, outmoded risk prediction rulesets with neural networks. For example, the LACE index is used to predict 30-day all-cause readmission of patients. Length of stay (LOS), a primary variable in this index, is a primary variable in this index, can save lives. In an increasingly complex world with more data, we must develop neural networks that empower us to process the cacophony into a symphony for the patient.

During the last decade, arterial grafts for coronary artery bypass surgery have caught much attention: many trials have reported the superiority of an arterial graft over a vein graft with regards to graft patency. However, both in Europe and in the US, the majority of surgeons still prefer to use vein grafts and only rarely is total arterial revascularisation performed. The use of saphenous vein grafts has a long tradition as it was the first graft to be used in the early days of modern bypass surgery. In addition, especially for a young surgeon, easier techniques and easier access to vein graft make it the number one choice for a second conduit. Despite trials pointing to the inferior patency rates of vein grafts, it can be argued that, at least to some extent, it is the harvesting techniques that determine the fate of this graft type. A lot of attention should be paid to make this graft reservoir of even greater value and quality. In my presentation during the session “How do I start my coronary practice: The devil is in the details” I will go through different aspects of vein harvesting that can hamper the success of the whole bypass operation. A vein is a delicate structure and is easily damaged by, for example, too much distension or the incorrect storage solution. Different surgical techniques for harvesting a vein graft have been reported as affecting patency rates. A classic example is traditional open harvest technique versus the so-called no touch technique and Kim technique. The latter two have been studied only in a handful of trials but show encouraging results. These techniques deserve more patient data from well-performed large-scale studies. Today, the indifference towards the vein graft is clearly mirrored in the number of randomised clinical trials (RCTs) studying new ways to improve vein graft patency. Fortunately, it seems that surgeons have noticed this unfairness and a couple of very interesting RCTs are currently under way. I definitely look forward to their results.

References
Early warning intensive-care scores can accommodate intra-operative events in predicting surgical outcomes

Priyadarshanan Aryaratanam
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In an area of cardiac surgery in which we are becoming more and more focused on minimising adverse events, risk prediction models become more and more relevant. Preoperative scoring systems such as the EuroSCORE and STS scoring systems are excellent in predicting postoperative mortality but do not adjust for events that take place intraoperatively. For example, what may look like a routine set of grafts with a preoperative EuroSCORE mortality risk of 1% suddenly become a nightmare postoperatively when the patient is placed on emergency extracorporeal membrane oxygenation (ECMO) due to inadequate myocardial protection, excessive bleeding or the inability to graft calcified coronary stenoses intraoperatively.

The EuroSCORE therefore becomes less meaningful in predicting what will happen in these scenarios, and it may be better to use a risk model that we can extrapolate from the first few hours of admission into intensive care after cardiac surgery – a model which takes into account intraoperative events in predicting not only mortality but also complications such as renal failure.

We evaluated whether one such model used in the UK, INARC (Intensive Care National Audit and Research Centre), could accurately predict perioperative and long-term outcomes in cardiac surgery. The INARC score is made up of biochemical and physiological variables in intensive care. We performed a prospective cohort study using peri-operative data from the INARC Audit and Dentistry database of 4,446 consecutive cardiac surgical patients operated between January 2011 and April 2018 at our institution. Receiver Operating Curves (ROCs) were used to evaluate how well the INARC scores predicted in-hospital mortality and post-operative complications (renal failure, pulmonary complications, gastrointestinal complications and multi-organ failure) and Cox-regression analysis was used to determine factors affecting long-term survival.

The mean Logistic INARC Score was 6.75 (I. 84) and the mean INARC Score in the first 24 hours of ICU was 13.4 ± 5.3. The c-indices for the ROCs for the INARC scores were 0.840 for in-hospital mortality, 0.858 for renal failure, 0.665 for pulmonary complications, 0.764 for gastro-intestinal complications, 0.702 for neurological complications in general and 0.654 for conversion, and 0.885 for multi-organ failure showing excellent discriminatory potential. The comparison of ROC curves for predicting multi-organ failure between EuroSCORE (c-index 0.797) and INARC is shown in Figure 1.

From Cox-regression analysis, the significant (p < 0.05) predictors of mid-term mortality (5 years) were a higher INARC Score, higher age at surgery, COPD, pre-operative renal failure, pre-operative neurological co-morbidity, anticoagulation and non-CABG surgery.

We conclude from our data that INARC is simple to collect and an excellent scoring system for predicting postoperative mortality, renal failure and multi-organ failure in the first 24 hours of cardiac surgery – and it can predict long-term mortality too. INARC can therefore be used as an early warning screening tool to predict which patients are at higher risk for post-operative organ failure so as to implement more aggressive monitoring and treatment strategies.

The Glasgow experience of extended myocardial protection: A novel method of implantation to reduce primary graft dysfunction after heart transplantation

Sanjeeet Singh Avtaar
Singh Scottson National Advanced Heart Failure Service, Golden Jubilee National Hospital, Glasgow, UK

A round 2,000 heart transplants are performed in Europe annually. Primary graft dysfunction (PGD) rates in Europe are among the highest in the world, the increasing use of marginal donor organs being suggested as a possible cause. In turn, this has resulted in a renewed interest in perfecting myocardial protection techniques to increase the yield of organs retrieved. We compared our experience with this method with the national UK cohort of patients (control group: 2015-2016). A total of 253 patients were studied; 28 patients were in the Glasgow group and 225 in the control group. The mean age of the recipients was 47.2 ± 13.5 years and the donors 38.3 ± 12.1 years. The incidence of PGD was 40.7% (n = 103) with 17.8% (n = 45) having severe PGD requiring institution of advanced mechanical circulatory support within 24 hours of transplantation.

The Glasgow method patients had a lower pulmonary capillary wedge pressure and mean pulmonary arterial pressure compared to the control group. Our study also showed a lower PGD, especially severe PGD rates. The odds ratio of PGD in the control group was 2.07 (95% CI 1.0148-4.075) when compared to the Glasgow group.

The Glasgow experience caused significant reductions in PGD and short-term mortality post-transplantation. This is likely attributed to the shorter warm ischaemic time. Larger studies are needed to show differences after further adjustment for known confounders of PGD. We believe this is a novel technique safe, cost-effective and reproducible.

Tricuspid regurgitation in aortic valve replacement, what should we do?

Juan Bustamante-Munigua1, Pablo Alvarez2, Bernat Romero1, Cristian Muñoz3, Marisa Camara1, Nuria Valles1, Jorge Lopez-Ayerbe1 and Angels Figuerola-Tejedor1
Servicio de Cirugía Cardiaca, Hospital Universitario Germans Trias i Pujol, Barcelona, Spain; 2. Servicio de Cirugía Cardiaca, Hospital Universitario Germans Trias i Pujol, Barcelona, Spain; 3. Servicio de Medicina Cardiaca, Hospital Universitario Josep Trueta, Girona, Spain; 4. Servicio de Cardiología, Hospital Universitario Germans Trias i Pujol, Barcelona, Spain; 4. Servicio de Medicina Preventiva, H.U. De La Princesa, Madrid, Spain

Published transcatheter aortic valve replacement (TAVR) results have indicated how right ventricular function, tricuspid regurgitation (TR) and pulmonary hypertension (PH) negatively affect these procedures, leading clinical practice guidelines to favour surgery as the therapeutic option for this patient group when the risk is manageable. However, there are few studies that back surgical results and evaluate whether TR should be treated at the same time as the aortic valve replacement (AVR). Indeed, the impact that TR and
The Hybrid surgeon

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hat’s special about surgery is that you are invading people’s bodies in a dangerous way,” says neurosurgeon and acclaimed writer of Do No Harm, Henry Marsh. “It is the seriousness of things if they go wrong – the thought of the damaged patient and a miserable colleague, patients and their families. As in many walks of life, it requires the ability to lead and manage a team, and above all, it requires the finest judgement to make the best decisions on behalf of another, the patient. That’s quite a blend of skills and personal qualities. The learning journey as a consultant surgeon never stops. Experience counts – as does exploring other interests in life that broaden our perspectives but so too can the choice to engage in continuous professional development. With this in mind, and following the success of the course in the autumn of 2016, EACTS is once again hosting a two-day Professional Leadership Course for consultant surgeons in Windsor, UK on 26-27 November. Last time, participants told us it was “a good investment,” and “something they would definitely recommend to a colleague or friend.”

The course isn’t clinically focussed – rather it explores the core values required for effective leadership with a strong emphasis on emotion, engagement, and EI – a learnable set of skills, attitudes and approaches which inform a leader’s style and which research indicates, contributes 90% of the difference between average and great leaders. The Course is interactive, fully engaging participants with objectives to increase their self-awareness, and develop leadership skills for the benefit of themselves, the team, and most importantly, the patient. Ethics and logistics are also key themes throughout; it is understood that in today’s environment, hospital departments are in a continuous state of flux, therefore navigating the politics and managing high-performance teams is critical if the best outcome for the patient is to be assured.

The two-day event draws on tested academic behavioural models in exploration of several key topics: EI and authenticity, building and maintaining high performance teams, and integrity and ethical decision-making. There will also be a highly interactive workshop on Political Savvy, designed to equip and encourage individuals to steer a course around organisational barriers, and actively engage in the political sphere in an ethical and systematic way.

The programme will be delivered once again by the warm, self-effacing master of emotional intelligence, Roger Delves, together with consultant haematologist. Jane Stevens, currently preparing for a doctorate focusing on the personal development of doctors, and the sustainability of the National Health Service (NHS) in the UK. They will be joined by Rebecca Stephens, a leadership coach and Britain’s first female mountaineer, who is currently writing a doctorate in organisational change at the Ashridge Executive Education Hult International Business School, and head of the Rotterdam School of Management’s Kilimanjaro MBA Leadership elective.

Dr Jane Stevens MD, MCRP, FRCPath, MBA studied medicine at Manchester University, UK. With over 20 years of experience in the NHS, latterly as a divisional director in an acute provider trust, she developed an interest in the current challenge facing doctors in the NHS. She is currently writing a doctorate in organisational change at Ashridge Hult International Business School, where she has recently been appointed as a member of the faculty.

**Course Facilitators**

Roger Delves is Professor of Leadership Practice and Dean of Qualifications at Ashridge Hult International Business School in the UK. He is a member of the Ashridge management team and teaches across a range of Ashridge and Hult qualification programmes. Rebecca Stephens, MBE is the first British woman to climb Everest and the Seven Summits – the highest mountains on each of the seven continents. A writer, lecturer and leadership coach, she is Adjunct at the Ashridge Executive Education Hult International Business School, and head of the Rotterdam School of Management’s Kilimanjaro MBA Leadership elective.

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**Professional Leadership Course, 26-27 November 2018, Windsor, UK**

**The Hybrid surgeon**

“W

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Aortic Valve Repair Summit

EACTS Aortic Valve Repair Summit 2019
The world’s largest meeting on aortic valve repair

Dear Colleagues,

It is with a great pleasure that we invite you to the fifth edition of the Aortic Valve Repair Summit (AVRS) to be held 20-21 June 2019 in Brussels, Belgium. Save this date in your agenda as it is one of the highlights in the largest meeting on aortic valve repair ever. This time the Summit comes back to Brussels where it was born four years ago thanks to a collaborative effort between two pioneers in aortic valve repair, Professor Gabriele El Khoury and Professor Hans-Joachim Schäfers. After the first two editions in Brussels, a third AVRS was held in Ottawa (led by Dr Munir Boodwani), followed by last year’s in Paris, organised by EACTS and led by Dr Emmanuel Lancis. Hence, many experts have joined this project.

The enthusiasm and the need for such a big meeting on aortic valve repair was felt ever since the beginning of the Summit story. Aortic valve repair is establishing itself so much into daily practice worldwide that more than 45 countries have participated in each edition of the Summit. Conscious of this fact, and in pursuit of their educational mission, last year EACTS accepted not only to endorse the Summit but to also to integrate aortic valve repair into their very well-structured educational programme. Indeed, this is a very unique opportunity for surgeons who want to relaRe such a programme or develop their skills.

Enriched by the collaboration of committed experts and EACTS, the AVRS has become a scientific meeting where all schools of thought are represented. As you can expect, this generates two exciting days of intellectual challenges and fruitful debates. The Summit’s roster of lectures, debates, abstract sessions, live surgeries and live-on-tapes ensures that there are plenty of learning opportunities, with a programme that not only covers surgical treatment, but also assessment modalities, medical management and timing for surgery. The Summit is an ideal opportunity for adult and congenital heart teams to get stuck in to the latest developments in these exciting fields.

Indeed, this is a very unique opportunity for surgeons who want to refresh such a programme or develop their skills.

The most recent edition of the Summit, held in Paris, was a real success, welcoming an attendance of 250 participants from 47 different countries. Endorsement of the AVRS by EACTS has added another dimension to the meeting, helping it reach a level reserved only for the largest meeting of its kind. In the most recent edition of the Summit, held in Paris, was a real success, welcoming an attendance of 250 participants from 47 different countries. Endorsement of the AVRS by EACTS has added another dimension to the meeting, helping it reach a level reserved only for the largest meeting of its kind. The Summit’s roster of lectures, debates, abstract sessions, live surgeries and live-on-tapes ensures that there are plenty of learning opportunities, with a programme that not only covers surgical treatment, but also assessment modalities, medical management and timing for surgery. The Summit is an ideal opportunity for adult and congenital heart teams to get stuck in to the latest developments in these exciting fields.

In Paris, the lectures and debates were very well appreciated by the audience and the two abstract sessions were of very high quality. The best abstract prize rewarded a study from Dr Vincent Chauvette and Dr Ismail El Hamamsy best abstract prize awarded a study from Dr Vincent Chauvette and Dr Ismail El Hamamsy

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Proposed advantages of hybrid techniques have included the potential to avoid the morbidity and mortality associated with the use of deep hypothermic circulatory arrest and the potential to avoid second stage open descending thoracic and thoracoabdominal aortic repair. The most concerning disadvantages seen with these novel hybrid techniques include higher than expected incidences of devastating spinal cord injury and renal failure, and a lack of data supporting improvement in operative mortality. Furthermore, the reported rates of distal aortic reintervention remain significant. All of these factors call into question the reality of a hybrid, single-stage "ideal." Despite the technical advances in both endovascular and open repair, extensive aortic disease remains a difficult challenge to manage and continues to incur significant morbidity and mortality. It is thus imperative to continue critical evaluation in both endovascular and open arenas in order to improve outcomes for this formidable disease.

We examined our own prospectively collected data on patients undergoing open aortic arch replacement over the last twenty years in order to examine differences in outcomes for patients undergoing total arch replacement vs total arch replacement with elephant trunk. During the study period, 200 patients had isolated total arch replacement. Ninety-seven had total arch replacement with a classic elephant trunk. Preoperative characteristics were similar to those reported in the literature for total arch repair performed with hybrid techniques, including the presence of a large percentage of patients requiring emergent repair. Propensity matching was used to neutralise the differences in baseline characteristics among patients undergoing the two different types of operation. There were no significant differences in major adverse events or in mortality. The rate of overall hospital mortality was 3.3%. The rate of permanent neurologic deficit was 1.2%, and the rate of paraplegia was zero. Postoperative renal failure requiring dialysis was 2.4%. Procedure type did not predict worse outcomes.

Our data suggest that open repair of aortic arch disease, including the use of the classic elephant trunk, remains a viable technique with favourable results when performed in a high-volume aortic centre. Extensive aortic disease continues to incur significant mortality and morbidity, and ongoing research to improve outcomes is necessary. This must include reflection on our current capabilities in open repair in order to guide our enthusiasm for novel hybrid approaches.

Vascular | Rapid Response | Flying over the arch with a parachute on board

Benefit without risk: adding the classic elephant trunk to total arch replacement

Leonard N. Girardi
Department of Cardiothoracic Surgery, NewYork-Presbyterian Hospital / Weill Cornell Medicine, New York, NY, USA

Since the introduction of the elephant trunk technique by Bent in 1963, the ideal management of extensive aortic disease remains the subject of debate. In the last two decades, enthusiasm for a variety of hybrid techniques to manage extensive disease involving multiple segments including the arch has grown. Literature searches on aortic valve surgery and the elephant trunk technique currently produce results saturated by studies of hybrid techniques, in particular the elephant trunk.

Proposed advantages of hybrid techniques have included the potential to avoid the morbidity and mortality associated with the use of deep hypothermic circulatory arrest and the potential to avoid second stage open descending thoracic and thoracoabdominal aortic repair. The most concerning disadvantages seen with these novel hybrid techniques include higher than expected incidences of devastating spinal cord injury and renal failure, and a lack of data supporting improvement in operative mortality. Furthermore, the reported rates of distal aortic reintervention remain significant. All of these factors call into question the reality of a hybrid, single-stage "ideal." Despite the technical advances in both endovascular and open repair, extensive aortic disease remains a difficult challenge to manage and continues to incur significant morbidity and mortality. It is thus imperative to continue critical evaluation in both endovascular and open arenas in order to improve outcomes for this formidable disease.

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Cardiac | Abstract | Modern antithrombotic therapy after cardiac surgery

Effects of ticagrelor with or without aspirin on saphenous vein graft patency under on-pump or off-pump one year after coronary bypass grafting: a post-hoc subgroup analysis of the DACAB trial (DACAB-PUMP)

Yunpeng Zhu, Ruijin Hospital, JiaoTong University School of Medicine, Shanghai, China

The DACAB trial (NCT02201771) was a randomised controlled trial comparing different antiplatelet regimens (ticagrelor plus aspirin, T+A; ticagrelor alone, T; or aspirin alone, A) on saphenous vein graft (SVG) patency one year after CABG. At one-year follow-up, the proportion of patients (approximately 75%) in this trial underwent CABG surgery without cardiopulmonary bypass support (off-pump CABG). Some studies have suggested that more potent antiplatelet therapy is important in off-pump CABG. In this subgroup analysis, we grouped the effects of ticagrelor with or without aspirin on SVG patency one year after on-pump or off-pump CABG. Five-hundred patients (1,460 grafts) from the DACAB trial were included in this subgroup analysis, with 121 patients in the on-pump subgroup (T+A = 39, T = 36, A = 46) and 379 patients in the off-pump subgroup (T+A = 129, T = 130, A = 120). The generalised estimating equation model was applied in graft outcome analyses. Per-graft analysis revealed that one-year SVG patency was 86.4% for on-pump and 81.5% for off-pump CABG (adjusted OR = 0.63, 95% CI: 0.37–1.08, p = 0.092). The one-year SVG patency was 91.7% for on-pump and 87.7% for off-pump in the T+A group, 84.2% for on-pump and 82.4% for off-pump in the T group, and 63.2% for on-pump and 73.9% for off-pump in the A group. Compared with A alone, T+A showed higher patency rate in the off-pump subgroup (adjusted OR = 0.35, 95% CI: 0.20–0.62), and in the on-pump subgroup (adjusted OR = 0.62, 95% CI: 0.16–2.45); interaction p-value = 0.647. Ticagrelor alone did not show higher patency rate in either off-pump (OR = 0.92, 95% CI: 0.31–2.76) or on-pump groups (OR = 0.34–1.00), interaction p-value = 0.430. Similar results were seen in patient-level analyses. Thus, we observed that the on-pump subgroup showed numerically better one-year SVG patency than the off-pump subgroup in the DACAB trial. Ticagrelor plus aspirin showed consistent benefit for achieving one-year SVG patency in both on- and off-pump subgroups, with particular benefit being seen in the off-pump subgroup.

Thoracic | Rapid Response | Oncology 2

Comparison of salvage surgery and pulmonary resections after induction chemoradiotherapy for locally advanced lung cancer patients

Aki K. Kobayashi, Department of Thoracic Surgery, National Cancer Center Hospital, Tokyo, Japan

For early-stage, non-small-cell lung cancer (NSCLC) patients, surgical resection with lymph node dissection has been the standard of care. However, for patients with locally advanced NSCLC, the optimal therapeutic condition, with recurrence of disease after definitive chemoradiation therapy in our daily practice. In order to determine the feasibility of salvage surgery after definitive chemoradiation therapy, we compared a salvage group (S) and an induction group (I) undergoing pulmonary resection after induction of chemoradiation therapy for clinical N2 NSCLC. Mean age was 63.5 years (range 20–78) in the S group and 61.4 (range: 38–74; p = 0.951) in the I group. Median radiation dose was 60 Gy in the S group (range 26–72) and 45 Gy (40–45) in the I group. Surgery in group S consisted of 6 pneumonectomies (right:left = 1:5), 1 bilobectomy, 8 lobectomies, 2 segmentectomies and 1 lymphadectomy for remaining lymph nodes. In the I group, 2 lobectomies and 16 segmentectomies were performed. The overall survival at five years in the S and I groups was 28.1% and 61.8%, respectively, while progression-free survival was 19.2% and 37.5% at five years. There was no 30-day mortality in either group, and there was no significant difference in terms of perioperative and postoperative course. The only difference was found in the length of the interval from chemoradiation therapy to surgery which did not affect the outcomes in our study. Salvage surgery is feasible in highly selected patients with a tolerable rate of morbidity and postoperative outcome.

Aki K. Kobayashi
Learn about LSI’s automated instrumentation for minimally invasive aortic and mitral valve replacement at LSI Booth E04 and experience hands-on training in our LSI Innovation Boutique located in the EACTS Training Village.
A new 2D echocardiographic approach to evaluate the membrane and valve movement of the Berlin Heart EXCOR VAD chamber in paediatric VAD patients

Arianna Di Molfetta
Polineco
Gemelli Hospital, Università Cattolica del Sacro Cuore, Rome, Italy

Echocardiography is useful to evaluate VAD function and the interaction between VAD and the native ventricle. There is a paucity of data regarding the evaluation of pulsatile flow VADs functioning such as the Berlin Heart EXCOR VAD (BH), which is mostly used in paediatrics. Assuming that the BH is a system composed of two artificial valves and a moving membrane, we conducted a serial and systematic echocardiographic study of these BH components enrolling all paediatric patients undergoing BH implantation at our institution from 2014 to 2017. For all patients, the BH pump was evaluated weekly by ECHO (Figure 1).

Forty BH chambers in 18 paediatric patients were prospectively analysed: 18 were 10 mL pumps, 6 were 15 mL, 12 were 25 mL, 2 were 30 mL, 1 was 50 mL and 1 was a 60 mL pump. Seven BHs were placed as right-sided VADs, and 33 on the left. Concerning the inflow valves, results revealed that 20 had no regurgitation, 14 had mild regurgitation and 5 a moderate regurgitation (Figure 2). For the outflow valves, there were 15 cases of no regurgitation, 21 with mild regurgitation and 3 with moderate regurgitation (Figure 2). In three cases, severe valve regurgitation was observed with backflow into the heart chamber. In the first case, the BH chamber was sent to the manufacturer who confirmed the BH valve alteration (Figure 3A). In the second case (Figure 3B), the valve regurgitation was due to cannula compression stemming from a combination of the patient’s small chest and the large size of the cannula. The problem was solved by keeping the patient’s chest partially opened. In the last case, the valve regurgitation was due to suction phenomena (Figure 3C) and was solved by replacing the inflow cannula.

Finally, as the BH and the native heart are not synchronised, we evaluated the beat phenomenon when the aortic valve opens and the BH is ejecting, i.e. how this disturbance is transmitted to the BH and to the patient’s cardio-circulatory system (Figure 4). In conclusion, we observed that mild regurgitation of BH valves is often present but can be tolerated. Any time we observed moderate to severe regurgitation, we were able to correlate it to specific events such as BH malfunction, patient tamponade, cannula compression, or the patient’s arrhythmias. The use of echo on the VAD could be an additional diagnostic tool to evaluate VAD patients permitting formulation of diagnostic hypotheses. Further studies are necessary to refine the method and to collect additional data to deeply understand the BH function and the interaction between the heart and the VAD using echocardiography as well as the possibility to detect thrombus formation.
‘Go with the flow’ for improved patient outcomes in CABG

On Saturday, final results of the prospective Registry for Quality Assessment with Ultrasound Imaging and TTFM (transit time flow measurement) in Cardiac Surgery (REQUEST) study were presented, supporting the significant role played by intraoperative ultrasound imaging and flow measurements in improving patient outcomes in coronary artery bypass grafting (CABG).

REQUEST was an observational registry study gathering information on the frequency and type of procedures performed during CABG, with the aim of using intraoperative surgical strategy following routine assessment and imaging using MiraQ™ or VeriQ™ (Medistim ASA, Norway) systems combining high-frequency ultrasound (HFUS) and TTFM.

David Taggart (Professor of Cardiac Surgery, University of Oxford, UK) – one of seven lead investigators located across sites in Europe and North America – will present the final results of REQUEST during the symposium sponsored by Medistim.

“The most important thing is to go with the flow,” emphasised Professor Taggart in conversation with EACTS Daily News. “If the probe tells you there’s a problem, it’s not going to be resolved by going by what you can see or feel.”

Intra-operative assessment is crucial for optimizing patient outcomes on the spot. There are three key benefits to using the system intraoperatively during CABG: to guide aortic manipulation – clamping, cannulation, and side-branch identification and avoiding diseased areas of aorta; to guide the anastomotic target and internal mammary artery in situ, and to provide instant and ongoing feedback on graft functionality.

The intraoperative probes used with MiraQ have regulatory approval for direct contact with the heart and vessels, in contrast to traditional ultrasound probes, which require use of a sterile sleeve.

Direct imaging of the aorta provides an excellent planning tool to assist in aortic handling, guiding clamp placement and where to cannulate. Further, the condition of the conduits may be evaluated prior to harvesting. The imaging probe also allows the surgeon to locate intramural coronary arteries and to find the best anastomotic site.

The TTFM component of the technology provides real-time visualization of flow patterns; while on-screen calculations provide a Pulsatility Index (resistance parameter), percent of flow occurring during diastole and flow volume. Awareness and correction of deviations before chest closure results in improved patient outcomes.

“If you are doing something technically more challenging then it is a prerequisite that the patient is checked prior to leaving the operating room,” stated Professor Taggart, who is an expert in the use of MiraQ. “If it’s 11 pm, and the phone rings, it’s not the hospital saying what a great job I’ve done, they’re calling to say there’s a problem. That problem will be a graft that did not appear to be an issue in the operating room, but which became one many hours later: the graft is now declaring itself blocked. When a graft fails in the operating room there is instability on blood flow pressure, or haemodynamic measures, so you wouldn’t know if you didn’t check.”

REQUEST study

All patients included in the REQUEST trial had 3 vessel diseased arteries and were scheduled for CABG. Of these participants, 86% were men, median age was 67 years, and mean body mass index (BMI) was 29.2.

The primary outcome was a change to planned procedure at the time of the anastomosis, and procedural adoptions made a surgeon when TTFM and/or HFUS identified suboptimal graft function.

Secondary outcome measures included the number of revisions (intraoperative graft revision, the type of revision, and the key identifier motivating the revision); post-surgical major adverse cardiac and cerebral events (MACCE) prior to discharge of all bypass procedure patients entered into the registry; and the incidence rate of Serious Adverse Events (SAEs) and/or Unanticipated Adverse Events (UAEs).

Intraoperative flow measurements were made using on-screen calculations, and this data was used to assess any potential flow changes. Post-surgical major adverse cardiac and cerebral events were assessed using intraoperative flow measurements, and the results were compared with clinical outcomes.

The prospective Registry for Coronary Artery Bypass Grafting (CABG) was used for quality assessment of the anastomosis and led to an anastomotic revision rate of 3% in 8% of patients. Finally, in-hospital outcome measures (MACCE) revealed a mortality rate of 0.5% and stroke rate of 0.7%.

“We wanted to look at the importance of quality improvement in bypass grafting,” continued Professor Taggart. “Overall, the results of CABG are good, but we improve to improving on this by doing more arterial grafts and off-pump surgery in high-risk patients, which are technically more challenging. It is almost mandatory that if we are doing technically more complex procedures that may benefit the patient more over the long term, we need to check before the patient leaves the operating room that we’ve got it right.”

With respect to imaging the aorta, the intraoperative information obtained via MiraQ tells the surgeon where not to touch the aorta in terms of cannulation or cross-clamping, said Professor Taggart. In addition, the probe also indicates the flow within the bypass graft. “In reality, in the vast majority of grafts that fail in the operating room, unless you attempt to measure it, you would not know that there was a problem until later,” he said, adding his message about trusting the equipment and the information it provides.

Reflecting on the interim results of the REQUEST study, Professor Taggart said that the major outcomes were changes to proposed surgical strategy for aortic manipulation. “All surgeons can see and feel a heavily diseased aorta, but with an aorta that appears okay externally, you can image and detect and detect soft plaque plaque on the inside. It is this plaque that could potentially move to another part of the body and cause harm. For example, if it moves to the brain, it could cause a stroke.”

There were also significant changes as to where the surgeons proposed to place the graft. “[Visually], and by palpating with a finger, the surgeons think there’s a soft spot, but it doesn’t reveal disease on the posterior wall of the artery, meaning they haven’t been able to potentially be opened in the wrong place,” added Professor Taggart.

Furthermore, problems connected to the anastomoses can be discovered by using the MiraQ ultrasound probe. This enables the surgeon to see and feel a heavily diseased aorta or anastomosis, and it is a prerequisite that the patient is checked prior to leaving the operating room.

Of particular note, NICE added that, “The MiraQ system is associated with an estimated cost saving of £141 per patient compared with clinical assessment alone when it is used routinely for assessing CABG surgery in this setting.”

In addition, revisions to the ESC/EACTS guidelines on myocardial revascularisation earlier this year provided some recommendations of relevance to the use of CABG. Firstly, there was a recommendation for more frequent and prospective coronary intervention (PCI) in complex disease with left main coronary artery or triple-vessel disease, with or without diabetes. The second recommendation of relevance was that epicardic scanning should be considered prior to aortic manipulation recommendation class IIa, level C evidence). This latter recommendation is new. Thirdly, there was a recommendation for consideration of routine use of TTFM.

Ultimately, Professor Taggart stands by his mantra of “go with the flow,” highlighting that the key benefit is for the patient, because by routinely assessing the ascending aorta it significantly reduces the risk of a patient being sent for a second procedure.

“This technology routinely, surgically improves their clinical result records, for example mortality and major morbidity figures,” he said. “By checking the patient prior to leaving the operating room the chances of subsequent difficulties are significantly reduced.”

Adding his thoughts on the system, Ms. Kari E. Krogstad, President and CEO, Medistim, said: “We acted upon advice from leading surgeons, that combining information from flow measurements with ultrasound imaging would take intraoperative guidance and graft functionality assessment to a higher level. The REQUEST study is proving that to be great advice.”

Medistim’s session, ‘Intraoperative graft and aorta assessment: How to improve results in the OR’ Lessons learned from the 1000 Patient REQUEST Registry will take place on Saturday at 12:45-14:00 in room Amber 5.
### Thursday 18 October

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<td>Degenerative mitral regurgitation: Bespoke management</td>
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<td>Conflicting evidence on patient-prosthesis-mismatch</td>
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<td>Modern antithrombotic therapy after cardiac surgery</td>
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<td>Innovations in thoracic surgery</td>
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<td>Flow analysis and annulus modification after valve sparing surgery</td>
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<td>The Ross procedure solves all problems!</td>
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<td>Minimising neurological risk in coronary surgery</td>
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<td>MNACTS Video cases – Vascular bailouts</td>
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<td>Relevant factor determining outcome after cardiac surgery</td>
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<td>EACTS-STS – Treatment of type B aortic dissection in the era of stent-grafting – Acute dissection</td>
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<td>Expert experiences with drafting your manuscript</td>
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<td>New technology meets common practice – How to enhance your surgical portfolio</td>
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<td>Tactology of Fallot &amp; pulmonary atresion / ventricular septal defect. Part II</td>
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<td>Pulmonary thrombosis and hypertension and venous complications of myocardial infarction</td>
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<td>EACTS-STS – Treatment of type B aortic dissection in the era of stent-grafting – Chronic dissection</td>
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<td>Insights into clinical trials</td>
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<td>Time-pressured reactions to avoid casualties in type A dissections</td>
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### Plenary

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<tr>
<td>12:45</td>
<td>Transcatheter aortic valve implantation training</td>
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<td>Transcatheter valve-in-valve implantation 2016</td>
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<td>Think Tank on European Cardio-Thoracic Surgery Training: Next Steps?</td>
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<td>The tricuspide valve dilemma: between confrontations and denial</td>
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<td>Nightmires in end stage heart failure</td>
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<td>Classics and novelties in the technical aspects of coronary artery bypass grafting</td>
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<td>Functional mitral valve disease</td>
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<td>Atrial fibrillation surgery: room for improvement</td>
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<td>14:15</td>
<td>A practical approach to aortic valve repair</td>
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<td>16:00</td>
<td>Prediction and avoidance of complications in transcatheter procedures</td>
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<td>16:00</td>
<td>Nightmires in cardio-thoracic surgery (Residents)</td>
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<td>16:00</td>
<td>Beyond conventional risk scores: Predicting mortality and serious morbidity</td>
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<td>16:00</td>
<td>Controversies &amp; catastrophes in adult cardiac surgery</td>
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<td>16:00</td>
<td>Updates on molecular biology in Amelung lung cancer – for surgeons</td>
<td>Thoric</td>
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<td>16:00</td>
<td>The host beyond valve surgery</td>
<td>Adult Cardiac</td>
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<td>16:00</td>
<td>Surgical videos</td>
<td>Congenital</td>
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<tr>
<td>16:00</td>
<td>How do I start my coronary dissection?</td>
<td>Adult Cardiac</td>
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<td>16:00</td>
<td>Minimally invasive mitral valve surgery - start up tool box</td>
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<td>16:00</td>
<td>Optimising perioperative care in cardiac transplantation</td>
<td>Vascular</td>
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<td>16:00</td>
<td>Strategies to minimize end-organ damage in aortic surgery</td>
<td>Adult Cardiac</td>
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<tr>
<td>16:00</td>
<td>EACTS/PASCaTS Joint Session</td>
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### Friday 19 October

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<tr>
<th>Time</th>
<th>Session</th>
<th>Location</th>
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<tbody>
<tr>
<td>8:15</td>
<td>How to do it ( risks)</td>
<td>Adult Cardiac</td>
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<td>8:15</td>
<td>Repeat before you treat</td>
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<td>8:15</td>
<td>Heart transplantation</td>
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<td>8:15</td>
<td>Osteometaesthetic disease</td>
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<td>8:15</td>
<td>Mechanical assist devices, extra corporeal support and left ventricular remodeling matrices</td>
<td>Adult Cardiac</td>
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<tr>
<td>8:15</td>
<td>Venous assist device therapy: Problem or solution</td>
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<tr>
<td>8:15</td>
<td>New developments in left main disease</td>
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<td>8:15</td>
<td>Congenital miscellaneous</td>
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<td>8:15</td>
<td>Surgical aortic valve replacement from bench to bedside</td>
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<td>8:15</td>
<td>Standard of care for P2 prolapse?</td>
<td>Brown 3</td>
<td>Adult Cardiac</td>
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<tr>
<td>8:15</td>
<td>A Journey in coronary artery bypass surgery</td>
<td>Michelangelo</td>
<td>Adult Cardiac</td>
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<tr>
<td>8:15</td>
<td>“Gut feeling”: management of type A dissection while awaiting evidence. Part 1</td>
<td>Raphael</td>
<td>Vascular</td>
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<tr>
<td>8:15</td>
<td>Non- oncology</td>
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<td>10:00</td>
<td>Surgery for functional mitral regurgitation: potential for improvements</td>
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<td>10:00</td>
<td>Is less more? Hybrid and minimal invasive coronary revascularisation</td>
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<td>10:00</td>
<td>New strategies to reduce bleeding beyond probe</td>
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<td>10:00</td>
<td>The new kid in town</td>
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<td>10:00</td>
<td>Rare thoracic cancers (EUROCAN)</td>
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<td>10:00</td>
<td>Work in progress</td>
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<td>10:00</td>
<td>New data in atrial fibrillation ablation</td>
<td>Adult Cardiac</td>
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<tr>
<td>10:00</td>
<td>Trial update – ART, IMMAG and MITRA FR &amp; COAPT</td>
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<td>1:00</td>
<td>Long-term outcome after surgical repair in congenital heart disease</td>
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<td>10:00</td>
<td>Mechanical Circulatory Support (ventricular assist device)</td>
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<td>10:00</td>
<td>Choosing the best valve sparing technique and how they compare with Bentalls</td>
<td>Brown 3</td>
<td>Adult Cardiac</td>
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<tr>
<td>10:00</td>
<td>Infections and malignancy in cardiac surgery</td>
<td>Michelangelo</td>
<td>Adult Cardiac</td>
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<tr>
<td>10:00</td>
<td>“Gut feeling”: management of type A dissection while awaiting evidence. Part 2</td>
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### Break

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### Abstract

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### Focus session

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### Rapid response

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### Techno College

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### Professional challenge

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### Hands-on training

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### Plenary

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### Issue 1 Thursday 18 October 2018

EACTS Daily News
### Saturday 20 October

<table>
<thead>
<tr>
<th>Time</th>
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<th>Location</th>
<th>Speaker/Institution</th>
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<tbody>
<tr>
<td>8:15</td>
<td>Aortic valve surgery made cosmetic</td>
<td>Amber 1 &amp; 2 Adult Cardiac</td>
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<td>8:15</td>
<td>Rare and uncommon diseases</td>
<td>Amber 3 Adult Cardiac</td>
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<td>8:15</td>
<td>EUROMACS</td>
<td>Amber 4 Adult Cardiac</td>
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<td>8:15</td>
<td>S.O.S. – Save our surgeon! Critical situations in cardiothoracic surgery</td>
<td>Amber 5 Adult Cardiac</td>
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<tr>
<td>8:15</td>
<td>Enhanced recovery after surgery (EJHAS)</td>
<td>套甲 7 General</td>
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<td>8:15</td>
<td>Single ventricle 1: Can we avoid univentricular palliation</td>
<td>套甲 3 Congenital</td>
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<tr>
<td>8:15</td>
<td>Heart team perspective in atrial fibrillation</td>
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<td>8:15</td>
<td>Challenges and solutions in proximal aortic diseases</td>
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<td>8:15</td>
<td>Evidence based decision making in transcatheter aortic valve implantation</td>
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<td>8:15</td>
<td>Living with a ventricular assist device – Living with problems?</td>
<td>套甲 4 Adult Cardiac</td>
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<td>8:15</td>
<td>Myocarditis, acute myocardial infarction and hypertrophic obstructive cardiomyopathy remodelling</td>
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<td>8:15</td>
<td>Put your lead vest on: Transcatheter aortic valve implantation under rapid fire</td>
<td>套甲 6 Adult Cardiac</td>
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<td>8:15</td>
<td>Coronary</td>
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<td>8:15</td>
<td>Anatomical segmentations</td>
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<td>Managing patients with multi-vessel disease in the modern era</td>
<td>套甲 9 Adult Thoracic</td>
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<td>12:00</td>
<td>Lunch</td>
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<td>12:15</td>
<td>Teaching root repair techniques by experts</td>
<td>套甲 1 Adult Cardiac</td>
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<td>12:15</td>
<td>LVAD Outpatient Management</td>
<td>套甲 2 Adult Cardiac</td>
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<td>12:15</td>
<td>Rapid fire – Congenital 2</td>
<td>套甲 3 Congenital</td>
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<td>12:15</td>
<td>Open access – who is paying the bill, the reader or the writer?</td>
<td>套甲 4 Thoracic</td>
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<tr>
<td>12:15</td>
<td>Second conduit: choices beside PITA</td>
<td>套甲 5 Adult Cardiac</td>
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<td>12:15</td>
<td>Optimised perfusion</td>
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<td>12:15</td>
<td>New solutions in mitral repair</td>
<td>套甲 7 Adult Cardiac</td>
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<td>12:15</td>
<td>The bigger picture – from aortic surgery towards comprehensive aortic medicine</td>
<td>套甲 8 Adult Cardiac</td>
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<td>12:15</td>
<td>The poprarity score: opening a black box</td>
<td>套甲 9 General</td>
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<tr>
<td>12:15</td>
<td>Chest Wall</td>
<td>套甲 3 Thoracic</td>
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Fifteen-year outcomes following bioprosthetic versus mechanical isolated aortic valve replacement for aortic stenosis in patients aged 50 to 65 years: the Andalusian aortic valve multicentric study (ANDALVALVE)

Emiliano Rodríguez Caulo
Hospital Universitario Virgen de la Victoria, Málaga, Spain

Table 1: Follow-up of major adverse cardiac and cerebrovascular events (MACCE) in a 2:1 matched sample (Bivariate analysis).

<table>
<thead>
<tr>
<th>Endpoints</th>
<th>Mechanical (n = 506)</th>
<th>Biological (n = 257)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-day mortality</td>
<td>12/506 (2.4%)</td>
<td>5/257 (1.9%)</td>
<td>0.491</td>
</tr>
<tr>
<td>Stroke</td>
<td>31/506 (6.1%)</td>
<td>16/257 (6.2%)</td>
<td>0.957</td>
</tr>
<tr>
<td>Major bleeding</td>
<td>66/506 (13%)</td>
<td>17/257 (6.6%)</td>
<td>0.004</td>
</tr>
<tr>
<td>Prostheses reoperation</td>
<td>10/506 (2%)</td>
<td>2/257 (0.8%)</td>
<td>0.010</td>
</tr>
<tr>
<td>Bleeding/ CR Transfusion</td>
<td>122/506 (24.1%)</td>
<td>39/257 (15.1%)</td>
<td>0.004</td>
</tr>
<tr>
<td>Transplantations</td>
<td>90/506 (17.7%)</td>
<td>30/257 (11.8%)</td>
<td>0.142</td>
</tr>
<tr>
<td>All-cause late mortality</td>
<td>76/506 (15.3%)</td>
<td>36/257 (14.1%)</td>
<td>0.165</td>
</tr>
<tr>
<td>Cardiac-related hospitalization</td>
<td>34/506 (6.8%)</td>
<td>14/257 (5.5%)</td>
<td>0.386</td>
</tr>
<tr>
<td>Infective endocarditis</td>
<td>6/506 (1.2%)</td>
<td>7/257 (2.7%)</td>
<td>0.098</td>
</tr>
<tr>
<td>Mean gradient (mmHg)</td>
<td>16.2 +/- 4.1</td>
<td>17.3 +/- 9.1</td>
<td>0.070</td>
</tr>
<tr>
<td>Mean valve size (mm)</td>
<td>21.7 +/- 1.8</td>
<td>22.1 +/- 1.9</td>
<td>0.090</td>
</tr>
<tr>
<td>MACCE-combined (patients)</td>
<td>105/506 (20.7%)</td>
<td>41/257 (16.1%)</td>
<td>0.111</td>
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</table>

Categorical values are expressed as n (%). a) MACCE: Major Adverse Cardiac and Cerebrovascular Events; b) Bold letters are statistically significant.

Figure 1: Survival Function Matched Cohort patients 55-65 years

In conclusion, our initial expectations regarding the capacity of cell therapies to regenerate, or more realistically to repair, broken hearts seems a pivotal factor. To the best of our knowledge, this issue has not yet been addressed in a Mediterranean population such as the Andalusian region in southern Spain (~9,000,000 population). This research aims to analyse long-term survival and major morbidity (30-day mortality, stroke, any prosthetic reoperation and major bleeding within this population. Our multicentre observational study included all subjects aged between 50–65 years undergoing a primary isolated AVR intervention due to severe aortic stenosis at all seven public hospitals equipped with a cardiovascular surgery department in Andalusia during 2000–2015. Concomitant surgery, reoperations and endocarditis were exclusion criteria. A total of 1,443 patients were registered (272 biological and 1,171 mechanical). Multivariate analyses, including 2:1 propensity score matching (506 mechanical and 257 biological), was conducted. Bioprostheses were implanted in 18.8% of cases (n = 272; 35% women, mean EuroSCORE of 3%). Mean follow-up was 8.1 ± 4.9 years in a matched sample. 8.8 ± 4.9 years for mechanical prostheses versus 7.1 ± 4.5 years for biological prostheses (p < 0.001). In the paired sample, 15-year survival was 73% for the biological valves versus 76% for mechanical valves (Hazard Ratio [HR] 0.80; Confidence interval [CI] 95%, 0.54–1.20, p = 0.159). No significant differences were observed in patients ≤50 years of age (74% of 15-year survival in both groups: HR: 0.88; CI 95%, 0.56–1.34, p = 0.527, Figure 1). A higher rate of major bleeding was found in mechanical prostheses (p = 0.004), whereas reoperation was more frequent among biological prostheses (p = 0.010; Table 1). All these data were confirmed using the Fine-Gray competing risk analysis method (Figure 2), with a very low cumulative incidence of reoperation in biological valves (6% at 15 years), and a very high rate of major bleeding in mechanical prostheses (12% mechanical vs 6% biological), without differences in stroke (6% at 15 years).

In conclusion, long-term survival was comparable in patients above 55 years. Mechanical prostheses were associated with more major bleeding, while bioprostheses incurred higher rates of reoperation. Bioprostheses use in patients above 55 years of age is a reasonable choice.

Figure 2: Left to right: Stroke, Major bleeding and Reoperation
Getting it right the first time

David Richens  National GIRFT Lead for Cardiothoracic Surgery, UK

"Getting It Right First Time" (or GIRFT) is an English national benchmarking programme focusing on 35 clinical work streams across surgery, medicine and other clinical services. It has a budget of £60 million, funded by the UK Government. GIRFT entails analysis of central data registries followed by a series of clinically led deep dive visits to each provider unit. It is driven by a desire to ensure better care and outcomes for patients and to address some of the challenges faced by clinicians in their day-to-day practice. It focused on the unwarranted variation in the quality and efficiency of the services that exist. The Cardiothoracic GIRFT project commenced in April 2016 and the associated deep-dive visits finished in November 2017. The Cardiothoracic Report was published in March 2018.

I found my visits to all of the 31 cardiothoracic centres in England to be inspirational. Overwhelmingly, clinical staff are striving to do things better. They combine high levels of energy and enthusiasm with intellectual rigour and a commitment to innovation – qualities that have characterised the development of cardiothoracic surgery as a distinct surgical specialty since the 1950s.

Our review of cardiothoracic surgery identified significant opportunities to improve patient care and outcomes. We also identified a total national financial opportunity of over £50 million. The report describes the variation we have found, examples of good practice, and our recommendations on how our specialty can realise these opportunities open to us. We have found significant degrees of unwarranted variation in a number of key areas, including patient pathways and associated test management, management of clinical risk and adverse clinical outcomes, lung cancer services, aorto-ocular surgery, mitral valve repair, and clinical coding.

GIRFT is putting in place a comprehensive programme to help implement the recommendations highlighted in the national report and supporting individual providers to implement these recommendations locally. For GIRFT to be a success it needs the backing of clinicians and senior trust managers.

GIRFT’s success to date has been acknowledged in an independent report by the King’s Fund. The report said, “The evidence to date suggests that the GIRFT programme is achieving what it has set out to achieve – higher-quality care in hospitals at lower cost – with the engagement of both clinicians and management in the process.”

Perceval® surpasses 10-Year Milestone

Perceval—widely recognized as an optimal tissue valve solution for MICS and complex procedures—has surpassed its 10-year milestone. With the first in-human implant of the Perceval 100% sutureless bovine pericardium aortic heart valve in 2007, there is now a full decade of data supporting this self-anchoring and self-expanding valve.

Backed by a robust body of evidence and a truly global reach, with the latest milestone reached in June with the valve’s approval in Japan, Perceval has proven to be a very good option for surgeons performing MICS and complex AVR procedures. According to Prof. Bart Mours, M.D., Cardiac Surgery, University Hospitals, Leuven, Belgium, “Perceval has shown good clinical performance with very low SVD rate during 10 yrs of clinical experience, demonstrating to be a viable alternative to stented valves in patients requiring aortic valve replacement.”

A truly sutureless valve, Perceval helps reduce complexity even in challenging and time-consuming procedures. It allows for precise positioning in both MICS and traditional surgery and is a valuable option to reduce post-operative complications.

Perceval reduces the physiological impact of the operation through increased visualization (thanks to the reduced collapsed profile), precise positioning (due to temporary guiding sutures) and ease of a self-anchoring implant (eliminates the 15-18 permanent sutures required with traditional valves). By reducing risk, procedure time and post-operative complications, Perceval has optimized the surgical approach for AVR and has become a trusted option for cardiac surgeons and their patients worldwide.

Aprotinin stronger than ever

Patient blood management remains an unmet medical need in patients undergoing cardiac surgery, according to experts who will discuss the matter and present potential solutions at a symposium sponsored by Nordic Pharma Group later today.

First on the podium will be Kai Zacharowski from University Hospital Frankfurt, Germany. “Cardiac patients are at high risk of bleeding and therefore of transfusion, which brings a high risk of complications,” he told EACTS Daily News. “This is aggravated nowadays because many cardiac patients are on various anticoagulant medications, and 30-40% have iron-deficiency anaemia. These patients start at low risk, but then they have major surgery with high risk of bleeding. Together, this can precipitate a very poor outcome.”

In fact, according to Patient blood management.eu, a website recommended by Professor Zacharowski, 11-48% of surgical patients suffer from anaemia prior to surgery, and if undiagnosed and untreated, preoperative anaemia is likely to dramatically affect patient outcome. Preoperative anaemia is an independent risk factor for increased morbidity, mortality and length of hospital stay.

“We need to improve outcomes by reducing the risk of massive transfusion, and stroke among other things,” continued Professor Zacharowski, who advocates three steps to reduce complications during major heart surgery.

“Firstly, treat anaemia prior to surgery so that patients arrive at surgery with a normal haemoglobin level. Studies have shown that if a patient enters surgery with mild anaemia then they have a five-fold increased risk of severe anaemia then this increases to a 13-fold increased risk of death.”

“Secondly, it is important to be aware of a patient’s anticoagulant therapy and when to stop it, and thirdly, the team needs to follow a blood transfusion algorithm including ways to reduce the need for transfusion.

Identifying the unmet medical need, Professor Zacharowski highlighted that all of these measures could be utilised together to improve outcomes. “This is the solution, but it is not happening in practice often enough. Only three hospitals in Europe are introducing all these measures together.” He estimates that by implementing all the measures together, mortality would be reduced by approximately 10%, although official figures are yet to be obtained.

“We also need to reduce the amount of blood being taken during the hospital stay,” he continued, adding that studies show that if a cardiac surgery patient stays in hospital for 50 days, then the patient loses approximately five litres of blood via venepuncture.1

Turning to aprotinin, he relayed that the drug is administered during surgery to patients who still have a high risk of bleeding, even after other measures have been put in place. “It has been shown in thousands of patients that bleeding can be reduced by administering aprotinin, which is associated with better patient outcomes,” said Professor Zacharowski.

Aprotinin is a basic trypsin inhibitor of the bovine pancreas, which is antifibrinolytic in nature and inhibits trypsin and related proteolytic enzymes, reducing bleeding via the slowdown of fibrinolysis. Use of aprotinin aims to reduce the need for blood transfusions during surgery, as well as end organ damage due to hypoperfusion.

Initially launched by Bayer in 1959 for patients, aprotinin is now approved for coronary artery bypass grafting (CABG) in 1993. However, in 2007, a worldwide suspension was enacted due to results from a major evaluative study known as the BART [Blood Conservation Using Anti-Fibrinolytics in a Randomized Trial] study that included frequent cardiac surgeries with an expected mortality over double that seen with primary CABG and an estimated risk for reoperation due to bleeding greater than 5%.

The results showed an increased mortality with use of aprotinin. In 2011-12, aprotinin was reinstated after an official European Medicines Agency (EMA) re-assessment of the BART study that found the study methodology to be flawed. In 2016, aprotinin was relaunched in European Union (EL) with its original indication: isolated CABG with high risk of bleeding.

Average bleeding after cardiac surgery is estimated to be 400 mL (+/- 200 mL) and can be up to 1,200 mL in patients treated with CABG. According to the EMA, 7% of patients lose greater than 2 L of blood, and up to 5% require reinforcement for bleeding after stent or valve closure.2

Severe post-operative bleeding can lead to increased morbidity and mortality for cardiac surgery patients and is a relatively common complication of cardiac surgery.3 Regarding transfusion in cardiac surgery, an Austrian benchmarking study in isolated CABG found that 57% of isolated CABG patients required transfusion, despite the use of patient blood management techniques. Patients who were transfused received a median of 3-4 units of blood products.4 Despite the use of tranexamic acid, 23% of cardiac surgery patients require a major transfusion (four or more red blood cell units).3

Jan van der Linden from the Karolinska Institute, Stockholm, Sweden, will tackle the place of aprotinin in current clinical practice, adding discussion of why re-assessment of the BART study led to dismissal of the evidence and the drug’s reinstatement and licensing. “Based on the BART study, the authorities were justifiably in taking aprotinin off the market at this point,” he told EACTS Daily News.

“But it turned out that this study was incorrect. An independent safety and monitoring committee stopped the study at a point where there were no significant differences in mortality, but after an unexplained exclusion of 137 patients by the trial investigators the study reached significance. But a re-analysis, that included originally excluded patients, showed no statistically significant mortality signal for aprotinin.”

There was also an unusually large number of re-classifications of outcomes from the originally reported data, with a large (~75%) change in the primary outcome measure: massive postoperative bleeding. “There were serious limitations in the conduct of this study according to the EMA and expert advisory panel that re-evaluated the data,” continued Professor van der Linden, adding that it was an investigator-led study, not initiated by a pharmaceutical company.

Professor van der Linden discussed how, in 2013, the EMA assessed the therapeutic benefit of aprotinin from RCIs and observational studies, including the BART study. The assessment found a lower risk of bleeding; a lower risk of risk of blood transfusion; and a lower risk of re-exploration for bleeding. “Since reinstatement for use by the Canadian regulatory authority (Health Canada), and the EMA, aprotinin has been indicated for the prophylactic use to reduce blood loss and blood transfusion in adult patients who are at high risk of major blood loss undergoing isolated Cardiopulmonary Bypass Graft surgery (CABG not combined with other vascular surgery).”

“It’s more effective than other antifibrinolytics at minimizing blood transfusions and reoperation rate,” said Professor van der Linden. “We combined with TXA and EACA (e-caproic-acidic-acid), said Professor van der Linden. “Aprotinin works by a wide range of effects,” he remarked, advocating use of the drug in patients with high risk of bleeding and cardiac failure and sepsis. “It preserves platelet function during cardiopulmonary bypass, and decreases anti-inflammatory response, which is very important if a patient is in shock or has sepsis. The inflammatory response is amplified by cardiopulmonary bypass.”

After the EMA assessment in 2013, other retrospective studies regarding withdrawal of aprotinin and replacement with tranexamic acid revealed results to support use of aprotinin.

For example, a German study in 320 open-heart procedures found a significant risk factor for mortality with tranexamic acid compared with aprotinin (16.2% TXA vs 7.5% aprotinin); and a UK study found there were significantly more transfusions and a 151% increase in 36-day mortality in high-risk patients (HR 2.51, CI 1.00-6.28).5

“Now, as a precautionary measure, the regulatory authorities recommended the use of aprotinin to contribute to a registry [Nordic Aprotinin Patient Registry (NAPaR)] to follow- up the use of the drug,” remarked Professor van der Linden. “The registry records all usage including off-label. In fact, the majority of use is off-label, in children and in adult patients at high risk of bleeding, and aprotinin was used in CABG patients who were on dual antiplatelet treatment.”

In 2017, the European Society of Cardiac Anaesthesiology (EACTA) released new guidelines on patient blood management for adult cardiac surgery. These noted that antifibrinolytic therapy (TXA, aprotinin, and EACA) is recommended to reduce bleeding and transfusions of blood products and reoperation rates. The evidence was rated as class 1, level A.6

References
Let the pachyderm proboscis freeze: FET experience is increasing

Preliminary results of a debranch-first technique in frozen elephant trunk procedure

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In 1983 Borst proposed a two-step surgery for combined aortic arch and descending aorta pathologies, called the “elephant trunk technique”. In 2003, a big step forward was achieved by endovascular stent graft technology: the frozen elephant trunk (FET) was introduced, but yet the aortic arch seemed to be excluded from its benefit. Arch repair with FET remains a complex intervention, with suboptimal organ protection and non-negligible rates of in-hospital mortality (1.8–17.2%), as well as complications including reintervention for bleeding in up to 30% of the cases, stroke and spinal cord ischaemia (SCI) in 2.5–20% and 0–21% of patients respectively and acute kidney injury (AKI) in 4–34.8% of procedures.

In 2016—35 years after Borst’s proposal and 15 years after FET—the Vascular Surgery Department and the Cardiac Surgery Department of San Raffaele Hospital joined together to start an ambispective single-centre study called the frozen elephant trunk organ perfusion technique (FET-OPT), using a novel custom-made E-vita open plus prosthesis from Jotec (Germany). Two additional branches were added on the side on the surgical graft portion (Figure 1) to allow distal aortic perfusion and reimplantation after supra-aortic vessel debranching. The reperfusion branch originates with a 90° angle from the main Dacron graft, the debranching branch is at 30 mm from the reperfusion branch and it originates with a 60° angle from the main Dacron graft. The stent graft is identical to a standard E-vita open plus device: the length and diameter can be tailored according to preoperative planning and individual surgical strategies in only 19 (interquartile range [IQR]: 18–23) days. The graft diameter is oversized according to the diameter of the distal aorta measured outer edge to outer edge for native distal aortas (20% oversize), while in case of dissected aortas it is sized according to the true lumen (0% oversize).

The new design, combined with a propaedeutic carotid-to-subclavian bypass (CSB), eliminates the need for complex access to the subclavian artery (that may be difficult in a deep chest or in redo surgeries) and allows near-physiological brain perfusion through the CSB with antegrade cerebral perfusion (ACP) through bilateral axillary artery cannulation. The new configuration allows a reduction in both the cerebral ischaemic time and systemic ischaemic time: brachiocephalic vessels reconstructed with a debranching-first technique can be performed at the beginning or at the end of the procedure under normothermic conditions, thus allowing a short cerebral ischaemic time (median 103 min; IQR 94–120). Similarly, the systemic ischaemic time is shortened by using the reperfusion branch—a very important aspect especially in patients requiring additional aortic or cardiac procedures (Figure 2).

This new concept, the custom-made E-vita open plus prosthesis, has been used in 21 patients undergoing FET surgery between November 2016 and July 2018 in the FET-OPT study. Early-term results are promising in terms of in-hospital death (0%) and major cerebrovascular events, transitory ischaemic attack (1 patient [5%]). Spinal cord injury occurred in two (10%) patients, with complete resolution within one month, and surgical revision for bleeding was seen in three patients (14%).

Figure 1. Above. (A) Technical sketch of the custom-made E-vita GRAFT (Jotec GmbH, Germany); (B) The custom-made E-vita graft is shown fully deployed with the surgical graft already retrieved and pulled back; (C) Orientation of the perfusion branch is marked with a black line on the standard delivery system of the device.

Figure 2. Right. Final result of the frozen elephant trunk at the end of cardiopulmonary bypass, showing the debranching branch (A), the reperfusion branch (B), the proximal and the distal anastomosis.
Bernoulli effect aggravates leg malperfusion during extracorporeal life support with femoral arterial cannulation

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During extracorporeal life support (ECLS) using a femoral arterial cannulation strategy, malperfusion up to the point of critical limb ischemia is frequently observed in the cannulated leg. This effect has mainly been attributed to obstruction of the femoral artery by the cannula. However, leg malperfusion also occurs in patients without peripheral arterial disease and large femoral vessels. We have investigated the pathomechanism of this phenomenon in an in-silico study, whereby we generated virtual CAD (Computer-aided design) 3D models from DICOM-data of a standard 16 F cannula and a life-sized model of the aorta and its major arterial branches.

After virtual cannulation of the common femoral artery, time-transit flow simulations were conducted with different stages of cardiac output and corresponding ECLS flow rates with a total circulating volume of 5 L per minute. The flow characteristics of the ECLS jetstream and the blood flow around the cannula were visualised.

Interestingly, particularly during diastole, we observed not only states of blood distal to the cannulation site, but also retrograde flow besides the cannula (Figure 1). This phenomenon can be explained with the Bernoulli principle, i.e. high-velocity jetstreams induce areas of low pressure with consecutive liquid flow towards this region. These in silico results imply that, even in patients with sufficient vessel diameters undergoing ECLS via femoral arterial cannulation, blood flow into the cannulated leg is impaired due to suction of blood from the limb by retrograde ECLS flow. We conclude from these data that in ECLS patients with femoral arterial cannulation, placement of a separate leg perfusion cannula is mandatory, irrespective of vessel diameters or peripheral arterial occlusive disease.
Free access to high-quality, expert-reviewed surgical videos is revolutionising the art of teaching surgery and reinventing an old adage: “See one, do one, teach one” has been the model for passing on surgical know-how since surgery was invented – a very long time ago. “See one” used to mean watching a skilled surgeon perform a procedure live, and opportunities to do so were limited and precious. In the age of YouTube and excellent online videos many surgeons are now able to witness procedures simply by watching clips on journal websites and e-manuals such as our award winning MMCTS.org.

MMCTS was created by Marco Turina, in collaboration with EACTS, in 2005 to provide cardio-thoracic surgeons with free step-by-step surgical demonstrations by some of the biggest names in the profession. When it was updated and relaunched at the end of 2016, the editors-in-chief, Roberto Lorusso and René Prêtre encouraged new authors to focus more on teaching than reporting on cases, and to add voice-over narration to their videos. Users have been showing their appreciation by sharing tutorials with colleagues and friends, and the site’s usage metrics tell the story of its success. In the past six months, MMCTS has seen its audience grow at a phenomenal rate. Total video watch-time and views have increased by a factor of 20 and the number of surgeons using the site has increased by nearly 40%. Users come from all over the world (as do the site’s authors) and, reflecting universal trends, MMCTS’s users are now taking advantage of the website’s new responsive design and they are watching, reading, and listening to tutorials using their smartphones.

Comprehensive but not completed: Will you help us “teach one”? MMCTS is an excellent educational resource with a global audience that is rapidly growing and fully engaged. The next step in reaching our goal of offering a complete online textbook of cardio-thoracic surgical procedures needs your support. When MMCTS.org was relaunched in 2016, many tutorials that were out of date or did not fit the new format were archived. Since relaunch we have published over 70 new tutorials and now have more than 250 surgical procedures live on MMCTS.org.
Annuplasty for aortic valve repair: a standardised approach
An EACTS technical course on aortic valve repair; March 27–29, 2019: Paris, France

Emmanuel Lansac
Course Director; Institut Mutualiste Montsouris, Paris, France

Phenotypes of Aortic Root and Ascending Aorta

Mechanisms of AI Classification

Type I
Normal cusps movements related to aortic root dilatation without annuloplasty or reconstruction

Type II
Cusp prolapse with annuloplasty or reconstruction

Type III
Cusp retraction with or without dilatation and aortic root remodelling

Figure 2

Figure 3

Phenotypes of Aortic Root and Ascending Aorta

Phenotypes of aortic root and ascending aorta

Indications for surgery in (A) severe aortic regurgitation and (B) aortic root disease (irrespective of the severity of aortic regurgitation)

Indications for surgery

Class
Level

A. Severe aortic regurgitation

Surgery is indicated in symptomatic patients [1, 2, 3, 4, 5, 6, 7, 8, 9]

B. Aortic root or tubular ascending aortic aneurysms (irrespective of the severity of aortic regurgitation)

Surgery is indicated in patients undergoing CAVG or surgery of the ascending aorta of another valve.

References


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Vascular Disease Domain

A 2018 review and a hybrid 2019

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I

took over from Professor Ruggiero De Paulis as Chair of the Vascular Disease Domain last year and I would like to thank Jean for the hard work and the impressive contribution he gave to the Domain. Aortic surgery can in many ways be considered the centre of innovation in cardiovascular disease. Examples are the growing treatment of aortic aneurysms and dissections, the use of catheter-based technology and the necessity to treat an increasingly aging population. The consolidated and expanding use of endografts has facilitated many high-risk procedures and paved the way to less invasive and hybrid procedures for the future. For this reason, the Vascular Disease Domain, whose main mission is to advance education, is continuing to offer its contribution to the Academy in the organisation of courses aimed at various levels.

Even this year, the traditional appointment of the Vascular Academy – the Introduction to Aortic Surgery Course (March) – received very impressive feedback from the delegates. We spent two-and-a-half days covering the major aspects of open and transcatheter aortic surgery from the proximal aorta to the thoraco-abdominal aorta. It offered an incredible opportunity to meet the experts and translate theory into practice with wet labs and hands-on simulation.

In addition, this year we decided to spend more time on training simulation sessions. Section 1 focused on an introduction to thoracic aortic diseases and surgical repair and gave many updates on biomarkers (including how useful they are in acute and chronic aortic pathology), as well as access options for cardiopulmonary bypass and refreshed knowledge on embryology, physiology and the haemodynamics of the aortic root with bicuspid/tricuspid valves.

Regarding surgical techniques, the two well-known techniques of a valve-sparing procedure – the Ross operation and the transannular patch – were both examined in detail, the tips and tricks exposed and, on day two, re-analysed during a much-appreciated wet lab (pictured). The same day, a new wet lab was offered focusing on annulus enlargement techniques.

For those cardiac surgeons wishing to embark upon an endovascular programme, we offered the opportunity to learn and train in the basics of TEVAR. A dedicated session walked through a basic overview of wires, catheters and sheaths before dealing with the indications for endovascular treatment and procedural planning, brought to life visually with a practical simulator session.

Extremely positive feedback came back from the evaluation questionnaires: all course attendees felt it had met the expectations and they would recommend it to a colleague. Moreover, the majority of them learned useful takeaways they could use to advance their careers.

Listening to the participants, helping them during the hands-on labs and carefully reading the suggestions coming from the questionnaires are some of the keys to improve the courses year-by-year. The Vascular Domain keeps trying to accommodate the feedback during the course and provide the best instrument to make it possible. For example, the new section on thoracic endovascular aortic repair was the most appreciated, both in terms of content and delivery, and therefore will be confirmed and enhanced next year. Moreover, the course will be strong on live-in-the-box presentations during which a surgical manoeuvre will be directly shown, explained, discussed and repeated in order to encourage more live interaction.

This year, together with the Adult Cardiac Domain, we were also active in organising two level II/IV courses on aortic valve repair and aortic valve sparing procedures: The Aortic Valve Repair and Ross Operation Course in Brussels, Belgium (March) and The Aortic Valve Repair Summit in Paris, France (June).

In a continually-changing world where transcatheter technology modifies the paradigm of standard and well-known surgical techniques, it is important to acquire knowledge, specific skills and leadership in every aspect of the aortic surgery. Indeed, a great deal of effort by EACTS is going to be channelled into supporting hybrid surgeons with multidisciplinary competences, and the Vascular Disease Domain is also trying to embrace this aim, focusing more on endovascular techniques. To do this, next year we are planning a multi-modular educational TEVAR programme consisting of four courses that will offer certification of competence of an acquired skill.

Another important goal will be to expand connections with other international societies. To that end, a closer cooperation with the European Society for Vascular Surgery will be founded to foster joint activities and more opportunities for our community.

Finally, as part of its continuing effort in education, the Vascular Disease Domain is also planning to organise advanced courses focused on many aspects of open aortic surgery.

Evolution of perioperative outcome in minimally invasive mitral valve surgery

A single centre experience of 4,382 patients

Martin Misfeld
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S
ince its introduction by Alain Carpentier in 1989, minimally invasive mitral valve surgery (MIMVS) has increasingly been used as a standard procedure for mitral valve surgery. Through the years, MIMVS has undergone a variety of technical modifications, which currently peaks in endoscopic surgery with 3D vision.

As one of the pioneering centres for MIMVS, the Leipzig Heart Center has performed more than 4,000 MIMVS procedures over more than 23 years. During this year’s EACTS Annual Meeting, we present our clinical data on the evolution of MIMVS. Through the years, the surgical technique has been modified from endo-clamping to X-clamping, from direct vision to totally endoscopic techniques, as well as undergoing further modifications to several steps of the procedure.

Meanwhile, the surgical techniques used to repair mitral valve incompetence have also been standardised, e.g. the loop-technique, which was introduced by Professor Friedrich Mohr in 2000. Analysis was performed by dividing 21 years of data (1994–2015) into four equal time frames (F1–F4). Mean age was 60 ± 13 years (range: 18.2–88.9 years) and patients were predominantly male (61.9%).

Despite increased complexity of the procedure and liberal use of additional tricuspid valve repair (Figure 1), hospital, and 30-day mortality decreased to 1.2%, including emergency cases, combined procedures with tricuspid valve and coryoablation surgery, and endocarditis (Figure 2).

A selected group of surgeons focus on MIMVS at our centre. This enables us to follow the 2017 ESC/EACTS Guidelines for the management of valvular heart disease even “in asymptomatic patients with preserved LVEF (>60%) and LVESD 40–44 mm, when a durable repair is likely, surgical risk is low, and the repair is performed in a heart valve centre.”

The exact number of MIMVS procedures in Europe is unknown. It is suggested that around 10% of isolated mitral valve procedures are being performed by a minimally-invasive approach in the UK, less than 5% in Scandinavia, around 11% in Poland, around 20% in Spain and nearly 50% in Germany. However, a wide range of centres are performing MIMVS only in very selected patients, while others are using MIMVS as a standard approach for nearly all patients. This is also the case at the Leipzig Heart Center.

A multinational data base of minimally-invasive cardiac surgery would be desirable to be able to standardise and judge outcomes from this procedure. This would enable the surgical community to compare surgical, interventional and medical data for the benefit of our patients.

To the best of our knowledge, the data presented at this Annual Meeting represent the largest single centre MIMVS series – one which offers relevant information on the outcomes of MIMVS from an experienced and dedicated heart valve centre.
Integrated multi-disciplinary simulation training: aiming at proficiency

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The Robert W M Frater Centre for Cardiovascular Research, University of the Free State (UFS), Bloemfontein, South Africa

The simulation programme development at the UFS aims at the establishment of an integrated multi-disciplinary simulation program for South Africa and sub-Saharan Africa. This training program focusses on the stepwise training of cardiothoracic surgeons in a safe environment, aiming at proficiency rather than competency. The modular programme combines a human-factor approach to training (Crew Resource Management or CRM widely used in the aviation industry), educational theory, a theoretical syllabus and stepwise surgical simulation in an integrated multi-disciplinary programme. Simulation can include bench models, virtual reality equipment addressing surgical and diagnostic training and finally high fidelity integrated multi-disciplinary simulation programmes involving a multidisciplinary team (Figure 1).

The system will be implemented as a hub-and-spoke construct involving participating training units. After completion of introductory modules in human factors and educational theory (providing basic background on learning, training, practice, the development of competency and proficiency), participants will be able to participate in a programme involving both distant learning and contact sessions at the UFS. Every subject will be introduced with a human factors section, followed by clearly stating the educational objectives.

A theoretical evaluation of prior knowledge (as set out in the programme) will be conducted and upon being successful the participant will perform a simulation exercise after a demonstration or video, if required, using the OSAT evaluation and feedback sessions. It is intended that a web application will be available for communication, data collection and evaluation purposes for mobile devices and smartphones (Figure 2).

Virtual reality training on TEE / echo as well as VATS surgery will take place in Bloemfontein. The use of the Califia perfusion system integrated with a pulsatile porcine heart provides interdisciplinary training involving anaesthetists, perfusionists, operating room nursing personnel and surgeons. The system can also be used to train a multidisciplinary team on VAD and ECMO exercises.

Some aspects of the programme were demonstrated and evaluated during the annual Hannes Meyer Registrar Symposium held 21–23 September 2018 at the UFS. The system was experienced and evaluated by 102 delegates from surgical training programmes in South Africa and other African countries, incorporating surgical registrars, senior surgeons, perfusionists, anaesthetists, nursing personnel and industry representatives. All delegates supported the further development of this programme as a two-year modular course.
Which patients are candidates for minimally invasive mitral valve surgery? Establishment of risk calculators using a national clinical database

Hiroyuki Nishi1, Hiroaki Miyata2, Noboru Motomura3, Toshiki Takahashi3, Yoshih Sawa3 and Shinichi Takamoto4 on behalf of the Japan Cardiovascular Surgery Database Organization, 1. Department of Cardiovascular Surgery, Osaka Police Hospital; 2. Japan Cardiovascular Surgery Database Organization; 3. Department of Cardiovascular Surgery, Osaka University Graduate School of Medicine

With advances in minimally invasive cardiac surgery (MICS) over the past 25 years, minimally invasive mitral valve surgery (MICS-mitral) via a right mini-thoracotomy has become increasingly utilised worldwide. Even though MICS-mitral is widely performed, controversy remains regarding its application because of procedure-related complications such as stroke or reoperation for bleeding. MICS-mitral should not compromise the clinical outcome, thus some surgeons may be reluctant to utilise this technique. Since the indications for MICS-mitral will likely be expanded with advancements of techniques and devices, an appropriate tool for risk assessment of patients undergoing mitral valve surgery is important to ensure quality control, and would be helpful when deciding whether MICS-mitral or conventional mitral valve surgery with a sternotomy is more appropriate for a patient who has undergone mitral valve surgery. Therefore, we aimed to develop MICS-mitral risk calculators using data from the Japan Adult Cardiovascular Surgery Database (JCVSD), in order to provide useful information for patient selection. Between 2008 and 2015, 3,240 patients (mean age 59 ± 14 years, males 1,950) underwent a MICS-mitral procedure in Japan and were registered in JCVSD. In this study, we examined mortality and composite outcome (operative mortality, stroke, reoperation for bleeding) using multivariate analysis, then developed a risk calculator for each using stepwise analysis. Furthermore, we examined the relationships of various preoperative factors with in-hospital mortality and composite outcome, as well as the effect that patient volume at each institution has on postoperative outcome by checking the distribution of MICS-mitral cases in the latest study year (2015). According to the number of MICS-mitral cases treated at each hospital, we divided the patients into those treated at institutions that experienced less than 10 cases/year and those that had 10 or more cases per year, and conducted the same analysis. Operative mortality was 1.1% and the composite outcome rate was 5%. Multiple regression analysis for all patients identified several risk factors affecting operative mortality and composite outcome. Four risk factors were found to be associated with both operative mortality and composite outcome: age, respiratory dysfunction, myocardial infarction, and the number of annual cases. In the multivariate analysis, risk factors associated with operative mortality were age, respiratory dysfunction, thoracic aortic disease, myocardial infarction, BMI >30, NYHA class III, moderate or severe aortic regurgitation, mitral valve replacement, multiple valve surgery and annual cases, while those associated with a composite outcome were age, recent cerebrovascular disease, carotid artery disease, respiratory dysfunction, myocardial infarction, moderate or severe tricuspid regurgitation and annual cases.

Our prediction formulas for mortality and composite outcome are shown in the figure. Comparison of outcome between institutions with small (<10 cases/year) and large (≥10 cases/year) caseloads revealed significant differences with regards to postoperative complications. We showed that MICS-mitral procedures were safely performed with acceptable outcomes in the present study cohort. Results obtained by this comprehensive multicentre analysis provide valuable information for appropriate selection of patients for MICS-mitral. In addition to its usefulness for patient selection, we consider that the present risk calculator formulas may influence future applications for this procedure.

An unusual pneumothorax
From the neck to the lung: the strange case of the migrating needle

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Introduction to the case

We report the case of a 30-year-old drug user who tried to inject himself with a syringe through the neck, on the left side, because of poor and abused peripheral venous accesses. During the attempt the needle accidentally broke and got stuck inside of the patient’s neck and eventually he came to the emergency department (Figure 1).

CT scanning of the neck revealed the presence of the foreign body close to the neuro-vascular bundle but with no clear signs of penetration into the vessels or evident damage to the surrounding structures (Figure 2). A vascular surgeon was consulted and a request for an ENT visit was done before the patient left the hospital due to a panic attack.

One month later the patient came back to the emergency department complaining of a persistent cough, chest pain and some difficulty in breathing. Chest X-rays were performed and a left pneumothorax was evident with the suspicious image of a possible foreign body at the apex of the lung (Figure 3).

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Figure 1. A-P and L-L X-rays locating the foreign body

Figure 2. CT scan images showing the depth level of the foreign body and its proximity to the vessels

Figure 3. One month later: left pneumothorax and the descent of the needle

CT scanning of the neck revealed the presence of the foreign body close to the neuro-vascular bundle but with no clear signs of penetration into the vessels or evident damage to the surrounding structures (Figure 2). A vascular surgeon was consulted and a request for an ENT visit was done before the patient left the hospital due to a panic attack.

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Results and lessons to be learned
The patient had a good and fast recovery from surgery and was discharged on post-operative day four, with no recurrences of pneumothorax observed on follow-up. This case teaches how cervical foreign bodies, even if small and apparently harmless like a broken needle, may harm the patient not only in the acute phase but also in the long-term. History is crucial to link the events and to understand the mechanism of damage.

Similar to the pathophysiology of some infective conditions descending from the neck to the mediastinum (necrotizing mediastinitis from ENT abscesses), cervical mobile foreign bodies may follow anatomical plans that displace them.

Contract-enhanced CT scan is essential to localise foreign bodies from the neck to the thoracic inlet; it can reveal active (or potential) vascular and visceral involvement, and sagittal and coronal reconstructions may help in the planning of surgical technique and access.

Figure 4. One month later: CT scan location of the needle, axial and sagittal views

Treatment and complications
The patient was admitted to our department. A chest drain was placed first and then a CT scan of the thorax was performed. It showed the presence of the needle and its position between the apical pleural pleura and the underlying lung (Figure 4).

The patient subsequently underwent emergent VATS; some pleura-pulmonary adhesions were released and the exploration at the apex of the pleural cavity revealed the small foreign body penetrating the lung from above. The needle was removed by VATS. No consistent bleeding occurred and there were no significant air leaks after re-expansion of the lung, therefore no pulmonary resections were necessary. Apical pleural scarification was performed in order to achieve sufficient pleurodesis. No complications were observed in the post-operative course.
Bicarbon® aortic valves with low INR: less anticoagulants, more results

It is well documented that patients with mechanical heart valves are at an increased risk of thromboembolic events, forcing them to a lifelong anticoagulant therapy, which carries an increase bleeding risk.

Recently, LivaNova received CE Mark approval for its Bicarbon aortic valves for use with low-dose anticoagulant therapy in low-risk patients undergoing single bileaflet mechanical aortic valve replacement. This expanded CE labeling allows for Bicarbon to be implanted in low-risk patients undergoing single bileaflet mechanical aortic valve replacement. Thanks to the new approval, physicians can now work with a lower range of anticoagulant therapy (international normalized ratio in the range of 1.5 to 2.5, and without the addition of aspirin). This has the potential to reduce bleeding risk with no increased risk of thromboembolic events.

The expanded indication is based on Bicarbon’s 25 years of clinical use and 17 years of published follow-up, demonstrating a very low incidence of thrombogenicity. Additionally, results from the independent randomized LOWERING-IT trial demonstrated a 60% reduction in the risk of bleeding with Bicarbon valves.

“Our experience from the LOWERING-IT trial with nearly 300 patients implanted with Bicarbon aortic valves maintained with an INR close to 1.9, with a median follow-up of over five years was presented at the AHA 2017 meeting in Anaheim, California,” said study lead author Michele Torella, M.D., Ph.D., Monaldi Hospital, Naples, IT. “Our study indicated that the proposed low-INR range between 1.5 and 2.5 (with 1.9 median target) is safe and feasible in low-risk patients after isolated aortic valve replacement with LivaNova’s Bicarbon prosthesis, resulting in similar thrombotic events and in a significant reduction of bleeding occurrence when compared to the conventional anticoagulation regimen.”

2. LOWERing the intensity of oral anticoagulant Therapy in patients with bileaflet mechanical aortic valve replacement. Results from the LOWERING-IT Trial. Torella et al. – Ann Heart 2015;18(2):82-8
Comparison of pulmonary function changes using neoadjuvant chemoradiotherapy or neoadjuvant chemotherapy followed by minimally invasive oesophagectomy: a randomised, controlled trial

Yaying Shen1,*, Yushun Gao1, Shugeng Gao2, Lijie Tan1 and Jie He1,2. 1. Zhongshan Hospital, Fudan University, Shanghai, China; 2. National Cancer Center/National Clinical Research Center for Cancer/ Cancer Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, China

During Friday’s dedicated oesophageal session, Yaying Shen will present randomised controlled trial results from a registered multicentre study focused on neoadjuvant chemoradiotherapy or neoadjuvant chemotherapy followed by minimally invasive oesophagectomy for patients suffering from locally advanced oesophageal cancer. The team members from Zhongshan Hospital, Fudan University and Cancer Hospital, Chinese Academy of Medical Science demonstrated the primary outcomes drawn from the trial's Chinese multi-institutional study group focusing on oesophageal cancer (CMISG1701). The study demonstrated the safety on pulmonary complications when neoadjuvant chemoradiotherapy was offered to oesophageal cancer patients, while cautioning that surgeons should be careful about the drops in FEV1 and DLCO due to the radiation.

According to cancer statistics, the incidence and death rate of oesophageal cancer in China remains the highest in the world, while most of the new cases found were at locally advanced stage requiring neoadjuvant therapy. The successful treatment of these oesophageal cancer patients requires a cooperation of multi-institutional and multi-disciplinary efforts to achieve a combination of surgical and chemotherapeutic benefits. The impressive outcomes of CMISG1701 recalled the famous study on neoadjuvant therapy from Cross (NEJM 2012) and the study on open versus minimally invasive esophagectomy (J Am Coll Surg 2012), while cautioning that surgeons should be careful about the drops in FEV1 and DLCO due to the radiation.

The study is scheduled to finish recruitment at the end of this year, with plans for more investigation in the coming years. As the large volume of oesophageal cancer patients in China contributes a lot to the quick registration of the study, we are also looking forward to international cooperation on this topic. A cross validation between European databases and CMISG1701 would be exciting since realising that there were many great teams working in the field of oesophageal cancer with promising results published every year.

This is the second time that Zhongshan Hospital and Fudan University from Shanghai, China has given a presentation at EACTS. As a Chinese team focused on oesophageal cancer, we hope to continue more collaboration between the Association and our young investigators, supporting joint study, and would be more than happy to welcome you all to Shanghai soon.

References

Minimally invasive oesophagectomy in the semi-prone position: the Zhongshan Experience

Obstructive hypertrophic cardiomyopathy or obstructive left ventricular outflow cardiomyopathy?

HOCM without septal hypertrophy – new management options

Daniel G. Swistel
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The pathophysiology of Hypertrophic Cardiomyopathy (HOCM) is commonly accepted to include at least a modestly thickened anterior basal septum protruding into the outflow tract of the left ventricle. As awareness of outflow tract obstruction has increased, along with the resolution of echocardiography, multiple anatomic variants have been identified that cause symptoms and gradients without necessarily having the profound basal hypertrophy we are accustomed to expect. These variants might include accessory papillary muscle heads, antero-basal displacement of the main antero-lateral papillary muscle, thin apical hypertrophy without basal hypertrophy and elongation of the anterior and sometimes even posterior leaflet of the mitral valve.

Patients may suffer profound symptoms, but on routine echo study may have a completely benign and normal appearing cardiac anatomy. Mitral-septal contact may only appear under stress-echo conditions and may necessitate even more profound provocation by preceding the stress-echo with a heavy meal. Furthermore, a high index of suspicion may be required to look for either mitral-septal or mid-ventricular contact or apical or mid-chamber obliteration.

Recognising these variants is critical if a successful resolution of obstruction is to be obtained with a surgical approach. Furthermore, obstruction caused by these ever more commonly discovered variants is frequently less successfully treated pharmacologically and is not at all amenable to alcohol septal ablation.

It remains, then, important for the surgeon to have an appreciation for these variations and the knowledge and understanding of the pathophysiology and how to treat them. Firstly, good pre-operative diagnostic testing is required which usually includes a TTE, MRI and cardiac catheterisation – both right and left – to rule out coronary obstructive pathology and pulmonary hypertension. A TEE may be helpful in equivocal cases where accessory papillary muscle heads may be suspected as part of the pathophysiology. In the operating room, 3D TEE may be especially helpful to help determine the location of accessory papillary muscle attachments that are involved with obstruction. The decision to resect these attachments must be carefully considered so as to not inadvertently cause leaflet prolapse and central insufficiency.

Other therapeutic options include leaflet plication, residual leaflet resection, papillary muscle tethering and accessory papillary muscle head thinning of resection. In cases which include some degree of modest septal hypertrophy, an intraventricular echo probe may help quantify more precisely the amount of available muscle for resection to minimise the risk of creating an iatrogenic ventricular septal defect.

In short, obstructive HOCM might be better renamed “Obstructive Left Ventricular Outflow Cardiomyopathy”, but whatever it is labelled, a thorough understanding of the pathophysiology and the surgical treatment options is critical for successful alleviation of mitral insufficiency, outflow tract gradients and symptoms.
The Cardiothoracic surgeon: A competent, safe, and certified physician

Eduard Quintana and Pietro Bajona

on behalf of EBCTS

Some national European surgical programmes continue to grant professional licensing without any type of standardised examination taken before independent practice. However, exit examinations may be in the best interests of healthcare systems – certainly for the patients, the public, employers and some national healthcare regulators, who put great stock in such examinations. EFCC is therefore concerned about advancing care through training education and assessment – the European Board of Cardiothoracic Surgery (EBCTS) is endeavouring to deliver these assessments through the development of examinations which have the potential to provide a common standard of certification for European surgeons and beyond.

The 2017 European Board MOQ (multiple choice questions) examination was of high quality, driven by knowledgeable question writers, standard-setting panels, experienced educators and external quality assurance assessors. The large proportion of surgeons who took the exam provided positive feedback. The Level 1 EBCTS exam continues as a multiple choice, 180-question single-best-answer paper in the generality of cardiothoracic surgery (cardiac, thoracic, congenital and critical care). The latest exam was delivered on 17 October here in Milan. There is growing worldwide interest in assessing professional competencies in cardiothoracic surgery through the EBCTS Section 1 examination. Candidates are coming from an increasing number of nations, and the number of registered candidates for this year’s venue continued to grow exponentially. Several countries have registered an interest in the EBCTS exam becoming part of their credentialing process for completion of training.

A panel of 25 Level 1 (MEBCTS) question writers is now well established. With the support of EBCTS, this group of motivated surgeons have been trained in exam question development and educational standards. This endeavour has required several meetings during the year and a significant amount of online work to produce and review questions. We continue to welcome self-nominated question writers, so if you are interested please see the EBCTS website where you will find an appraisal process for all examinees. A large number of new questions have been added to the Level 1 question bank and are ready to be used. Revision of original questions is a continuous process with the advent of new clinical evidence or revised clinical guidelines. We have reached the point where new questions are now routinely and continuously submitted. During face-to-face examiner meetings, new questions are appropriately assessed, discussed, criticised, refined and finalised. At this point, questions are stored and prepared for subsequent standard setting.

This year’s Level 1 (MEBCTS) exam was reviewed by a panel of senior cardiothoracic surgeons on 1 October at EACTS House in Windsor, UK. This served to establish the fair pass mark, and all of the questions were reviewed to detect potential ambiguities, errors and any other problems including an inappropriate level of difficulty. Feedback from last year’s examinations has also been considered and found to be useful in the continued improvement of the examination.

The ongoing development and delivery of high-standard assessment is one of our profession’s key needs. It is also expected by our patients, thus it will help assure them of the quality of care that they receive from us. Professional trust in the examination is continuing to expand and there may be an opportunity for this to become a regulatory requirement across Europe. However, regardless of diverse national political and legal decisions, this assessment and certification should be appreciated as a common standard of competence in our specialty in the international arena.

Thoracic | Rapid Response 1 – Thoracic

Thoracoscopy evacuation compared to reinsertion of thoracostomy tube in persistent traumatic haemothorax

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Trauma is the most common cause of death all over the world. Mortality and morbidity in multiple injury patients accounts for 25% of deaths annually. Haemothorax is the most frequent complication of chest trauma. In most cases chest tube will be enough for treatment but in a minority of patients they will need more intervention to evacuate a persistent haemothorax.

In this study we aimed to compare between VATS evacuation of persistent clotted blood and our standard approach of reinsertion of thoracostomy tube, thereby exploring the safety and complications of such techniques, as well as drainage days. We conducted a prospective, randomised case-control study of patients presented by persistent haemothorax admitted to a trauma unit from July 2017 to July 2018. During this timeframe our trauma unit received 44,879 patients, with 14,722 of them needing admission, only 288 patients requiring further intervention for retained haemothorax. Admitted patients were divided into 2 groups: Group A included 35 patients who were treated with VATS evacuation of persistent haemothorax; Group B included 35 patients who underwent thoracostomy tube reinsertion. In group A, drainage days ranged from 2 to 7 days (mean: 3.31 days), while in control group B, drainage days were significantly increased (4 to 10 days, mean: 6.47 days; p = 0.001). One patient (2.85%) underwent thoracotomy (failed VATS) due to extensive fibrosis in group A. In group B, 15.8% (three patients) needed a third thoracostomy tube, while 21.1% (four patients) underwent open thoracotomy.

Operative time for VATS ranged from 24 to 130 minutes, with a mean of 79.8 minutes. There was a strong positive linear correlation between the operative time and the duration between initial chest tube and VATS evacuation (r = 0.702; p = 0.002). The mean operative time of multiport VATS was 96.25 minutes, compared to 63.5 minutes in uniportal VATS evacuation (significant difference, p = 0.024).

We concluded that VATS for evacuation of retained haemothorax is feasible and safe for trauma patients. Early VATS evacuation leads to shorter hospital stay and reduced need for open thoracotomy in comparison to re-insertion of a chest tube. Uniportal VATS evacuation can lead to similar results as multiport VATS, with shorter operative time and better patient experience. The motto is clear: “No incision other than that of a chest tube”.

References
Mitral valve repair in Marfan Syndrome: medium- and long-term outcomes in a contemporary series

Susana Villar, Carlos Esteban Martín, Jorge Rivas, Yazmin Vera, Daniel Martínez, Santiago Serrano-Fiz, Susana Mingo and Alberto Forcada

Aim
The aim of this study was to review our experience and outcomes in mitral valve repair in MS patients treated in our multidisciplinary Marfan Unit. The study population consisted of patients diagnosed preoperatively of MS and with significant mitral valve regurgitation known in previous echocardiographic studies. Results were analysed in terms of survival and freedom of reoperation.

Material and methods
This retrospective and descriptive study included 21 MS patients who underwent elective mitral repair surgery from January 2005 to December 2017.

Results
The mean age was 30.67 ± 12.75 years and 12 patients (57.1%) were men. Most of the patients needed other surgery in addition to the mitral valve repair, for example aortic valve sparing (David’s technique), which was the most common, performed in 61.9% of the patients (n = 13).

Mitral valve repair in MS patients remains a complex technique due to the wide impact seen on the components of the valve. We observed large valve sizes, with diffuse myxomatous changes and excess leaflet tissue, with thickened, elongated and often ruptured chordae.

Conclusion
More than a half of our patients (57.1%) required ring or band annuloplasty with implantation of neo-chords and/or valve resections. Mean perfusion and cross-clamp times were 135.00 ± 51.22 minutes and 116.45 ± 46.45 minutes, respectively. Mean follow-up time was 59.29 ± 38.97 months and one-year reoperation was due to severe mitral regurgitation after 23 months from the surgery. There were no endocarditis or cerebrovascular events in follow-up. The survival at 1, 5, and 10 years was 100%, 94.12% and 82.35%, respectively.

Surgical data

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Surgical repair</th>
<th>Follow-up results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parabax tone minutes</td>
<td>135.00 ± 51.22</td>
<td>50.29 ± 38.97</td>
</tr>
<tr>
<td>Cross-clamp time minutes</td>
<td>116.45 ± 46.45</td>
<td>14.87</td>
</tr>
</tbody>
</table>

Type of mitral valve repair:
- Ring annuloplasty (n = 7, 33.33%)
- Band (n = 2, 9.52%)
- Resection + Ring annuloplasty (n = 4, 19%)
- Neochoords + Ring annuloplasty (n = 5, 23.81%)
- Neochoords + Band (n = 3, 14.29%)

Surgery associated:
- David (n = 6, 28.57%)
- David + Tricuspid valve repair (n = 4, 19%)
- Aortic valve repair (n = 1, 4.88%)
- Bivalve (n = 1, 4.88%)

Analysis
As predicted, most of them were symptomatic, mostly at effort, however a not insignificant portion was comprised of asymptomatic patients, with aortic regurgitant orifice of the right coronary artery being the most frequent.

Discussion
The study analysed correlation between anatomical features and types of surgery, revealing that surgery for AAOCA is safe, with very low operative mortality and rate of perioperative complications, which mostly occurred in old patients or with poor preoperative conditions, either in left or in right AAOCA. Urological and coronary complications were the most common and safest procedures, showing 0% operative mortality. In addition, it seems that asymptomatic, especially young, are returning to competitive sports after surgery. Late occurrence of adverse events is not negligible, and effectiveness in terms of objective evidence of alleviation of ischaemia or of reducing the long-term risk of SCD cannot be completely demonstrated in this study because of a relatively short follow-up. Therefore, long-term surveillance is mandatory in all patients.

Conclusion
The next research step is creation of an ECHSA-AAOCA registry which could possibly involve all European centres for a long-term, prospective multi-institutional study of this rare but potentially lethal condition which would provide answers to the remaining issues. In addition, it would extremely interesting to evaluate if surgery is really lifesaving in all cases by means of an accurate comparison of matched populations of surgical and non-surgical patients. This kind of data on patients who were not treated surgically, along with a general comparison of these two groups is likely to be revealing. However, this last task may not be really feasible since recruitment of compatible and truly comparable patients may be complicated due to biases in numbers, surgical centre philosophy and patient will.


**Artificial intelligence in cardiac surgery**

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Articles about artificial intelligence (AI) are popping up everywhere. We first find them in the innovation and technology sections of high-ranking newspapers and magazines. Mostly without noticing, we are surrounded by products in our daily life that have AI already implemented. Our phone unlocks by facial recognition, our daily life that have AI already implemented. Newspapers and magazines. Mostly without interaction, but contemporary progress in technology boosted the development of AI, giving broad access to better developed technology section of high-ranking newspapers and magazines. Some predict the end of jobs due to new AI robots. What can AI do for us? What can we gain from AI in modern cardiac surgery? We grouped AI in seven fields of interest: planning, learning, communication, decision-making, knowledge representation, perception and motion. For each of these fields, we explored their current technological progress and established methods and applications in other medical and non-medical areas in a descriptive and experimental way. We further assessed the fields in a quantitative and qualitative manner regarding possible applications in cardiac surgery, what would be required to develop and implement solutions and what could be gained from an enhancement of cardiac surgery in each of the subfields. The big question, "Will our job be replaced by the robot?" we still cannot answer; rather we should think about the small every-day tasks that AI can already do for us, and start putting it to work.

**Rapid Response**

Effect of treatment with periprosthetic complications
during the follow-up in patients with aortic valve replacement.

**Congenital | Professional Challenge | Tetralogy of Fallot & pulmonary atresia / ventricular septal defect. Part II**

Choice of pulmonary artery rehabilitation procedures in patients with pulmonary atresia and ventricular septal defect: a prospective randomised pilot study

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The fate of the downstream aorta after open aortic repair for acute DeBakey I aortic dissection: Total arch replacement versus non-total arch replacement

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Vascular | Rapid Response | Time‐pressed reactions to avoid casualties in type A dissections

The fate of the downstream aorta after open aortic repair for acute DeBakey I aortic dissection: Total arch replacement versus non-total arch replacement

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Background

The aim of this study was to evaluate the fate of the downstream aorta following open aortic repair for acute DeBakey I aortic dissection, comparing total arch replacement (TAR) elephant trunk (ET) and non-arch replacement (non-TAR).

Methods

From October 1999 to December 2016, 267 patients underwent open repair for acute DeBakey I aortic dissection. A tier-oriented strategy was predominantly used to determine the extent of graft replacement. The non-TAR group included homograft replacement and partial arch replacement, and ET insertion was exclusively performed in the TAR group. Aggressive TAR was also used in patients with aortic arch dilation or severe dissection involving supraaortic orifices, younger patients or patients with suitable status. Hospital mortality was 10.0% (12/120 patients) in the TAR group and 17.0% (25/147 patients) in the non-TAR group (p = 0.070). Late outcomes were compared in 230 hospital survivors (TAR, n = 108; non-TAR, n = 112). Mean follow-up was 6.5 ± 4.6 years. Aortic diameters were measured at four levels across six time points, using computed tomography.

Results

Freedom from additional aortic surgery for distal dilation was significantly better in the TAR group than the non-TAR group (TAR, 97.5 ± 1.8% at five-years; non-TAR, 88.2 ± 3.4% at five-years; p = 0.045). Freedom from a distal aortic event was also significantly better in the TAR group compared with the non-TAR group, (TAR, 97.2 ± 1.6% at five-years; non-TAR, 80.7 ± 4.2% at five-years; p = 0.013). In the non-TAR group, aortic diameter increased significantly (p = 0.001). Significant aortic remodeling occurred at the proximal descending aorta in the TAR with ET group (p < 0.001).

Conclusions

TAR with ET reduced the need for additional distal aortic repair compared to non-TAR. TAR with ET prevented unfavourable aortic growth in both the aortic arch and the proximal descending aorta.
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