Welcome

On behalf of the Association and the Council, I would like to extend a very warm welcome to you at this our 33rd EACTS Annual Meeting. Our Annual Meeting is the greatest and largest cardiothoracic congress in the world and we are delighted that so many of you are joining us this year. Lisbon promises to be a terrific event and thank you for taking the time to be a part of it.

Your work is vital. It matters – to patients and their families – and I know many of you are making personal sacrifices and travelling long distances to be here. So, thank you. But I also say well done for choosing to be here in Lisbon because we have an excellent conference for you. For the second year running we are packing a year's worth of education into three days. Your time in Lisbon will be time well spent: a time to learn, deepen your understanding, refresh your skills, and develop and extend your network.

A packed programme

Over the next three days you can look forward to exploring new scientific insights, learning about the latest innovations in cardio-thoracic surgery and, importantly, taking part in topical debates alongside global experts. We have a packed programme full of learning opportunities.

Did you know?

- You will have several opportunities to learn more about advances in areas such as imaging, next-generation robots and the future of LVAD technology. And don’t miss the Techno-College sessions where the latest innovation, technology, equipment and devices will be shown during live surgery.
- A series of surgical cases, live-in-a-box broadcasts and the ever-popular ‘Lion’s Den’ competition are all unmissable.
- This year we are working with other associations to offer more joint sessions on coronary surgery and provide a more in-depth programme to educate clinicians on how to interpret data properly.
- We also have more than 18 sessions focused on TAVI including our stand-out session on Saturday. Analysing new data on longer-term outcomes for patients
- Looking ahead to Saturday, I’d like to highlight our ‘Trial Update and Evidence Review’ session at 11:45 in Auditorium 1, which will consider the long-term outcomes for patients who have surgery, as well as those who opt for heart slants or transcatheter aortic valve implantation (TAVI). Do not miss this debate. I am thrilled that Dr Rita Redberg, the Editor of the Journal of the American College of Cardiology, will co-chair this session. She will be joined by a world-class panel of contributors to present the very latest in international studies. Their analysis of five-year survival rates will focus minds and challenge some conventional thinking.

A world class networking opportunity

But we’re not just here to learn. Just as important is the opportunity to form new relationships and reconnect with existing colleagues from around the world. With this in mind, don’t forget that there is a fantastic social and cultural programme that is not to be missed. You will also have the opportunity to meet EACTS’ Council members and expand your professional network.

Da Vinci

This year marks the 500th anniversary since the death of Leonardo da Vinci. I am delighted that at this year’s meeting we will be celebrating the life and legacy of this genius and exploring how his work influenced many aspects of cardiothoracic surgery. I am thrilled that we will be joined by an array of international historians and clinicians for these sessions. To whet your appetite, make sure you pick up a copy of Friday’s EACTS Daily News for a preview of Mr Francis Wells’ lecture on ‘Leonardo’s Heart’. Leonardo da Vinci’s drawings on human physiology and anatomy are truly remarkable so do take a moment to enjoy the exhibition of his work.

Social media

Throughout all of this we encourage you to post and tweet via your social networks. We’re using the hashtag #EACTS2019 and the best Tweets will be visible on our Twitter wall. In addition, those interested in social media will be interested in the #500Mid session being run by Dr Patrick Myers at 09:00.

Here’s to a tremendous event

Once again, it is an honour to share the 33rd Annual Meeting with all of you and I do hope you find the time to enjoy this magnificent city and take in its culture, food, architecture and warm spirit. As the great Leonardo said, ‘The noblest pleasure is the joy of understanding’, but just as important is to have fun, and on that note I look forward to meeting as many of you as possible on Saturday evening at the party to celebrate what is sure to be another exceptional Annual Meeting.

Have a great stay in the wonderful city of Lisbon. Domenico Pagano EACTS Secretary General

New

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Techno-College showcases the ‘latest and greatest’ in cardiac practice

Hendrik Treede, Director, Department of Cardiac Surgery, University Hospital Bleiberg, Germany, spoke to EACTS Daily News to highlight the Techno-College sessions at this year’s Annual Meeting.

The importance of the Techno-College sessions, began Professor Treede, is reflected in their prime-time slot this year. “The Techno-College is really very important as it gives surgeons the chance to have taster talks on the ‘latest and the greatest’ treatments and techniques for their daily practice, all in one place,” he said.

“The Techno-College is becoming even more important because of the increasing rate in which innovations and advances are now emerging. Each session, held Thursday and Friday morning, will be the showroom window for what’s new in surgery and interest from techniques at EACTS. The Techno-College is not so much data based; it’s about presenting ideas to solve problems.”

Professor Treede added: “The talks and live surgery broadcasts are designed to provide a mixture of developments that might shape practice in the future, but they will also include the sort of new techniques and innovations you could go home from the Meeting and use right away.

While it is difficult to choose from the many highlights of this year’s sessions, Professor Treede did stress that the live surgery elements are always the fundamental pillars of the Techno-College programme: “This morning, we have two transcatheter-based live cases which are being broadcast from Hamburg, Germany,” he said.

One of the cases involves a TAVI patient with aortic regurgitation – a special indication in itself that are being broadcast from Hamburg, Germany,” he said.

“The other case involves the ‘cracking’ technique, where a balloon is opened up inside the bioprostheses so in such a fortuitous way that the prosthetic ring is fractured,” continued Professor Treede. “It’s a pretty new approach which has been around for less than two years, until recently has only been used in small numbers. This will be the first time it has been shown live, anywhere.”

Friday’s Techno-College includes a minimally invasive aortic valve replacement with a newly developed pericardial bioprosthesis that is combined with automated suturing technology – another brand new innovation about to emerge on the market. “This allows for smaller access, faster operations and (possibly) more reproducible suturing,” explained Professor Treede. “This is something delegates might find particularly useful to hear about – something practical they might be able to use pretty soon.

“The second live case on Friday from Leiden, Germany, will showcase a new type of MitraClip – somewhat different from the one we have known and have used for many years. Again, what’s interesting is that the team who will implant this are all cardiac surgeons, thereby proving that surgeons are very capable of doing interventional mitral valve work.”

Professor Treede is also looking forward to the ‘Live-in-a-box’ broadcasts, including Friday’s from Freiburg, Germany, during which two aortic arch cases will be shown at the same time, both with similar pathologies. One will be treated surgically, and the other with TEVAR; the comparison serving to highlight the differences between the two treatment strategies, and who should receive them. The hope is that it will help other surgeons make decisions about which approach to use, noted Professor Treede.

“I’m also expecting a debate on Friday about the live-in-a-box I am presenting on minimally invasive beating heart tricuspid valve repair,” he said. “There’s a move towards using transcatheter techniques in treating the tricuspid valve, but the results so far are not very compelling, and I think we should argue against using these catheter-based procedures in patients who are good candidates for surgery. We should do that now, before they become established: we can achieve better results with open surgery.

“So long as catheter-based procedures are only used in patients not suitable for surgery, that’s fine with me, but what we are seeing now is that some cardiologists are jumping into using these techniques in a patient population that are very good candidates for surgery. In these situations, I think we should say, ‘No, we already have a great treatment available here’.”

“The Lion’s Den’ format for the Techno-College Awards, introduced in 2016, will also return this year. Here, applicants present their case in front of a panel of not only experts in the field, but also venture capitalists and CEOs of companies too.

“Applicants are asked, for ideas and have to make a business case,” said Professor Treede. “In addition, the audience gets to vote and controls a third of the final outcome. It was very popular and good fun last year, so we’ve decided to stick with this format.”

As he underlined, Professor Treede’s main message is to encourage as many surgeons as possible to attend the Techno-College sessions to pick up ideas, advice, tips and insights that they might be able to use in their own practice to improve outcomes. “The Techno-College lives through its audience; we need you there. There are so many new techniques and procedures now, and these sessions will give you an overview of what’s interesting, and what might help your daily practice,” he said.

“If you want to see what’s coming up in the next few years in regular cardiac surgery, transcatheter techniques and minimally invasive surgery, come along and see them all in one place.”

Hendrik Treede

Focus Session | Cardiac | 3rd International EACTS VAD Coordinator Symposium

The 3rd International EACTS VAD Coordinator Symposium Thursday, 09:45–13:00, Room 3C, Pav 3

Katrien Vandersmissen; on behalf of the VAD Coordinator Symposium moderators

The growing number of ventricular assist device (VAD) patients requires a dedicated team of health care professionals to bridge specific needs from ambulatory to hospital care. Consequently, the role of VAD coordinators is expanding. With this in mind, EACTS has founded a European association of VAD coordinators, and is actively supporting the development of this new profession. The annual EACTS VAD Coordinator Symposium is a great opportunity to bring together the knowledge and experience of mechanical circulatory support (MCS) clinicians dedicated to caring for end-stage heart failure patients. Held this morning at 09:45 in room 3C (Pav 3), the meeting will focus on the long-term management of VAD patients.

Whilst VAD therapy started as a bridge to transplant, many patients are implanted with an alternative strategy. The experience of the London University Medical Center (the Netherlands) is exceptional as dedicated to destination therapy only. During the session, Meinert Palmen will explain how his team has built up a destination programme and created a referral base. Chronic heart-failure patients are faced with transplantation, and decision making on VAD therapy is often troubled by the assessment of this frailty and its reversibility. The keynote speaker of this meeting, Sarah Schettle (Rochester, USA), addresses this challenge to provide insight in how to deal with frail patients.

Other topics to be discussed today include improvement the management and quality of life of patients with VADs, the power of data, device innovations and infection control, shared by a number of esteemed European VAD coordinators.

We hope to see you there!

Programme

Moderators: A. M. Oppelaar, Ultecht, K. Vandermolen, Luevain, D. Roefe, Bad Oeynhausen

09:45 Frailty in LVAD patients S. Schettle, Rochester

10:15 How to build a DT program M. Palmen, Lieder

10:35 Daily life and Self-care in LVAD patients G. Soerensen, Oslo

10:55 Cold Atmospheric Plasm for Driveline infections F. Mueller, Heidelberg

11:15 The Power of Data: Waveforms and logfiles T. Schloglhofer, Vienna

11:35 EUROMACS PRESENTATION S. Antoniades, Rotterdam

11:55 HVAD and the future of Left Ventricular Assist Devices K. Grudkowska, Fleming

12:10 Latest advantages in the HeartMate 3(tm) M. Muller, Eschborn, Germany

12:25 Hands – on HeartMate and HeartWare
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Francis Fontan Fund: Attracting high-calibre applicants from all over the world

**The Francis Fontan Fund**

Rafael Sádaba outlined details of the Francis Fontan Fund for Education fellowships (some of which are closed for this current year but will be open again in 2020).

### FFF Fellowships

Professor Sádaba outlined details of the Francis Fontan Fund for Education fellowships (some of which are closed for this current year but will be open again in 2020).

**The Postoperative Critical Care Fellowship in Adult Cardiovascular Surgery 2020**

This is a four-month fellowship at the Department of Cardiovascular Surgery at the Hospital Clinic Barcelona, Spain, running from January to May 2020. Applications close in a few days on October 8. This fellowship has been designed to provide knowledge and competences required in postoperative care of cardiovascular surgery patients.

The successful fellow will engage in perioperative management of patients undergoing cardiovascular surgery under the supervision of the department and fellowship programme director. There will be a special focus on post-operative care, and fellows will be expected to acquire all of the knowledge, training and skills necessary to be able to adhere to the European Board of Cardiothoracic Surgery (Membership and Cardiac subspecialty) during or after completion of the fellowship.

In January 2019, two surgeons from Italy and Korea started their fellowship at the Hospital Clinic Barcelona.

### The Atrial Fibrillation Fellowship in co-operation with AtriCure

There are six fellowships available in this category. Fellows get the chance to stay in a high-volume AF ablation centre in Stuttgart (Germany), Warsaw (Poland), Mexico City (Mexico), Brescia (Italy) or Brussels (Belgium) and attend two AtriCure events including a one-day course called ‘Navigating the Maze’, alongside the ‘Maze IV training course’.

### The EACTS-MSTCVS Quality and Outcomes in Cardiac Surgery Training Fellowship

This fellowship focuses on quality collaborative activities and data analysis. This includes the chance to spend four months with the MSTCVS in Ann Arbor, Michigan, USA. Milan Mihaljevic from the Department of Cardiothoracic surgery at Erasmus University, Rotterdam, the Netherlands, completed the fellowship in 2018 and Chris Bond, a surgeon from the Heart of England NHS Foundation Trust, Birmingham, UK, took up a fellowship in 2019.

### OPCAB Fellowship

Here the goal is to provide newly graduated cardiothoracic surgeons worldwide with the education and training to perform OPCAB treatments with the necessary skills and experience required to be able to perform OPCAB on a regular basis.

The specific learning objectives are to provide surgeons with the foundational knowledge of the pathophysiology of coronary artery disease, the rationale for its surgical treatment and first-hand experience in OPCAB and minimally invasive cardiac surgery (MICS) coronary artery bypass grafting (CABG).

As a result of this training, fellows may ascend to leadership roles and set up their own OPCAB/MICS CABG programmes in their own centres.

### Uniportal VATS Fellowship in General Thoracic Surgery

This is a three-month fellowship in uniportal access lobectomy at Shanghai Pulmonary Hospital and Tongji University in China – a high-volume centre performing the highest number of lung cancer resections in the world.

The successful fellow will be involved in acquiring hands-on experience in a mentor- and surgeon-led environment, which could eventually lead to performing procedures either under remote supervision or no supervision.

### Aortic Root and Valve Repair Fellowship

The purpose of this fellowship is to acquire knowledge on the disease of the aortic valve and the aortic root, understand the basis for current recommendations for management and learn about optimal management.

It consists of a two EACTS organised courses, one in Windsor, UK, and another in Brussels, plus a two-week internship in a high-volume centre (one week in Paris, France or Brussels, and one week in Homburg, Germany or Rome, Italy).

**Come visit the TAVI Training Village**

Enrico Ferrari Cardiovascular Surgery, Cardiocentre Ticino Foundation, Lugano, Switzerland

During the last 10 years, cardiovascular surgery has rapidly changed, with new transcatheter devices for valve replacement or repair becoming more and more familiar to a new generation of cardiac surgeons, earning them a more consistent role in daily clinical practice. The implementation of new transcatheter devices together with the rapid innovation of hybrid and minimally invasive cardiovascular procedures has led to the creation of multidisciplinary Heart Teams in the majority of cardiovascular centres worldwide, thereby modifying the perception of what the modern cardiovascular surgeon looks like.

In this new era, skills for the manipulation of wires and transcatheter devices are required, however these skills are not always integrated in the postgraduate cardiovascular surgical training programme of countries in and outside of Europe. As such, the EACTS Academy has gradually introduced the concept of advanced specialised education for young cardiovascular surgeons, with course-led teaching of the guidewire skills required to perform safely and effectively transcatheter heart valve procedures.

For Heart Teams, knowledge of the technical details surrounding new transcatheter technologies such as valve devices or new low-profile delivery catheters is strongly associated with the possibility of performing successful transcatheter valve implantations or repairs in complex high-risk cases with intermediate-risk patients.

To that end, the TAVI Training Village hosted at the 33rd Annual Meeting is a great opportunity for all cardiovascular surgeons to touch and play with guidewires, valves, delivery systems and simulators. In partnership with Industry, we have been able to organise a fascinating journey through the latest transcatheter valve devices and technologies where self-expanding valves, balloon-expandable valves, valve clips and guidewires are all disposal of all cardiovascular surgeons who understand the need and desire of the modern Heart Team to maintain a key role in the modern cardiovascular domain.

The Training Village is a place where the virtual introduction of guidewires together with the implantation of valve devices is performed in modern simulators. Both transapical delivery systems and transfemoral devices are available at EACTS TAVI Training Village and real-time simulation. We strongly believe that the cardiac surgeon, as part of the Heart Team, has to be able to actively participate in transcatheter procedures in partnership with cardiologist colleagues.

We look forward to welcoming you to the TAVI Training Village, and we look forward to discussing the indications and the technical details underpinning modern transcatheter heart valve therapies.

The TAVI Training Village takes place 14:30-17:45 today.
CryoLife enters into distribution agreement with Endospan

CryoLife, Inc., a leading cardiac and vascular surgery company focused on aortic disease, announced that it has entered into distribution and credit facility agreements with Endospan, as well as an option agreement to purchase Endospan. Endospan is an Israeli-based, privately-held developer of NEXUS™, the only endovascular stent graft system approved for the repair of both aneurysms and dissections in the aortic arch. The addition of NEXUS™ to CryoLife’s highly differentiated branched aortic stent graft portfolio further strengthens the Company’s position as a leader in the growing aortic repair market. By this CryoLife will be able to offer an even more comprehensive and differentiated portfolio of products and technologies for the endovascular treatment of the entire aorta, from the ascending aorta to the iliac arteries - all from a single source.

NEXUS™, the first approved branched endovascular system to treat aortic arch disease, transforming a complex surgical aortic arch repair into a standard endovascular procedure. It is designed for enhanced intra-procedural and long-term stability attributable to its proprietary geometrical design, which reduces arch manipulation and, hence, stroke risks.

Prof. Dr. Nicolas Doll, Sana Cardiac Surgery, Stuttgart, Germany, commented, “NEXUS is a highly differentiated stent graft system that allows physicians to repair aneurysms and dissections in the aortic arch through an endovascular approach. NEXUS is especially important for elderly patients who are not suited for open surgery, and for patients with a prior Type A dissection that was repaired in an open surgical approach.”

Univ. Prof. Dr. Hubert Schelzig, Clinic for Vascular and Endovascular Surgery, University Clinic Düsseldorf, Germany, commented. “The NEXUS system has the potential to cross the next frontier in aortic surgery, namely a safe, therapeutic, minimally invasive procedure in aortic arch pathology. Not only does it provide a platform to treat the aortic arch, but it is a perfect fit with CryoLife’s highly differentiated and comprehensive portfolio of products that treat the entire aorta.”
The EACTS Acquired Cardiac Disease Domain

The EACTS Acquired Cardiac Disease Domain within EACTS. These Task Forces are made up of international colleagues who have an interest in developing our specialty further. Currently the following Task Forces exist: New Technology, Coronaries, Arrhythmia, Heart Failure, Mitral and Tricuspid Therapies, Imaging, Transcatheter Techniques, Aortic Valve Surgery, and Aviation Medicine.

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The EACTS Acquired Cardiac Disease Domain

Thomas Walther
University Hospital, Frankfurt, Germany; Chair, Acquired Cardiac Disease Domain

Thank you very much for your interest in adult cardiac surgery and for your participation at this year’s EACTS Annual Meeting. The Acquired Cardiac Disease Domain programme features many interesting sessions, including didactic state-of-the-art lectures, abstract sessions, live-in-box video presentations and training courses. Topics to be covered include the latest evidence in coronary artery bypass grafting, aortic valve repair and aortic valve replacement, indications and technical aspects as well as longer-term outcomes of transcatheter aortic valve implantation, mitral valve repair or replacement, transcatheter techniques to treat mitral valve disease, therapy for heart failures and new ideas in the miscellaneous sessions. Experts in different fields will provide structured overviews in order to summarise session content and provide perfect learning experiences.

Additionally, two major Techno-College sessions – featuring live surgery and the latest technical developments – will focus on topics including endoscopic mitral valve therapies, new ablation strategies, updates on the latest TAVI technologies, minimally invasive access options and tricuspid valve therapies. We are confident that, as in previous years, these sessions will generate some of the true highlights of the Meeting.

We hope that by raising your interest in the new developments and medical advances in adult cardiac surgery, you will be encouraged to participate in one of the different Task Forces of the Acquired Cardiac Disease Domain within EACTS.

The EACTS Daily News

Annual Meeting

This year’s Congenital Domain

Lorenzo Galetti
Bambino Gesù Paediatric Hospital, Rome, Italy; Chair, Congenital Heart Disease Domain

The Congenital Domain will feature a roster of 14 sessions. We think that the Annual Meeting should honour presenters of oral work, thus all but one of the sessions has been assembled from abstract presentations and featured lectures by experts. Among the abstracts received, 36 have been selected for oral presentation, 18 of which will be held in Rapid Response sessions. This format has been particularly appreciated in the last few years due to its animated discussion that is often generated.

This year we have two sessions dedicated to adult congenital heart disease, a topic more and more prevalent in congenital meetings. Two invited lectures will address fundamental aspects that include the status of adult congenital management in Europe, and the long-term neuro-psychological, social and artistic aspects that patients face after correction of their heart disease.

Two sessions will be dedicated to single ventricle lesions – one to hypoplastic left heart syndrome (HLHS) and the other to the complex problem of atrioventricular valve regurgitation in single ventricle reconstruction. Another session is dedicated to updates on mechanical circulatory assist devices in children – a field of continuous evolution. Other topics that will be touched upon include congenital disease in children, valve surgery in children and Ebstein’s anomaly.

This year, as a novelty, we wanted to include the presentation of clinical scenarios with interactive discussion and possible therapeutic options. These will take place during two sessions (‘Ebstein Disease’ and ‘AVR Regurgitation in SV’; see session listings for details). The underlying idea is to mimic what normally happens in our surgical units when patients are presented and discuss, in an interdisciplinary manner, how we can establish a pathway for treatment. We will also host a session dedicated to innovative surgical techniques, illustrated by eight video presentations. Finally, an important session entitled ‘Knowledge Generation in Congenital Heart Surgery’ is dedicated to the analysis and discussion of evidence derived from the latest guidelines and trials in congenital heart disease. Two invited lectures will address topics from the EACTS–AEPC existing guidelines on transplantation of the great arteries (TGA) and truncus arteriosus, and a third lecture will be dedicated to expert consensus related to management of anomalous aortic origin of coronary arteries. We also know that existing guidelines for the management of valvular and aortic diseases do not accurately fit the young and/or congenital patient. Keeping this in mind, two lectures will discuss management of aortic dilation in the congenital patient and the role of the Ross operation in aortic valve replacement.

The final lecture of this session will be dedicated to evidence generated by a single-ventricle reconstruction trial – an important prospective multicentric study dedicated to HLHS.

The Vascular Domain continues to spread aortic knowledge and promote research and education on vascular pathologies. We hope you stay tuned for future events!

A great year for the Vascular Domain

Davide Pacini
S. Orsola-Malpighi Hospital, University of Bologna, Italy; Chair, Vascular Disease Domain

The Vascular Domain programme over the next three days will include several focus sessions that will alternate with Abstract and Rapid Response sessions. All the aspects of aortic disease treatment – from the valve to the abdominal aorta – will be covered and discussed. Masters in aortic surgery from all over the world will make their contributions, underlining the future events!

This year started as a great success for the Vascular Domain thanks to the traditional appointment of the ‘Introduction to Aortic Surgery’ course (pictured), held 14–16 March in Windsor, UK, about which participants gave extremely positive feedback – better than ever before. Aimed at resident and young surgeons wishing to broaden their experience in the aortic pathologies, this year’s highly interactive course covered major aspects of the aortic valve, ascending aorta and arch, all the way to the descending thoracic aorta. Invited experts supported delegates with keynote presentations and supervision during wet labs, dry labs and hands-on simulations of valve sparing procedures, arch repair and aortic root enlargement techniques. Live-in-the-box cases gave the opportunity to engage in practical training during the course. Delegates were also trained in the basics of thoracic endovascular aortic aneurysm repair (TEVAR) via a dedicated simulation session.

We then had two Academic Courses on Aortic Valve Repair: the EACTS Aortic Valve Repair Summit in Brussels on June and the Advanced Skills Course ‘Reconstruction of the Aortic Valve and Root: A practical approach’ taking place 18 to 20 September in Homburg Saar, Germany. During these two courses, knowledge and concepts spanning all aspects of the management of the proximal aorta were shared. They were especially designed in a didactic way to allow participants to reproduce the content.

The Vascular Domain is also working hard to offer an educational programme on TEVAR via multi-stage courses. The aim is to join the Hybrid Surgeon Educational Programme, thereby offering proof and certification of an acquired skill competence. Two fellowships will be provided to understand and encourage this programme. The objectives of the endovascular courses will range from the basic principles of imaging and transcather skills to the management of more complex thoracic and thoraco-abdominal aortic pathologies. Participants will be able to work in a hybrid room and practice on “A-arm”, they will also be actively involved in the use of simulators and animal models.

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The ‘Introduction to Aortic Surgery’ course held in March.

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The ‘Introduction to Aortic Surgery’ course held in March.
The 2019 Thoracic programme

Eric Rössner
University Hospital Mannheim, Germany
Chair, Thoracic Disease Domain

Thoracic topics here in Lisbon will cover a broad range of specialist areas, ensuring full immersion in cutting-edge techniques, guidelines and best practices. Some of the highlights from the expansive programme include Techno-College sessions on new technologies beyond robots, complex sleeve resections, ‘how to’ teaching and very advanced surgery with live-in-a-box videos; a joint session with the European Respiratory Society (ERS) on mesothelioma, including presentation of the new joint guidelines; a joint EACTS-STS-ASCVTS session on international perspectives on lung cancer screening; and other great, high-level abstracts across all fields of thoracic surgery.

Throughout the year we also feature three Thoracic Surgery courses, the first of which took place from 4 to 6 April at the EACTS Headquarters in Windsor, UK. Part I of the series (pictured) offered greater insight and up-to-date knowledge on different aspects of thoracic surgery related to lung diseases with emphasis on lung cancer, infectious diseases, lung resection and transplantation. There was also a hands-on dry-lab session on bronchoscopy placement of double lumen tubes and bronchial blockers.

Thoracic Surgery: Part II was held 5–7 September in its new location of Mannheim, Germany, featuring fantastic international speakers who are experts in their field. The main topics and sessions showcased included: Chest wall, surgery for metastasis and mediastinum; hands-on sessions on chest wall repair; energy devices, lasers and the latest DaVinci XI dual console system. Part II will be hosted in Porto, from 28 to 30 November. There we will focus on extended resections, hands-on sessions on sleeve resections, and much more.

Final-year trainees, junior consultants and anyone preparing for EBCTS or EBTS are encouraged to attend.

EACTS Residents

Highlights for residents at the 33rd EACTS Annual Meeting

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Since trainees are the future of our specialty, each year, EACTS organises numerous Annual Meeting sessions targeted especially at residents. These sessions are designed by residents for residents. Over time, many of these sessions have become real classics, but every year the EACTS Residents Committee tries its best to come up with new sessions that provide education across ‘hot topics’ in the field.

This year, we will start the Meeting by organising a tour for residents. The aim of this tour is to get the most out of the conference. The EACTS Annual Meeting has grown into a huge event with multiple sessions at the same time – as well as interesting sessions in the Exhibition Hall, which host cutting-edge activities promoted by our collaborators. Thus, during the tour held at 14:00 this afternoon, we will start from the EACTS Residents’ Lounge and take a stroll through everything that this year’s fantastic venue has to offer over the next three days. As we begin the first day of the Meeting, residents will get a chance to hear some alternative career paths. In the ‘Outside the Box of Cardiopulmonary Surgery’ session (Thursday, 11:15, Room 108) we will hear presentations by senior colleagues who have chosen to work in crisis areas. If you are interested, you will have a chance to ask how to participate in this kind of international work yourself. And, to end the session with on a lighter note, we will hear an inspiring presentation by a surgeon who balances his successful surgical career with something completely different: winemaking!

The EACTS Residents Committee has a strong belief in collaboration. Thus, this year we will feature two special sessions: one organised in cooperation with the Young Community of the European Society of Cardiology (YSC), called ‘The Team is the Key’ (Thursday, 14:30, Room 5C, Pav 5); and another called ‘Help! Trainee in Trouble’ (Saturday, 15:15, Room 108) which we will organise with great help from national resident societies in France, Germany, the UK, Switzerland, Portugal and the Netherlands. Both of these sessions will provide interesting food for thought via complex case examples, all presented by residents.

“In conjunction with our growing collaboration with national resident societies, the Residents Committee launched a survey on current training practices in Europe. We have finally gathered all the responses from trainees in numerous European countries and will present the results in our ‘Career Development’ session (Saturday, 11:45, Room 108). In this session, we have also invited successful surgeons to share some tips from their own career path, ranging from how to fit family life into an academic- and clinical work schedule, to publishing in high-impact journals. And of course, like in the previous year, we will once again hold on to our traditions and organise our three popular staples: the ‘Work in Progress’ session (Saturday, 08:00, Room 108), bringing future research talents to the stage; ‘Nightmares in CT Surgery’ (Friday, 14:00, Room 108), where well-known surgeons will reveal their most palm-sweating cases; and ‘How to do it – Live in a box’ (Friday, 15:45, Room 108), during which refined surgical techniques will be introduced by top-talents in the field.

To end the Annual Meeting in style, we will host the Residents Luncheon on Saturday. Please remember to book your seat at your favourite table in good time – the seats always sell out fast!”
INSIDE LISBON
Where to go? What to do?

BEST OF BELÉM

MOSTEIRO DOS JERÓNIMOS
Lisbon’s original story of one-upmanship, this breathtaking Unesco-listed monastery was commissioned by Manuel I at the end of the 15th Century to lord it over Vasco da Gama, the Portuguese explorer who was the first European to reach India by sea. That’s one beautiful act of jealousy…

TORRE DE BELÉM
The Tower of Belém is an intricate yet powerful fortress built in the early 16th century to protect Lisbon’s harbour from would-be attackers. Resembling a giant chess piece, its design includes meringue-like cupulas and even rhinoceros-inspired stonework. The views from the top are stunning, but be warned it gets very busy on Sundays.

MUSEUM OF ART, ARCHITECTURE AND TECHNOLOGY
Rising out of the ground like a majestic wave, the MAAT museum showcases art, architecture and technology right on the waterfront. Its exhibitions often reflect its location, with displays on ocean pollution being particularly poignant.

PASTÉIS DE NATA
The famous (and delicious) Portuguese tart filled with custard cream and dusted with cinnamon originated in Belém back in the early 1800s. If you want the most authentic, Antiga Confeitaria de Belém is the place to go.

ALFAMA

CASTELO DE SÃO JORGE
Lisbon’s oldest quarter, Alfama, is about as picture-perfect as it gets. Its most visited attraction is this seemingly well-preserved castle dating back to around 200 BC which, over generations, has served as everything from a barracks and prison to a theatre and even a children’s home. In reality, what you see has been largely restored since 1938, but its magnificence is still timeless.

TAKE A TRAM
Far from being a quaint tourist attraction, the little yellow trams of Lisbon are still used by hundreds of locals every day. But, for that true out-of-towner experience, hop onto the number 28 tram for a more scenic journey through Alfama’s rustic streets.

FABULOUS FADO
The soulful sound of Alfama is Fado, a centuries-old traditional music that rose out of Lisbon’s poorest classes. If you want to learn more about it, the nearby Fado museum charges a small fee to fill your head with historical context. Or, you could take a seat in almost any restaurant or bar to hear it first-hand.
Outcomes of aortic coarctation surgical repair in adolescents and adults: the efficacy of left subclavian artery to descending aorta bypass grafting

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Abstract

Introduction

The treatment of adult coarctation of the aorta (CoA) is challenging due to complications with other cardiovascular diseases, vascular abnormalities (such as aneurysms) and possible CoA recurrence. Therefore, adult CoA patients may require a different surgical method than that for children – of which several operative techniques exist. Surgical strategy was determined based on the coarctation site, length of the coarctation segment, collateral, comitant lesions, and surgeon preference. A variety of surgical techniques are available to manage CoA which can be classified as either in situ management or extra-anatomical bypass.

In situ techniques have been used in patients as follows: In patients with an aortic aneurysm, we preferred aneurysmal resection and graft interposition, and end-to-end anastomosis was primarily used in patients with a very short coarctation segment.

Extra-anatomical bypass was often used in patients with long coarctation segments, and those with high-risk of recurrent laryngeal nerve injuries due to severe subclavian arterial narrowings or intercostal vessels. Left subclavian artery to descending aorta bypass was performed without cardio-pulmonary bypass. This technique was performed via left thoracotomy through the third or fourth intercostal space, and a graft was interposed under partial aortic clamping. The patients who underwent left subclavian artery to descending aorta bypass required a smaller dissection and did not have compromised arterial blood flow to the spinal cord.

Methods

From November 1994 to July 2018, 24 adolescents and adults underwent CoA repair. The mean age at operation was 29.9 ± 15.1; 19 (79%) were older than 18 years; 16 (67%) patients had hypertension; 5 (21%) had bicuspid aortic valves; 4 (17%) had descending aneurysms; 2 (8%) had ascending aneurysms; 2 (8%) had patent ductus arteriosus; and 1 (4%) had an atrial septal defect. There were three patients who had prior surgery (two CoA repair, one venricular septal defect repair).

Results

Surgical correction included extra-anatomical bypass in 12 (50%) patients (9 left subclavian artery to descending aorta bypass, 2 proximal-to-distal coarctation bypass, 1 ascending-to-descending bypass), an end-to-end anastomosis in 6 (26%), resection and interposition of the graft in 5 (21%), and 1 (4%) arch augmentation with a patch. Mean follow-up duration was 6.2 ± 5.1 years. No mortality was observed. No patients required reoperation or re-intervention. Mean upper extremity systolic pressure significantly decreased from 142.4 ± 34.5 mmHg preoperatively to 97.1 ± 13.5 mmHg postoperatively (p = 0.003). Arterial pressure gradient between the upper and lower extremities significantly decreased from 50.3 ± 21.9 mmHg preoperatively to 9.7 ± 13.5 mmHg postoperatively (p = 0.003). The postoperative mean upper extremity systolic pressure of nine patients who underwent left subclavian artery to descending aorta bypass also significantly decreased from 141.2 ± 34.5 mmHg to 117.9 ± 13.5 mmHg (p = 0.038). Postoperatively, the mean right- and left-sided ankle-brachial pressure index of patients who had a left subclavian artery to descending aorta bypass were 0.96 ± 0.16 and 0.94 ± 0.11. All grafts were patent at the last follow-up. Postoperative course was uneventful with no morbidity.

Conclusions

CoA surgical repair in adolescents and adults showed good outcomes. Left subclavian artery to descending aorta bypass is a safe and reliable approach that is recommended for complex CoA with long stenotic segments. Re-coarctation, following previous transcatheter or surgical therapy and calcification of the aorta, is another indication for this kind of bypass. This procedure avoids total cross-clamping of the aorta and extensive dissection through the hard adhesions between the CoA and surrounding organs. Compared to other surgical techniques, it is easy to perform, tension free, and the collateral vessels can be preserved.

Rapid Response | Cardiac | Review of the latest tendencies and improvements in cardiac surgery

Contemporary Valve Heart Team: Indications and decision-making in 500 consecutive cases

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Evaluation of patients with valvular heart disease aims to diagnose, quantify and assess the mechanism of disease, as well as its consequences. Decision making for intervention should be made by a dedicated ‘Heart Team’ with specific expertise in valve diseases (‘Valve Team’). It comprises cardiologists and cardiac surgeons, echocardiologists and anaesthesiologists. General practitioners, geriatricians, heart failure specialists, electrophysiologists or intensive care specialists should also be involved whenever needed.

The Heart Team approach is particularly advisable in the management of high-risk patients, but is also important for other subsets, such as asymptomatic patients, or when the evaluation of valve reparability is a key component in decision making. The fullity of interventions in patients unlikely to benefit from the treatment should always be taken into consideration.

Therefore, the Valve Heart Team is currently considered as a standard of care to guarantees a tailored approach for patients with valvular heart diseases. However, little is known about patient profiles, treatment delays and adherence to guidelines with this approach. The aim of this study was to determine the feasibility of a multidisciplinary Valve Team that could drive decision making for patients with different valve disorders.

In this retrospective analysis, we analysed consecutive cases of valvular heart disease discussed by our institutional decision making process used during the Valve-Team meeting and the final indications. The results uncovered that between July 2018 and April 2019, 500 case discussions occurred (15 were repeat cases, resulting in a cohort of 485 patients, or 48.5 patients/month). The mean age was 72 ± 12 years, 63% were men, and 35% had concomitant ischaemic cardiomyopathy. The Society of Thoracic Surgeons score was 1.7 vs 5.9% for surgery and catheter-based procedures, respectively.

Aortic valve disease was present in 305 patients (combined with aortic-valve disease in 27% of patients and mitral disease in 5%), of whom 103 patients (34%) received surgical treatment and 202 patients (66%) received TAVI (10% valve-in-valve). Mitral valve disease was discussed in 164 patients (97% degenerative aetiology), of whom 125 patients (76%) were treated surgically and 33 patients were referred to transcatheter treatment (95% MitraClip). Isolated tricuspid valve disease was present in 13 patients (2.6%), of whom 12 patients were successfully percutaneously treated. Treatment decisions were postponed in 35 patients (5.5% of cases) due to a need for additional diagnostic information (angiography or stress echocardiography in all the cases). Conservative treatment was chosen in 12 patients (2.4%) due to absence of treatment indication stemming from optimisable medical therapy and a lack of symptoms. Every patient was discussed within one week from referral and treated in less than four weeks from Valve Team evaluation. Indications were adherent to ESC Valve Guidelines in 483 cases (96.6% of patients) and proposed treatment by referring physicians was confirmed in all but 27 patients (94% of patients).

To conclude, in our single-centre analysis, the Heart Team approach for valve heart disease was feasible, with multidisciplinary decision-making and consecutive treatment within a short time after referral. The timing of treatment could be further optimised if adequate information and imaging could be available at the time of the Heart Team discussion. The Valve Team is currently an integrated part in the treatment of cardiovascular valve disease according to European Guidelines, and it is standard of care at our institution.

References

Fibonacci’s Golden Ratio
An innovative approach to the design and management of extracorporeal circulation

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Technological advances in the field of extracorporeal circulation (ECC) over the past decade have led to numerous methods for monitoring metabolism and coagulation during cardiopulmonary bypass (CPB), as well as to the development of materials with improved biocompatibility, thereby reducing the risks associated with CPB. However, ECC is still predominantly based on a traditional design that involves the use of roller pumps. This exposes the patient to a variety of pathophysiological consequences, both intra- and postoperative, such as cognitive disorders, haemolysis and haemodilution, systemic inflammation and changes in coagulation.

We describe the advantages of an ECC circuit inspired by the Fibonacci Golden Ratio, which does not use a roller pump, in a prospective study of patients undergoing elective cardiac surgery. Comparing to conventional ECC, this prospective cohort study of superiority was carried out between August and mid-November 2018 at Anthea Hospital, GVM Care & Research (Bari, Italy). The study consisted of 60 adult patients (aged 49–75 years) who were scheduled for elective isolated aortic valve replacement (AVR; n = 30) or ascending aortic replacement (AAR; n = 30) with ECC for CPB.

Patients were randomly assigned to either the Fibonacci circuit or conventional circuit (Figure 1). The Fibonacci ECC includes a serial impeller pump along with vacuum-assisted venous drainage (VAVD) for intracavitary aspiration into a venous reservoir and a further VAVD for another hardshell reservoir. The Conventional ECC circuit takes advantage of a WMD master pump. Intracavitary aspiration into the reservoir is achieved via a roller pump, and extracavitary aspiration is achieved via a roller pump in a second chamber of the reservoir.

During CPB, echocardiography was used to estimate the quality of fluid dynamics in the extracorporeal circuit and the patient’s arterial vessels (Figure 2). A DIC management system was used to evaluate metabolism, and an electronic system was used to determine gaseous microemboli (GME) counts. Statistically significant differences between the Fibonacci and conventional groups were found in the average value of DO2, the cardiac index and the volume of fluids administered. The average absolute free haemoglobin (Hb) concentration at 10 min after CPB in the Fibonacci group was significantly less than that in the conventional group (12.7 ± 0.7 vs 38.9 ± 0.4 mg/l; p = 0.003). Furthermore, on average, the Fibonacci group showed significantly fewer red blood cell (RBC) units per patient (p = 0.003). This increased postoperative cognitive dysfunction was also associated with a longer ICU stay (16.9 ± 43.4 hours, p = 0.04). Fibonacci ECC offered superior intraoperative fluid dynamics, reduced the production of – and improved elimination – of GME (Figure 3), and improved intrapreoperative metabolism, particularly with regards to oxygen delivery and extraction. The improvements in fluid dynamics and metabolic variables were associated with a reduction in the incidence of pathophysiological events compared to the conventional system, particularly regarding transitory cognitive disorders, and a shorter stay in intensive care.

Abstract | Cardiac | Re-directing blood flow with mechanical circulatory support

Wartime cardiothoracic injuries: characteristics of those who sustained an injury – a Yemen War casualties report

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Background
During the Yemen war, the army produced several penetrating thoracic injuries and blunt traumas, ranging from major to minor, the most common to the safety. Strategies to prevent death or decrease late sequelae by medical professionals were confronted with controversies or opinions from different war casualties reports questioning best management practice.

Methods
We analysed the 159 patients who sustained cardiothoracic war wounds received at our hospital between January 2016 to June 2016.

Results
There were 46 (28.9%) patients with pure lung injuries, 4 (2.51%) with pure cardiac injuries and 109 (68.5%) with mixed injuries. The scope of management of the presented cases ranged from chest drainage only in 63 (39.62%) patients, thoracotomy, evacuation of haemothorax and suture of the lung tear in 53 (3.14%) patients, lobectomy in 2 (1.25%) patients, decortication in 4 (2.51%) patients and in 1 (0.63%) patient we encountered a pleurocutaneous fistula. The more commonly injured cardiac chamber was the right ventricle in 2 (1.25%) patients, the left ventricle in 1 (0.63%) patients, the right atrium in two (1.25%) patients and there was one (0.63%) patient with left-sided injury of the internal thoracic artery. The primary procedure consisted of exploratory thoracotomy, evacuation of haemopericardium and haemothorax, and cardiac sutures with pericardial pledges, undertaken in three (1.88%) patients.

Conclusions
Cardiac injuries are the most serious injuries seen in wartime. However, despite their nature, patients who sustained such injuries could be managed with low mortality or morbidity.
Abstract | Cardiac | Tissue is the issue: collaborative insights from translational science

Toll-like receptor 3 mediates ischemia/reperfusion injury after cardiac transplantation

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1. Department of Cardiac Surgery; 2. Division of Cardiac Surgery, Department of Cardio-Vascular Surgery, Hospital heart failure.1 Ischaemia during upon tissue injury.3 In this study initiating inflammatory response it remains unknown how the graft dysfunction. However, resulting in tissue damage and inflammatory response result in blood flow initiates excessive consecutive restoration of Toll-like receptor 3 mediates ischemia/reperfusion injury (IRI). IRI is associated with resulting in ischaemia/reperfusion organ harvesting and subsequent inflammation and graft damage and upon tissue injury. To assess the role of TLR3 in IRI in vivo, human endothelial cells were subjected to IRI. Human of the anti-inflammatory peptides CCL3, CCL4, IL10 and TGF-beta, as displayed in line with these findings, the rate of cardiac apoptosis was markedly reduced in Tlr3/- animals. Most prominently, reflecting our in vitro findings, TLR3 deficiency affected the attraction of inflammatory cells, as displayed by a significant reduction of intragraft cell infiltrates. In conclusion, we uncover a novel pathomechanism of IRI. Providing evidence that TLR3 plays a crucial role in the orchestration of inflammation. Injured cells release RNA which in turn promotes the development of IRI after cardiac transplantation. We reveal TLR3 as a novel target for future pharmacologic therapies to prevent IRI and thus, improve outcome in solid organ transplantation.

Abstract | Cardiac | TAVI – New approaches and data from the real world

Fitness-tracker assisted Frailty-Assessment before transcatheater aortic valve implantation

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Wearable devices have the potential to transform modern healthcare and the FIFA-trial showcases an innovative new way in which their use can completely overhaul preoperative assessment.

Treaditional methods of preoperative assessment are both labour- and resource-intensive, providing only a glimpse into a patient’s status. To meet the increasing demands in healthcare and obtain a more holistic view of patient baseline, new approaches are required. Hamstringing technology in the operating room has yielded paradigm-shifting procedures, yet utilising existing consumer hardware has remained a largely untrapped arena. The surge in the popularity of smartwatches and fitness bands provides doctors with an unprecedented opportunity to easily evaluate a patient’s frailty outside the vacuum of an isolated clinical assessment. Findings from the FIA trial highlight how this concept can be translated into clinical practice, providing a more accurate and intuitive way to perform preoperative assessments.

The prospective study analysed data of 30 consecutive patients (17.5 ± 5.1 years, EuroSCORE II of 3.3 ± 4.1%) undergoing either a transfemoral or transapical TAVI procedure between 2017 and 2018. Every patient was fitted with a wrist-worn health-monitoring device (Garmen Vivearm) for one week prior to the procedure. Twenty different parameters were measured, and threshold values for the three most predictive categories (step count, heart rate, preprocedural stress) were calculated. The patients were assigned one point per category, when exceeding the cut-off value and then classified in four stages (no, borderline, moderate, severe frailty). The FIFA-score was then compared to preprocedural gait speed category derived from 6-minute-walking test (GSC-EMVT) and the Edmonton Frailty Scale classification (EFS-CS). The primary study endpoint was hospital mortality. Overall preprocedural stress level (p = 0.017), minutes of high stress per day (p = 0.019), minutes of rest per day (p = 0.045) and daily maximum heart rate (p = 0.048) as single parameters were the strongest predictors of hospital mortality. When comparing the different frailty scores, the FIFA-score demonstrated the greatest predictive power for hospital mortality (FIFA area under curve [AUC] = 0.848 [0.666–1.000], p = 0.048; GSC-EMVT AUC = 0.671 [0.487–0.855], p = 0.416; EFS-C AUC = 0.636 [0.254–1.000], p = 0.436).

This proof-of-concept study demonstrates the strong predictive performance of the FIFA-score compared to conventional frailty assessment and the potential of wearable technology to be integrated into the surgical pathway. The minimal infrastructure required combined with the FITS trackers ease of use of free resources and staff previously allocated to frailty assessment, whilst simultaneously serving as a less disruptive measure for preoperative evaluation.
Endoscopic Port-Access Mitral Valve Repair Drylab Training

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Endoscopic mitral valve repair is one of the most difficult procedures to learn. The learning curve is steep, which is partially linked to the fact that the operation is conducted with long-shafted instruments, with the surgeon looking at a monitor rather than into the wound. Acquiring endoscopic skills with long-shafted instruments is a process that no one can escape from.

However, acquiring those skills in patients is not logical or efficient, thus in 2012 I initiated a project to develop a high-fidelity minimally invasive mitral valve simulator (MMVS). Rigidity in simulation has traditionally been defined as “the degree to which the simulator replicates reality”. Obviously, a simulation platform should be realistic and mimic the procedure setup.

In addition to this, and fundamental to learning, is feedback. There is no efficient learning without feedback, and indeed it has been shown that if the feedback is provided in an objective and reproducible manner, the learning process is more efficient. Therefore, the aim of the project was to create a platform that was realistic and could provide feedback regarding the skills that one would like to develop; normally, a platform that could be used to train oneself objectively, repeatedly, and in a reproducible manner.

In 2013 we developed a prototype which I used to start the endoscopic mitral valve programme myself, and to refine my skills. Because of the success of the platform, we received funding from Maastricht University Medical Center to develop an industrialised platform. We assembled an engineering group that I worked with to actualise my ideas. We were able to create a high-fidelity simulator that provides a platform on which to train endoscopic skills repeatedly and objectively.

Additionally, the simulator we created provides the objective assessment and feedback essential in any simulator-based training. What’s more, the disposable mitral valve is made of special silicon, developed by us, that provides a true suturing experience. We were awarded the EACTS Techno-Chrome Innovation Award in 2014. At that time, we envisioned using this platform to train surgeons, as well as for pre-operative planning. Ever since, we have striven to bring this innovation from bench to reality. We published the process involved in development of this simulator in the *Journal of Thoracic and Cardiovascular Surgery* to stimulate the development of this field.

During various educational programmes, 99 senior surgeons validated the platform for use in training of minimally invasive mitral valve surgery.

Furthermore, we developed a process for modeling and 3D (dimensional) printing of different mitral valve diseases for procedural planning and simulation, based on 3D transoesophageal echocardiography (TOE). We published the results recently in the *European Journal of Cardio-Thoracic Surgery*. Disposable 3D-printed pathological silicone replicas can be mounted into the simulator so that one can also be trained in any repair technique on any pathology of the mitral valve. We also provided proof of concept of the use of 3D printing and simulation in prospective patients for procedural planning.

In 2015, we founded the EACTS Endoscopic Port-Access Mitral Valve Repair Drylab Training course using the high-fidelity simulators. This course has since been organised almost 20 times in Maastricht. The course was designed based on the latest educational sciences and is structured like an air-pilot-training concept course, starting with technical and theoretical pre-assessment and two subsequent days of intensive training on simulators, mixed with interactive presentations and videos regarding all aspects of the endoscopic mitral repair programme.

The course ends with technical and theoretical post-assessment.

The aim of the course is to provide a formula for success for those who would like to start an endoscopic programme, and provide standardisation education. For example, we used the high-fidelity mitral valve simulator to develop a suturing map for placement of the annuloplasty ring with minimal tissue manipulation and maximal visual exposure. The suturing map could be helpful for less-experienced surgeons who are starting to learn the techniques of minimally invasive mitral valve surgery. We have already trained around 200 surgeons, and our preliminary analyses show very promising results for skill development using the simulator. We presented the results of the endoscopic mitral valve courses during the AATS annual meeting in Toronto.

The majority of participants were senior surgeons. Theoretical pre- and post-assessment showed that participants scored significantly higher on post-assessment. Pre- and post-assessment of skills on the simulator showed that participants could work with long-shafted instruments more accurately and faster. Follow-up of the participants based on course evaluation and a survey showed that over 30% of participants had started the endoscopic mitral programme successfully, while 70% had yet to start due to the right conditions not being in place.

The course is a continuous EACTS educational programme taking place four times a year in Maastricht. The next course will take place 9–10 December. For more future dates, head to the EACTS Academy website at www.eacts.org/educational-events/academy.

I am looking forward to welcoming all those interested in taking part in Maastricht.

References


Conflict of Interest Statement

Peyman Sardari Nia is the inventing/originating inventor of a simulator that is commercialized by Maastricht University Medical Center. Maastricht, the Netherlands.

Acknowledgements

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Quantitative evaluation of superior mesenteric artery calcification in haemodialysis patients undergoing aortic valve replacement

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The number of patients with end-stage renal disease requiring haemodialysis (HD) has been increasing. As the prognosis of HD patients improves, the number of patients with major comorbidities typified by calciﬁed vascular and valvular disease is expected to increase. Speciﬁcally, aortic valve stenosis (AS) is a well-recognised complication of long-term HD. In Japan, aortic valve replacement (AVR) still remains the gold standard treatment in HD patients with severe AS because transcatheter aortic valve replacement (TAVR) in HD patients is not recommended. However, previous publications have illustrated adverse outcomes including higher mortality and morbidity after surgical AVR in HD patients. One of the reasons for these poor outcomes after AVR may be associated with aortic mesenteric ischaemia (AMI). This is a life-threatening complication which frequently occurs in HD patients. Therefore, the occurrence of AMI must be prevented to ensure the safety of surgical AVR in HD patients.

The objective of this study is to evaluate the association between the presence of superior mesenteric artery calcification (SMAC) and early and late outcomes after AVR in HD patients with severe AS. Between April 2003 and December 2018, of the 58 haemodialysis patients who underwent AVR for severe AS, 46 patients (19 women; mean age 72 years) were retrospectively reviewed. Twenty-ﬁve patients (54.3%) who had hyper calciﬁcation from the ostium until distal branches of superior mesenteric artery (SMA) were deﬁned as the SMAC group, and the calciﬁcation of SMA and its arterial branches including thoracic aorta, celiac artery and abdominal aortas were evaluated quantitatively on preoperative non contrast-enhanced CT using the Agaston calcium score (calcification area [cm²] × max CT value [HU], Figure 1). The operative outcomes were compared with those of the non-SMAC group, comprising 21 consecutive patients (45.7%). In this study, the incidence of AMI (24.5%) in the SMAC group was signiﬁcantly higher than that (4.7%) of the non-SMAC group (p < 0.001). The presence of SMAC was an independent risk factor for the incidence of AMI (OR = 3.8, p = 0.02) and hospital mortality (OR = 2.4, p = 0.02) following AVR. Furthermore, the calcium score of SMA in those complicated with AMI was signiﬁcantly higher levels compared with those without AMI (815.7 ± 302.5 vs 366.9 ± 351.2 cm² × HU; p < 0.01).

In conclusion, the presence of SMAC was signiﬁcantly associated with the risk factor for AMI. SMA hypoperfusion-related to postoperative hypotension must be avoided in HD patients with high calcium score of SMA to prevent the incidence of AMI. Quantitative evaluation of SMAC could be a new predictive marker of postoperative AMI and improve the prognosis after AVR in HD patients.

Abstract

Surgical repair of aortic coarctation in adults: half a century of a single centre clinical experience

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Endocarditis-related stroke is not a contraindication for early cardiac surgery – an investigation among 440 patients with left-sided endocarditis

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A treatment dilemma arises when surgery has to be performed in patients with infective endocarditis (IE) complicated by cardio-embolic stroke. In such an event, neurologists recommend surgery to be postponed for at least one month if possible. The aim of this study was to investigate the rate of perioperative neurological complications and the long-term neurological recovery potential in patients with IE-related stroke and indication for early cardiac surgery. A total of 440 patients with left-sided IE undergoing urgent or emergent surgery were investigated. One hundred and thirty-five patients (30.7%) suffered cardio-embolic strokes prior to cardiac surgery. Surgery was performed within 72 hours after stroke onset in 38% of IE patients and in 70% of patients the cardiac procedure was performed within the first week after the index neurologic event. Among 28 patients (20.7%), cardio-embolic stroke occurred while under antibiotic treatment. In 107 patients (79.3%) stroke was the index clinical event for hospitalisation. Uncomplicated ischaemic stroke was found among 93 patients (88.9%), and 42 patients (31.1%) presented with complicated cerebral lesions such as concomitant abscess formation, secondary cerebral haemorrhage, meningeitis, or mycotic aneurysms. During follow-up, neurologic recovery was assessed by the modified Rankin scale and the Barthel Index. A Rankin scale ≤ 1 and a Barthel index ≤ 20 points defined complete neurologic recovery. The hospital- and long-term mortality risk was calculated by Cox regression models, adjusting for age.

Among stroke patients, the age-adjusted hospital mortality risk was 1.4-fold higher (95% CI 0.74–2.57; p = 0.31), as was the long-term mortality risk (95% CI 1.003–2.01; p = 0.548) compared to IE patients without previous stroke. However, age-adjusted mortality risk was increased among patients with complicated ischaemic lesions (HR: 2.1; 1.24–3.54; p = 0.005) but not in patients with uncomplicated ischaemic strokes (HR: 1.18; 0.79–1.77; p = 0.41). The observed risk for intraoperative haemorrhage was 2.3% among patients with complicated ischaemic strokes and 0% among patients with uncomplicated ischaemic strokes. In long-term follow-up, full neurological recovery could be achieved in 84 survivors (62.3%) and partial recovery in 32 patients (23.7%). Aggravation of neurological injury was found in two patients only (1.5%).

Contrary to common clinical practice and neurologic recommendations, early surgery in IE is safe and is associated with a very low intraoperative neurologic complication rate. In patients undergoing early surgery for IE, intraoperative cerebral haemorrhage risk is extremely low in both uncomplicated-ischamic and complicated IE-related strokes. As a result, and long-term outcome was convincing – together with the high neurological recovery potential – we recommend early surgery in all patients with IE-related strokes.

Epidural versus local – a long-term study on pain management in an enhanced recovery program after thoracic surgery

Fabian Doerr1, Falko Lindacher2, Margaret Bryant3, Georg Schlachtengerber1, Asmae Gassa1, Matthias Heldwein1, Thorsten Wahlers1, Khosro Hekmat1

1. Department for Cardiothoracic Surgery; 2. Department for Anaesthesiology; 3. Central area medical synergies, University Hospital of Cologne, Cologne, Germany

The treatment of postoperative pain with multimodal analgesia is a key component of ‘Enhanced Recovery After Surgery’ (ERAS). In this prospective study we examined whether the mode of analgesia has an influence on ERAS in thoracic surgical patients. We compared the efficacy of pain therapy with an epidural catheter (EDC) and with a local wound infiltration catheter (WIC) that was placed intercostally at the end of surgery. Short-term effects and long-term outcome up to one year were assessed. Besides the assessment of pain, we examined impairment in patients’ daily activities. We prospectively recruited patients between June 2015 and November 2017. The one-year follow-up was finalised in November 2018. Patients with chronic pain were excluded a priori. A total of 67 patients included in this study completed the one-year follow-up. All patients were randomly allocated either to the EDC (n = 34) or to the WIC (n = 33) group. Patients in both groups had similar age, gender and physical status according to ASA classification. They were in similar ERAS stages of non-small cell lung cancer (NSCLC). The mean age of the patients was 59.3 ± 14.6 years; 57% of the patients were men.

All patients were interviewed for pain on the 3rd and 10th postoperative day (POD) and at 6 and 12 months after surgery using a numeric rating scale (0–10). Possible daily impairments were assessed at POD 3 and 10, and 6 months after surgery. The start of continuous analgesia either through EDC or WIC was 20 minutes before the end of surgery. We terminated continuous analgesia within 12 hours after the removal of the chest tube. Patients with EDC received on average 5 ml/h ropivacaine (0.75%) plus sufentanil (0.75 μg/ml). Patients with WIC were given a constant rate of 8 ml/h ropivacaine (2 mg/ml). During hospitalisation both groups received identical oral pain therapy.

Both groups had a comparable amount of video-assisted surgery (EDC: 47%; WIC: 45%). We performed a similar rate of lobectomies due to NSCLC in both groups (EDC: 65%; WIC: 63%). Operations such as wedge resections and mediastinal tumour resections were equally distributed between the two groups. The mean duration of surgery was comparable in both groups (EDC: 134 ± 62 min; WIC: 121 ± 59 min; p = 0.38). Total length of stay in hospital was identical in both groups (EDC: 9.4 ± 6.2 days; WIC: 8.2 ± 5.9 days; p = 0.41). All patients had only one chest tube. The mean duration of chest drainage was similar in both groups (EDC: 3.2 ± 2.4 days; WIC: 3.4 ± 2.1 days; p = 0.26).

On POD 3, patients with EDC experienced significantly lower stress pain than patients in the WIC group (EDC: 2.5 ± 1.9; WIC: 4.3 ± 2.5; p = 0.001). Stress pain on POD 10 showed no significant difference between both groups (EDC: 3.8 ± 2.0; WIC: 4.2 ± 2.4; p = 0.39). None of the patients reported pain after 6 and 12 months.

These results are displayed in Figure 1. Regarding impairments in everyday tasks, we detected a non-significant trend at POD 3 and 10 in favour of the EDC group. Patients in this group reported reduced sleep (EDC: 15%; WIC: 19%) and deep breathing impairments (EDC: 22%; WIC: 26%). Patients with epidural catheter experience less pain during the first 72 hours after surgery. Both the EDC and the local WIC effectively prevent chronic pain. There is no significant superiority of epidural pain therapy in regard of impairment in daily activities. As part of an ERAS program, successful pain management may either be based on an epidural or a local approach with intercostal catheter.
Individualised and precise dual antiplatelet therapy based on CYP2C19 genotype and platelet function improves the patency of coronary endarterectomy

Tianxiang Gu, Enyi Shi
Department of Cardiac Surgery, v First Hospital, China Medical University, Shenyang, China

C
orony endarterectomy (CE) with coronary artery bypass grafting (CABG) may be a method to revascularise otherwise un-graftable vessels with controversial outcomes. Early graft closures with reduced long-term graft patency is the common concern after CE combined with CABG. The current study retrospectively evaluated the mid-term results of closed CE adjunct to off-pump CABG with precise dual antiplatelet therapy (DAT) based on CYP2C19 genotype and platelet function at least one year. The graft patency of CE was highlighted.

Sixty-one patients underwent closed CE with off-pump CABG for diffuse coronary artery disease. The principal indications for CE were as follows: 1) total or subtotal occluded major coronary arteries caused by diffuse coronary artery disease with viable myocardium; 2) revascularisation that could not be performed with percutaneous methods; 3) diameter of the target vessel >1.0–1.5 mm. CYP2C19 genotype was tested for all the patients before the operation. Clopidogrel is a prodrug, and its antiplatelet activity is dependent on its conversion to an active metabolite by the cytochrome P450 (CYP) system, principally CYP2C19. Ticagrelor is a direct-acting inhibitor of the ADP receptor P2Y12. DAT with aspirin (100 mg) and clopidogrel (75 mg) or ticagrelor started six hours after the operation and lasted for 12 months followed by administration of aspirin only. Clopidogrel was used in patients who were ultrarapid metabolisers (CYP2C19 *1/*1, *1/*2, *2/*2, *3/*3, *1/*3), while ticagrelor was used in patients who were intermediate metabolisers (CYP2C19 *1/*2, *1/*3, *2/*3, *3/*3, *2/*2, *2/*3, *2/*4, *2/*5) or poor metabolisers (CYP2C19 *1/*1, *1/*2, *1/*3, *2/*2, *2/*3). The adenosine diphosphate (ADP) induced platelet aggregation function was measured and the value was controlled between 10-30%.

A dose of ticagrelor was individualised and adjusted according to the platelet aggregation rate. Graft patency was evaluated by a computer tomography angiogram or coronary angiography. Twenty-nine patients (47.5%) were intermediate or poor metabolisers. All patients underwent off-pump CABG with 3-5 bypass grafts per patient. CE was performed in one coronary vessel in 16 patients and in two coronary vessels in the other five patients. One patient died from multiple organ failure 23 days after the operation. Ticagrelor was adjusted from 15 to 45 mg twice a day. No severe bleeding complications were detected during the protocol of DAT. Rates of graft patency in endarterectomised vessels were 93.8% and 89.1% at discharge and one year after the operation. Clinical follow-up of 42.1 ± 11.5 months reported a one-, three-, and five-year survival of 98.4%, 94.3%, and 83.9%, respectively.

In selected patients with diffuse coronary artery disease, CE with off-pump CABG can be used for complete myocardial revascularisation with acceptable graft patency and mid-term survival. Individualised and precise DAT based on CYP2C19 genotype and platelet function may improve the patency of endarterectomised vessels with low bleeding risks.

Table 1. CYP2C19 genotype of patients in the current cohort.

<table>
<thead>
<tr>
<th>CYP2C19 Genotype</th>
<th>Clontigrel resistance</th>
<th>DAT strategy</th>
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Comparative analysis of mechanical and bioprosthetic tricuspid valve replacement over a 20-year period

Yoonjin Kang, Hee Young Hwang, Suk Ho Sohn, Jae Won Choi, Kyung Hwan Kim, Ki-Bong Kim
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T
he optimal prosthesis for tricuspid valve replacement (TVR) is the subject of ongoing debate due to the fact that clinical outcomes of TVR have generally been suboptimal, and the life expectancy of patients undergoing TVR is poor. Previous studies, including ours,3,6 suggest that the long-term outcomes of bioprosthetic TVR might be comparable to those of mechanical valves when considering life expectancy.

In this retrospective cohort study, 226 TVR patients underwent 212 patients underwent bioprosthetic TVR (BTV group) and 106 underwent mechanical TVR (MTV group). Early results and long-term clinical outcomes were compared. The median follow-up duration was 73 (3–235) months. Propensity score (PS) analyses indicating PS-adjusted Cox regression models and 1:1 PS matching were performed. The mean age of the MTV and BTV groups was 53.9 ± 8.9 and 55.9 ± 12.2 years, respectively. There were no significant differences in early mortality (9.2%) and postoperative complications between the two groups. The overall survival and freedom from cardiac death in the BTV group was similar to the MTV group (hazard ratio [HR] 95% confidence interval [CI] = 0.840 [0.476–1.482] and 1.003 [0.517–1.901], respectively). The rate of freedom from a composite of thromboembolism and bleeding was significantly higher in the BTV group (2.065 [0.891–4.768], p = 0.018). However, freedom from tricuspid valve reoperation was significantly lower in the MTV group (0.906 [0.521–1.532]).

Overall, TV-related event rates in the BTV group were similar to those in the MTV group (0.891 [0.558–1.424]). The PS matching extracted 69 pairs. Comparative analyses of early and long-term outcomes from the matched groups yielded similar findings with those from the complete patient groups.

In summary, the outcomes of conventional TVR were comparable with those of mechanical TVR in terms of long-term survival and tricuspid valve-related events over a 15-year postoperative follow-up. Although reoperation rates were higher in the BTV group, overall survival, freedom from cardiac death and freedom from TVRE were not significantly different between the two groups in multivariable models, and the composite of thromboembolism and bleeding rate was lower in the BTV group.

References

Figure 1. Embolus taken out from the endarterectomised coronary arteries.

Figure 2. The endarterectomised right coronary artery is still patent four years after the operation.
Intrapulmonary-artery septation: Does it overcome cases of pulmonary vein obstruction?

Motonori Ishido, Kazuyoshi Kanno, Masaya Murata, Keiichi Hirose, Akio Ika, Kisaburo Sakamoto (Department of Cardiovascular Surgery, M. Fujishoku Children's Hospital, Japan)

Patients with unbalanced pulmonary artery (PA) growth and decreased pulmonary circulation are not considered suitable candidates for the Fontan procedure. Following our previous study on the utility of intrapulmonary-artery septation (IPS) for patients with PA hypoplasia (Figure 1), we investigated the use of IPS in patients with pulmonary vein obstruction (PVO).

We recruited 42 patients who underwent IPAS for unilateral PA hypoplasia and/or PVO between 1998 and 2018 and classified them into those without PVO (group N) or with PVO (group P). We calculated the affected PA index (PAI) to assess growth of affected PA.

Functional significance of the PVO segments was evaluated using lung perfusion scanning, and the percentage of defective segments in the affected lung was calculated. We defined the percentage of the effective pulmonary vein (PV) segment in the affected lung divided by total PV segments in both lungs. We evaluated PV segments before the Fontan procedure, as well as the relevance of this parameter to operative outcomes.

Groups P and N included 24 and 18 patients, respectively. One patient in group N and six in group P died during follow-up; this difference was statistically significant (log rank p = 0.06). In group N, 15 patients (83%) achieved two-lung Fontan circulation. In group P, all patients with ≥ 25% effective PV segments underwent the two-lung Fontan procedure. In patients with > 25% effective PV segments, the percentage of the effective PV segments increased after IPAS (Figure 2A, B). The shunt size was significantly larger in patients with > 25% effective PV segments (median 4.0 mm [range 4–5 mm]) than in others in group P (median 3.5 mm [range 3–4 mm]; p = 0.04).

Figure 3A shows the Kaplan-Meier survival curve of patients with or without ≥ 25% effective PV segments. There was a significant difference in survival (log rank p = 0.04). Poorer PA growth was observed in patients with < 25% effective PV segments than in patients with ≥ 25% (Figure 3B).

Our surgical approach primarily aims to release PVO and allow the affected lung to receive pulmonary blood flow. However, the occurrence rate of PVO is high. We considered that more continuous antegrade blood flow from the systemic pulmonary artery shunt (SPS) could achieve growth of the affected PA and prevent PV recurrence, thus we consequently increased the shunt size over time as we adapted IPAS to PVO.

The severity of atrophicventricular valve regurgitation (AVVR) with single-ventricle physiology influences mortality and achievement of two-lung Fontan circulation. Although we speculate that ventricular volume overload after IPAS with SPS contributes to the deterioration of AVVR and ventricular dysfunction, we did not identify strong relationships between AVVR mortality and success of the two-lung Fontan procedure. We performed aggressive valvuloplasty using various techniques such as the inter-annular bridge technique at IPAS which could maintain atrophicventricular valve function and ventricular function, allowing larger shunts into the affected PA.

In conclusion, larger shunt use in the affected lung at IPAS increased the percentage of the effective PV segments in patients with PVO. Maintenance of ≥ 25% effective PV segments in the affected lung, along with comprehensive treatment, is key for a successful two-lung Fontan procedure.

Figure 1. Intrapulmonary-artery septation concept. A Glenn shunt and systemic pulmonary artery shunt (SPS) are adjoining in an unbalanced pulmonary artery (PA). A septation patch was obliquely placed between the unaffected PA connected to the SPS and affected PA connected to the Glenn shunt. Abbreviations: APCA – aorto-pulmonary collateral artery; AVV – atrophicventricular valve; LA – left atrium; PVD – pulmonary vein obstruction; PVR – pulmonary vascular resistance.

Figure 2. (A) Percentage effective pulmonary vein (PV) segments in group P at the time of evaluating indications for Fontan procedure after intrapulmonary-artery septation. Twelve patients maintained ≥ 25% effective PV segments in affected lungs; all underwent successful two-lung Fontan procedure. (B) Changes in median percentage of the effective PV segments in the affected lungs in patients with or without ≥ 25% effective PV segments. The effective PV segments increased significantly in patients with ≥ 25% effective PV segments after IPAS. Abbreviations: IPAS – intrapulmonary-artery septation; PAI – pulmonary artery index; PV – pulmonary vein; TCPC – total cavopulmonary connection.

Figure 3. (A) Kaplan-Meier survival curve of patients with or without ≥ 25% effective pulmonary vein (PV) segments. Survival differed significantly (B) Changes in median affected pulmonary artery index (PAI) in patients with or without ≥ 25% effective PV segments. Poor pulmonary artery growth was observed in patients with < 25% effective PV segments compared with patients with ≥ 75%. Abbreviations: IPAS – intrapulmonary-artery septation; PAI – pulmonary artery index; PV – pulmonary vein; TCPC – total cavopulmonary connection.

Blood flow analysis of Fontan pathway using computational fluid dynamics in apicocaval juxtaposition

Aiko Sonobe, Muneaki Matsubara, Hideyuki Kato, Yuki Hiramatsu (Department of Cardiovascular Surgery, University of Tsukuba, Japan)

A malpositioned heart with apicocaval juxtaposition (ACJ) complicates the selection of conduit route in children with a functional single ventricle during the extracardiac Fontan procedure (eTFPC). Conduit placement (isoplastic to the cardiac apex [isoplastic route]) carries the risk of conduit compression by the ventricle while a route contralateral to the cardiac apex (contralateral route) requires a long and curved conduit that risks energy losses and conduit kinking.

Computational fluid dynamics (CFD) has identified a design characteristic of eTFPC pathways that can cause flow disturbances and energy dissipation.1 Our objective is to use CFD models based on flow stagnation and energy loss to determine optimal Fontan routes in patients with ACJ.

Based on CT data before and after eTFPC in ACJ patients, a virtual simulation of two viable Fontan routes (isoplastic and contralateral routes) was created with 3D computer graphics and blood flow analysis. With this advanced CFD, valuable insights into the proper Fontan route selection for ACJ were revealed. We found that a virtual Fontan route opposite to the actual route caused significant left-right imbalance in pulmonary blood flow from the inferior vena cava, increasing future pulmonary arteriovenous fistula risk (Figure 1).

CFD simulation of routes for Fontan circulation with ACJ eliminates inferior options and increases chances of sequelae-free repair. Although further follow-up in a larger cohort is required, cutting edge CFD computer simulations may function as a portal to enable virtual surgery in the near future.

Figure 2. Prediction of postoperative blood flow (A Case). (A) Contralateral route (Virtual route) with SPS and LPA graft. (B) Isoplastic route (Actual route) with TCPC. (C) Flow ratio from IVC to LPA (Graph). LPA 85.3% (LPA 14.7% IVCA 56.4% RVCA 43.6%)

References
Bridge to recovery with Berlin Heart EXCOR in children < 10 kg with dilated cardiomyopathy – clinical and histological analysis

**Background**

Berlin Heart EXCOR® (BHE) has significantly improved survival. However, the management of paediatric patients < 10 kg with dilated cardiomyopathy (DCM) remains a challenging issue because of the high incidence of morbidity including stroke, bleeding, and infection. Therefore, minimizing mortalities associated with BHE support is becoming increasingly important. In adult patients with DCM, the left ventricular (LV) myocardial histology is reported to predict the recovery of myocardial function after mechanical unloading with VAD support, however the predictive factors for myocardial recovery with BHE in paediatric patients with DCM is unclear. This study aimed to identify the histological characteristics associated with bridge to recovery using BHE in paediatric patients < 10 kg with DCM.

**Methods**

Of the 10 consecutive patients < 10 kg with DCM who underwent BHE implantation between 2013 and 2018, four showed improvement in LV function resulting successful BHE explantation (Group E). The remaining six patients showed persistent LV dysfunction and underwent heart transplantation (Group N). The following variables were compared between the two groups: (1) Histological findings in LV myocardium obtained at BHE implantation; and (2) LV function after BHE implantation assessed with echocardiography and cardiac catheterization.

**Results**

The degree of myocardial fibrosis was significantly lower and the capillary vascular density was significantly higher in Group E than in Group N (16 ± 6% vs 28 ± 6%, p = 0.02 and 65 ± 11 vs 43 ± 18 units high-power field p = 0.04). The changes during the three months after BHE implantation of the diastolic dimension (p-score) and ejection fraction were significantly greater in Group E than in Group N (9.6 ± 3.5 vs -3.6 ± 4.5, p = 0.045 and 36 ± 13% vs 13 ± 13%, p = 0.03).

**Conclusions**

In paediatric patients < 10 kg with DCM, the degree of LV myocardial fibrosis and capillary vascular density at Berlin Heart EXCOR® implantation were found to be predictive factors for bridge to recovery.

**References**


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Re-repair after previous mitral valve reconstruction: handle with care!

**Abstract**

Cinzia Trumello, Ilaria Giambuzzi, Benedetto Del Forno, Marta Bagargna, Stefania Ruggeri, Alessandro Castiglioni, Ottavio Alfieri, Michele De Bonis

Dilatval repair is the gold standard for the treatment of mitral regurgitation (MR), and the rate of repair for degenerative disease has progressively increased over the years, whether in high- or low-volume centres. Yet despite significant improvements in surgical techniques and results, failure to repair remains an issue both early and late after surgery. The reasons are essentially related to failure of the previous procedure (such as leaflet misjudgement of artificial chordae, ring prolapse or suture dehiscence), progression of the original disease (new valve prolapse or further annular enlargement) or onset of a new pathology (such as endocarditis). The optimal surgical strategy for repair failure is still under debate. In this study, we retrospectively evaluate our series of patients with recurrent mitral disease after mitral repair and compare short- and long-term outcomes of those who underwent a re-repair versus replacement. A total of 81 patients, admitted in our institution for mitral valve re-surgery from 2003 to 2017 were selected and divided into two groups: Group A (patients who underwent a re-repair) and Group B (patients who underwent mitral valve replacement: MVR). Each group had identical baseline differences thus patients were matched to create comparable distributions of the covariates that were significantly different. The degree of MR was measured semi-quantitatively by Doppler colour imaging using a four-grade scale: mild (1/4+), moderate (2/4+), moderate-to-severe (3/4+) and severe (4/4+). The mean follow-up was 7.4 ± 3.20 years (max 14.4). Despite the mixed aetiology of initial mitral disease, a re-repair was feasible in 48.1% of the patients (39/81). No differences were found in cardiopulmonary bypass (CPB) and cross-clamp times in the re-repair vs replacement groups: 91 (72–88) vs 76 (83–87), p = 0.577 and 51.8 ± 15.36 vs 60.0 ± 18.37, p = 0.061. A greater number of concomitant procedures were necessary in the MVR group (43% vs 12.8%) and, at hospital discharge, 5 patients (12.5%) of the re-repair group showed residual moderate or severe MR. There was no residual MR in the replacement group. This suggests that in a valve which has already been repaired, the re-repair procedure is technically more cumbersome and time consuming, carrying a higher risk of immediate, suboptimal results. There were no in-hospital deaths in either group. The paired overall survival at 8 years was 100% in the re-repair group and 96.6 ± 3.20% (95% CI: 88.15–99.06) in the replacement group (p = 0.051). The cumulative incidence function (CIF) of cardiac death was 23.7 ± 7.43% in the re-repair and 0% in the replacement group (p = 0.001; Figure 2). In summary, survival seems to be worse with mitral valve replacement, however recurrent significant MR after re-repair is not rare at 8 years, which mandates for a careful balance when deciding whether a re-repair is a worthy alternative to replacement for each individual.
14:00 Management of HLHS  
Auditorium 2  
Congenital Disease

14:00 Nightmares in CT  
Room 108  
Annual Meeting

14:00 Controversies and new findings in the treatment of tricuspid regurgitation  
Auditorium 7  
Adult Cardiac

14:00 Guidelines  
Auditorium 1  
Adult Cardiac

14:00 Thoracic surgery and basic science  
Room 5A, Pav 5  
Thoracic Disease

14:00 Acute Type B Dissection  
Auditorium 6  
Vascular Disease

14:00 Jeopardy – Final  
Room 5B, Pav 5  
Annual Meeting

14:00 Thoracic Miscellaneous  
Auditorium 3+4  
Thoracic Disease

14:00 Controversies and catastrophes in adult cardiac surgery  
Room 5C, Pav 5  
Adult Cardiac

14:00 Training Suite – Coronary  
Training Village  
Adult Cardiac

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**Saturday 5 October**

<table>
<thead>
<tr>
<th>Time</th>
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<tr>
<td>08:00</td>
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| 08:00    | Auditorium 2  
Congenital Disease |
| 08:00    | Work in Progress                                                        |
| 08:00    | Room 108  
Annual Meeting |
| 08:00    | Aviation medicine and high hazard occupational medicine  
Room 3C, Pav 3  
Adult Cardiac |
| 08:00    | Minimally Invasive Mitral Valve Surgery parade.  
Auditorium 8  
Adult Cardiac |
| 08:00    | Physiology for the cardiac surgeon.  
Room 3A, Pav 3  
Adult Cardiac |
| 08:00    | Stroke in TAVI, Prediction, Prevention and Treatment  
Auditorium 1  
Adult Cardiac |
| 08:00    | Systematic Reviews and Meta-Analysis: at the top of the evidence?  
Room 3B, Pav 3  
Adult Cardiac |
| 08:00    | Nurses & Allied Health Professionals  
Room 5C, Pav 5  
Allied Health |
| 08:00    | Lung Failure (Transplantation, ECMO and pulmonary endarterectomy)  
Room 5A, Pav 5  
Thoracic Disease |
| 08:00    | Thoracic aortic surgery in the young (DA VINCI SESSION)  
Auditorium 6  
Vascular Disease |
| 08:00    | Approaches to minimise stroke and improve survival in aortic stenosis  
Auditorium 3+4  
Adult Cardiac |
| 08:00    | Thoracic Mixed  
Room 5B, Pav 5  
Thoracic Disease |
| 09:45    | Leonardo Da Vinci: 500 years of genius  
Auditorium 1  
Annual Meeting |
| 11:45    | Career Development  
Room 108  
Annual Meeting |
| 11:45    | A further step ahead: minimally invasive and Hybrid CABG  
Room 3B, Pav 3  
Adult Cardiac |
| 11:45    | BAV Repair  
Auditorium 8  
Adult Cardiac |
| 11:45    | Heart transplantation in 2019  
Room 3A, Pav 3  
Adult Cardiac |
| 11:45    | EURAS Cardiac Surgery: First International Presentation of Guidelines  
Room 5C, Pav 5  
Allied Health |
| 11:45    | Ebstein Disease  
Auditorium 2  
Congenital Disease |
| 11:45    | Joint session ERS: MDT COPD and transplant  
Room 5A, Pav 5  
Thoracic Disease |
| 11:45    | Cerebral protection in aortic arch treatment  
Auditorium 6  
Vascular Disease |
| 11:45    | Optimising outcomes in mitral surgery  
Auditorium 3+4  
Adult Cardiac |
| 11:45    | Oncology  
Room 5B, Pav 5  
Thoracic Disease |

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**Break**

13:30  
CABG surgeon should know  
Room 3A, Pav 3  
Adult Cardiac

13:30  
TAVI vs. SAVR in low-risk patients  
Room 5B, Pav 5  
Adult Cardiac

13:30  
Congenital Valve  
Auditorium 2  
Congenital Disease

13:30  
Strategy and long-term results in aortic valve repair  
Room 3C, Pav 5  
Vascular Disease

13:30  
Cardiac Surgery and translational basic science  
Room 108  
Adult Cardiac

13:30  
Choosing conduits for CABG: strategy in the secret for success  
Room 3B, Pav 3  
Adult Cardiac

13:30  
Heart failure surgeon at the cutting edge  
Room 3A, Pav 3  
Adult Cardiac

13:30  
TAVI – interesting new data will influence your practice...  
Auditorium 3+4  
Adult Cardiac

13:30  
Dissecting aortic dissection  
Room 5B, Pav 5  
Vascular Disease

13:30  
EACTS-EACTA Joint Session: Repair of a regurgitant aortic valve  
Auditorium 8  
Adult Cardiac

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**Break**

16:15  
Improving outcomes by a perioperative personalized blood management  
Room 3B, Pav 3  
Adult Cardiac

16:15  
SAPI – long-term results, emphasis on particular subgroups  
Room 3A, Pav 5  
Adult Cardiac

16:15  
Congenital Miscellaneous  
Auditorium 2  
Congenital Disease

16:15  
Help! Trainee in Trouble  
Room 108  
Annual Meeting

16:15  
Technical pearls in mitral valve repair: artificial chordae adjustment  
Auditorium 1  
Adult Cardiac

16:15  
Multidisciplinary tumour board  
Room 5A, Pav 5  
Thoracic Disease

16:15  
“Here we go again” – Strategies in re do thoracic aortic surgery  
Auditorium 6  
Vascular Disease

16:15  
Nurses & Allied Health Professionals  
Room 5C, Pav 5  
Allied Health

16:15  
Predicting and managing Mechanical Circulatory Support-related complications  
Auditorium 3+4  
Adult Cardiac

16:15  
Do you like the elephant frozen?  
Room 5B, Pav 5  
Vascular Disease
Minimally Invasive Techniques in Adult Cardiac Surgery (MITACS)

Michael A Borger  University Department for Cardiac Surgery, Leipzig Heart Center, Germany

Please come and join us June 18–19, 2020 for the EACTS Minimally Invasive Techniques in Adult Cardiac Surgery (MITACS) meeting in Leipzig, Germany. I have the great privilege of joining Peyman Sardari Nia, Thomas Walther, and Volkmar Falk as a MITACS Course Director, and together we’ll give our best efforts to make next year’s meeting a memorable one.

As in years before, the course will be structured primarily as an educational event with several live operations interspersed with didactic practical lectures and live in-a-box videos. The course will be of value to cardiac surgeons, cardiologists, cardiac anesthetists, fellows, residents, perfusionists and nurses who are interested in minimal invasive cardiac surgery. Live surgical procedures will be broadcast from the operating room and hybrid suites within the Leipzig Heart Center, with plenty of opportunity for interaction and discussion between expert faculty and course attendees. We will continue to focus on contemporary approaches to minimal invasive aortic valve, mitral valve, tricuspid valve, aortic, and atrial ablation surgery, as well as showing detailed tips and tricks necessary to perform MICS CABG surgery.

In vivo evaluation of third generation hybrid aortic graft using SPIDER technique for thoracoabdominal aortic repair

Awards

Young Investigator Award programme

EACTS is grateful to Edwards Lifesciences SA for their generous support of this year’s Young Investigator Award programme.

<table>
<thead>
<tr>
<th>Time</th>
<th>Presentation</th>
<th>Room</th>
<th>Session Title</th>
<th>Presenter</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:30</td>
<td>The FIFA-trial. Fitness-tracker assisted Faddly Assessment before transcatheter aortic valve implantation</td>
<td>Auditorium 6</td>
<td>TAVI – New approaches and data from the real world</td>
<td>Markus Mach</td>
</tr>
<tr>
<td>09:45</td>
<td>Safety and Efficiency of Continuing Aspirin during the Perioperative Period of Lung Resection — A Propensity Score-matched Analysis</td>
<td>Room BB, Pav 3</td>
<td>Non Oncology</td>
<td>Takashi Sakai</td>
</tr>
<tr>
<td>11:15</td>
<td>Acute Aortic Dissection Complicated by Cerebral Mispresentation. Complete Vascular Remodeling Utilizing the AMIDS Arch Remodeling Device</td>
<td>Room BB, Pav 5</td>
<td>EMBRACING THE AORTIC ARCH</td>
<td>Sabir Mozio</td>
</tr>
<tr>
<td>12:15</td>
<td>Mapping Pre-Dissection Aortic Growth: a multiparametric assessment</td>
<td>Room BB, Pav 5</td>
<td>EMBRACING THE AORTIC ARCH</td>
<td>Chuan Tian</td>
</tr>
<tr>
<td>13:30</td>
<td>Smartphone-based Effective Orifice Area charts</td>
<td>Auditorium 3+4</td>
<td>SMART new concepts and ideas you have not heard about before</td>
<td>Michiel Vissersdorp</td>
</tr>
<tr>
<td>14:30</td>
<td>Surgical Repair of Aortic Coarctation in Adults: Half a Century of a Single Center Cardiac Experience</td>
<td>Auditorium 2</td>
<td>Management of AF-DO</td>
<td>Damaris Edgbaston</td>
</tr>
<tr>
<td>15:30</td>
<td>Twenty-year follow-up of Bentall procedure using the Palmaz Procedure and the Valvular graft</td>
<td>Auditorium 1</td>
<td>The difficult choice of a prosthetic valve in the 21st century</td>
<td>Sana Chinchilli</td>
</tr>
<tr>
<td>16:30</td>
<td>Mitochondrial Transplantation for Myocardial Protection following Warm Global Ischemia. Repopulation in ex-vivo Perfused Diabetic Hearts</td>
<td>Room 10B</td>
<td>Tissue is the issue: collaborative insights from translational science</td>
<td>Anish Gauriando</td>
</tr>
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<td>17:30</td>
<td>Toll-like receptor 3 mediates ischemia metabolism in diabetic patients undergoing cardiac surgery</td>
<td>Room 10B</td>
<td>Tissue is the issue: collaborative insights from translational science</td>
<td>Can Calmusso-Tapalnyil</td>
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<td>Atrial fibrillation, increased EURO SCORE, low calcium, low contractility and high pentaxin-3 serum levels independently predict right heart function in elective CABG patients</td>
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<td>Complexity in Brief: Translational Research in Cardiac Surgery</td>
<td>Constanze Basing</td>
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<td>The genetics of cardiac energy metabolism in diabetic patients undergoing cardiac surgery</td>
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<td>Yama Nagaud</td>
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</tbody>
</table>

Friday 4 October

<table>
<thead>
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<th>Presentation</th>
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Saturday 5 October

<table>
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</tr>
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<tbody>
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<td>08:00</td>
<td>Survival after surgical ablation for atrial fibrillation in heart surgery: Proportion score matched analysis from the Polish National Registry of Cardiac Surgery Procedures (KROPS)</td>
<td>Auditorium 3+4</td>
<td>Approaches to minimise stroke and improve survival in atrial fibrillation patients</td>
<td>Markusz Kowalewski</td>
</tr>
<tr>
<td>09:00</td>
<td>Coagulation factors and fibrinolytic activity in heart chambers and effect on left atrial appendage closure on peripheral blood hemostasis and fibrinolysis in patients with atrial fibrillation</td>
<td>Auditorium 3+4</td>
<td>Approaches to minimise stroke and improve survival in atrial fibrillation patients</td>
<td>Radoslaw Ulitzewicz</td>
</tr>
<tr>
<td>10:00</td>
<td>Hemodynamic impact of aortic valve implantation</td>
<td>Pav 3</td>
<td>STABLE TIJEP (Aortic Valve-sparing Root Replacement in Patients with Bicuspid Aortic Valve: Long-term outcome with David I Procedure over 20 Years)</td>
<td>Alexandra Kowalewski</td>
</tr>
<tr>
<td>11:00</td>
<td>TAVI – interesting new approaches for thoracoabdominal aortic surgery: Spying on the practice ...</td>
<td>Auditorium 6</td>
<td>TAVI – innovations new data will influence your practice ...</td>
<td>Markus Mach</td>
</tr>
<tr>
<td>12:00</td>
<td>Aortic valve-sparing Root Replacement in Patients with Bicuspid Aortic Valve</td>
<td>Room 10B</td>
<td>EACTS-EACTA Joint Session: Repair of a regurgitant aortic valve</td>
<td>Erik Beckmann</td>
</tr>
<tr>
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<td>A direct correlation between Commissural Orientation and annular shape in aortic valves: a new anatomical and Computed Tomography classification</td>
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Snapshots from this year’s MITACS Course in Frankfurt, Germany

EACTS Daily News
Minimally invasive aortic valve replacement without visible scars – the next evolutionary step in aortic valve surgery

Conventional aortic valve surgery by full sternotomy is an extremely controlled and safe approach. It has been the gold-standard procedure for addressing aortic valve disease since Harken and Starr performed first surgical aortic valve replacement in 1960. Nonetheless, surgical aortic valve replacement is continuously challenged by catheter-based procedures and their ever-expanding indications. Indeed, the FDA expanded TAVR indications to low-risk patients just weeks ago.

TAVR, brings us one step closer to the aim of an individualised and tailor-made therapeutic concept. The ever-expanding indications and better cosmetic outcome. To meet these issues, surgery consequently has to implement minimally invasive techniques. For upper partial sternotomy surgery consequently has to implement minimally invasive aortic valve replacement without visible scars – the next evolutionary step in aortic valve surgery.

For detailed planning, and to rule out unsuitable patients, a preoperative 3D-reconstructed computed-tomography scan of the chest and heart is necessary. Through a small skin incision in the right anterior axillary line, the third intercostal space is opened. Extracorporeal circulation is established by femoral cannulation. After placing the soft tissue retractor and pericardial stay sutures, an impressive exposition of the aortic valve can be achieved.

The simplicity of the technique translated into short procedural times (median 1-hour 55 min) and short cross-clamp times (median 45 min). All patients were discharged successfully from hospital without peri-procedural morbidity, and follow-up until now has been uneventful.

Of course, “one size does not fit all,” but this complimentary technique can easily be established and, together with the other access routes and TAVR, brings us one step closer to the aim of an individualised and tailor-made therapeutic concept.
Safety and efficiency of continuing aspirin during the periperaoperative period of lung resection — a propensity score-matched analysis

Takashi Sakai, Keiju Aokage, Shinya Katsumata, Shoko Nakasone, Satoshi Okada, Kentaro Tame, Tomohiro Miyoshi, Masahiro Tsubo
Department of Thoracic Surgery, National Cancer Center Hospital East, Kawasaki, Japan

Abstract

Prognostic assessment of valvular surgery in active infective endocarditis: Multicentric nationwide validation of a new score developed from meta-analysis

Laura Varela Barca1, Borja M. Fernández-Feliú1, Enrique Navas Elorza1, Carlos A. Mestres1, Patricia Muñoz1, Gregorio Cuerpo-Caballero1, Hugo Rodríguez-Abella2, Miguel Montecho-Baranda2, Raquel Artigas3, Francisco Gutiérrez Díez4, Miguel Ángel Goenaga5, Eduardo Quintana6, Guillermo Ojeda-Burgo5, Arístides de Alarcón7, Laura Vidal-Bonet8, Tomasa Centella Hernandez9 and José López-Menéndez10-12 on behalf of the Spanish Society of Cardiology Endocarditis — Grupo de Apoyo al Manejo de la Endocarditis Infecciosa en España (GAMES)

1. Department of Cardiovascular Surgery, University Hospital Son Espases, Palma de Mallorca, Spain; 2. University of Alcalá de Henares, Madrid, Spain; 3. CIBER Epidemiology and Public Health (CIBERESP), Clinical Biostatistics Unit, Hospital Ramon y Cajal (HRYC), Madrid, Spain; 4. Department of Infectology, University Hospital Ramon y Cajal (HRYC), Madrid, Spain; 5. Department of Cardiovascular Surgery, University Hospital Zurich, Zurich, Switzerland; 6. Department of Clinical Microbiology and Infectious Diseases, University Hospital Gregorio Marañón, Madrid, Spain; 7. Department of Cardiovascular Surgery, University Hospital Gregorio Marañón, Madrid, Spain; 8. Department of Cardiovascular Surgery, University Hospital Cruces, Bilbao, Spain; 9. Department of Cardiovascular Surgery, University Hospital La Fe, Valencia, Spain; 10. Department of Infectology, University Hospital Donostia, San Sebastian, Spain; 11. Department of Cardiovascular Surgery, Hospital Clinica de Barcelona, Barcelona, España; 12. Department of Infectology, University Microbiomedicine of Seville (IBiS), University of Seville/CSIC/University Hospital Virgen de la Victoria, Malaga, Spain; 13. Clinical Unit of Infectious Diseases, Microbiology, and Preventive Medicine Infectious Diseases Research Group, Institute of Biomedicine of Seville (IBiS), University of Seville/CSIC/University Hospital Virgen del Rocío, Seville, Spain; 14. Internal Medical Cardiology, University Cardiovascular Surgery, University Hospital Ramón y Cajal, Madrid, Spain.
Video-assisted thoracoscopic thymectomy is feasible for large thymomas: a propensity matched comparison

Wenhan Weng1, Xiao Li1, Shushi Meng2, Xianping Liu2, Peng Peng2, Zhenfan Wang2, Jianfeng Li1, Jun Wang1

1. Department of Thoracic Surgery, Peking University People’s Hospital, Beijing, China; 2 Peking University Health Science Center, Beijing, China

Video-assisted thoracoscopic thymectomy (VATT) is becoming the preferred approach for early-stage thymomas. However, large thymomas are still recognised as a relative contraindication due to the possible risk of incomplete resection or capsular disruption. Thus, the aim of this study is to evaluate the feasibility of VATT for large thymomas.

Patients diagnosed with Masaoka Stage I–IV thymomas between April 2001 and December 2018 were retrospectively reviewed. All patients were divided into two groups: thymoma < 5.0 cm (group A) and thymoma ≥ 5.0 cm (group B). Propensity score matching (PSM) was performed to compare postoperative results. Recurrence-free survival (RFS) and overall survival (OS) were compared for oncological evaluation.

A total of 346 patients were included in this study. In the PSM analysis, 126 patients were included both in group A and group B. There was no significant difference between these two groups in terms of the R0 resection rate (95.2% vs 94.4%, p = 1.003), conversion rate (1.6% vs 3.2%, p = 0.684), operation time (119.4 ± 48.4 min vs 139.1 ± 46.6 min, p = 0.995), blood loss (93.2 ± 231.7 ml vs 100.5 ± 149.3 ml, p = 0.648), duration of chest drainage (2.7 ± 1.6 days vs 2.8 ± 2.0 days, p = 0.184), duration of hospitalisation (5.0 ± 3.9 days vs 5.2 ± 2.9 days, p = 0.628) or postoperative complications (9.9% vs 8.5%, p = 0.068). There was no significant difference between these two groups in terms of the OS (p = 0.271) and RFS (p = 0.288).

Tumour size is not a prognostic factor for thymoma and does not influence stage4, but the appropriate tumour size for VATT still remains debatable. In the present study, there was no significant difference found between smaller and larger thymomas in any perioperative outcome. In addition, tumour size was not a predictive factor for OS and RFS. Thus, from our perspective, large thymomas should not be contraindicated for VATT. During actual clinical practice, we prefer VATT for almost every thymoma condition (including vascular involvement), except for invasion of the SVC, aorta and pulmonary artery trunk. Furthermore, the reality of an operation may sometimes not be in accordance with the imaging which is evaluated preoperatively. Therefore, we wanted to attempt VATT for almost every patient with thymomas, converting to open thymectomy to remove residual thymic cells that are invisibly distributed in the anterior mediastinal fat tissue to improve the remission rates of MG.

In conclusion, VATT is a safe and effective approach for large thymomas (≥ 5 cm) with comparable surgical and oncological outcomes. The size of the thymomas should not be a contraindication for VATT.
Critical tetralogy of Fallot: right ventricle to pulmonary connection vs systemic to pulmonary artery shunt for first-stage palliation

Rapid Response  | Congenital  | Congenital Rapid Response 1

More than 40 years’ experience of tetralogy of Fallot repair: Impact of preserving pulmonary valve annulus and minimizing right ventriculotomy

Yoshikazu Ono1, Takaya Hoashi1, Masatoshi Shimada1, Kenta Imai1, Motoki Komori1, Kenichi Kurosaki1, Hajime Ichikawa1
1. Department of Pediatric Cardiovascular Surgery; 2. Department of Pediatric Cardiology, National Cerebral and Cardiovascular Center, Suita, Osaka, Japan

Right ventricular outflow tract reconstruction (RVOTR) is problematic during the repair of tetralogy of Fallot (TOF) compared with the closure of a large and malaligned ventricular septal defect (VSD) through the transannular patch (TAP). While RVOT obstruction can be relieved without right ventriculotomy (RVotomy) if possible1-3, there is no choice except the transannular patch (TAP) augmentation in RVOT in patients whose pulmonary valve annulus is too small, whose right ventricular inlet-outlet has long segmental stenosis, or when VSD is of the total conus defect type. Starting from the idea that right ventriculotomy adversely affects long-term outcomes after TOF repair, we compared the clinical courses of TOF repair of three different surgical procedures: preserving pulmonary valve annulus (PPVA) without RVotomy, PPVA with RVotomy, and transannular patch (TAP). Additionally, the effect of the length of RVotomy at TAP was analyzed. Four-hundred and forty consecutive patients were enrolled, aged less than 10 years, who underwent TOF repair from 1978 to 2003; 242 patients (55.0%) underwent TAP, 92 patients (20.3%) underwent PPVA without RVotomy, and 106 patients (23.4%) underwent PPVA with RVotomy. Patients who underwent PPVA with RVotomy were the oldest patients. Shunt palliation was most frequently performed in TAP. The median follow-up period was 21.8 years (inter-quartile range: 10.7–27.6 years). Actuarial survival rate at 20 years was 95.3% in PPVA vs 91.2% in TAP, and 92.2% in PPVA without RVotomy. Although patients who underwent TAP tended to show worse long-term life prognosis and freedom from both atrial and ventricular arrhythmia compared with patients who underwent PPVA with RVotomy, no significant differences were identified between the outcomes in patients who underwent TAP and PPVA with RVotomy. This finding suggests that minimizing the RVotomy was more advantageous than preserving the native pulmonary valve annulus in providing long-term arrhythmia-free survival. For TAP, avoiding too much minimization of the RVotomy was necessary for better long-term arrhythmia-free survival. However, this study demonstrated that excessive minimization of the RVotomy was not required. Appropriately sized RVotomy for dpTAP is therefore thought to provide necessary and sufficient relief of the RV outflow tract obstruction.

References
Is long duration of cardiopulmonary bypass a contraindication for on-table extubation after paediatric cardiac surgery?

Rajnish Garg, N. Julia Children's Hospital, Dubai

In the last few years, there has been an increasing trend towards the practice of on-table extubation after corrective or palliative paediatric cardiac surgery. A number of authors have reported successful on-table extubation in children undergoing complex congenital repairs – even in the neonatal age group. Long duration of cardiopulmonary bypass (CPB) time is often cited as one of the main reasons for failing to practice on-table extubation in paediatric patients. Since we have practiced on-table extubation for the last six years without considering CPB duration, per se, as a contraindication, the aim of the study was to retrospectively analyse data of all the patients who had long CPB (>180 minutes) and to find out how many of them were extubated on-table.

The data were reviewed for age, complexity of the procedure, duration of CPB, haemacotroc, use of conventional and modified ultrafiltration and requirement of additional fluid in the reservoir. Patients were categorised with respect to age and duration of CPB. The total number of patients extubated on-table in each category was recorded. Reason for failure to extubate was noted. Data was also analysed for reintubation, morbidity and mortality in extubated patients. A total of 63 patients had CPB duration > 180 minutes, anaesthetised with standardised protocols. The number of patients who had CPB duration of 180–300/300–400/>400 minutes were 46/7/9, respectively. Age-wise there were 15/32/16 neonates/infants/children, respectively. All patients underwent pre-bypass, conventional and modified ultrafiltration. Haemacotroc was always kept above 27% in infants/children and above 30% in neonates during CPB, and above 35% and 45%, respectively, after weaning from CPB, with the help of conventional and modified ultrafiltration. Fifty-six patients (88%) were extubated on-table. None of these patients had mortality or required re-intubation in the intensive care unit. CPB is associated with several cascade activations with consequent pro-inflammatory mediators released into the circulation, leading to systemic inflammation response syndrome (SIRS) which is exaggerated in prolonged CPB. A number of pharmacological and non-pharmacological interventions are postulated to minimise CPB-triggered SIRS, such as corticosteroids, ultrafiltration, heparin coated circuits, aprotinin, leukotriphenol, optimal haemacotroc and miniaturisation of circuits. However, there is not enough evidence for most of these strategies as the choice of treatment. We used corticosteroids, ultrafiltration, optimal haemacotroc and miniaturisation of circuits as our strategies to minimise CPB-triggered SIRS. One of our criteria for on-table extubation is not to have any surgical concerns which can lead to surgical reintervention. So, complete structural repair, without correctable residual defects, was our goal as it is more important than CPB time or worrying about a second-run CPB.

We conclude that long duration of CPB is not a contraindication for on-table extubation. Complete structural repair, strategies to minimise SIRS, avoidance of haemodilution, ensuring adequate venous drainage to prevent addition of extra volume and consequent interstitial oedema along with proper anaesthetic management potentially help in achieving on-table extubation.

Prevalence of permanent pacemaker implantation after conventional aortic valve replacement – a propensity-matched analysis in patients with a bicuspid or tricuspid aortic valve: A benchmark for TAVR

Josephina Haunschild, Martin Misfeld, Thomas Schroeter, Frank Lindemann, Pirroze Davierwala, Ricardo A. Spampinato, Stefan Weiss, Michael A. Borger, Christian D. Ettz

Over the past years, the indication for transcatheter aortic valve replacement (TAVR) has expanded from predominantly elderly, multi-morbid, high-risk patients to young, low- and intermediate-risk patients who are equally eligible for conventional or possibly minimally invasive surgical aortic valve replacement (SAVR). These younger patients with early aortic valve dysfunction frequently carry a bicuspid aortic valve (BAV up to 30% in contemporary series), even though this abnormality typically affects between 0.5–2% of the general population. Despite improvements in valve prostheses and deployment systems, conduction disturbances remain the most common – and frequently understated – complication after TAVR, especially high-degree atrioventricular block or complete heart block, with a potentially significant impact on longevity and quality of life. In contemporary clinical studies, BAV patients – although frequently younger – are affected by the highest pacemaker implantation (PMI) rates (up to 14%) when compared to their tricuspid peers.

We performed a retrospective single-centre analysis of 4,154 patients receiving isolated SAVRs (w/o concomitant procedures), between 2000 and 2019, of whom 1,108 had a BAV (27%). PMI rate, early- and long-term outcomes were analysed. For better comparability of these demographically unequal cohorts, 1:1 nearest neighbour matching was performed. After matching, PMI rate in BAV patients (94 vs 90% in TAV at 5 years; 89 vs 82% in TAV at 9 years; p = 0.013). With SAVRs, the overall incidence of PMI among BAV-patients seems significantly higher, however after propensity matching no difference in PMI rates between BAV and TAV is evident. The PMI rate was remarkably lower among BAV patients after SAVR compared to reported incidence after TAVR. This large retro-spective single-centre analysis suggests contemporarily reported PMI rates to be two-fold higher in TAV and three-fold higher in BAV patients undergoing TAVR, as compared to conventional SAVR.
Annuloplasty for aortic valve repair: A practical approach

An EACTS technical course on aortic valve repair: March 9-11, 2020: Paris, France

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

Recent EACTS/EACTS guidelines for heart valve diseases recommend a heart-team discussion to evaluate aortic valve reparability and aortic valve repair using the re-implantation or remodeling with aortic annuloplasty technique, in young patients with aortic root dilation and tricuspid aortic valves. (Figure 1).

However, despite an increased level of evidence that aortic valve repair — when compared to the use of a prosthetic valve — leads to fewer valve-related complications, as well as a better quality of life, it is still rarely performed. This fact brings into question the lack of technical standardisation of valve-sparing / repair procedures aimed at improving reproducibility and reducing the risk of re-repair. The Level 3 EACTS technical course on aortic valve repair offers, for a limited number of attendees, an in-depth 2.5-day training course on standardised approaches to aortic valve repair with external aortic ring annuloplasty.

Good candidates for aortic valve repair are patients with pliable, non-calcified tricuspid or bicuspid valves who have type I (enlargement of the aortic root with normal (cusp) motion) or type II (cusp prolapse) mechanisms of aortic insufficiency. Depending on whether the sinuses of Valsalva and/or the tubular ascending aorta are dilated, these phenotypes can be individualised:

1. Dilated root aneurysms (sinuses of Valsalva 45 mm); 2) dilated tubular ascending aortic aneurysms (sinuses of Valsalva 40–45 mm); 3) isolated aortic insufficiency (all diameters < 40–45 mm).

According to each phenotype, a standardised approach to valve repair was developed based on: 1) dynamic preservation or reconstruction of the aortic root; 2) cusp geometry and effective height assessment of the valve; and 3) an external aortic ring annuloplasty to increase the surface of coaptation and protect the repair (Figure 2).

The objective of this Level 3 EACTS technical course is to offer a standardised approach for aortic valve repair with external aortic annuloplasty, providing a step-by-step process including patient selection, echo valve analysis and technical standardisation for a reproducible repair, according to each phenotype of the aorta. As this course reflects the multi-disciplinary aspect of aortic valve repair, course delegates could include cardiac surgeons and echocardiographers (cardiologists and anaesthesiologists) who are willing to start, or are already part of, a valve-sparing aortic root replacement and aortic valve repair programme. Advanced residents interested in the field of valve repair are also welcomed.

The course will provide in-depth training of aortic valve repair from valve-sparing root replacement, to isolated aortic annuloplasty for tricuspid, bicuspid and unicusp valves. The aim is to integrate state-of-the-art into daily practice, as well as to challenge current knowledge via lectures from international faculty. Presentations will address anatomical issues, technical choices and limitations of guidelines, the selection of patients as well as detailed surgical techniques in aortic valve repair, in these current outcomes.

The course will also feature live surgeries, offering a fascinating overview of the whole procedure which will be combined with a short video session illustrating specific lesions related to the type of case. Technical issues will be addressed in detailed step-by-step fashion, including standardisation of management of the valve with assessment of cusp geometry and effective height, as well as aortic annuloplasty techniques to protect the repair. Specific facets of aortic dissections as well as the paediatric population will be addressed. In addition, the surgical strategy of valve replacement for non-elderly patients will be addressed including the Ross procedures and Dixie type procedure with decellularised patches.

The programme will also include a ‘failure session’, in which attendees will discuss cases at the way for echo analysis to surgical repair, learning how to identify predictors of repair failure as well as the balloon techniques available to them when such situations arise.

The course will end with a wet lab which will bring together the theoretical knowledge with a practical application on anatomical heart in the historical laboratory of anatomy, du Fer à Moulin in Paris.

This Level 3 EACTS Aortic valve repair technical course, ‘Annuloplasty for aortic valve repair: A practical approach’ will take place in H-1 March, 2020 in Paris, France. For registration (or a limited number of attendees), the programme and other details, head to the course website at: http://www.eacts.org/academy/courses/master-class-on-aortic-valve-repair/.

References
European multicentre assessment of mitral repair strategies using patient-specific valve replicas

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Abstract

Multicentre assessment of mitral repair strategies is needed in order to move this technique towards greater standardisation.

Methods

For this purpose, our research group created silicone replicas of patient-specific mitral valves (Figure 1)3,4. Using patient-specific valve replicas, we aimed to evaluate surgeons’ perception of the repair strategies they would approach to repair it, and indicate which strategy they would choose for the different pathological valve annulus size. We believe that a broader approach to repair it; and indicate which

Results

Interestingly, there was a systematic and significant over sizing of the prosthesis implanted during surgery (average suggested ring size +4.5 sizes) in our model, despite the fact that intraoperatively, a triangular P2 resection and a Physio II ring of size 32 mm was implanted. It has to be noted that models are obtained using a ‘snapshot’ of valves in the beating heart (end-systolic phase), and are endowed with the shape and structure of such a situation, while traditional ring sizing is carried out on the flaccid cardioplegic heart. We mainly attribute the differences in functional state of the model and the intraoperative cardioplegic heart to this fact, since there are only minor manufacture errors. Furthermore, we calculated the effective orifice area (EOA) of the end-systolic valve and Physio II ring models. The difference between end-systolic EOA (1731.44 mm²) and the EOA of the 32-mm ring size (implanted during surgery, ~625.45 mm²) was 64%. The difference of the 36-mm ring size (EOA ~786.55 mm²); the mean size implanted by surgeons in our study) is 54% (Figure 2). We believe that this difference of EOA could lead to a functional increase in transvalvular diastolic gradients with possible clinical consequences, above all, during exercise.

Conclusions

Our study confirms that sizing technique is strictly dependent on the surgeon and should be considered with care to avoid underestimation of the annulus size. We believe that a broader reflection regarding the subjectivity of mitral repair strategies is needed in order to move this technique towards greater standardisation.

References


Figure 1. Patient-specific mitral valve replica.

Figure 2. Illustration of the the valve model together with the intraoperatively chosen ring size and the maximally commercially available ring size (40 mm).

STSc/EACTS Latin America Cardiovascular Surgery Conference
November 22 - 24, 2019 | ICC | Cancun, Mexico

Programme Information

The programme will concentrate on the multidisciplinary approach to coronary artery disease, valvular heart disease, thoracic aortic disease, atrial fibrillation, and the surgical management of heart failure as well as additional tracks covering congenital heart disease, research, database, leadership and fellowships.

Sessions will incorporate invited lectures from a world-class international faculty, including experts from Europe, Latin America, and North America, on traditional and new technology procedures, plus technical videos and original scientific abstracts. New this year, we have introduced a number of webinar and simulator sessions on Sunday 24 November, providing participants with an opportunity to hone their skills in small supervised training groups.

Learning Objectives

Upon completion, participants should be able to:

- Evaluate the impact and the application of new knowledge and technology on the treatment of cardiovascular diseases
- Discuss surgical techniques in order to improve the standard of care for cardiovascular patients
- Review the results of clinical and laboratory investigations designed to reveal new knowledge of cardiovascular disease
- Describe the multidisciplinary approach to coronary artery disease, valvular heart disease, thoracic aortic disease, atrial fibrillation, and the surgical management of heart failure
- Discuss quality improvement as it pertains to pediatric cardiac surgery
- Describe new surgical strategies in neonates and children with congenital heart disease.

Target Audience

This conference is intended for:

- Cardiothoracic surgeons
- Cardiovascular surgeons
- Cardiologists
- Anesthesiologists
- Perfusionists
- Physician assistants
- Nurses
- Other health care professionals interested in the topic

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Abstract | Cardiac | Current challenges in heart transplantation

The association between psychiatric problems and parental coping strategies in adolescents with left ventricular assist devices and heart transplantations

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Psychological impairments in children following heart transplantation are associated with parental coping strategies. The aim of the study was to determine the association between parental coping strategies and the psychological impairment in adolescents with left ventricular assist devices (LVAD) and adolescents who underwent heart transplantation (HTx) and to investigate the psychological impairments in children following heart transplantation.

A total of 25 patients with end-stage cardiac failure were reviewed for this study. Twelve of them were recruited (HTx [n = 8], LVAD [n = 4]). K-SADS (Schedule for Affective Disorders and Schizophrenia for School-Aged Children) was administered to detect the psychiatric diagnosis of the patients. The Children’s Depression Inventory (CDI), State-Trait Anxiety Inventory (STAI), Childhood Sleep Habits Questionnaire (ECSHQ), and Pediatric Quality of Life Inventory were filled by the participants.

To evaluate the coping styles of the parents, participants’ mothers completed the Brief Coping Styles Inventory. All of the LVAD cases and 25% of the HTx cases had an internalizing disorder (depressive and anxiety disorders). Compared to the HTx group, the LVAD group had significantly higher depressive symptom scores (p = 0.048). When we allocate the groups according to the presence of an internalizing disorder, as a way of coping strategy the “optimistic approach” scores were significantly higher in the mothers of the cases without an internalizing disorder (p = 0.003). Although both the LVAD and the HTx cases were at risk for internalizing disorders, the LVAD cases were more inclined to have psychiatric symptoms. This result may be explained by the fact that the LVAD cases have to admit a life that is far from normal and their caregivers and themselves have to adapt their lifestyles to these changes. Besides, the long waiting period for HTx and low possibility of HTx are other factors that increase the psychological stress of patients with LVAD.

However, the caregivers’ optimistic coping strategy may be a protective factor against internalising disorders for these patient groups. Optimism is described as an individual’s tendency to expect positive results in potentially negative situations. Optimal individual mental health problems as external and temporary, and they can be more easily cope with serious health threats, admit reality, and take actions to reduce health risks.

Thus, it seems that the caregiver’s coping strategies may be better examined in each case, and families supported by psychologists, cardiologists, and coordinators.

Furthermore, cognitive restructuring and problem-solving training techniques can be used by psychiatrists to enhance the active-monitoring, optimistic approach in the caregivers. A future multi-centred, prospective, large-scale longitudinal study should be planned to assess the effect of parents’ coping strategies on the psychopathology of the cases.

Reference

Focus Session | Congenital | Knowledge Generation in Congenital Heart Surgery

Late arterial switch and the pursuit of left ventricular fitness: limits and “hopes”

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In transposition of the great arteries with intact ventricular septum (TGA/IVS), the left ventricle (LV) – with a mass at birth equivalent to that of the right ventricle – undergoes a period of “deconditioning”, eventually losing the ability to function against a systemic afterload. At a cellular level, this involution corresponds to the transition from an early hyperplastic phase of both myocytes and capillaries to a myocyte hypertrophic phase within few postnatal weeks.

Therefore, an arterial switch operation (ASO) for TGA/IVS is advisable within the first month of life, ideally at one week. Nevertheless, a primary ASO has been safely accomplished up to 6-8 weeks after birth with occasional requirement for temporary mechanical circulatory support to manage postoperative LV failure. Beyond the neonatal period, a patient with TGA/IVS becomes a “late presenter” with an increasingly age-dependent unsuitability of the LV for systemic work, though it differs from patient to patient.

Hence, there is a need for a period of LV “retraining” to regain adequate myocardial mass and qualify for ASO. For this purpose, two methods have been adopted: 1) Pulmonary artery banding combined with a Blalock-Taussig shunt, capable of eliciting an increase in LV myocardial mass by virtue of combined pressure-volume overload hypertrophy (retraining). Here, the subsequent staged ASO becomes feasible as early as 1-2 weeks in infants (later with aging). 2) Secondary mechanical circulatory support (ECMO, VAD) in the (rare) cases of LV failure following a “late” primary ASO (hormonic retraining).

As specified in the guidelines, there are strict criteria governing both indications and their timing. Unfortunately, in older infants and children, there is no clear-cut evidence that a normal myocardium will develop. Indeed, despite being anatomically adequate, the increase in LV mass mostly depends on myocyte hypertrophy with a pattern of concentric (± eccentric) hypertrophy. From a functional point of view, the initially compensated “physiologic hypertrophy” may evolve into “pathologic hypertrophy”, commonly associated with upregulation of fetal genes, fibrosis, cardiac dysfunction and increased mortality. In fact, experience with pulmonary artery banding in late TGA/IVS presents is disappointing overall, with slower development of adequate LV mass, less satisfactory LV function and even leads to unsuitability for secondary ASO.

A realistic upper age limit for a successful staged ASO is unknown, but based on the scant available information, any attempt at LV retraining in TGA/IVS beyond two years of age is likely doomed to failure. Therefore, an arterial switch may still have a role in the older population, yet with many limitations.

In conclusion, the current quest for LV “fitness” in late TGA/IVS presenters relies only on physical methods, i.e. by increased afterload/preload challenges, and cannot confer adequate and durable LV endurance. Is there an alternative? Recent research advances in cell therapy, aimed at enhancing ventricular function in congenital heart anomalies (particularly single ventricle), might suggest new paths of treatment of this group of patients based on increased cellularity. 
Real-world cost-effectiveness of thoracoscopic versus open oesophagectomy for oesophageal cancer: a nationwide population-based study

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Surgery remains the cornerstone of curative treatment for oesophageal cancer. However, oesophagectomy is a highly complex procedure, and despite advances in perioperative management, morbidity and mortality after oesophagectomy remains high. Over the last two decades, video-assisted thoracoscopic oesophagectomy (VATE) has gained increasing popularity owing to its capacity to provide an improved magnification and precise tissue dissection. In several randomised clinical trials, VATE has been shown to result in a significant reduction of postoperative mortality and morbidity compared with open oesophagectomy (OE).

However, VATE is known to incur an increased surgical expense due to the endoscopic system, specialised instruments, and disposable surgical materials, and it is unknown whether the benefits associated with VATE outweigh the increased costs. As health care budgets are becoming increasingly constrained, the cost-effectiveness of new medical technologies and surgical techniques should be established before widespread adoption. To our knowledge, the real-world cost-effectiveness of VATE versus OE has rarely been reported. In the current study, we aimed to estimate the cost-effectiveness of VATE versus OE for oesophageal cancer patients at a population level.

We identified 3304 oesophageal cancer patients who received transthoracic oesophagectomy and gastric tube reconstruction between 2008 and 2015 through a comprehensive population-based database containing cancer and death registries, and reimbursement data. To reduce the selection bias, we included eight potential confounding covariables (age, gender, comorbidity, histology subtype, clinical stage, tumour location, use of preoperative therapy, pathology stage) and used propensity scoring (PS) to construct a 1:1 match sample. The duration of interest was three years after surgery. Effectiveness was measured by the life expectancy after surgery and cost was measured by direct costs including medical expenditures paid by the National Health Insurance Program and co-pay of patients in Taiwan. Life expectancy was projected by a Weibull model. We took the societal perspective and converted the cost to 2017 United States dollars (USD).

Our population consisted of 942 PS-matched subjects. VATE was associated with a significantly higher numbers of lymph-node dissections (25.79 vs 19.39, p < 0.001) and lower 30-day mortality rate (2% vs 3.7%, p = 0.027) compared with OE. VATE had higher index-hospitalisation cost (13,447 USD vs 11,831 USD, p < 0.001) while the difference diminished and became insignificant for the long term. The survival was higher for VATE compared with OE (three-year overall survival: 45% vs 40%). The life expectancy was 3.78 years for VATE and 3.26 years for OE, respectively. Cost-effectiveness showed that that 49.2% of VATE was less costly but more effective, while only 0.5% of VATE was more costly and less effective than OE (Figure 1). The probability of VATE being cost-effective was 0.497, 0.897 and 0.965 at willingness-to-pay (WTP) thresholds of 0, 50,000 and 100,000 USD/life-year, respectively (Figure 2).

In the current study, we provided empirical evidence that when compared to OE, VATE was cost-effective within common WTP levels.
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