The number of devices used for thoracic endovascular aortic repair (TEVAR) is growing. Stent grafts and their delivery systems’ designs differ substantially. The success of TEVAR is based on the correct use of stent graft delivery systems, and on identifying and understanding radiopaque markers and the new stent graft’s accurate placement. Not just in the emergency situation, but also shortly before elective TEVAR procedures, it may be helpful to quickly review the instructions on how to use the device to avoid device-related complications. Many centres have more than one kind of TEVAR system at hand. The total number of TEVAR interventions per year, per centre is on how to use the device to avoid device-related complications. Many centres have more than one kind of TEVAR system at hand. The total number of TEVAR interventions per year, per centre is not always high. The quick and easily accessible information on TEVAR devices may aid those who perform TEVAR, and lower the number of adverse events.

More and more TEVARs are in fact reinterventions in patients with one or more stent graft prostheses already in place. Understanding what the radiopaque markers mean attached to an already-implanted stent graft is essential when planning and performing a TEVAR intervention. At present, there is no single data source providing information of this nature on all the common TEVAR devices currently available.

**TEVAR App**
The TEVAR App is the first app for smartphones and tablets providing information on most of the TEVAR devices currently in use (Figures 1 and 2). Until now, there has been no other similar platform. This app has been developed as a reference tool for TEVAR procedures. It contains summarised instructions together with animations, demonstrating the stent grafts’ deployment, as well as troubleshooting information on how to solve unexpected problems during implantation. The TEVAR App includes size tables that illustrate the diameter and length of each stent graft, as well as the outer diameters of the delivery system catheter. There are diagrams of each device showing the locations of radiopaque markers, their shape and meaning. Furthermore, the TEVAR App contains stent graft and delivery system photographs and chest X-rays, designed to help the user to visualise what the stent graft will look like on fluoroscopy. It helps evaluate the immediate result after stent graft deployment in the operating room, and can aid in planning a reinvention in patients with already-implanted stent grafts. The TEVAR App also includes information on magnetic resonance (MR) safety and compatibility, which is important since relatively young patients also undergo TEVAR, and MR (which requires no ionising radiation) is an attractive diagnostic tool in this patient group.

The TEVAR App is cost-free, and its development has not been financed by industry. It is a non-profit project with the aim to educate and help physicians carrying out TEVARs. It is easy to use. Once downloaded on the smartphone or tablet, it requires no internet access. It helps you plan and prepare for TEVAR without having to seek information from different sources. The TEVAR App has been available online since 25 July, 2015 and can be downloaded in the App Store for free by searching for ‘TEVAR App’.

**TEVAR Calculator**
The TEVAR App contains the TEVAR Calculator, which has been designed to assist the surgeon when planning stent graft size according to indicated device, individual aortic dimensions and desired oversizing factors. The TEVAR Calculator suggests the most appropriate stent graft sizes and also provides information on the minimal and true length of the overlapping zone between stent grafts and the factual proximal and distal oversizing factors.

**Conclusions**
The TEVAR App is a novel guide to thoracic endovascular aortic repair. It provides key information that is quick to access and easy to understand on the thoracic aortic stent grafts currently available.
in coronary artery and peripheral bypass surgeries. In addition to being buffered, DuraGraft is synergistically designed with components that preserve the overall structure and functionality of grafts whose performance is critical to successful patient outcomes. Professor John Pepper of the Royal Brompton Hospital will discuss the significant clinical outcomes when DuraGraft is used.

Medistim is an innovator and market leader within intraoperative Transit Time Flow Measurement (TTFM) and ultrasound imaging for surgical guidance and quality assessment. Medistim is serving the global market with the devices VeriQ™, VeriQ C™ and the latest generation, MiraQ™. These systems enable medical professionals to reduce risk and enhance quality of cardiac, vascular and transplant surgery.

Dr. Daniel Wendt of West German Heart Center Essen will present their experience with the combined use of TTFM and High-frequency Ultrasound Imaging to ensure successful clinical outcomes. VGS develops external scaffolds for saphenous vein grafts (SVG) improving their longevity and the clinical outcome of peripheral and coronary bypass surgery. VEST, the company’s leading product, is the only available technology that has demonstrated clinical effectiveness in mitigating SVG intimal hyperplasia and improving lumen uniformity and hemodynamics. In use in more than 40 leading heart centers across Europe, VEST offers the cardiac surgeon a hybrid conduit which combines the benefits of venous and arterial grafts. This simple tool, aims to drive a significant change in the clinical outcome of CABG. Prof. David Taggart (Oxford, UK) will present his clinical experience and discuss latest clinical results.

The luncheon will take place Monday October 5th, from 12:45–14:00 in Room E104/105 onsite at the RAI Amsterdam.
Cardiac – Focus Session: Update on the results and rationale and design of ongoing clinical trials

2-year CoreValve US pivotal high-risk randomised trial results

Michael J. Reardon
The Houston Methodist Hospital, Texas, USA

The CoreValve US pivotal high-risk trial randomised 797 patients at 45 US sites to transcatheter aortic valve replacement (TAVR) or surgical aortic valve replacement (SAVR). The 1-year results showed superior survival for TAVR versus SAVR.1 This was the first and only time superiority for TAVR over SAVR has been demonstrated in a randomised trial, so the durability of this advantage at 2 years is of great interest. The 2-year results of the trial are now available.2

In the 2-year analyses, Reardon et al. looked at factors considered important to the future position of TAVR. They examined all-cause mortality, stroke, major adverse cardiovascular and cerebrovascular events (MACCE), and valve haemodynamics. Additional analyses on complications were performed. All comparisons were done using a two-tailed log rank test.

The superior survival seen at 1 year with an absolute survival advantage of 4.8% increased to 6.5% at 2 years (22.2% versus 28.6%, p=0.04), demonstrating a sustained, durable and increasing survival advantage. Stroke has been a significant concern for both TAVR and SAVR. In this trial, to capture all neurologic events, all patients had a National Institute of Health Stroke Scale prior to their procedure, immediately after their procedure, and at all follow-up points. The modified Rankin Score was collected after any possible neurologic events. Changes triggered a neurologic consultation and appropriate imaging for the most rigorous neurologic evaluation to date when published. The incidence of any stroke for TAVR versus SAVR was 10.9% versus 16.6% (p=0.05) with a strong trend in favour of TAVR. Major stroke for TAVR versus SAVR was 6.8% versus 9.8% (p=0.25). The rate of MACCE, which was superior for TAVR versus SAVR at 1 year with an absolute advantage of 6.5% (20.5% versus 27.0%), increased its advantage at 2 years to 8.9% (29.7% versus 38.6%; p=0.01) for sustained, durable and increasing superiority. Core lab derived echocardiographic flow parameters of valve area and mean gradient were superior for TAVR at every time point post-procedure. Paravalvular leak as expected was less in SAVR versus TAVR at 2 years (0.6% versus 6.1%).

Extensive sub-group analysis that included age, sex, body mass index, Society of Thoracic Surgeons Predictor of Mortality (STS PROM) greater than or less than 7%, left ventricular ejection fraction, hypertension, previous coronary artery bypass grafting, peripheral vascular disease and diabetes mellitus, favoured TAVR in every group. Of interest to me as a surgeon were the patients with an STS PROM of <7%. In the higher-risk groups a surgeon can perform a perfect SAVR, but the patient may succumb to other comorbidities or frailty that prevents recovery from major surgery. As we move down the risk scale this should be less of a problem and the ability of TAVR to compete with SAVR should diminish. At 2 years the absolute survival advantage of TAVR over SAVR in the group with STS PROM of <7% was 11.3% (log rank p=0.01), which makes the results for the current randomised intermediate risk trials of great interest.

References

Cardiac – Focus Session: Safer surgery for who?

Bartlo Leigh
EACTS Solutions

Of man’s first disobedience, and the fruit Of that forbidden tree, whose mortal taste Brought death into the world, and all our woe

The last word of each of the first three lines of John Milton’s Paradise Lost encapsulate the creation myth that unites the Judaic, Christian and Islamic traditions. The forbidden tree was the tree of knowledge, so this myth is a challenge to doctors who believe that all knowledge is good.

Lawyers know that half of us must lose all the cases that go to trial. If doctors are sued you may seek out one of the lawyers who wins all their cases, but lawyers know that such people should be avoided. They take good care not to fight cases that could go either way, to ensure their statistics will continue to glow at the expense of your reputation and your indemnifier’s bank balance.

If I fall tonight with a dissecting aortic aneurysm I hope I will be carried swiftly into a hospital where one of you will be kind enough to take charge of my case. You may decide that my chances are pretty bleak and a sensible surgeon who has an eye on his own survival may well refuse to operate. My death will not appear in his statistics and he will be paid just as much for going back to bed as he would for staying up all night, fighting to save me. If his senior colleague is on duty, a man within sight of retirement whose statistics are so good that he can afford the risk, he may be more likely to have a go and if we are both very lucky I will survive.

It is of course true that the EuroSCORE II offers some protection to us both. But it ignores the fact that the usual anaesthetist, perfusionist and scrub nurse are away on leave or have been stricken with buplicic plague.

Even worse, the mortality does not attempt to distinguish those who die in ICU as a result of events that have nothing to do with the surgeon. Still they are all attributed to the surgeon – even if he falls down a lift shaft as one of you complained to me,. Lawyers have a rule that evidence is not admissible where the judge accepts that its prejudicial significance outweighs its probative value, and that may be the question here. In Britain we still cannot agree; some say it is making it much harder for some people to get surgery and young doctors are choosing safer specialties. Others that patients are not denied surgery because EuroSCORES are going up and that mortality is going down – there is a sort of Hawthorne effect because surgical data are being scrutinised. Critics say that the only things being pushed up by the Hawthorne effect are the EuroSCORES. This concerns doctors outside the UK and USA because there is a second creation myth, that our woes are to be attributed to the opening of Pandora’s Box. You will remember that once this was opened it could never be closed.

Those who get up early on Sunday 4 October can come and join in the debate about what to do with data that can now be collected. Sir Bruce Keogh, a former Secretary-General of EACTS and now one of the leaders of the NHS, says that if you do not know what your own results are then you have no right to operate. Does it follow that you must also publish them to the world?

Cardiac – Postgraduate Course: Extracorporeal life support devices and strategies for management of acute cardiorespiratory failure

Roberto Lorusso
Maasichi Heart & Vascular Medical Centre, Maasichi, the Netherlands

Extracorporeal life support (ECLS) is increasingly used in the presence of cardiac arrest, acute refractory cardiac dysfunction, severe respiratory distress syndrome, or concomitant significant cardiorespiratory compromise. Implantation of ECLS cannulae is a critical aspect of the clinical situation, the indication, type of support, and therapeutic strategy (bridge-to-recovery, bridge-to-transplant, bridge-to-bridge, bridge-to-decision, or bridge-to-destination therapy). Furthermore, new indications (sepsis, trauma, poisoning, and others) are providing new clinical scenarios and needs while planning ECLS with impact on type and modality of cannulation and access.

Historically, open surgical access, except veno-venous ECMO, was the most frequent mode of implant. Recent scenarios, mostly due to increased use in emergency situations, improved cannula design, and appraisal of sufficient support with reduced sizes, like 15 French-size,1 have pushed forward the application of ECLS through minimally invasive cannulation approaches by means of Seldinger technique. Although percutaneous cannulation is preferred for cardiac arrest patients, controversy remains as to whether to favour percutaneous implantation, generally taking advantage of existing indwelling arterial and/or venous introducers applied in the catheterisation laboratory, or directly exposing femoral vessels to provide better view and control, particularly in relation to distal compartmental syndromes should not be underestimated.4

References
**INTRODUCING THE NEW CAPIOX FX® ADVANCE OXYGENATOR – ENHANCED FLOW DYNAMICS AND EXPANDED PATIENT RANGE**

First launched in 2008, the CAPIOX FX Oxygenator pioneered a fully integrated arterial filter. Integrating the arterial filter into the oxygenator fiber bundle housing facilitates removal of gaseous and solid emboli without increasing the oxygenator’s priming volume. Compared to a conventional circuit with a separate arterial line filter, the CAPIOX FX significantly lowered priming volume and foreign surface area contact, helping to minimize the entire perfusion circuit.1

The CAPIOX FX Oxygenator is available in different sizes, allowing clinicians to choose the optimal oxygenator and reservoir combination based on the patient’s size and metabolic needs, a concept known as Prescriptive Oxygenation.2-5 Independent researchers have documented the CAPIOX FX15’s contributions to helping clinicians reduce prime volume and lower hemodilution, leading to fewer blood transfusions and reduced hospital costs.3,4 Building on the success of the CAPIOX FX Oxygenator, Terumo Cardiovascular Group is pleased to announce the introduction of the CAPIOX FX Advance Oxygenator. Advancements include an increased blood flow rate on the 3,000 mL reservoir – available on the CAPIOX FX15 Advance Oxygenator – and a lower minimum operating level on the 4,000 mL reservoir – available on the CAPIOX FX15 and FX25 Advance Oxygenators. The new CAPIOX FX Advance Oxygenator is currently pending CE Mark and is expected to be available for sale in Europe within a few months.

**CAPIOX FX Advance Oxygenator at a glance**

Available in two sizes – CAPIOX FX15 and FX25 Advance
- 3,000 mL Reservoir with increased Maximum Flow Rate of 5 L/min
- 4,000 mL Reservoir with lower Minimum Operating Level of 150 mL
- Straight connecting arm between oxygenator and reservoir

For further information, please visit us at the Terumo booth # 3.21 in Hall 3 and register for Terumo’s Perfusion Product Theater from October 4–6, 2015, Elicium Building, Room 408, 4th floor.

**References**

Introducing

CAPIOX® FX Advance Oxygenator

With Integrated Arterial Filter and Hardshell Reservoir

Patients come in all shapes and sizes — so do CAPIOX FX Oxygenators. Now, you can expand the use of CAPIOX FX Oxygenators through the enhanced flow dynamics¹ offered on the CAPIOX Advance Hardshell Reservoir.

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Visit Hall 3, Booth# 3.21
and learn about our new CAPIOX® FX Advance Oxygenator

Terumo Cardiovascular Group
Women in cardiac surgery: view from the United States

Dorothy Prentiss
College of Medicine, Houston, Texas, USA

The profession of cardiothoracic surgery, traditionally viewed as a male preserve, has a heritage of female surgeons that goes back to Greek myths and ancient Egyptian temple walls.1,2 Dr Mary Edwards Walker, who was only the second woman to graduate from a US medical school in 1855, became America’s first female surgeon.3 In 1943, Myra Adele Logan, who graduated from New York Medical College in 1903, became the first woman to operate on a human heart.3 In 1961, Drs Nina Starr Braunwald, Arni McKel, and Nermier Tuttunji became the first women certified by the American Board of Thoracic Surgery (ABTS), which had been established 13 years earlier. By 2011, a total of 200 female cardiothoracic surgeons had been certified by the ABTS.2 Unofficial data show that this number increased to approximately 274 in 2015. Among the Accreditation Council for Graduate Medical Education (ACGME) thoracic surgery residents and fellows in the United States in 2013, 20.2% (63/312) were female, as compared to only 17% in the 2010–2011 academic year.4 On average, these women undergo 9.1 years of training, and more than half receive additional non-ACGME training.5

With regard to subspecialties, women compose 3.4% of adult cardiothoracic surgeons, 5.2% of congenital cardiac surgeons, and 7.9% of general thoracic surgeons.6 Among the 450 active practicing thoracic surgeons in the United States in 2013, 248 (5.5%) were female.7 More than half of the female cardiothoracic surgeons in the United States have entered the profession since 2000, an indication of the current female workforce trend. According to a questionnaire study conducted in 2010, increased subspecialization, longer training, greater educational debt, and inadequate institutional support were major sources of discontent among female cardiothoracic surgeons.8 Despite the increasing number of women entering the surgical field, women are advancing to leadership positions in academic surgery at a slow rate. This slow advancement and underrepresentation may influence their career choices. Female cardiothoracic surgeons have come a long way, but we cannot rely on serendipity to increase the number of women in cardiac surgery. Everyone needs a mentor. Young women interested in science should be encouraged to pursue a career in cardiothoracic surgery. Women need to see other women at the podium. They need a supportive environment where achieving a work-life balance doesn’t require tremendous effort.

In a male-dominated field, they need to be able to communicate effectively, to feel that they can fit in, and to be given leadership opportunities. The role of women in cardiothoracic surgery in the United States has expanded despite the barriers described here. Women have demonstrated that professional success and work-life balance are possible when you pursue a career you truly want. You just have to make it happen.

References

Cardiac – Rapid Response: Aortic valve substitutes: the long-term view

Long-term follow-up after implantation of Shelhigh® aortic valve conduit

Under the lead of David Reineke and Abdul Kaya, the Departments of Cardiovascular Surgery at the University Hospital Bern, Switzerland (T Carrel) and Cardiothoracic Surgery at the St Anthony’s Hospital, Nieuwegein, Netherlands (M Monshou), joined forces to combine their substantial data on the Shelhigh® No-React® biological aortic valve conduit. Starting in the late nineties, both centres implanted this complete biological valve conduit liberally as initial haemodynamic and short-term data proved to be favourable.1 However, conflicting clinical results occurred during the further clinical follow-up period, with patients requiring urgent and extensive reoperation after disintegration of the graft and rupture of the aortic root.2,3 The issue of a pubic health notification by the FDA on possible contamination and malfunction of devices manufactured by Shelhigh Inc. led to the use of this biological conduit being discontinued in 2007. The study group is glad to present a complete long-term follow-up of 291 consecutive patients receiving the Shelhigh® conduit.

The secondary procedures were technically demanding, therefore we recommend a close follow-up of patients with the Shelhigh No-React® aortic valve conduit.

References

Cardiac – Professional Challenge: Challenges in mitral valve repair: part I

How to handle systolic anterior movement after mitral repair

Manuel Costell
Hospital Clinic, University of Barcelona, Spain

Systolic anterior motion (SAM) of the mitral valve is a displacement of the anterior leaflet towards the outflow track of the left ventricle (LVOT) during systole, provoking from almost no alteration to severe haemodynamic compromise by mitral regurgitation and/or LVOT obstruction. It is considered mild when LVOT obstruction is absent and MR negligible; moderate when LVOT maximum pressure gradient ranges between 20 and 50 mmHg, MR is mild to moderate, or both; and severe when LVOT maximum gradient is over 50 mmHg. SAM is usually thought to be typical of hypertrophic cardiomyopathy, SAM is a typical complication of mitral repair, ranging from 7% to 11% of cases. There are risk factors dependent on the patient, most commonly in myxomatous disease, leaflet prolapse or flail with posterior leaflet tissue that pushes the line of coaptation between posterior and anterior mitral leaflets. SAM should be sought and discarded if a mitral-repaired patient experience is to resume cardiopulmonary bypass and re-check the repair technique. Surgical strategies to address SAM include replacing the ring with a larger size, performing a slide-plasty in quadrangular resections of the posterior leaflet larger than 1.5 cm, downsizing the height of the posterior leaflet to 1.5 cm, or, in case of neo-chordae, shortening the chordae to posterior leaflet and the longer chordae of the anterior leaflet to bring the line of coaptation towards the posterior leaflet, forming a ‘smiley’ shape.

SAM should be sought and discarded if a mitral-repaired patient does not have a haemodynamically correct postoperative period. If detected, β-blockers and fluid therapy should be initiated, and diuretics and inotropes should be avoided, while trying to maintain high arterial pressure. If symptoms are not controlled, the patient is haemodynamically still unstable or echocardiographic signs of SAM persist, early reoperation is highly recommended.

Of special interest are recent reports of long follow-up comparing patients presenting no SAM with patients in which SAM was successfully managed with haemodynamic manoeuvres. Evidence supports conservative management, being associated with good late echocardiographic outcomes, with no differences in mitral regurgitation or need for reoperation between groups.

Two cases of posterior prolapse with good water test:

Figure 1. Triangular resection and closed a ‘smiley’ line of coaptation.

Figure 2. Posterior prolapse managed with two neo-chordae and an amniotic ring. Good height of the posterior leaflet, drawing a ‘smiley’ line of coaptation.

Figure 3. Protective prolapse managed with two neo-chordae and an amniotic ring. Good function on the water test, but at high risk for SAM, since the line of coaptation is too close to the LVOT. Neo-chordae need to be shortened to bring the line of coaptation towards the posterior leaflet.
Finally, SSIs occurring at the vein harvest site are often a problem, involving several hospital admissions, prolonged recovery, and sometimes representing a complex surgical challenge leading to the formation of sternocutaneous fistulas. SSIs are much less frequent. Late infections, which can manifest around cannulation sites in the groin or after radial artery harvest, are encountered less often, although they often represent a complex surgical issue, involving several hospital admissions, prolonged antibiotic treatment and repeated wound debridements. Wound infections at the vein harvest site are often problematic and associated with significant patient morbidity and high costs for the healthcare system. Fortunately, most sternal wound and leg vein harvest infections are superficial and respond to minor wound debridement and antibiotics. However, 1–3% of patients develop deep sternal wound infections. These are among the most significant complications seen after open heart surgery, resulting in increased morbidity and prolonged length of hospital stay for patients. Deep wound infections of this nature can sometimes be fatal and are associated with significantly increased hospital costs. In our presentation, the current literature on established risk factors of sternal wound infections (LIMA harvest, diabetes, smoking, etc.) will be reviewed, together with the more debated risk factors such as the use of bilateral internal mammary arteries (BIMA) for coronary revascularisation. Prophylactic measures for sternal wound infections will also be covered, including the appropriate timing and dosage of antibiotics, use of some adjuvants, and the use of triclosan-covered sutures. We will conclude that a prospective randomised trial is necessary to determine whether the use of triclosan-covered sutures is beneficial, but neither benefit nor harm has been clearly demonstrated at this time. It is important to establish this however, because a large group of patients are affected worldwide.

Fluid replacement in ECC: crystalloid versus colloids

Tormod Deane
University of Jena, Germany

Administration of intravenous fluid is one of the most common interventions in the management of patients undergoing cardiac surgery with extracorporeal circulation and also in the intensive care unit. Broadly, such resuscitation fluids can be divided into crystalloids and colloids. Crystalloids are preferred because short-term clinical studies suggested that they result in faster haemodynamic stabilisation and better cardiac performance than colloids, and that 3–4 times less volume was required to achieve the same haemodynamic endpoints. It is expected that lower fluid requirements result in less positive fluid balances and reduced tissue oedema, and therefore improved patient outcomes.

Hydroxyethyl starch (HES) is the most widely used colloid. However, Cochrane and other groups failed to identify data that prove the superiority of one type of crystalloids or colloid over another. Recent evidence from randomised controlled trials and meta-analyses suggests that the use of high and medium molecular weight (200 kDa) HES may result in an increased incidence of renal failure and that the volume-sparing effect of colloids is <50%. Last generation 6% HES 130/0.4 is perceived to have an improved safety profile, but the clinical data in support of this claim have also been questioned. In addition, both crystalloids and modern HES preparations are available as chloride and sodium rich ‘unbalanced’ and ‘balanced’ preparations, which are low in NaCl but high in lactate or acetate. ‘Unbalanced’ fluids may result in metabolic acidosis, ‘balanced’ fluids may cause severe alkalosis. The discussion on the associated benefits and harms of these fluids has been intense over the past few years, but the evidence is mainly based on studies that do not primarily include cardiac surgery patients or even address the effect of these fluids with the use of ECC. This presentation will address the evidence specifically in the context of ECC and cardiac surgery. We will conclude that a prospective randomised trial is necessary in this field, because it is the perception of many that colloids are beneficial, but neither benefit nor harm has been clearly demonstrated. It is important to establish this however, because a large group of patients are affected worldwide.
Is there a place for TEVAR in the ascending aorta?

Ali Khoynezhad
Cardio-Spine Heart Institute, Los Angeles, USA

Image-guided therapeutic and thoracic endovascular aortic repair (TEVAR) has become the standard of care for most patients with descending thoracic aortic pathologies. In fact, many patients with distal aortic arch aneurysm or thoracoabdominal aortic aneurysm are treated using endograft – especially if they are deemed poor surgical candidates. This is due to morbidity and mortality rates and the protracted recovery associated with open repair of distal arch and thoracoabdominal aorta. Compared with open repair, TEVAR has been shown to have lower neurological complications, lower mortality rates and shorter recovery time. Concerning the ascending aorta, open aortic root and ascending aortic replacement, with or without hemiarch replacement for aneurysmal pathology, currently demonstrate extremely low mortality (in single figures). How can TEVAR compete with such stellar outcomes? I learnt that I had to qualify as a doctor first to achieve those goals. Since arriving in the UK and it has been a saga of emotional, financial, physical and mental endurance, I had only one contact in the country, with no family or friends. At my very first interview for a position in cardiac surgery as a junior doctor, I was explicitly told by a consultant on the interview panel that I was better off doing something else, because there were practically no women in the field of cardiac surgery. I calmly stood my ground and expressed surprise at his views, especially since I am the only female Asian cardiac surgery trainee in Wales in a specialty where the majority of consultants I trained under. This pivotal PS-IDE study’s primary focus is on safety and good patient outcome; it is not about numbers. A total of 39 patients were screened for the study, but only six were enrolled. It is expected that the results of this PS-IDE will influence future feasibility studies involving the ascending aorta, particularly in the US. The preliminary evaluation of endovascular treatment for ascending aortic pathologies demonstrates uniform accuracy of deployment and secure fixation for up to 1 year. There is positive remodelling of the excluded aortic segments, as has been observed in the descending aorta. However, because of the severe aortic/arch angle encountered in some patients, it will be used in further patients where needed. Transapical approach is especially favourable and should improve outcomes in patients with horizontal aorta or with acute type A aortic dissection.

Cardiac – Focus Session: Women in cardiac surgery

Indu Deglurkar
University Hospital of Wales, Cardiff

It has been a long and hard journey. Having decided to become a cardiac surgeon at the age of seven adoring Michael DeBakey most of my life, I decided to become a cardiac surgeon at the age of 17. They make huge sacrifices and are the pillar of support when reaching those goals. Since arriving in the UK and it has been a saga of emotional, financial, physical and mental endurance, I had only one contact in the country, with no family or friends. At my very first interview for a position in cardiac surgery as a junior doctor, I was explicitly told by a consultant on the interview panel that I was better off doing something else, because there were practically no women in the field of cardiac surgery. I calmly stood my ground and expressed surprise at his views, especially since I am the only female Asian cardiac surgery trainee in Wales in a specialty where the majority of consultants I trained under. This pivotal PS-IDE study’s primary focus is on safety and good patient outcome; it is not about numbers. A total of 39 patients were screened for the study, but only six were enrolled. It is expected that the results of this PS-IDE will influence future feasibility studies involving the ascending aorta, particularly in the US. The preliminary evaluation of endovascular treatment for ascending aortic pathologies demonstrates uniform accuracy of deployment and secure fixation for up to 1 year. There is positive remodelling of the excluded aortic segments, as has been observed in the descending aorta. However, because of the severe aortic/arch angle encountered in some patients, it will be used in further patients where needed. Transapical approach is especially favourable and should improve outcomes in patients with horizontal aorta or with acute type A aortic dissection.

HEARTMATE 3™ CE MARK TRIAL OUTCOMES TO BE PRESENTED

The recent HeartMate 3™ CE Mark trial was a multicentre, multinational clinical study designed to evaluate the efficacy and safety of the HeartMate 3 LVAS against established standards. HeartMate 3 builds on the legacy of proven performance established by HeartMate II®, designed to offer unprecedented blood-handling characteristics that elevate LVAD therapy to even higher standards. The new pump incorporates Full MagLev™ flow technology, which allows the device’s rotor to be magnetically levitated, or suspended, by magnetic forces. This contact-free environment is designed for haemocompatibility, with large blood-flow pathways designed to reduce blood trauma and minimise complications. Patients who received HeartMate 3 were studied for 6 months, with follow-up continuing up to 24 months post-implant.

The primary outcome measure was survival, and secondary outcome measures included quality of life, 6-minute walk distance, adverse events, device malfunctions, reoperations, rehospitalisations, and stroke. For full inclusion and exclusion criteria, please see ClinicalTrials.gov. identifier: NCT02170363.

Results of the HeartMate 3 CE Mark clinical trial suggest significant implications for the care of patients with advanced heart failure. Discover study outcomes that can impact your practice: 6-month data for the HeartMate 3 CE Mark trial will be presented at a symposium on Tuesday 6 October, from 12:45-14:00 at Forum Room, RAI Amsterdam.

Exclusively for clinical investigations.
BETTER FLOW BEGINS HERE

Explore the HeartMate 3™ experience at Thoratec booth 3.13
Valve choice for patients under 65: the surgeon’s role when moving towards shared decision-making

The paper published by Bourguignon et al. in The Annals of Thoracic Surgery documents the 20 year outcomes of 2659 Edwards PERIMOUNT valves implanted in the aortic position. The highlights include an expected valve durability of 19.7 years for all age groups and freedom from reoperation due to structural valve deterioration (SVD) of 98.1±0.8% at 15 years in patients older than 70 years at the time of implantation.1 A follow-up paper focusing on patients younger than 60 years at time of implant demonstrated that expected valve durability remained above 17 years.2

Given such a low incidence of SVD and solid hemodynamics it is hard to see past these valves as a good choice for elderly patients. Younger patients have to make a trade-off between anticoagulation risks and potential redo surgery when choosing between a mechanical and tissue valve. Bourguignon et al. suggest that their results support using bioprosthetic valves at least from the age of 60.3 The UK trend is of increasing use of tissue valves in under 65 year olds because of:

1. Better proven longevity of tissue valves
2. Lower risk of planned reoperation
3. TAVI valve-in-valve solutions for degenerated tissue valves

The risk of redo surgery is indeed low with the publication reporting a 2.3% reoperation mortality amongst patients younger than 60 at the time of first implant.4 These results are supported by an overall mortality in the UK for isolated first time AVR of 1.7% and 5.5% for redo surgery. Given the UK risk for redo surgery in patients without significant comorbidities is 2.3%, it is reasonable to implant tissue valves in younger people who are otherwise well.5 Patients with other risk factors do however have a higher risk profile (e.g. low LVEF) for redo surgery.

Additionally valve-in-valve TAVI is an alternative for treating degenerated tissue valves, but again there must be caution. At present the best results are obtained in valves greater than 23 mm.6 Long-term outcomes for patients that have undergone a valve-in-valve procedure are not yet available, but a patient aged 55 having a pericardial valve today will be unlikely to need further intervention. Bourguignon et al. report a probability of 10% for patients that are 55 years at first implant to undergo a redo procedure after 13.1 years.7 There are of course still opportunities for continued improvements to catheter based treatment options, but this is a voyage into un-navigated waters.

As delivery of healthcare is moving towards shared decision-making with patients it is the surgeon’s role to support them in making the best choice. What AVR option would I prefer being under the age of 55? With a good LVEF, without other comorbidities and assuming a valve reasonable orifice size, I would choose a tissue valve that should see me through my life comfortably with the knowledge that treatment options of low risk would be available if needed.

Expert opinions, advice and all other information expressed represent contributors’ views and not necessarily those of Edwards Lifesciences.

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5. SCTIS Data App – Apple App store.

Unifoicalisation of pulmonary atresia

Roberto Di Donato
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Current surgical approach to pulmonary atresia with ventricular septal defect and major aortopulmonary collateral arteries (PA/VSD/MAPCAs) greatly varies among centres worldwide. Two main strategies have been adopted. One predominantly relies on the growth of native pulmonary arteries, avoiding as much as possible the recruitment of MAPCAs on account of their unpredictable morphology and the intrinsic nature of bronchial arteries with an allegedly limited potential for growth (‘rehabilitation’ of pulmonary arteries). The other makes assertive use of MAPCAs, seeking to primarily assemble a unified, all-inclusive and possibly unobstructed neo-pulmonary artery arterioplasty (‘unifoicalisation’ of MAPCAs).

Both the rehabilitation and the unifoicalisation approaches produce good results and, in our opinion, are not necessarily mutually exclusive. In fact, a so-called ‘integrated approach’ can be tailored on the individual morphomorphic features of pulmonary blood sources, selectively employing either one-stage unifoicalisation or first-stage palliative right ventricular outflow tract reconstruction.1,2

In the integrated approach, patient selection is initially based on preoperative calculation of the total neo-pulmonary artery index (TNPA); i.e. the cumulative indexed cross-sectional areas of pulmonary arteries and MAPCAs, assuming a cut-off value of ≥150 mm²/m³ as indicative of an overall compliance of the pulmonary vascular tree sufficient to accommodate one-stage unifoicalisation and repair. In the majority of these cases, the pulmonary blood supply is provided by good-sized MAPCAs and the pulmonary arteries are either severely hypoplastic or absent. In contrast, in cases with a TNPA <150 mm²/m³, characterised by severely hypoplastic, though dominant, pulmonary arteries combined with MAPCAs supplying only a few lung segments, primary unifoicalisation would be less effective. Therefore, these patients are electively treated by primarily establishing forward flow into the true pulmonary arteries to promote their growth. Afterwards, second-stage midline unifoicalisation should also be carried out if there are associated sizeable MAPCAs, especially those providing isolated supply. In our experience, this strategy maximises the possibility of closing the VSD at the time of unifoicalisation. The final decision about suitability for VSD closure at the time of the unifoicalisation is based on the so-called ‘pulmonary flow study’, a sort of intraoperative compliance test of the unifoicalised pulmonary arterial tree.

In our initial experience with the integrated approach on 90 patients at Bambino Gesù Hospital in Rome, the 14-year survival rate, freedom from conduit reintervention and freedom from percutaneous intervention on the pulmonary arteries were 75%, 46% and 52%, respectively. At a median interval from percutaneous intervention on the pulmonary arteries of 95 months, the right/left ventricular pressure ratio did not differ significantly from early postoperatively. The outcomes were negatively affected by neonatal age, low body weight and chromosome 22q11 deletion, and positively affected by synchronous or staged VSD closure.

Admittedly, unifoicalisation is technically more demanding than the rehabilitation procedures, and its success rate is crucially influenced by early timing of surgery and by extensive neo-pulmonary artery reconstruction up to introparachenal stenotic branches, using all the MAPCAs available and favouring native tissue-to-tissue anastomoses. However, by virtue of primarily recruiting all available lung segments, unifoicalisation has several advantages over the rehabilitation strategy. First, it frequently allows simultaneous two-ventricle repair, whereas rehabilitation inevitably involves two or more staged procedures. Second, it may allow a higher overall chance of repair, as rehabilitation is limited by the extent of peripheral distribution of the native pulmonary arteries (often incomplete). Third, for the same reason, unifoicalisation may achieve lower post-repair right ventricular pressure. In conclusion, we believe that unifoicalisation, whether primary or secondary, is the best method to generate adequate pulmonary artery arterioplasty in PA/VSD/MAPCAs and that a rehabilitation strategy may also have a role in selected cases.

References
Edwards Pericardial Valves

Built on a proven trusted valve platform
A controlled, randomised trial of a sutureless heart valve (PERCEVAL) versus standard bioprostheses in the surgical treatment of aortic valve disease; rationale and design

Theodor Fischerin and Roberto Lorosin
Paracelsus Medical University, Nuremberg, Germany, and Robertor Lorosin (Maasstricht University Medical Center, the Netherlands)

Sutureless valves are prostheses that are anchored in the aortic annulus without the need for surgical sutures. These valves belong to a new generation of aortic bioprostheses, which have already shown advantages in shortening ischaemic time and facilitating minimally invasive aortic valve replacement. The Sorin Perceval Aortic Heart Valve (PERCEVAL) is a self-expanding prostheses made of bovine pericardium mounted in a Nitinol stent, which does not require anchoring sutures. To date, promising results with Perceval have already been reported in terms of postoperative outcomes, haemodynamic performance, and freedom from structural valve deterioration and reoperation up to five-year follow-up. Early trials have also reported significant cost savings, primarily driven by reduced hospital stay and significantly lower procedural costs. Despite these initial positive results, there remains a lack of prospective, randomised trials comparing Perceval with standard prostheses (stented biological valves). To overcome this void Sorin has agreed to sponsor an international, prospective, randomised multicentre trial (PERCEVAL Sutureless Implant versus Standard Aortic Valve Replacement (PERIST-AVR), a controlled randomised trial in the surgical treatment of aortic valve disease]. The primary endpoint of the trial is to demonstrate non-inferiority of major adverse cardiac and cerebrovascular (MACCE) events at one-year follow-up. While it aims to show superiority in resource consumptions at hospital discharge for patients treated with a Perceval valve, compared with standard aortic valve replacement. For the purpose of comparing the cost profile of the two treatment groups, a specific resource consumption index has been developed within the frame of this trial. Patient enrolment for PERIST-AVR is planned to start in Q4 2015, with the aim to recruit over 1200 patients with severe symptomatic aortic stenosis or steno-insufficiency, who are also candidates for surgical replacement of their native aortic valve according to established guidelines following the current medical practice. Patients will be recruited after a standard preoperative CT scan to optimise annulus measurement and to avoid crossover between groups. The bioprosthesis will be implanted by full sternotomy or mini-sternotomy, according to standard practice at the local site. Patients will be randomised 1:1 to either Perceval or commercially-available, conventionally-stent bioprostheses. In the postoperative phase quality of life data will be collected and specific questionnaires will be used to assess occurrence of cerebrovascular events. An independent Clinical Event Committee will adjudicate the relevant serious adverse events pertaining to the primary endpoint. An independent Data Safety Monitoring Board will be established to oversee the safety of the trial. Clinical endpoints will be reported according to the VARC-2 (Valve Academic Research Consortium) standard definitions. The trial will be conducted worldwide with a two-year enrolment period and 5-year follow-up phase. If the enrolment target can be achieved within the given period, it is expected that primary endpoint data will be reported at the end of 2018.

The Principal Investigators for PERIST-AVR are Theodor Fischerin (Klinikum Nürnberg, Paracelsus Medical University, Nuremberg, Germany) and Roberto Lorosin (Maasstricht University Medical Centre, the Netherlands). A Steering Committee has been established, which comprises: AP Kappetein (Rotterdam, the Netherlands), AP Tuzcu (Utrecht, the Netherlands), respectively. Leuven, Belgium), T Folliguet (Nancy, France) and E Roselli (Cleveland, OH, USA). The study is fully supported by the Sorin Group. If confirmed, the results of this landmark trial will substantially impact the normal daily practice of aortic valve replacement indicating Perceval as the prosthesis of choice.

References
Minimally invasive mitral valve surgery – Standard of care?

Martin Moshfegh
University of Leipzig Germany

Minimally invasive mitral valve surgery (MIMVS) has been known for more than two decades. Its popularity has increased in the last couple of years because it has been proven to achieve the same surgical results as mitral valve surgery through standard sternotomy and has the advantage of quicker recovery from surgery and improved cosmesis. Data from the annual data report of the German Society of Cardiac, Thoracic and Vascular Surgery (GSCVTS) showed that 47.2% of all isolated mitral valve surgery was performed through minimally invasive surgical access. Around 80% of all German centres performed MIMVS. In these centres, the percentage of minimally invasive surgery of the mitral valve ranged from less than 5% to more than 96%. GSCVTS data further showed that the mortality rate for MIMVS was 0.9% (n=2347), compared with 2.7% (n=1540) in sternotomy cases. This may be attributed to patient selection, but it may also express higher expertise in centres in which MIMVS is performed. Patients clearly benefit from MIMVS and, in our experience at the Heart Centre in Leipzig, only a very limited number of patients have clear contraindications for MIMVS. These contraindications are previous right thoracotomy with severe lung adhesions, severe annulus calcifications or annulus abscess formation and acute aortic valvular regurgitation. Complex mitral valve repair and additional surgical procedures such as tricuspid valve surgery, Maze procedure, ASD/PFO-closure and myectomy for hypertrophic obstructive cardiomyopathy can additionally be performed via minimally-invasive access. It has even been shown that MIMVS as a reoperation following valve and/or coronary artery bypass grafting can safely be performed and be beneficial for patients. Therefore, it is not clear why MIMVS is not accepted more widely by the surgical community. One reason might be that, with the excellent surgical results obtained with mitral valve surgery through a standard sternotomy, surgeons weigh the benefit of the patient to faster recovery and improved cosmesis as being less important against the background of a learning curve which is present when starting a MIMVS programme. Indeed, MIMVS requires specific surgical skills and knowledge. In addition, for some surgeons limited patient numbers may also contribute to their decision not to use this technique. If patient numbers are limited, it is recommended that MIMVS should not be performed and that patients be transferred to centres which have expertise in mitral valve surgery, i.e. centres that perform an adequate number of procedures each year. MIMVS also requires more focus on a team approach including the whole team in the operating room, as echocardiographic expertise and guidance is mandatory, not only to access mitral valve pathology and the surgical result, but also to avoid and detect potential pitfalls. In addition, the surgeon needs to be open to using new instruments and equipment. If MIMVS is performed completely thoroscopically, this surgical technique differs even more from standard mitral valve surgery. It is, therefore, advisable that centres that aim to start a MIMVS programme follow specific aspects:

1. The surgeon should get used to MIMVS instruments, which can be advantageous in specific settings during cardiac surgery through standard sternotomy;
2. Courses of MIMVS should be attended to gain knowledge of the standardisation of this procedure and potential pitfalls to overcome the learning curve;
3. Centres of expertise in MIMVS should be visited by a team which intends to start a MIMVS programme, consisting of a cardiac surgeon, anaesthesiologist, perfusionist and scrub nurse, to get to know the routine set-up and performance of this procedure;
4. It is also recommended that the first cases are performed in the presence of a proctor, who can guide the surgeon through the set-up and procedure.

From my perspective MIMVS should be the standard of care in mitral valve surgery. It has clear advantages, which should benefit patients. If educational pathways are followed, patients are not put at increased risk. If the surgical community are not open to beneficial techniques, we will miss this particular opportunity. With a new intervention technique for treating mitral valve disease coming over the horizon, cardiac surgeons need to be more open to using this technique, which is already available.

Benign tracheal stenosis: surgical treatment

Federico Rea
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Benign tracheal stenosis (BTS) is mostly an iatrogenic occurrence due to prolonged endotracheal intubation, tracheostomy, trauma, etc. The management of BTS remains a challenge, often requiring a multidisciplinary approach by well-trained personnel. Meticulous preoperative assessment and preparation associated with a perfect surgical technique are mandatory to obtain good results.

Preoperative assessment is a crucial step in the surgical management of BTS. The precise definition of the injury in the subglottic area, the length of the stenosis, the degree of tracheal involvement, and the presence of active inflammation or cicatricial stenosis are important factors for the optimal surgical treatment. The decision to delay the surgical treatment and allow time for the inflammation to regress and the stenosis to stabilise. Rigid bronchoscopy is the cornerstone for the assessment of BTS and may be essential for maintenance of a safe airway, while awaiting definitive surgical treatment, by direct dilatation. CT-scan provides multiplanes reconstruction permitting evaluation of tracheal stenosis and of the extra-tracheal tissue. Preoperative treatments, such as laser resection or cryosurgery, provide only temporary benefit in patients with circumferential lesions. Furthermore, repeated laser resections may increase the extent of injury in some cases or may result in damaging of the cricoid posterior plate. Similarly, the use of an endotracheal prosthesis could increase the length of stenosis, thus we recommend avoiding these treatments in all patients who are candidates to receive surgical operations, unless strictly necessary.

When a prolonged period prior to surgical correction of the stenosis is needed, either because of temporary individual contraindication or because of the inflammatory state of the trachea, we recommend the use of a tracheostomy and a Montgomery T-tube. Tracheal resection and primary anastomosis remain the standard for care of the definitive treatment of tracheal stenosis with success rates greater than 90% (95% excellent or good results in our series).

As regards the surgical technique, we recommend the basic principles of tracheal reconstruction introduced by Grillo and Pearson. These include avoidance of excessive anastomotic tension, maintenance of tracheal blood supply and meticulous dissection and anastomosis. For the end-to-end anastomosis, we adopt a running suture with a monofilament absorbable sutures (PDS 4-0) in the posterior membranous wall of the trachea and an interrupted absorbable sutures (Vicryl 3-0) in the anterior cartilaginous wall. Major complications are: (i) anastomotic dehiscence or fistula, usually managed by reinventorisation or conservative treatment (tracheostomy and stenting with a Montgomery T-tube) and (ii) stenosis usually managed by endoscopic approach (laser or dilatation).

In our experience, associated illness (mostly diabetes) and repeated preoperative procedure may play a role in postoperative complications.

Clinical guideline for the prevention of postoperative infections by systematic oral hygiene associated with elective thoracic surgery interventions in adult patients

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The National Board of Health in Denmark has launched a 4-year project to prepare 60 clinical guidelines. To date, the Centre for Clinical Guidelines at Aalborg University in Denmark, in collaboration with the national board, has produced 45 clinical guidelines (since 2008), with 40 more underway.

There are major challenges to implementing these guidelines in routine clinical practice, due to the busy world in which we work. By preparing a generic module, the aim of this project is to make the process of guideline implementation easier by providing individual tools to help support the implementation process. This includes adaptation of national recommendations for local organisations and cultures, and the implementation of staff and patient education through the use of videos, websites and SMS services (which can be used to remind patients about certain important aspects of their medical care for example). It is hoped that initiatives like these will make guideline implementation more successful.

Studies and clinical experience show that there are major challenges in implementing research findings into clinical practice. Many resources are spent on initiatives that only have a short-term effect. In a systematic review, one of the reasons for this appears to be that research was not translated into routine practice. As a result, local adaptation of research should be based on an analysis of the specific organisation, relevant stakeholders, procedures and culture. The focus of this new project initiated by the Cardiopulmonary Department at Aalborg University Hospital is to change this.

We have chosen the following clinical guideline from the Centre for Clinical Guidelines as the focus for our work: ‘Clinical guideline for the prevention of postoperative infections by systematic oral hygiene associated with elective thoracic surgery interventions in adult patients’. This particular guideline was chosen because, with relatively simple effort and at low cost, it has the potential to reduce the number of infections and be of great benefit to patients, as well as reduce consumption of unnecessary resources.

Based on a validated implementation model, we have developed an implementation strategy to ensure local anchoring in the Cardiopulmonary Department, Aalborg University Hospital. In addition, a website for patients has been created to show them how, even before hospitalisation, they can take practical steps to prevent respiratory infections following cardiac surgery, thereby ensuring that the audit objectives are met. Evidence suggests that it is not only respiratory infections, but also other potentially more serious types of infection that need to be prevented, for example to treat an infection in the sternum post-surgery it costs between €55,000 and €65,000. These complications occur in 1–2% of patients and are relatively constant. The costs obviously go beyond those that are financial, and must include the level of patient suffering experienced as a result of the infection and not just the prolonged illness they will endure. This project is a part of a much larger study, where compliance and effect are also being examined.

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Acknowledgement to Anita Tracey and Jens Grendelund, Cardiopulmonary Department at Aalborg University Hospital, Denmark.

Thoracic – Postgraduate Course: Management of acquired tracheal disorders: from stenosis to laceration

Benign tracheal stenosis: surgical treatment

EACTS Daily News 13
Aortic root replacement using composite graft prosthesis, now routinely performed by a greater proportion of cardiac surgeons, has been described as a rational treatment for AAD with satisfactory results.6 It is, however, accompanied by manifold disadvantages of mechanical and biological valve prosthesis, mainly thromboembolic events, and haemorrhage due to lifelong anticoagulation and reoperations due to degeneration of biological valve prosthesis.4 In some centres with particular expertise and extensive experience in aortic surgery, valve-sparing operations have been used in cases of AAD giving very good short-term results and avoiding the shortcomings of the composite graft replacement.11 The remplantation technique should be preferred to remodeling because it seems to be associated with favourable long-term outcomes.11 However, due to the fact that these operations are more demanding than the standard techniques, their applicability in AAD remains debatable and results are limited. In our department, between 1999 and 2014, 296 patients were treated for AAD and in 40.2% of them we performed a root replacement intervention (Bentall or David procedure). We found no differences in early or long-term mortality in these two groups of patients even after propensity-score analysis. On the other hand, we demonstrated an increased risk of late re-intervention in patients undergoing conservative root management (freedom from proximal aortic re-intervention at 7 years: 80.1±6% versus 96±2.8%; log-rank p = 0.029). In summary, supraannually conservative aortic root replacement with aortic valve preservation and root reconstruction is the treatment of choice of acute type A aortic dissection. A more extensive root procedure, with potential additional operative risk, can be justified for the potential benefit of long-term results in all patients with extensive dissection of the sinuses or of the calcified aortic root, in patients undergoing redo aortic surgery or severe aortic regurgitation and in patients affected by connective tissue disease such as Marfan syndrome. Valve-sparing operations should be performed only in centre with good experience.

References

Vascular – Postgraduate Course: Basics in proximal thoracic aortic surgery: session 2

Management of the aortic root and coronary malperfusion

Davide Pusterla, University of Bologna, Sant’Orsola-Malpighi Hospital, Bologna, Italy

Despite significant improvements in perioperative anesthetic and surgical management, surgical treatment of acute type A aortic dissection (AAD) remains associated with high mortality, ranging from 15% to 30% in published series.5–7 Although numerous risk factors have been evaluated, the preoperative status of the patient, mainly due to organ malperfusion, is the most important predictor of in-hospital outcome. Approximately one third of all patients with AAD have preoperative end-organ malperfusion syndromes and coronary malperfusion, which is associated with a very high in-hospital mortality (30–40%).5,6 The principal objective of surgery is prevention of lethal aortic rupture and aortic root dissection or related coronary malperfusion. Dilated aortic root diameter at initial presentation and the incidence of late cardiac tamponade, caused by remaining blood clots and blood remnants left in a higher need for re-interventions for bleeding and acute aortic regurgitation and in patients affected by connective tissue disease such as Marfan syndrome or Loyes-Dietz are the most important.5–7

Possible re-dissection or aneurysm formation may develop and may require further operation of the proximal ascending aorta. In fact, aortic root morbidity represents the main reason for reoperations during follow-up (from 10 to 40%).8,9 Some preoperative predictors for late root dissection and aortic valve regurgitation requiring reinvention have been demonstrated. Dilated aortic root diameter at initial presentation and connective tissue disease such as Marfan Syndrome or Loyes-Dietz are the most important.8,9

Cardiac – Postgraduate Course: Update on the results, rationale and design of ongoing clinical trials

David R Koolbergen, Academic Medical Center, Amsterdam, and Leiden University Medical Center, Leiden, the Netherlands

In the Sunday afternoon session ‘Update on the results, rationale and design of ongoing clinical trials’ we will present our study protocol, ‘A randomised trial of continuous postoperative pericardial flushing to reduce postoperative blood loss’. During this presentation, a method will be unveiled that has shown 30% reduction in blood loss and re-interventions in a pilot study that we hope to confirm in our clinical trial. The continuous postoperative pericardial flushing (CPPF) method is a completely new approach to postoperative wound drainage following cardiothoracic surgical procedures. We believe that traditional systems (low-pressure suction on a variable amount of chest tube) cannot be necessarily high risk of partial or complete clogging of the chest tubes, especially when postoperatively the coagulation system starts to stabilise and normalise. In this situation, blood and clots tend to accumulate in the pericardial space and consequently induce high fibrinolytic activity. This will maintain and increase blood loss, and result in a higher need for re-interventions for bleeding and acute cardiac tamponade. In addition, clots and blood remnants left behind after chest tube removal, may cause inflammation-related complications such as adhesion formation, and at a later stage. Our innovative method has been developed in the Academic Medical Centre at the University of Amsterdam in the Netherlands, and has specifically been designed to promote the continuous and complete evacuation of contaminated blood and clots from the pericardial cavity. The CPPF method works by continuously flushing the pericardial cavity with a warm saline irrigation solution, starting towards the end of surgery but before sternal closure and continuing for 6–12 hours postoperatively or for as long as necessary. Continuous flushing of the pericardial cavity results in a lower viscosity mixture that will prevent chest tube blockages and promote the complete evacuation of blood and clots from the pericardial cavity. The CPPF method was developed with the primary aim to reduce postoperative blood loss, thus lowering the need for transfusions and re-interventions for bleeding and/or acute cardiac tamponade. But it is also hoped that it could reduce the incidence of late cardiac tamponade, caused by remaining pericardial haematomas and inflammation-related complications (such as adhesion formation and possibly even arrhythmias). A safety and feasibility study (Figure 1) performed in 21 patients, showed the CPPF method to be safe and feasible in an experimental setting and demonstrated a reduced blood loss of 30%. We hope to confirm these findings in the present randomised clinical trial (n = 170), and provide definitive proof of concept. During the presentation the experimental setting and study protocol will be explained. Until now, all CPPF procedures have been conducted in a highly-controlled setting, where a research assistant continuously monitors the in- and outflow volumes to maintain an accurate record of the amount of actual blood loss or lagging flushing fluid. For a safe and effective application of the CPPF method in daily clinical practice a new medical flushing device was invented and a spin-off company was founded (Haermonics) to develop, validate and produce the flushing device. The Haermonics flushing system (Figure 2) is needed for regulation of the inflow volume and temperature, and analysis of the outflow fluids with use of haematocrit and volume sensors. The device will continuously calculate the balance of in- and outflow volumes, and registers clearly displays the actual amount and trend of blood loss. The device comes with a multi-lumen chest tube with integrated inflow canals for the irrigation solution, and temperature and pressure transducers of dilated aortic sinuses, to alert when haematocrit values rise, or outflow volumes or intrapericardial pressure reaches a critical value. In this way, the clinical evaluation of postoperative bleeding problems is secured and even improved because of continuous registration, trend monitoring and alarms.

Reference

Figure 1. Graphical abstract of the CPPF method.

Figure 2. Impression of the Haermonics CPPF system.
Using cumulative sum charts to explore surgical performance

Tom Treasure
University College London, UK

The aim of this presentation is to demonstrate the potential of Cumulative Sum (CuSum) charts to explore surgical performance. This was listening to Marc de Leval’s presentation to the American Association of Thoracic Surgeons in 1993. De Leval had an unsurpassed record of success with the then innovative arterial switch operation. Because he was closely monitoring his results he was immediately aware of a change in his success rate. A couple of deaths became a cluster of seven deaths from case 53 to 68. No unifying cause was identified, nor was it possible to attach statistical significance to the change, or to its resolution, but the ability to see deviations from the norm in the early stages of a pattern so compelling as a monitoring method. When a sufficiently long series of cases is displayed, the time related trends of learning and deteriorating skills can be seen as well as clusters. This study of a series of his own cases allowed de Leval to test some hypotheses and seek solutions but simple CuSum presupposes that cases are much the same in terms of difficulty and risk. That is the case (e.g. monitoring a manufacturing process) patterns may be attributable to operator performance. But in the reality of surgery, among two or more trained and experienced surgeons, a large component of the variation in outcome is attributable to the patient primary disease and comorbidity. At St George’s we have Pancrenet data on 5000 patients from 1992 to 1996. On returning from the AATS I took the problem to my late great friend Steve Galkin, a mathematician at University College, London. He varied the size of the steps of the CuSum according to the preoperative risk of the patient. This led to VLAD plots – an easily understood way of displaying data for any outcome of importance, incorporating prior inherent risk. It is vital to remember that VLAD plots are indicators, early warnings and not statistical proof of error or deterioration. Their strength is the early warning and the insight into trends and patterns that can be provided. Consider testing a surgeon’s performance against a standard of 2% risk adjusted mortality for coronary surgery. A steady 6% mortality rate would still be within test limit after 200 consecutive operations (12 versus 4 deaths). If before intervening we insist on statistical proof by hypothesis testing and the standard of p value at 0.05, the difference would be deemed just ‘significant’ after 250 operations when there has been an excess of 10 deaths, arguably avoidable. That might take several years to identify. Using VLAD plots this trend will have been detected much earlier, near-misses analysed, and remedial action will have been taken. There are various arguments against this strategy.

One is the disruption of repeatedly investigating surgeons who experience statistically insignificant clusters of deaths. During her Reith Lectures on ‘Trust’ the Irish philosopher Onora O’Neill likened this to pulling up a seedling every few days to inspect its roots. Then there is the statistical problem of repeated looks, a no-no in clinical trials. Inevitably some surgeons will have been besmirched and unjustly driven out of work. For a mastery exposition on these issues and much more read Samer Nashef’s book ‘The Naked Surgeon’.

References

Scientific Programme of the Surgical Training and Manpower Committee (STMP) during the 29th Annual Meeting of the EACTS

Peyman Sardari Nia, Maastricht, the Netherlands
Chairman of the Surgical Training and Manpower (STMP) Committee on behalf of the STMP Committee members:

Peyman Sardari Nia, Maastricht, the Netherlands
Lusco Careddu, Bologna, Italy
Ikono Ilenon, Helsinki, Finland
Påll Ermel, Tartu, Estonia
Fabian Kari, Freiburg, Germany
Eduard Quintana, Barcelona, Spain
Marco Scarci, Cambridge, UK
Joerg Sinhabaker, London, Germany
Matthias Siepe, Freiburg, Germany

I am honoured and pleased once again to announce the scientific programme for the Annual Meeting of the European Association for Cardio-Thoracic Surgery (EACTS) in Amsterdam. For those of you unfamiliar with the STMP Committee of EACTS, the committee represents the views of young surgeons and residents, the future of our specialty. We believe that training, research and innovation are the fundamentals of our practice and future of our specialty. Without these the potential that we and our patients have are not to be realised.

We support and initiated this by awarding each year different prizes for research (Young Investigators Awards), for training (Leonardo Da Vinci Award for Excellence in Surgical Training) and will be compiling in envelopes to be opened at tables to facilitate discussion and interaction.

Residents can register at the Annual Meeting onsite to attend these sessions.

We as the representatives of the STMP Committee hope that the proposed activities serve the surgeons well. A lot of energy has been put into creating these innovative sessions and selecting the prominent faculty involved in them. We very much hope that the format of the sessions and quality of the faculty, will create a highly interactive atmosphere.

Programme details

Monday

Work in progress
Meet the experts
Pro and con debate
Resident’s coffee break
Live-heart team, complex pathologies
Endoscopic drylabs

Tuesday

Nightmares in cardiothoracic surgery
Resident’s lunchroom
Preoperative planning
Endoscopic drylabs

Wednesday

How to do it with live-in-box

Tuesday

Nightmares in cardiothoracic surgery
Resident’s lunchroom
Preoperative planning
Endoscopic drylabs

Wednesday

How to do it with live-in-box

One is the disruption of repeatedly investigating surgeons who experience statistically insignificant clusters of deaths. During her Reith Lectures on ‘Trust’ the Irish philosopher Onora O’Neill likened this to pulling up a seedling every few days to inspect its roots. Then there is the statistical problem of repeated looks, a no-no in clinical trials. Inevitably some surgeons will have been besmirched and unjustly driven out of work. For a mastery exposition on these issues and much more read Samer Nashef’s book ‘The Naked Surgeon’. 
Negotiated work-based learning (NWBL) to up-skill an advanced nurse practitioner (ANP) to interpret plain film chest radiographs

Amanda Walmsley Liverpool Heart & Chest Hospital, Liverpool, UK

Prolonged air leaks are a recognised complication following thoracic surgery. As a thoracic advanced practitioner, interpretation of chest radiographs was deemed essential to enable autonomous management of patients discharged with chest drains so they could be managed in an outpatient clinic. Achievement of this advanced clinical skill would decrease delays by reducing the need for medical staff intervention, and improve the patient experience within the current service. However, ANPs who undertake image interpretation must be trained to a level comparable with that of a middle-grade doctor to maintain patient safety. This could not be achieved by traditional methods of learning due to its bespoke nature. Hence, NWBL was the appropriate pedagogy.

This NWBL approach enabled expert guidance from the University and work-based mentorship from the thoracic consultants and radiologists. The project was part of an MSc in advanced practice module equating to 20 credits. A tutor at the University of Liverpool was used as an expert resource and guide for the development of the assessment tools and portfolio of evidence of competence. The initial project was focused on patients with chest drains, pneumothoraces and effusions as these patients would be commonly referred to the clinic. The consultant radiologists were key in defining the basics of X-ray interpretation. However, assessment was done directly with the thoracic consultants as holistic patient assessment, accurate X-Ray interpretation and best management strategy could be assessed in the workplace with direct cases under their supervision. Assessment strategy involved direct observation of clinical skill (DOPS) whereby an assessment tool, MINI IPX =0.01), but non-significant after incorporation of post-procedural ECG variables. Preoperative use of statins was a protective factor for PPM. This finding expands the debate about the pleiotropic effects of this drug class: a protective effect of statins on the conduction system had not previously been reported. Baseline atri-ventricular conduction disturbances (QRS and RBBB) are predisposed to the need of PPM. Multiple studies on CoreValve are consistent with our findings but post-Percival investigations are rare. But appearance of LBBB after the aortic valve procedure with a nitinol device (AVR or TAVI) is quite frequent. Occurrence of LBBB can be detrimental in cases of pre-existing RBBB and this explains why RBBB has consistently been identified as a risk factor for PPM. Morbidity and early mortality did not differ. However, intensive care and overall stay were significantly longer in the PPM group.

Nitinol technology represents a groundbreaking option for aortic valve procedures. The radial forces of the self-expandable mechanism could be implicated in the increased need of PPM mostly in cases of TAVI. In the context of a transcatheter procedure, in situ calcium clusters could locally load the nitinol structure, alter force distribution and provoke localised excess of radial force that can eventually harm conductive tissue. During an open surgical procedure, the possibility of calcium debridement and direct prosthesis sizing may preserve stent shape and consequently assure homogeneous energy distribution.

Cardiac – Rapid Response: Transcatheter aortic valve implantation versus surgical aortic valve replacement

Risk factors for permanent pacemaker after implantation of self-expanding aortic prostheses

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2 University of Milano-Cardiac Surgery School, Sant’Ambrogio Clinic, Milan, Italy

The nickel-titanium alloy nitinol is experiencing increasing use in medicine. Although the first trans-catheter aortic valve implantation (TAVI) was performed with a stainless-steel balloon-expandable stent, widespread adoption of this procedure has been achieved after the advent of a nitinol auto-expandable device. Cardiac surgery has evolved rapidly after the introduction of nitinol-based percutaneous prostheses for aortic valve replacement (AVR).

Atrio-ventricular block requiring permanent pacemaker (PPM) replacement (AVR) of nitinol-based sutureless prostheses for aortic valve has emerged as a frequent event after TAVI and AVR patients with these prostheses, providing a pool of patients for a retrospective analysis.

In 43 (12.8%) of 335 patients without an indwelling stimulation device at admission, a PPM was implanted during hospitalisation for the aortic valve procedure (TAVI 17.5% versus AVR 6.8%, p=0.007). PPM patients had higher logistic EuroSCORE (20.8% versus 15.6%, p=0.01), lower use of statins (20.0% versus 34.2%, p=0.02), longer QRS (117 ms versus 88 ms, p=0.02) and higher incidence of conduction disturbances (29.3% versus 16.8%, p=0.034) and high prevalence of right bundle branch block (RBBB). Immediate PM dependency was prevalent in the PPM group (p=0.0001). At the first ECG, unstimulated PPM patients showed longer PR (208 versus 182 ms, p=0.007), longer QRS (150 versus 113 ms, p=0.001) and longer QTc (p=0.005). The prevalent intraventricular conduction disorder in both groups was left bundle branch block (LBBB). AVR patients received the PPM later than the TAVI group (6 days versus 3 days, p=0.01). TAVI was an independent predictor of PPM (adapted from the Royal College of Radiologists, 2013), was used to utilise the skills needed to gain competence, once high standards were met final assessments were undertaken formatively and summatively. This involved interpretation of a series of 10 chest radiographs on two separate occasions by the ANP. This test-retest method ensured reliability and consistency. Importantly 100% accuracy in correct diagnosis was required to ensure patient safety. Maintenance of competence is assessed regularly by the consultants within daily practice by participation in daily ward rounds and a portfolio of evidence has been kept for reference.

Increasing competence and capability in this advanced clinical skill has enabled autonomous management of patients attending the nurse-led chest drain clinic and within the ward environment, expediting treatment, improving patient outcomes and service efficiency.

Aymen Rashed University of Dusseldorf, Essen, Germany

The aortic valve regurgitation with reintervention of coronary arteries is a reliable solution to repair the aneurysm in aortic root and ascending aorta with involved aortic valve. Bentall and De Bono came up with the surgical technique which involving replaced the aortic valve and ascending aorta with a composite mechanical valve conduit in 1968, as a therapy to treat aortic root aneurysm. The introduction of biological valve conduits brought important benefits to a large group of patients suffering from the anticoagulation disorders. However, in the case of using a bioprosthesis, these procedures cannot be performed. However, biological valves are not durable due to degradation. There was a need to compare the differences in haemodynamic performance and durability between the different available bioprostheses because they differ in various aspects.

Two of the most commonly used pre-seven sterility biological conduits are BioValsalva and BioIntegral BioConduit (adapted from the Royal College of Radiologists, 2013). As a result of the lack of comparative studies between the different biological valve conduits, there was a need to review the midterm performance of these two conduits. Both of the biological valve conduits are similar in the respect that they have stentless biological valves; however, they differ with regards to two main characteristics: 1) the graft of the BioValsalva conduit is made of polyester, whereas the graft of the BioIntegral conduit is made of bovine pericardium, and is therefore a complete biological conduit, which may demonstrate a stronger resistance to infection; 2) the BioIntegral conduit is a straight pericardial graft with an incorporated sterility valve inside the graft with no extra sewing ring. By contrast, the BioValsalva conduit is composed of a graft and a valve sewn together with an extra sewing ring around the valve that adds 4 mm to the diameter of the valve, which in turn decreases the effective orifice area. Conversely, the design of the BioValsalva conduit has two advantages: 1) the BioValsalva conduit is composed of two parts, which can be separated in case of a reoperation and the diseased part can be replaced; and 2) the design of the BioValsalva recreates the sinuses of Valsalva, which may reduce the distance between the coronary ostia and the graft, and help to reduce tension on the coronary anastomoses.

Between July 2008 and June 2014, a total of 55 patients underwent aortic root replacement using a BioValsalva conduit (n=27) or a BioIntegral conduit (n=28) at the University Hospital of Essen, Germany. The echocardiographic follow-up for the BioIntegral group was shorter because of the novelty of BioIntegral prostheses in our centre. The median echocardiographic follow-up for the BioIntegral group was 44.0 months compared with 8.4 months for the BioIntegral group. It was hypothesised that the BioIntegral prosthesis with no sewing ring, will provide benefits in valve haemodynamics; however, these potential benefits were not observed when compared with the BioValsalva prosthesis in our echocardiographic follow-up. The effective orifice area in the BioIntegral group was 1.85 cm² compared with 1.80 cm² in the BioIntegral group (p=0.24). The mean pressure gradient in the BioIntegral group was 11.5 mmHg compared with 11.0 mmHg in the BioIntegral group (p=0.82).

In conclusion, the use of biological valve conduits is increasing due to an aging population and the durability of the new biological valve conduits. We do not observe a significant difference in the outcome between the two biological valve conduits, and both of them had excellent outcomes. Despite our mid-term results suggesting a favourable outcome, a long-term follow-up is needed.

Cardiac – Rapid Response: Aortic valve substitutes: the long term view

BioValsalva or BioIntegral: Which biological aortic valve conduit has a better hemodynamic performance?
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I have been using the Easy Flow for several years, and I find it to be the best solution for arterial cannulation in all MICS situations. The procedure is easy and reproducible, the learning curve is gentle and its technical features improve cannula insertion. Specifically designed for MICS procedures, the cannulae allow an easy and bloodless insertion, particularly in lateral thoracotomy, while the dispersion tips provide a more gentle blood flow and can improve patient outcomes and reduce aortic wall shear stress. Additional Easy Flow cannulae features include an integrated obturator and stilet, a small outer diameter and thin-wall, wire-reinforced design. These benefit the physician by providing easy access without kinking and reduced potential for vascular damage. This expanded arterial cannulae offering allows physicians to take advantage of these key features and benefits in all their MICS procedures.

The Easy Flow DUO 23 Fr has been in the market four years, and the addition of the 19 Fr cannulae marks another step forward in MICS cannulae design. The MICS cardiac community can now take full advantage Sorin Group’s cannulation and the opportunity it presents to provide optimal flow dynamics, improve patient outcomes and simplify procedures.

Find out more at Sorin Group Booth #3.15

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CARDIAC – Rapid Response: Aortic valve substitutes: the long-term view

Mitroflow LXA® structural deterioration following aortic valve replacement: a single-centre experience

One of the most widely used pericardial tissue valve prostheses for aortic valve replacement, the Mitroflow LXA model in 2007. The manufacturing process improvements for the LXA model were implemented to increase manufacturing efficiencies, without affecting the design or performance of the prosthesis, which advocates the advantage of better haemodynamic efficiency in smaller aortic annuli. An anti-calcification process was not integrated into the manufacturing process. Recently, reports from other centres have alerted to the possibility of early structural valve deterioration (SVD) for the Mitroflow prosthesis, but without distinguishing between the 12A and LXA models. In this single-centre retrospective study, we evaluated 227 patients implanted with a Mitroflow LXA from February 2007 to October 2011. Endocardiochographic data during follow-up, as well as explanation for degeneration, were used to define SVD. Mean follow-up time was 49.6±23.5 months and completeness of follow-up was 95%. Overall mortality, and mortality from cardiac or unknown causes, in our series were 30.3% and 21.6%, respectively.

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Our secondary goal is to create a platform for research and best handover of patients in the OR. Be given on the time-out procedure in the OR and pitfalls in the use of extracorporeal membrane oxygenation (ECMO). Another topic of importance is safety; presentations will facilitate femoral and direct cannulation of vessels. In a section on postoperative management of these patients. In a section on

Nurses and allied professionals at EACTS

Christina Bannister and Richard van Valen on behalf of the organising committee

This year will be the 5-year anniversary of the postgraduate course for nurses, nurse practitioners and physician assistants. In 2009, the council decided to give these allied professionals a platform within the European Association for Cardio-Thoracic Surgeons (EACTS). Since that moment a small pan-European group has worked on creating a day with topics of interest for operating room (OR) staff, nurses, nurse practitioners and physician assistants from the intensive care unit (ICU) and the ward. This course has been extremely well received by all who have attended, and networking opportunities across Europe have been created as a result of the course.

Topics this year include care of the genetic patient. A genetician, surgeon and nurse practitioner will present on quality of life, issues during screening for frailty and the pre-, peri- and postoperative management of these patients. In a section on innovation there will be a presentation on unipORT thoracic surgery and the use of extracorporeal membrane oxygenation (ECMO). Another topic of importance is safety; presentations will be given on the time-out procedure in the OR and pitfalls in the handover of patients in the OR.

Our secondary goal is to create a platform for research and best practice by allied professionals. Research aimed at improving care during the clinical and outpatient period has been presented since the first postgraduate session in 2010. This year we will be rewarding the best presentation with a peer-selected travel grant (our thanks go to Maquet for their support) to show that evidence-based care is another vital topic in improving patient outcomes. Great surgery needs to be accompanied by excellent care before and after surgery; we encourage all nurses and allied professionals who are performing research and best practice to share it with our group.

The third goal of the group is to cooperate and create learning opportunities together with other parties within EACTS. An excellent example of this cooperation is the left ventricular assist device (LVAD) coordinator training course, initiated by EACTS Euromacs (Figure 1).

The growing group of patients with LVAD as their destination therapy requires highly skilled healthcare professionals; in different countries different professions fulfill this role. These professionals came together in the German Heart Center in Berlin to learn trouble-shooting, management of fluid status, screening process and other important subjects. This course received great feedback because of its hands-on approach and highly interactive sessions; the course is planned to be run again in 2016.

The collaboration between the council and staff of EACTS has always been good. There are, however, issues that can only be addressed by the key opinion leaders within the different countries. The options for nurses and other allied professionals to attend important meetings, such as our annual meeting, are very limited. Financial resources need to be freed, and recognition by surgeons on the important role of allied professionals and joint working needs to be confirmed. The knowledge we have on evidence-based care in cardiothoracic surgery should be shared by all involved in the field, and we must work together to make this possible. Furthermore, surgeons should inspire allied professionals to play their role in expanding the body of existing knowledge, and encourage them to share this knowledge with the rest of the community.

Figure 1. Participants at the first LVAD coordinator course.
Visceral organ protection during aortic surgery

Robert N. Bartoletti
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Visceral organ protection remains one of the most technically challenging of modern aortic surgery. The pathogenesis of visceral organ damage is complex and multifactorial, mainly depending on temperature and the duration of circulatory arrest. Deep hypothermia was the first strategy used to avoid ischaemic damage to the CNS, visceral organs and spinal cord. Different techniques for organ protection according to the aortic segment that has to be replaced are available. In aortic arch surgery the three main methods used to protect the CNS are deep hypothermic circulatory arrest, retrograde cerebral perfusion and antegrade selective cerebral perfusion (ASCP). The Kazui technique is the most popular ASCP approach. Concerns have grown over the effectiveness of mild-to-moderate hypothermia for visceral organ protection during circulatory arrest, although some authors have reported excellent results.

The use of specially adapted conventional materials (long curved instruments with both proximal and distal articulation) is one technique for VATS major pulmonary resections in 2010, we have demand has helped uniportal VATS to become widespread. The offset time of the effect is more dependent on renal function.

The patient is placed in a lateral decubitus position as is usual for thoracoscopic view. A single chest tube is placed in the posterior thoracoscopic resections. The use of a video laparoscope with the distally mounted CCD design enhances the instrumentation. The surgeon and the assistant must be positioned in front of the patient in order to have the same thoracoscopic vision throughout the procedure. Even though the field of vision can only be obtained through the anterior access site, the combined movements of the 5-numbered thoracoscope along the incision allow for different angles of vision. The advantage of using the thoracoscope in coordination with the instruments is that the surgeon is always in the right part of the field. By using this, we are lining up the instruments to address the target lesion from a direct, sagittal perspective. Optimal exposure of the lung is vital in order to facilitate the dissection of the structures and to avoid any instrument interference.

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The patient is placed in a lateral decubitus position as is usual for thoracoscopic view. A single chest tube is placed in the posterior thoracoabdominal aortic surgery.

Cardiac – Postgraduate Course: Perfusion: haemostasis and fluid management

Anders Jepsen
Luleå University of Technology, Gothenburg, Sweden

Oral anticoagulants include warfarin and the new oral anticoagulants (NOACs) dabigatran, rivaroxaban and apixaban. Dabigatran inhibits thrombin directly, but it is not an effective anticoagulation factor X. Today an increasing number of patients are treated with NOACs instead of warfarin due to atrial fibrillation and other conditions with an increased risk of thrombosis. The NOACs differ markedly in pharmacokinetic and pharmacodynamic profiles compared with warfarin. These differences constitute a challenge if the patient requires an operation. The time to peak concentration with the NOACs is much shorter than with warfarin, 2–3 hours versus 120 hours, and the half-life is also shorter, 9–17 hours versus 50 hours. The offset time of the effect is more dependent on renal function than with warfarin. One special problem in surgical patients is that there are currently no available antidotes for the NOACs. In addition, the anticoagulation effect of the NOAC cannot be easily detected with standard clinical coagulation tests. During the presentation a handling strategy for surgical patients treated with NOACs will be discussed.

The risk of bleeding complications may also increase the risk for bleeding complications in patients in need for acute or urgent surgery. Dual antiplatelet therapy with acetylsalicylic acid and a P2Y12 antagonist in patients with acute coronary syndrome reduces the risk of thrombotic complications compared with treatment with acetylsalicylic acid only. The risk of thrombotic complications is further reduced if one of the new P2Y12 antagonists, ticagrelor or prasugrel, is used instead of clopidogrel. On the other hand, the risk of surgical bleeding complications may be increased, especially if the treatment can’t be discontinued before surgery. The new inhibitors have a stronger antiprostaglandin effect than clopidogrel and a markedly shorter time to effect, 30 minutes compared with 3 hours. Ticagrelor has a shorter offset time than prasugrel or clopidogrel. P2Y12 antagonists are withdrawn before surgery to reduce the risk of excessive bleeding but the patient’s condition sometimes renders this impossible. The optimal period of discontinuation varies between the P2Y12 antagonists. Current guidelines recommend 5 days for clopidogrel and ticagrelor, and 7 days for prasugrel. During this period most patients are hospitalised which is resource-consuming and costly. An alternative method to a set discontinuation time is to measure platelet function and operate when this has sufficiently recovered. During the presentation the pros and cons of this approach will be discussed together with recently published real-life studies about experiences with the new platelet inhibitors and surgery-related bleeding complications. Furthermore, a handling strategy for surgical patients treated with dual antiplatelet therapy will be discussed.
30th EACTS
Annual Meeting
Barcelona, Spain
1-5 October 2016

Abstract deadline 30 April 2016
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Raising Standards through Education and Training
Transformation of percutaneous access to a safe peripheral cannulation

Stefano Demertzis
The Cardiac Surgery Service, Cardiocentro Ticino, Lugano, Italy

Venoventral extracorporeal membrane oxygenation support (VA-ECMO) is an accepted life-saving approach for cardiogenic shock inside, and more recently, outside the hospital setting. In these circumstances percutaneous cannulation of the groin vessels is frequently used to initiate extracorporeal support and stabilize the patient. The peripheral flow distal to the cannulation site can cause limb ischemia and significant morbidity.

In Figure 1, a surgical technique is presented, which allows for a timely transformation of a percutaneous to a safe peripheral arterial cannulation, to prevent the deleterious effect of distal limb ischemia. There are several techniques for distal perfusion after peripheral arterial cannulation, including the introduction of an additional perfusion catheter in the distal artery. The effective distal perfusion flow can be inadequate, as it is determined by the resistance of the stopcock connection of the perfusion catheter to the circuit and of the catheter itself. After decannulation, the artery is left with two openings that need to be taken care of. The proposed surgical technique ensures adequate distal perfusion, prepares for safe decannulation and substantially reconstructs the artery, and gives the surgeon the chance to reconstruct the insertion hole of the percutaneous cannula and/or the possibility to perform an embolotomy of the distal femoral arteries under undisturbed ECMO perfusion.

This technique should be seen as an enrichment of the armamentarium and lowers the threshold for a proactive approach towards prevention of distal limb ischemia in critically ill patients placed on percutaneous VA-ECMO.

References

Cardiac – Postgraduate Course: Extracorporeal life support devices and strategies for management of acute cardiorespiratory failure

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Transapical transcatheter aortic valve implantation versus surgical aortic valve replacement in a prospective randomised trial: comparable health-related quality of life (HRQOL) in low-risk patient

A total of 59 patients were randomised at our institution: 29 were assigned to a-TAVI and 30 to SAVR. One patient in the SAVR group declined participation, resulting in 29 SAVR assigned to a-TAVI and 30 were assigned to SAVR. One patient during follow-up; one patient died on the waiting list, one died from brain haemorrhage, one due to acute coronary syndrome, one from pelvic cancer, and we were unable to identify the causes of death in the remaining two patients. The year-by-year survival rates are displayed in Figure 1 and we found no statistically significant difference between the two groups (p > 0.05). In the a-TAVI group a total of four patients died during follow-up; one died from brain haemorrhage, one due to acute coronary syndrome, one from pelvic cancer, and we were unable to identify the causes of death in the remaining two patients. The year-by-year survival rates are displayed in Figure 1 and we found no statistically significant difference between the two groups (p > 0.05). In the SAVR group 24/29 (83%) in the a-TAVI and SAVR groups (p < 0.05).

In summary, we examined the 4-year HRQOL and survival rates in a year-by-year manner from patient groups of the STACCATO trial. Our data from these low-risk patients display equivalent self-estimated quality of life and survival rates after a-TAVI and SAVR, except for self-estimated physical condition at 1 year, where a-TAVI was statistically superior to SAVR. However, the results of our trial must be interpret with caution because of its early termination and the small number of patients. In terms of HRQOL the a-TAVI procedure provides a robust alternative to SAVR in low-risk patients. Moreover, our 4-year survival rates after a-TAVI appear comparable with SAVR.

Figure 2. SF-36 scores in the intention-to-treat groups.
(A) Composite physical score; (B) Composite mental score.

References

Figure 1. Number of patients alive in the intention-to-treat groups.
Nurses can play a vital role in reducing pain after cardiac surgery

Richard van Velden
Nurse practitioner Framus Medical Center, Rotterdam, the netherlands

Pain after cardiac surgery is often described as severe in the first days after surgery. Many different types of pain medication and application in recent years, culminating in close to 50% of isolated mitral valve procedures performed through mini-thoracotomy in Germany in 2014. Nevertheless, MIMVS is still restricted to a select number of highly specialised centres. Video-assisted direct vision MV surgery (Leipzig technique) is the gold standard until recently, leaving a total endoscopic approach to only a very few extremely specialist, high-volume surgeons around the world. With the availability of a new high definition 3D technology (Einstein Vision®) total endoscopic MV surgery has become a reality for many less busy surgeons. The system combines a double-channel endoscope, which is connected to two high-definition video cameras permanently fixed to the endoscope.

No sterilisation is required since the whole videocamendoscope is covered by a disposable sterile cover.

Since June 2014, 52 MIMVS operations have been performed with the aid of this system in our centre. There was no hospital mortality. Complications included one extracorporeal membrane oxygenation (ECMO) for severe lung oedema, one re-expansion for bleeding from the thoracotomy, and one re-expansion for a lost amnuloplasty ring after a large ring had been implanted for correction of systolic anterior motion (SAM). One reoperation was done through median sternotomy for a ruptured papillary muscle after MV replacement. All operations were performed by two experienced surgeons, however, three more surgeons have been trained in total endoscopic mitral surgery with 3D videocapsocopic assistance from the beginning.

As a result of the 3D videocapsocopic technique, all surgeries are performed without the use of a rib retractor and, in the most experienced hands, access came down to a 3 cm linear (Figure 1) or semicircular pericardial microincision. Up-to-date 3D videocapsoscopic technology definitely represents a major step forward and added value for MIMVS.

Figure 1. Microincision for MIMVS.

Cardiac – Professional Challenge: Challenges in mitral valve repair: part I

Ludwig Müller
Embrikus Medical University, Austria

Minimally invasive mitral valve surgery (MIMVS) has found increasing interest and application in recent years. In 2010, no more than 1% of isolated mitral valve procedures had been performed with the aid of this system in our centre. There was no hospital mortality. Complications included one extracorporeal membrane oxygenation (ECMO) for severe lung oedema, one re-expansion for bleeding from the thoracotomy, and one re-expansion for a lost annuloplasty ring after a large ring had been implanted for correction of systolic anterior motion (SAM). One reoperation was done through median sternotomy for a ruptured papillary muscle after MV replacement. All operations were performed by two experienced surgeons, however, three more surgeons have been trained in total endoscopic mitral surgery with 3D videocapsocopic assistance from the beginning.

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Cardiac – Professional Challenge: Challenges in mitral valve repair: part II

Ludwig Müller
Embrikus Medical University, Austria

Minimally invasive mitral valve surgery (MIMVS) has found increasing interest and application in recent years, culminating in close to 50% of isolated mitral valve procedures performed through mini-thoracotomy in Germany in 2014. Nevertheless, MIMVS is still restricted to a select number of highly specialised centres. Video-assisted direct vision MV surgery (Leipzig technique) is the gold standard until recently, leaving a total endoscopic approach to only a very few extremely specialist, high-volume surgeons around the world. With the availability of a new high definition 3D technology (Einstein Vision®) total endoscopic MV surgery has become a reality for many less busy surgeons. The system combines a double-channel endoscope, which is connected to two high-definition video cameras permanently fixed to the endoscope.

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Figure 1. Microincision for MIMVS.
Recent developments in extracorporeal organ support and the use of pre-operative extracorporeal membrane oxygenation have radically improved the prospects for patients waiting for new lungs. This course will bring you up-to-date with these developments, describe in detail how these technologies are applied and enable you to manage the complications for the benefit of your patients.

Please refer to the EACTS Academy website for further information and registration http://www.eacts.org/academy/courses/lung-failure

The surgical treatment of lung and heart failure courses will run consecutively in Windsor, UK.

A specially discounted fee is available for delegates wishing to attend both.

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Recent developments in extracorporeal organ support and the use of pre-operative extracorporeal membrane oxygenation have radically improved the prospects for patients waiting for new lungs. This course will bring you up-to-date with these developments, describe in detail how these technologies are applied and enable you to manage the complications for the benefit of your patients.

Surgical treatment of lung failure, 16–18 November 2015, Windsor, UK

Course Directors: J Pepper and A Simon, London, UK

Recent developments in extracorporeal organ support and the use of pre-operative extracorporeal membrane oxygenation have radically improved the prospects for patients waiting for new lungs. This course will bring you up-to-date with these developments, describe in detail how these technologies are applied and enable you to manage the complications for the benefit of your patients.

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The surgical treatment of lung and heart failure courses will run consecutively in Windsor, UK.

A specially discounted fee is available for delegates wishing to attend both.

Thoracic surgery: Part II, Date/duration: 8–11 December 2015

Location: Windsor

Course Director: P Rajesh, Birmingham, UK

Course overview

The course will include didactic presentations with interactive discussions and seminar sessions with faculty to promote discussion with delegates. The course material will be such that, at the conclusion of the 4 days, the delegates will have an understanding of the principles of airway management, mediastinal and oesophageal disorders, indications and contraindications and techniques and access for surgery.

Target Audience

This course is designed for Senior Trainees in Cardio-thoracic Surgery and newly appointed Consultants in Europe. The faculty are experts in the various subspecialities of General Thoracic Surgery. Senior Trainees in Cardio-thoracic Surgery and newly appointed Consultants.
### Agenda

#### Saturday 3 October

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Location</th>
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</thead>
<tbody>
<tr>
<td>08:00</td>
<td>Transcatheter aortic valve implantation/aortic valve</td>
<td>Auditorium</td>
</tr>
<tr>
<td>11:00</td>
<td>Heart failure/aortic disease</td>
<td>Auditorium</td>
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<tr>
<td>14:30</td>
<td>Atrioventricular valves</td>
<td>Auditorium</td>
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<tr>
<td>09:00</td>
<td>Diagnosis and surgery</td>
<td>G102+G103</td>
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<tr>
<td>13:30</td>
<td>Outcome</td>
<td>G102+G103</td>
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<tr>
<td>13:00</td>
<td>3D Technology</td>
<td>G104+G105</td>
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<tr>
<td>16:20</td>
<td>Mechanical support</td>
<td>G104+G105</td>
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#### Sunday 4 October

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Location</th>
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<tbody>
<tr>
<td>08:15</td>
<td>Challenges in mitral valve repair</td>
<td>Auditorium</td>
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<tr>
<td>08:15</td>
<td>Safeter surgery for who?</td>
<td>G104+G105</td>
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<tr>
<td>10:15</td>
<td>Quality improvement</td>
<td>E106+E107</td>
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<tr>
<td>10:15</td>
<td>Safer surgery for who?</td>
<td>G104+G105</td>
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<tr>
<td>13:45</td>
<td>Women in cardiac surgery</td>
<td>F003</td>
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<tr>
<td>13:45</td>
<td>Quality improvement programme update</td>
<td>F002</td>
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<tr>
<td>13:45</td>
<td>Basic science – heart</td>
<td>G109</td>
</tr>
<tr>
<td>10:15</td>
<td>Basic science – lung</td>
<td>G109</td>
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<tr>
<td>10:15</td>
<td>Transcatheter aortic valve implantation versus surgical aortic valve replacement</td>
<td>E102</td>
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<tr>
<td>13:45</td>
<td>Aortic valve substitutes: the long-term view</td>
<td>E102</td>
</tr>
<tr>
<td>12:00</td>
<td>CanBetter: optimising training programmes in cardiothoracic surgery</td>
<td>Auditorium</td>
</tr>
<tr>
<td>08:15</td>
<td>Perfusion</td>
<td>E106+E107</td>
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<tr>
<td>08:15</td>
<td>Nurse and nurse physician postgraduate programme</td>
<td>E108</td>
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<tr>
<td>13:15</td>
<td>Update on the results and rationale and design of ongoing clinical trials</td>
<td>Auditorium</td>
</tr>
<tr>
<td>13:45</td>
<td>Extracorporeal life support devices and strategies for management of acute cardiopulmonary failure</td>
<td>G104+G105</td>
</tr>
<tr>
<td>08:15</td>
<td>Pneumonectomy controversies: what is the problem?</td>
<td>E104+E105</td>
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#### Monday 5 October

<table>
<thead>
<tr>
<th>Time</th>
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<tr>
<td>10:15</td>
<td>Management of oesophageal perforations</td>
<td>E104+E105</td>
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<tr>
<td>13:45</td>
<td>Management of acquired tracheal disorders: from stenosis to laceration</td>
<td>E104+E105</td>
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<tr>
<td>08:15</td>
<td>Update on hypoplastic left heart syndrome management</td>
<td>G106+G107</td>
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<tr>
<td>10:15</td>
<td>Update on Tetralogy of Fallot with pulmonary valve atresia at the great arteries and left ventricular collateral arteries</td>
<td>E104+E105</td>
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<tr>
<td>13:45</td>
<td>Meet the experts</td>
<td>G106+G107</td>
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<tr>
<td>14:45</td>
<td>Surgical film session</td>
<td>G106+G107</td>
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<tr>
<td>08:15</td>
<td>Basics in proximal thoracic aortic surgery: session 1</td>
<td>G102+G103</td>
</tr>
<tr>
<td>10:15</td>
<td>Basics in proximal thoracic aortic surgery: session 2</td>
<td>G102+G103</td>
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<tr>
<td>13:45</td>
<td>Outcome and follow-up after major thoracic aortic surgery: session 3</td>
<td>G102+G103</td>
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<tr>
<td>14:45</td>
<td>Thoraco-abdominal aneurysms revisited: session 4</td>
<td>G102+G103</td>
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<tr>
<td>16:00</td>
<td>Joint Session EACTS STSBCOV PAScaTS – Cardiac surgery in the emerging economies: the evolving management strategies</td>
<td>G109</td>
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<tr>
<td>10:15</td>
<td>Minimally invasive surgery for lung cancer: up-to-date debates</td>
<td>E108</td>
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<tr>
<td>14:15</td>
<td>Meet the experts</td>
<td>E103</td>
</tr>
<tr>
<td>16:00</td>
<td>TNM classification: 8th edition</td>
<td>E103</td>
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</tbody>
</table>

#### Abstract

- **Heart transplantation in the modern era**
  - Forum
- **Endocarditis: a continuous dilemma**
  - G104+G105
- **Risk models in coronary surgery**
  - E104+E105
- **Work in progress**
  - Emerald Room
- **Aortic valve replacement: what is new?**
  - G104+G105
- **Cardiac general**
  - E104+E105
- **Basic science 1**
  - E109
- **Future of sutureless valves**
  - Forum
- **Challenges in surgical aortic valve replacement**
  - G104+G105
- **Basic science 2**
  - F002
- **The two faces of arterial revascularisation**
  - Auditorium
- **Results of Ross procedures and homografts in aortic surgery**
  - E106+E107
- **Thoracic oncology I: staging**
  - E103
- **Non-oncology I**
  - E108
- **Thoracic oncology II: perioperative management**
  - E103
- **Mediastinum**
  - E108
- **Fontan circulation**
  - G106+G107
- **A broad view on acute dissection**
  - G102+G103
- **A 4D view of the aortic root**
  - G102+G103

#### Focus Session

- **CanBetter: optimising training programmes in cardiothoracic surgery**
  - Auditorium
- **Avoiding disasters in cardiac surgery**
  - E106+E107
- **Meet the experts**
  - Emerald Room
- **Coronary artery bypass graft is on the rise, don’t give it up**
  - Auditorium
- **Infectious problems**
  - E106+E107
- **Transcatheter aortic valve implantation: current and future perspectives**
  - E104+E105
- **Pro and con debates**
  - Emerald Room
- **Joint session EACTS STSBCOV PAScaTS – Cardiothoracic surgery**
  - G109
- **Fast-track management**
  - E104+E105
- **Live-heart team of complex pathologies**
  - Emerald Room
- **Transcatheter mitral valve replacement: new valves and experiences**
  - G104+G105

#### Abstract Rapid Response

- **Reducing invasiveness**
  - E102
- **Supporting the heart and lung**
  - E102
- **Thoracic quick fire session**
  - E102
- **Congenital**
  - E102
Tuesday 6 October

**Plenary**

11:50 Presidential Address Auditorium

**Residents Session**

10:15 EACTS Cardiakortheic Masters Jeopardy F002
12:45 Cardiac surgery residents – where do we come from and where are we heading F002
16:00 Endoscopic port access mitral valve repair F004

**Training in Research**

10:15 All you need to know for your next research project – part I F003
14:15 All you need to know for your next research project – part II F003
16:00 How to statistically analyse your next research project F003

**Tuesday 6 October**

**Professional Challenge**

08:15 Less invasive procedures for complex patients Auditorium
10:15 Less invasive procedures for complex patients Auditorium

**Focus Session**

08:15 Aortic valve disease and heart failure: how do they connect? E104+E105
10:15 Acute extracorporeal support and mechanical circulatory assist Forum
10:15 Is minimally invasive cardiac surgery the present and the future of mitral valve repair? G104+G105
10:15 Perioperative complications in cardiac surgery E104+E105
10:15 Nightmares in cardiothoracic surgery Emerald Room
14:15 Challenging the options for younger patients – minimising long-term risks with biological valves along the patient journey Forum
14:15 Pre-operative planning, simulation, 3D printing and intra-operative navigation in cardiothoracic surgery Emerald Room
16:00 Aortic valve replacement: ever had any problems? Forum
16:00 Better outcomes through optimising international normalised ratio management and anticoagulation in aortic valve replacement E104+E105

**Abstract**

08:15 Current challenges for extracorporeal life support Forum
08:15 Native and prosthetic valve endocarditis: an update G104+G105
08:15 Revisiting the tricuspid valve E106+E107
10:15 Functional mitral regurgitation E106+E107
14:15 Left ventricular assist device: Latest advances E104+E105
14:15 Degenerative mitral regurgitation E106+E107
16:00 What is new in transcatheter aortic valve implantation Auditorium
16:00 Case reports and videos G104+G105
08:15 Thoracic oncology III: Postoperative follow-up E103
08:15 Thoracic non oncology II E108
10:15 Session case report E103
10:15 Lung transplantation E103
14:15 Basic science and education E108
16:00 Chest wall E108
08:15 Tetralogy of Fallot G106+G107
10:15 Valve surgery G106+G107
16:00 Congenital miscellaneous G106+G107

**Abstract Rapid Response**

08:15 How to perform an effective surgical atrial fibrillation ablation E102
14:15 General cardiac E102
16:00 New technology in mitral surgery E102
10:15 Innovation and new strategies in thoracic aortic surgery E102

Wednesday 7 October

**Advanced Techniques**

09:00 Controversies and catastrophes in adult cardiac surgery G102+G103
09:00 A future without suture G104+G105
09:00 Advance technique session on multiple arterial grafting G106+G107

**Focus Session**

09:00 Learn from the experts how to do it? With live in a box Emerald Room

**Wetlab**

09:00 Learn from the experts how to do a remodelling or a re-implantation procedure E106+E107
09:00 Mitral valve repair E104+E105
10:30 Learn from the experts how to do a remodelling or a re-implantation procedure E106+E107
09:00 VATS lobectomy E103
09:00 AoV reconstruction and Senning E102

**Abstract**

09:00 Video session G109

**Key**

Cardiac
Thoracic
Congenital
Vascular
Plenary
Sutureless biological valves are designed to simplify the surgical replacement of a diseased aortic valve by facilitating minimally invasive approaches with minimal or no suturing and resultant reduced cross-clamp and ECC times. These procedural attributes have the potential to deliver fewer complications, lower morbidity and mortality, and reduced costs. Hence, it is expected that demand for sutureless AVR will increase and indications will expand. 

Launched in Europe in 2011 as an AVR solution for high-risk patients, the Sorin Perceval Aortic Heart Valve is a self-expanding, sutureless prosthetic made of bovine pericardium mounted in a nitinol stent. The reason why Perceval was launched for high risk patients was due to the initial Perceval CE mark approval for patients older than 75 years. After one year the indication for use was extended to patients 65 years of age or older and to adult-age patients in 2014, allowing treatment of a broad spectrum of AVR patients. Since the first implant in 2007 more than 95 publications have been published showing promising results with Perceval valve. Those studies have reported excellent results in terms of postoperative outcomes, hemodynamic performance, freedom from structural valve deterioration and reoperation at one-year follow-up. Shresta et al., in a published summary of three consecutive five-year European multicenter trials (Pilot, Pivotal, CAVALIER) in an elderly patient cohort (mean age of 78.5); reported excellent clinical and haemodynamic results up to the five-year follow-up, including: very low early and late cardiac mortality rates (1.9%, 1.4%); low early major paravalvular leak (1.4%); and low early stroke (1.6%). Furthermore, no valve migration, structural valve degeneration or valve thrombosis was observed in the follow-up, which involved the largest patient cohort ever implanted with sutureless valves. 

Recently, Eusancio and Phan described sutureless AVR as a promising alternative to conventional AVR, with major advantages being a reduction in cross-clamp and CPB duration. The authors also noted excellent hemodynamic outcomes plus fewer complications and greater savings compared with conventional AVR. Encouraging safety and efficacy results to date make the Perceval a promising alternative to the standard biological valve and the potential new gold standard for minimally invasive aortic valve surgery.

This truly sutureless valve has received dedicated reimbursement status in Belgium, Germany, Turkey and recently in Australia. We report the experience of Belgium which reimbursement has allowed Perceval to earn its place on surgeon shelf (or armamentarium) in most of the cardiac centers.

**Find out more at Sorin Group Booth # 3.15**

**References**


THE BIOLOGICAL VALVE OF CHOICE IN AVR

Reducing the trauma of the operation

Easy, safe and reproducible procedures.

Perceval’s distinctive design features provide excellent clinical outcomes and fast patient recovery. The broadest follow-up in sutureless solutions with more than 8 years of experience and over 5 years of published results.

Aortic solutions

Cardiac – Rapid Response: Transcatheter aortic valve implantation versus surgical aortic valve replacement

Comparison between aortic valve replacement with rapid deployment valve and transfemoral transcatheter aortic valve implantation in the ‘grey zone’ patients with severe aortic stenosis

who are deemed operable but considered as presenting a high surgical risk. In recent years several studies have focused on comparing AVR and TAVI in this ‘grey zone’ of patients. TAVI has shown excellent early and mid-term clinical and haemodynamic results in inoperable or high-risk patients. However, its increased costs, the non-removal of the calcified aortic valve and the resulting risk of paravalvular leakage, coronary occlusion and aortic rupture have been recognised as important limitations of TAVI. For these reasons aortic valve replacement with rapid deployment valve (RD-AVR) has been proposed as an additional option for the treatment of high-risk patients, with the aim of reducing the aortic cross-clamp time and facilitating minimally invasive access.

RD-AVR has also proven to be well tolerated, and it provides good early clinical and haemodynamic outcomes, therefore it may be commonly considered as a hybrid procedure indicated for ‘grey zone’ patients who are at high risk for aortic valve replacement (AVR), but who are not really inoperable. Because TAVI and RD-AVR are both indicated for the treatment of these intermediate to high-risk patients, this study aimed to compare the immediate clinical and echocardiographic outcomes after TAVI and RD-AVR with the Intuity Valve System (Edwards Lifesciences, Irvine, California).

A total of 122 consecutive patients between 75 and 85 years old with severe aortic stenosis underwent either TAVI or RD-AVR at our institution. Sixty patients, 30 treated by TAVI and 30 by RD-AVR, were identified and matched 1:1 according to age and EuroSCORE II, as to define a ‘grey zone’ of indication for either RD-AVR or TAVI. Hospital mortality was similarly low in both study groups (0% and 3.1% in RD-AVR and TAVI groups, respectively). Permanent pacemaker implantation was more frequently required in TAVI patients (37.5% versus 3.3%, after RD-AVR (p=0.001). Conversely, the RD-AVR group had a higher rate of postoperative atrial fibrillation (66.7% versus 34.4%, p=0.015) and a longer stay in the intensive care unit (75.4±62.1 versus 50.5±23.4 in TAVI, p=0.051).

At the echocardiographic examination, significant differences in prosthesis performance were detected. In particular, the absence of any aortic regurgitation was more common in the RD-AVR group (no aortic regurgitation in 96.7% versus 50% of the TAVI group), while the postoperative mean transprosthetic gradient was lower in the TAVI group (9.0±4.0 mmHg versus 11.5±3.9 mmHg, p=0.025).

Study results suggest that TAVI and RD-AVR are promising treatment options for ‘grey zone’ patients, but as both techniques are associated with specific patterns of prosthesis function, further evaluations of their impact on late clinical outcome are warranted.

The past decade has seen a trend towards less invasive medical procedures in virtually all medical specialties. Clinical outcome studies have shown that less invasive procedures can provide reductions in procedure and hospitalisation times, cost savings and improvements in patient recuperation and outcomes. Minimally invasive heart surgery dramatically reduces the traumatic impact of the operation. Aortic valve stenosis is currently the most frequent valve disease treated in daily cardiac surgery practice. Despite the development and recent clinical technical advances of transcatheter aortic valve implantation (TAVI), originally designed to extend indications in patients unsuitable for a surgical procedure or with high-risk factors for morbidity and mortality, surgical aortic valve replacement (AVR) remains the gold standard to treat aortic valve degeneration and dysfunction.

Aortic valve replacement with rapid deployment valve (RD-AVR) and transfemoral transcatheter aortic valve implantation (TAVI) represent emerging techniques for managing patients with aortic stenosis. The key question in the current medical setting is whether RD-AVR will benefit patients with severe aortic stenosis.
In recent years, percutaneous coronary intervention (PCI) has largely surpassed coronary artery bypass graft (CABG) surgery as the preferred revascularisation strategy in several scenarios of the coronary artery disease (CAD) spectrum. One of these scenarios, in which CABG still shows better long-term results is the subgroup of patients with multivessel disease. In this group, the outcomes gap between the two strategies still persists, despite having decreased considerably following the introduction of drug eluting stents (DES). This difference in outcomes is mainly driven by repeat revascularisation procedures and myocardial infarction rates.

The recent advances in stent technology have sought to solve both these efficacy (restenosis) and safety (thrombosis) issues. One of these technological advances, which has been called the “Fourth Wall,” is in the field of percutaneous coronary intervention (after balloon angioplasty, bare metal and drug eluting stents), is the development of biodegradable vascular scaffolds (BRS). These are “stent-like” devices that disappear over time freeing the caged vessel and restoring vasomotion, working as an “endoluminal bypass.” In the next few lines, we describe the features that give BRS the possibility of finally closing the outcomes gap between PCI and surgery for the treatment of coronary disease.

Preventive plaque sealing and the ‘endoluminal bypass’

One of the most important characteristics of normal coronary vessels is their ability to dilate or contract in response to vasomotor stimuli. While coronary segments treated with metallic stents show a permanent endothelial dysfunction associated with the caging of the vessels, BRS have shown a restoration of vasomotion following the disappearance of the mechanical integrity associated with the resorption process. This return of vasomotion has been demonstrated to occur in the first 6 to 12 months following BRS implants.

Furthermore, in contrast with metallic stents, the resorption process of BRS is also associated with the disappearance of neointimal formation, with a refurbished endoluminal lining, with cap sealed atheroma plaques, late lumen enlargement and restored vasomotion and cyclic strain. This ‘golden tube’, in reference to its OCT appearance, might be the endoluminal bypass that the interventional cardiologists have been looking for (Figure 2). This could potentially close the outcomes gap that still exists, at least in some instances, between PCI and CABG for the treatment of coronary artery disease.

References


12. Karanasos A, Simsek C, Gnanadesigan M, et al. OCT assessment of the neointimal formation of coronary atherosclerotic plaques16,17 (Figure 1). All these changes lead to the formation of a coronary vessel with a refurnished endoluminal lining, with cap sealed atheroma plaques, late lumen enlargement and restored vasomotion and cyclic strain. This ‘golden tube’, in reference to its OCT appearance, might be the endoluminal bypass that the interventional cardiologists have been looking for (Figure 2). This could potentially close the outcomes gap that still exists, at least in some instances, between PCI and CABG for the treatment of coronary artery disease.

Satellite sessions at the 29th EACTS Annual Meeting
What Makes a Difference in the Real World?

The HVAD® System. Commercial use registry out to 5 years demonstrates excellent long-term outcomes for heart failure patients implanted with the HVAD® Pump.

1. Schmitto, J. Long-term support of patients receiving an LVAD for advanced heart failure: follow-up analysis of the registry to evaluate the HeartWare left ventricular assist system (The ReVOLVE Registry), presentation at ISHLT, April 16, 2015, Nice, France.

Warning: Serious and life threatening adverse events, including stroke, have been associated with use of this device. A user must fully consider the risks of this device with that of other treatment modalities before deciding to proceed with device implantation.

In the USA the HVAD System is intended for use as a bridge to cardiac transplantation in patients who are at risk of death from refractory end-stage left ventricular heart failure.

CAUTION: Federal Law (USA) restricts this device to sale by or on the order of a physician. Refer to the “Instructions for Use” for complete Indications for Use, Contraindications, Warnings, Precautions, Adverse Events and Instructions prior to using this device.

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Coffee reception for residents

The Surgical Training and Manpower Committee (STMP) will host a coffee reception for all residents on Monday 5th October at 12:45–14:00 in room F002.

The aim of the meeting is to inform you about the activities of the STMP, both at the Annual Meeting and throughout the year.

We will also be looking for new members to join us and we will announce new vacancies for which residents can apply.

Furthermore, we will inform you about resident’s associations across Europe and their needs and explore how we can collaborate.

Peyman Sardari Nia
Sparing the aortic root in acute type A aortic dissection: risk reduction or gross negligence?

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Root sparing replacement, conduit graft replacement, or David V procedure – is less or more surgery better? The optimal treatment of the proximal aorta in acute type A aortic dissections remains controversial, and not only depends on the extent of the pathology, but also on the surgeon’s preference, experience and caseload. But how much surgery is really necessary with regards to the aortic root? Replacing the entire root (with re-implanting the coronary arteries) represents a bulletproof solution in the future perspective. Yet is sparing the root, which is technically easier and associated with fewer postoperative morbidities, such an inferior choice during follow-up, thus justifying a more aggressive approach? This retrospective study addressed these questions and aimed to determine whether proximal extension is necessary or not. Therefore, we merged two databases of acute type A aortic dissections from the Aortic Institute of Yale University (New Haven, U.S.) and the Department of Cardiovascular Surgery of Medical University Innsbruck (Innsbruck, Austria) and analysed the data of 338 patients according to the treatment strategy at the proximal aorta. We excluded syndromic diseases like Marfan’s disease from our study, because, in our opinion, a root replacement is highly recommended in these patients. Among our cohort, 26% received a root replacement (valved conduit prosthesis [87%], David V procedure [14%], and 74% underwent ascending replacement in root sparing technique resecting the aorta in supracoronary fashion. We found that, besides a prolongation of the cardopulmonary bypass times reflecting the higher technical complexity, patients undergoing root replacement showed an increased incidence of postoperative bleeding, low cardiac output syndrome, and vasoplegia (sepsis/GFR), and thus incurred prolonged hospital stays. Operative mortality was substantial (17%), but did not differ significantly between the root sparing (15%) and root replacement (20%) approach.

But is an untouched root really safe in the long term? To answer this question, we evaluated the growth rate and root events after root sparing ascending replacement. The root dilates very slowly, at 0.40 mm/year (equal to patients with solely underlying aneurysm disease [Figure 1]), and thus slower than the other portions of the aorta. The often proclaimed higher incidence of secondary dilation, recurrent dissection and need for root sparing reoperation could not be confirmed in our study (3% root events only in the long term). On the contrary, the freedom from root events was statistically not different compared with root replacements, even if the proportional data showed a slight trend with 97% versus 100% after 5 years (Figure 2). Even though the root sparing group was significantly older, long-term survival showed no inferiority of an untouched root.

In our opinion, sparing the root is an appropriate technique which can be performed with excellent results in stabilising the native root without disadvantages, compared with complete root replacement. Due to lesser technical complexity and better postoperative outcomes, this technique should be preferred, if not indicated separately. These observations and recommendations do not apply to patients deemed at risk for above-mentioned secondary complications. In our opinion, these are namely younger patients, with connective tissue disease (i.e. Marfan’s disease), a diseased valve with bicuspid morphology, or root dilation >40 mm, in whom root replacement is strongly recommended.

Vascular – Postgraduate Course: Thoraco-abdominal aortic aneurysms revisited

Validating collateral network near-infrared spectroscopy (cnNIRS) for real-time monitoring of spinal cord oxygenation

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Sunday 4 October 2015

Figure 1. Growth rate of the aortic root.

Figure 2. Freeword from aortic root events.

Figure 3. Near-infrared spectroscopy and direct muscle/spinal cord oxygenation measurement.

Figure 4. Near-infrared spectroscopy and direct muscle/spinal cord oxygenation measurement.

References

The Heart Valve Society – Leading the Future of the Heart Team in Action

The HVS held its historic inaugural meeting in May at the stunning Grimaldi Forum in Monte Carlo, Monaco. President Dr. Michael Borger noted during his Presidential Address that the HVS is the first truly collaborative, multi-disciplinary society dedicated to the full range of treatment of heart valve disease across the globe. Even in our short existence, our membership is reflective of a truly inclusive international organization. Our Monaco meeting was attended by over 430 medical professionals, plus 80 industry partners, for a total attendance of more than 500.

The future is boundless for our organization, and we intend to stay true to our message – “The Heart Team in Action.”

HVS also offers all members of the heart valve community the opportunity to volunteer, participate, and become active in our committees and working groups. We offer the opportunity to work with the AVIATOR Registry, to serve in one of the many aspects of the ever-growing Scientific Research Committee, and to be a part of our 2016 Scientific Program Committee, which is putting together our 2016 Annual Meeting Program. Our 2016 Meeting will be held in New York City, from March 17 to 19, at the Marriott Marquis, located directly in the heart of Times Square. Abstract submission is now open and we invite you to submit your work for consideration by going to our website, www.heartvalvesociety.org.

We also encourage you to join our vibrant new organization! HVS members receive a significant discount on registration fees for our meetings – plus get the ground floor opportunity to be a part of the most collaborative and inclusive society supporting the care and treatment of heart valve disease. Whether you are a cardiologist, surgeon, researcher, physician assistant, anesthesiologist, nurse, pulmonologist, or another member of the crucial valve disease treatment team – HVS welcomes you to become a part of something very unique and very special.

Membership is available online at www.heartvalvesociety.org/membership.

On behalf of our President, Dr. Maurice Sarano, our Secretary, Dr. Hanneke Takkenberg, and our President-Elect, Dr. Gilles Dreyfus, we hope you become a part of the HVS!
Managing bleeding and thrombosis in extracorporeal membrane oxygenation

Fontan patients are complex. The atrial incisions and suture lines for the lateral tunnel baffling contribute to the occurrence of intra-atrial reentrant tachycardia. The interventional atrial incision/cryoblation connecting the right atriotomy to the coronary sinus/right atrioventricular valve annulus would create intra-atrial conduction block, interrupt intra-atrial reentrant tachycardia circuits from developing around the atriotomy, coronary sinus and right atrioventricular annulus, and reduce the overall incidence of intra-atrial reentrant tachycardia. Based on this concept, right atriotomy was extended to the coronary sinus to block slow rate conduction isthmus, and cryoblation was performed between right atriotomy and right atrioventricular valve annulus. Because the location of the intra-atrial suture line in relation to the crista terminals can also induce intra-atrial reentrant tachycardia, the lateral tunnel baffling was modified to avoid injury to the crista terminals. In addition, the surgical technique was also modified, and sandwich technique was used with closure of right atriotomy incorporating the Gore-Tex patch to reduce atrial activation, the artificial surface area and sites of turbulent flow.

Maintenance of flow though heart chambers using inotropes and adjusting ECMO flow may avoid stasis and potential thrombus formation in patients with low cardiac function. Postoxyrogeny pressure drop, postoxyrogeny gas exchange and d-imer estimation predicts oxygenator failure (most common reason being clotting), and immediate exchange may avoid embolism. It is worth noting the increasing incidence of heparin-induced thrombocytopenia in ECMO patients. It is an immunologic disorder mediated by antibodies to heparin-platelet factor 4 complex characterised by the occurrence of thrombocytopenia in conjunction with thrombotic manifestations after exposure to unfractionated heparin or low molecular weight heparin. It is managed by removing all exposure to heparin and switching to alternative anticoagulation – direct thrombin inhibitors (argatroban and bivalirudin), fondaparinux and danaparoid.

Continuos, vigilant monitoring, early detection and management of complications, protocol-based anticoagulation, and strategic and early weaning remain key for good results in patients supported on ECMO.

References
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ISMICS celebrates innovation, embraces new ideas, and welcomes surgeons from around the world. First time attendees marvel that ISMICS is an open, collegial, and warm society where cardiac, thoracic, and cardiovascular surgeons and their allied health partners come together to share ideas, their latest challenges and successes, and their very candid opinions on the ever-changing cardiac, thoracic and cardiovascular specialties. ISMICS members are innovators – whether they are pursuing less invasive surgical techniques, embracing the newest technologies, or pushing the boundaries of medical science.

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EACTS Daily News
A NEW TISSUE ENGINEERING APPROACH TO CREATE A VERSATILE COLLAGEN SCAFFOLD FOR APPLICATION IN CARDIOVASCULAR SURGERY.

Numerous biological substitutes are used for congenital and adult cardiovascular repair procedures. Most of these substitutes have a limited life span due to degeneration and calcification. Alternative approaches with autologous tissue substitutes and synthetics have shown some improvement but fail due to retraction, surface thickening and calcification. The primary objective of this innovation was to create a versatile collagen scaffold with outstanding biocompatibility, durability, optimal physical properties and maximum calcification resistance for congenital and adult cardiovascular applications. Biological substitutes are chemically treated to improve durability and reduce antigenicity. The cytotoxic nature of these chemicals have a negative effect on biocompatibility and also on the physical properties of these substitutes. The reduced biocompatibility induces a cascade of inflammatory responses after implantation which result in calcification and graft failure. This problem was addressed by a multi-step treatment approach. Bovine pericardium from BSE-free cattle were used for all studies and clinical trials. All tissue-related factors responsible for the cascade of inflammatory responses were eliminated. The pericardium was exposed to a multi-step tissue engineered treatment regime which is called the ADAPT® process. Tissue engineering principles such as delipidation, decellularisation and nuclelease treatment form part of the ADAPT® process. The collagen scaffold was cross-linked in a novel way using monomeric glutaraldehyde at a significantly lower concentration compared to what is currently being used in the industry (12 times less than the conventional glutaraldehyde concentration which is done with the polymeric form of glutaraldehyde). The cross-linked scaffold was exposed to a detoxification treatment after crosslinking which addressed unbound and residual glutaraldehyde moieties. The detoxified, crosslinked scaffold was sterilized and stored in a non-glutaraldehyde solution which allows for direct application without any rinsing procedures.

Assessment included in vitro assessments (tensile testing, stem cell interactions, enzymatic degradation studies, residual glutaraldehyde levels, burst testing) and in vivo assessments (small and large animal models as well as a Human Phase II Clinical Trial). Results demonstrated a unique collagen scaffold with outstanding physical properties and a significantly high resistance to calcification in both pediatric and adult patients. The CardioCel® bioprosthetic patch obtained CE mark and FDA 510k clearance for use in Europe and the USA respectively during 2013-2014. For the first time all aspects to produce an ideal universal bioprosthetic substitute for cardiovascular application in both pediatric and adult patients were effectively addressed. Pre-clinical as well as clinical evaluations have demonstrated ultimate biocompatibility, durability, outstanding calcification resistance and unique physical properties in simple and complex cardiovascular repair procedures.

**Cardiac – Abstract: Left ventricle – strategies in left ventricular moderations**

**Left ventricular stroke work index predicts reverse remodelling after submitral procedures for ischaemic dilated cardiomyopathy**

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Surgery for ischaemic dilated cardiomyopathy with functional mitral regurgitation (MR) is still challenging. Besides its high surgical mortality, recurrence of MR and left ventricular re-dilatation are two key concerns after surgery for these patients. Our objective was to examine whether left ventricular stroke work index (LVSWI) estimated by transthoracic echocardiography predicts LV reverse remodelling after surgery for patients with ischaemic dilated cardiomyopathy. A total of 23 patients with ischaemic dilated cardiomyopathy with functional MR were included in the study. LVSWI was calculated as follows: (LV stroke volume) x (mean arterial pressure – left atrial pressure/body surface area) / body mass index. The left atrial pressure was approximated to estimated pulmonary artery diastolic pressure. All cases underwent mitral valve repair including subvalvular procedures. When LV end-diastolic dimension (LVDD) was more than 65 mm, LV restoration procedure was also employed. LV reverse remodelling was defined as follows: (pre-operative LVDD) – (LVDD at the last follow-up) (mm).

The mean follow-up was 33±21 months. Freedom from cardiac-related death was 90% and 90%; freedom from all-cause mortality was 82% and 77%, and 1 and 3 years after surgery, respectively. LVDD decreased from 67±6 mm to 60±8 mm (p=0.001); LV ejection fraction (LVEF) increased from 27±7% to 34±12% (p=0.026); MR grade decreased from 3.2±0.8 to 0.7±0.6 (p<0.001); pre-op and at the last follow-up (27±15 months), respectively. Pre-operative LVSWI was 25±12 gm-m/m²/beat. Only two patients (9%) with a low LVSWI of 15 gm-m/m²/beat presented with re-dilatation of the LV, but it did not correlate with the recurrence of MR. Pre-operative LVSWI significantly correlated with LV reverse remodelling (R=0.681, p=0.005), while LVEF, MR grade and LV size did not. LVSWI significantly correlated with LV reverse remodelling (p=0.005), while LVEF, MR grade and LV size did not. We conclude that LVSWI predicts LV reverse remodelling after surgery for patients with ischaemic dilated cardiomyopathy. LVSWI may be useful for establishing surgical strategy in these high-risk patients.
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Research Training/General – Focus session: All you need to know for your next research project

How to get your abstract accepted for a meeting

Friedhelm Beyerdorf, University Heart Center Freiburg, Germany

After any scientific work has been completed, researchers are eager to publish their results in order to make their work available to the wider scientific community. Not only for general discussion and stimulation of further research, but also as verification of their data, to add further knowledge to their special field of research, to acknowledge the support of others (e.g. research funding societies), and to receive credit from their peer group. In general, the first step in this process is the submission of an abstract to a meeting. The likelihood of acceptance of an abstract depends upon many prerequisites. The main factor of any abstract is the ‘scientific content’. Therefore, one should spend as much time as possible in a) generating an important and timely hypothesis; b) planning and careful conduct of a (e.g. interdisciplinary) study; c) including all necessary members for a specific study; and d) precise documentation of all data for further evaluation and discussion. After all the necessary data are compiled, the next consideration has to be to which meeting the abstract should be submitted and to check the submission deadline. The ‘acceptance rate’ depends upon the number of abstracts submitted and the number of oral presentations/posters that are being included in the final programme. In general, the acceptance rate at local meetings is much higher compared with established international meetings. However, presentations at international meetings have a much higher impact and dissemination, compared with data that are presented at regional meetings. Once the most appropriate meeting to which to submit your abstract has been selected, it is important to read the specific ‘instructions for authors’ and to write the abstract accordingly. For international meetings the content should be written in perfect English. To achieve this, ask a native speaker to read and correct your abstract.

Next, find an interesting and meaningful title. The standard abstract is divided into the following four sections: objectives, methods, results and conclusions. Add a table or a figure to illustrate the most important findings of the study. Recently, some meetings are asking authors to provide an alternative abstract submission in the form of a PowerPoint® presentation. Another very important aspect of any abstract is the art of writing the sections using terminology that is easily understood. With this in mind, it is important to explain complex coherences in simplified terms so that even a non-expert in the field can understand it. In addition, the conclusions drawn have to be substantiated by the results presented. To write a good abstract is hard work and is an art in itself, which needs years of experience (as well as numerous acceptance and rejection letters), with a constant strive to improve further. To write an abstract takes both many hours and many revisions. Therefore one should start writing the abstract long before the abstract deadline for a meeting. A good abstract cannot be written the evening before the deadline. It has to be circulated to all co-authors who must approve the content, the chosen co-authors and the wording. All co-authors must be invited to make suggestions to improve the abstract, and once complete, you should get as many friends as possible to correct it and ask them if they understand the importance of your work. Once the abstract has been accepted, prepare your oral or poster presentation carefully. This is again an art in itself and is different from the abstract writing. Therefore, an original article needs to be written for submission in a scientific journal, such as the European Journal of Cardio-Thoracic Surgery or the Interactive Cardiovascular and Thoracic Surgery.

The harder you work, the luckier you get!

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IM-00478 A
Chest Wall Diseases

Date/duration: 2-4 December 2015
Location: Windsor
Course Director: M Yüksel, Istanbul, Turkey

Course overview
This course aims to teach the indications, techniques and follow-up of minimally invasive and open surgery in pectus deformities, alternative treatments for pectus deformities, chest wall resection and reconstruction techniques in chest wall diseases, the surgical techniques in thoracic outlet syndrome. As well as learning the treatment options in sternal dehiscence. The programme will include a combination of both high level interactive discussion and lectures delivering theoretical knowledge.
Outcomes of tricuspid valve replacement: a meta-analysis

Emiliano Angelini, Giovanni Malina, Simone Refice, Fabio Capuano, Antonio Roscitano, Cosimo Comito, Ricardo Sinatra
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Tricuspid valve replacement (TVR) is quite an uncommon intervention. However, recently published registry data show that the number of tricuspid procedures has more than doubled from 1999 to 2008. In addition, the role of TVR is critical for those patients, presenting with heavy clinical deterioration or chest irradiation, in whom repair is not feasible or where attempts at repair have failed because of technical issues (e.g. high calcification or severe degeneration/ridilation). Thanks to scientific and technological progress, recent studies reported improving results for TVR, but great concerns about mortality risk and debate about valve choice still remain. Indeed, the current knowledge of long-term results of TVR is limited, while risk assessments are not clear or univocal.

A systematic review and meta-analysis retrieved a total of 34 papers, including 3850 patients who underwent TVR, which reported clinical outcomes at a mean follow-up of more than 7 years. The resulting study population was the largest TVR cohort ever investigated, and with a worldwide spread. One previous meta-analysis did not include “historical” cohorts from the 1970s and 1980s, but we decided to include such data in our analysis because even the most recent papers reported data also regarding patients who underwent TVR before 1990.

Pooled analysis showed cumulative 30-day and follow-up mortality rates (16.9% and 41.5%, respectively) that confirmed the well-known high risk associated with such procedure. In fact, tricuspid valve disease requiring replacement is often considered to be a marker for end-stage valvular heart disease, especially when young patients and/or anaesthesia are present. Unfortunately, clinical and echocardiographic data were sparse, and heterogeneous, in the source publications, hence not allowing their analysis.

Moreover the 5695/6932980 patients who received a tissue valve did not show significantly better survival. On the other hand, patients who were re-operated on the tricuspid valve (1659/3880, 49.1%) showed significantly worse survival, both at 30 days and at follow-up (mean 8.4±2.6 months). In addition, despite a significant benefit in terms of hospital survival for patients receiving isolated TVR (hospital mortality 7.6±2.9% versus 12.9±4.3%, respectively), no significant difference was found between the latter and those undergoing concomitant procedures (follow-up mortality 42.4±15.6% versus 32.5±19.9%, respectively).

The rate of reoperation on the tricuspid valve through the mean follow-up of 7 years was 9.4%, and was more likely to occur in smaller series. Despite a trend towards lower reoperation rates among patients initially receiving mechanical prostheses (9.7% versus 14.1%), the difference did not reach statistical significance.

In conclusion, TVR is still burdened by considerable mortality and morbidity, especially when it is a repeated procedure. This may be attributable to underlying heart failure, and functional impairment. The type of prostheses implanted (biological versus mechanical) does not seem to influence outcomes (both mortality and hospital mortality were not significantly different).
Vascular – Rapid Response: Innovation and new strategies in thoracic aortic surgery

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Perioperative and mid-term results of endovascular management of complicated type B aortic dissection using proximal thoracic endoprosthesis and selective distal bare stenting

Malperfusion syndrome, as a result of type B aortic dissection, carries a heavy burden of mortality and morbidity, and will involve at least half of patients referred for treatment.1-14 The goal of thoracic endovascular aortic repair (TEVAR) in complicated type B aortic dissection is to cover the most proximal entry tear and reduce false lumen (FL) perfusion enhancing true lumen (TL) expansion. We present our results in the treatment of complicated type B aortic dissection with a tailored strategy of proximal entry tear coverage using endoprosthesis implantation followed, wherever required, by bare stenting of the distal thoracic aorta, to achieve homogeneous aortic TL expansion, correct persistent distal malperfusion, and facilitate FL thrombosis.

Endovascular treatment was performed in a case series of 35 patients with complicated Stanford type B aortic dissection. The aim was to include all distal re-entries to minimise the risk of continuous retrograde perfusion of the FL. Indications for endovascular treatment were: malperfusion syndrome (71.4%), aortic rupture (14.3%), rapid FL enlargement (8.6%), uncontrollable thoracic pain (2.8%), and unresponsive systemic hypertension (2.8%). In all patients with preoperative malperfusion and FL diameter >55 mm, aortic rupture, or uncontrollable thoracic pain, aortic dissection was covered using at least two stent grafts (each ≤30 mm in length).

A wide range of bioreinforced and biodegradable materials are available. Due to attractive mechanical properties, low immunogenicity, and low incidence of infections, absorbable synthetic meshes and the incidence of infections, surgeons have started to explore the use of biologic scaffolds.

Thoracic – Abstract: Basic science and education

Patch replacement of left hemidiaphragm in dogs by decellularised heterograft

Hamidreza Davari
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Diaphragmatic defect occurs mainly after tumour resection and occasionally as congenital malformations or post trauma. The reconstruction of large-size defects needs reconstruction. To evaluate the possibility of using diaphragm allografts in humans, we conducted a study comparing decellularised with cryopreserved heterograft diaphragm patches.

Heterografts were prepared using en bloc left hemidiaphragms from deceased donors which were transported in PBS solution, repacked under laminar airflow, frozen at −70 to −80°C, and preserved for 1 to 2 months. Alternatively, left hemidiaphragms were taken, transported in PBS solution, subjected to 25 cycles of washing with sodium deoxycholate/ONase, then stored at 5°C in PBS until utilisation.

Six adult healthy mongrel dogs, weight 20±2 kg, were anaesthetised, then placed in prone lateral thoracotomy through the 8th intercostal space and left upper position. A prepared patch of 10 x 7 cm of cryopreserved heterograft was replaced subsequently to native diaphragm with running 2-0 polypropylene sutures. Animals were intensively monitored with CT scans performed 3 weeks after the operation. Patch replacement of decellularised heterograft diaphragm was performed in 5 dogs using the same technique (Figure 1).

Bioartificial materials are available. Due to improved surgical complications, or mortality, were nil and vasculitis was over 70% of referred patients, and in up to 90% of these patients we reported a dynamic malperfusion. The arterial branches were originating from the aortic TL and were either occluded by the ‘flapping’ intimal dissection membrane, which at times also extended within the arterial branches, or were malperfused as a result of a proximal diastolic collapse of the TL. In summary our findings confirm that, whenever visceral ischaemia occurs as a result of dynamic malperfusion, and possibly TL collapse, bare metal stents elongation may enhance distal perfusion of those branches originating from the TL. Although in our experience, patients treated with extension had ‘abdominal branches’ originating from the TL, PETTICOAT in patients with origin of arterial branches from the FL should be considered cautiously because it may lead to branch occlusion, unless there is evidence of a large more distal re-entry tear. In any case, the possible benefits of PETTICOAT should be evaluated in terms of late aortic remodelling, FL regression/thrombosis, and TL volume regain. In this context, even when using extensive aortic stenting, a complete sealing of the aortic FL is difficult to achieve. Moreover, it appears that although PETTICOAT did not increase the FL, thrombosis rate, it contributed to a consistent and significantly greater TL gain, particularly at the abdominal aortic level.

Finally, in this series late mortality was most often related to aortic complications (mainly retrograde aortic dissection/ascending aorta haematoma) and accounted for 14.2%. Moreover, the 3-year freedom from any major adverse vascular events was 67.6%. Both these findings confirm that, independent of the strategy used (with or without bare metal stents extension), and even using a tailored approach, the risk of further catastrophic aortic complications persists even after initially successful endovascular handling of acute aortic type B dissection.

In conclusion, although our findings are encouraging, randomised data and longer-term follow-up are required to confirm whether this technique is beneficial in these high-risk patients.

Patch replacement of left hemidiaphragm in dogs by decellularised heterograft
Withdrawal of lungs from uncontrolled donation after cardiac death: the lesson learned from the first case

Alessandro Pellegrini, Mario Nosotti, Lorenzo Rossi, Davide Tom, Luigi Santandrea, Ignazio Selvaggi, Giuseppe Chiare, Franco Valentini

Thoracic – Abstract: Session case report

Procuring lungs from donors after cardio-circulatory determination of death (DCDD) has been identified as a strategy to increase the number of transplantations. Procurement from DCDD donors is operationally challenging for the recipient. We report the first case of lungs drawn from an uncontrolled DCDD (uDCDD) after an open-lung strategy in situ preservation strategy. Our uDCDD lung procurement programme commenced in 2014. The first eligible donor was a 46-year-old man who died after cardiac arrest because of ascending aorta dissection. Cardio-pulmonary resuscitation (CPR) started out of hospital, and continued during the transfer to emergency room with the auto pulse LUCASA™. After CPR suspension, death was declared according to cardio-vascular criteria (20 min of flat ECG is it worthwhile?).

Using an iPhone ECG to self-monitor for atrial fibrillation recurrence

Nicole Lawers University of Sydney, Sydney, Australia

Postoperative atrial fibrillation (AF) occurs in 25–40% of patients following cardiac surgery, and is associated with a significantly increased risk of stroke both before and after discharge. Although often thought to be transient, postoperative AF recurs in at least 18% of patients within the first year and episodes are often asymptomatic, consenquently recurrences may go undetected. A practical solution for detecting asymptomatic recurrence is for patients to monitor themselves for AF post-discharge, using a smartphone with an ECG cover. This may assist stroke prevention.

Left atrial appendage exclusion to prevent cerebrovascular events during surgical ablation of atrial fibrillation: is it worthwhile?

Giuditta Coppola San Raffaele Hospital, Milan, Italy

The strong interest in atrial fibrillation (AF) is due to the five times higher risk of stroke associated with this condition and its association with cardiac death. Evidence from clinical and diagnostic imaging indicates that at least 70% of all strokes in patients with AF are cardio-embolic from the left atrium and 90% of these arise from the left atrial appendage (LAA). Hence, the surgical exclusion of the left atrial remnant could play a role in preventing ischemic cerebrovascular events (CVE).

We retrospectively analysed 187 patients (mean age 64.3±9.12, 69 (36.9%) males) who underwent Maze procedure alone or during other cardiac surgical operations, including mitral valve repair/replacement and thecaspial valve repair with or without LAA exclusion, from 2003 to 2014 at our institution. Paroxysmal AF was present in 14 patients (7.5%), persistent AF in 87 (46.5%) and permanent AF in 86 (46%). Exclusion of the LAA was performed in 140 patients (Group 1) with atrial ligation or epicardial clip device, and preservation was carried out in 47 patients (Group 2). Radiofrequency with or without cryotherapy was used to perform the Maze lesion box. The primary endpoint of our study was to evaluate the possibility of LAA exclusion during cardiac surgery to prevent postoperative ischaemic CVE (transient ischemic attack and stroke). Other outcomes included freedom from AF with or without antiarrhythmic drugs (AADS) at final follow-up and the rate of postoperative permanent pacemaker implantation.

There were no significant differences in baseline profiles between the two groups. During a median follow-up of 54 months (range 1–144) there were 28 deaths (15%) and 10 cases of ischaemic CVE (5.3%), four of these were in Group 1 and six in Group 2. By comparing the CVE rates between the two groups we found a significant difference (p = 0.017). By contrast, freedom from AF at final follow-up (24-hour Holter monitoring) did not differ significantly (p = 0.092) between Group 1 and Group 2, being 78.6% and 78.7%, respectively. Similarly, the difference in postoperative permanent pacemaker implantation for the two groups was not statistically significant (p = 0.066).

Cardiac – Rapid Response: How to perform an effective surgical atrial fibrillation ablation

Nicole Lawers University of Sydney, Sydney, Australia

Within 3 weeks of discharge, the iECG detected recurrence of AF in 25% of patients. The majority (78%) of these patients had a stroke risk high enough to recommend anticoagulation (mean CHADS2-VASC score: 2.3±1.2). Symptoms were not a reliable indicator of AF recurrence, as only 44% of AF episodes were associated with palpitations. Additionally, 25% of all participants reported palpitations which were not AF-related but due to atrial and ventricular ectopic beats. Therefore, the majority of AF recurrences would not have been identified without additional ECG monitoring, and many palpitations were not AF recurrences.

We have previously validated the iECG device for detection of AF in various settings used by healthcare professionals, and shown it to be highly sensitive (98%) and specific (97%). However, this is the first time we have provided the device to patients for self-monitoring. Patients closely adhered to the suggested screening schedule, and reported self-monitoring was not onerous. Indeed, patients stated they appreciated the additional monitoring post-discharge and felt an increased sense of reassurance and peace of mind. Surprisingly, age was not a barrier to using the iECG technology, with the average age of patients being 68 years, and the oldest patient 85 years. The main reported barriers encountered were forgetting to charge the phone and, in some rural/remote areas, poor mobile-phone reception affected the quality of ECG readings.

Providing patients with an ECG case to attach to a smartphone is a non-invasive, inexpensive, convenient, and feasible way to monitor for AF recurrence in post-cardio-thoracic surgery patients, and the AF diagnostic algorithm is now available on the smartphone. The success of patients using this technology also has implications for extending the use of iECG self-monitoring to other patient groups such as those undergoing ablation for AF.

Figure 1. ECG displayed on iPhone ECG.
Hybrid treatment of thoracoabdominal aneurysm and dissection: visceral debranching

Recently, synergistic effects leading to a pro-thrombotic state constitute metabolic syndrome has been estimated to result from the accumulation of abdominal fat and is characterised by obesity, insulin resistance, hypertriglyceridaemia, low high-density lipoprotein cholesterol and hypertension. The cluster of metabolic alterations constituting metabolic syndrome has been estimated to affect 35–40% of the population in industrialised countries. Its components are frequently associated with coronary artery disease, whereas less is known about its influence on heart valve disease.

A continuous series of 749 patients undergoing elective, first-time, heart valve surgery at one institution was studied. Metabolic syndrome was diagnosed using the modified Adult Treatment Panel III of National Cholesterol Education Program criteria. A total of 307 (40.9%) patients showed metabolic syndrome at baseline. Major adverse cardiac and cerebrovascular events (MACCE; including death, myocardial infarction, cerebrovascular accident, prosthetic dysfunction, and need for re-operation) were investigated. At a mean follow-up of 37±16 months, mortality was 19/307 (6.2%) versus 17/442 (3.8%) in patients with and without metabolic syndrome, respectively (p=0.04). At three years, freedom from MACCE was significantly poorer among patients with metabolic syndrome (47±6% versus 59±8%; y=0.92, p=0.004; Figure 1). Of note, the occurrence of every single component of the composite outcome ‘MACCE’ was significantly increased among patients with metabolic syndrome. In particular freedom from prosthetic valve dysfunction (because of thrombosis, endocarditis or paravalvular leak) was 82±4% in the metabolic syndrome subgroup versus 91±3% for patients without metabolic syndrome (χ²=4.03; p=0.02; Figure 2). Metabolic syndrome is associated with poorer outcomes after heart valve surgery. In addition, metabolic syndrome has shown to exert a synergic effect, much more deleterious than its individual components and their arithmetic sum. The synergic effect seems to be related to a pro-inflammatory and pro-thrombotic state previously demonstrated by the founding of higher levels of inflammatory markers in these patients (especially C-reactive protein and interleukin-6). In conclusion, patients with metabolic syndrome appear as a selected high-risk population and the poor long-term outcomes shown seem to be correlated with that patient profile. Given its modifiable nature, metabolic syndrome should be recognised as an independent preoperative variable to identify high-risk patients and, moreover, should be corrected with lifestyle modifications and pharmacologic therapy to improve the results of valve surgery.

Figure 1. Kaplan-Meier MACCE-free survival curves stratified for metabolic syndrome. Figure 2. Kaplan-Meier PVD-free survival curves stratified for metabolic syndrome.
A matched-pair analysis of non-rib-spreading, fully endoscopic, mini-incision technique versus conventional mini-thoracotomy for mitral valve repair

We present our early results regarding feasibility and safety, functional results, and mid-term outcome. From June 2015 to March 2016, 50 consecutive patients underwent non-rib-spreading (NRS) minimally invasive MV repair or replacement in our institution. We compared this group with a historic collective of 50 age, gender and preoperative diagnoses matched patients, who received a rib-spreading (RS) procedure in the period from January 2011 to December 2012. The indication for MV surgery was isolated severe mitral regurgitation (MR). Exclusion criteria were cardiac resynchronisation procedures except for atrial ablation, chest wall deformities or apparent radiation therapy injuries, and severe peripheral arterial disease.

Access was via a 3-4 cm incision in the inframammary fold through the fourth intercostal space, in the NRS group using only a soft tissue retractor. In 10 male patients in this group a reduced skin incision along the intercostal margin was performed. Operative visualisation in the NRS group was provided by 3D endoscopy, creating improved and detailed visualisation and overview. Surgical data, early postoperative outcomes, patient responses to the procedure, and postoperative course were collected. Operative visualisation was assessed by the surgeon. Repair results, ejection fraction, NYHA class, and freedom from major adverse cardiac events (MACE) were determined after 1 year, using standardised questionnaires and echocardiography.

Both the non-rib-spreading and rib-spreading procedures were successful in all patients without technical repair limitations. Valve replacement was only performed in one patient of each group with a stenotic valve due to rheumatic alteration. Mortality was 0% in both groups. Significant differences were seen for operation times (delta = 20 min), shorter operation time in the NRS-MMVS group (p=0.012) and length of stay (LOS) in the hospital (delta = 2.4 days shorter stay in the NRS-MMVS group; p=0.022). Postoperative systolic blood pressure was significantly lower in the NRS-MMVS group (p=0.029), and patient satisfaction regarding cosmetic results were comparable in both groups. Regarding repair results, ejection fraction, perioperative morbidity, postoperative NYHA class and MACE, no significant differences between groups were observed. Follow-up echocardiography at 3 months and 1 year showed sufficient repair in all patients from both groups.

In conclusion, we believe that NRS endoscopic MV repair and replacement is feasible and safe, improves postoperative pain and has no limitations with regards to surgical repair technique or results. Significantly shorter operation times and postoperative hospitalisation were observed in the NRS-MMVS group. 3D endoscopy proves to be a helpful tool, especially for complex cases and placement of artificial neochords.
Cardiac – Abstract: Revisiting the tricuspid valve

How to improve outcomes of surgery in patients with carcinoid heart disease

Miriam Silaschi1, Jona Bagai1, Nikhil Deshpande2, Jonathan Byrne2, Max Baghai1, Philip MacCarthy2, Olaf Wendler1
1Department of Cardiothoracic Surgery, King's College Hospital, London, UK
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Carcinoid heart disease (CHD) is common in patients with carcinoid syndrome (CS), affecting approximately one half of patients.1 Surgical treatment can improve the generally poor prognosis of CHD, but the reported perioperative mortality is high (17%, range: 1–63%),2 mainly due to perioperative right heart failure, coagulopathy and carcinoid crisis. We implemented a standardised treatment protocol for the surgical management of patients with CHD at a UK Neuroendocrine Centre of Excellence in order to improve surgical outcomes. Surgical features such as invasive pulmonary valve inspection and preservation of the tricuspid subvalvular apparatus were established. Other characteristics included early detection of CHD through serial measurements of brain natriuretic peptide and echocardiography screening in patients with CS, as well as perioperative medication with octreotide. Between 2008 and 2015, a total of 11 patients were treated according to this protocol and we analysed outcomes retrospectively. Median patient age was 63 years (interquartile range [IQR]: 56–70 years). All patients had metastatic liver involvement of CS and symptomatic CHD. Median time from first diagnosis of CS to cardiac surgery for CHD was 5 months (2–17 months). Median right ventricular function was normal at time of surgery (tricuspid annular plane systolic excursion [TAPSE] 23.5 mm [21.3–26.8 mm]). In ten patients both pulmonary valve replacement (PVR) and tricuspid valve replacement (TVR) occurred, one patient underwent isolated TVR. Additional aortic valve replacement was performed in one patient, as was coronary artery bypass grafting. Tissue valves were used in all patients, stented for TVR, stentless for PVR. Median crossclamp and bypass times were 70 minutes (60–84 minutes) and 108 minutes (90–132 minutes) respectively. Invasive pulmonary valve inspection led to detection of pulmonary valve involvement and unplanned PVR in three cases (27%). In hospital mortality was 0%. Postsurgical right heart failure occurred in one case (9.1%), in which the tricuspid subvalvular apparatus had not been preserved at first-time surgery. No coagulopathy and carcinoid crisis occurred during admission. During 1-year follow-up, one death occurred due to progression of CS on day 348 (1-year survival: 90.9%). The carcinoids primary was resected in five patients (45.5%) during a median interval of 10 months (4.5–19.5 months) post cardiac surgery. Clinically relevant degeneration of implanted tissue valves was not seen in any patient. Improved surgical results can be achieved in patients with CHD using a standardised treatment protocol (Table 1) for surgical management. The pulmonary valve should always be invasively inspected during surgery as echocardiographic may underestimate pulmonary dysfunction and even minimal involvement may lead to inferior outcomes. The geometry of the right ventricle should be respected to prevent right heart failure and tissue valves should be used as these patients have a limited prognosis3 and are likely to undergo future non-cardiac surgery. In our experience tissue valves have excellent durability. In summary, our data show that, supported by a multidisciplinary team and if referred at the onset of cardiac symptoms, cardiac surgery in patients with CHD is a safe procedure with excellent outcomes.

References

Table 1: Standardised protocol for medical and surgical management of patients undergoing surgery for CHD.

<table>
<thead>
<tr>
<th>Medical Treatment</th>
<th>Surgical Treatment</th>
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<td><strong>Pulmonary Valve</strong></td>
<td><strong>Pulmonary Valve</strong></td>
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<td>Invasive inspection independent from echo</td>
<td>Invasive inspection independent from echo</td>
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<td>Use a stentless valve to optimise orifice area and right ventricle haemodynamics</td>
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<tr>
<td><strong>Tricuspid Valve</strong></td>
<td><strong>Tricuspid Valve</strong></td>
</tr>
<tr>
<td>Preserve the subvalvular apparatus during replacement to support right ventricle function</td>
<td>Preserve the subvalvular apparatus during replacement to support right ventricle function</td>
</tr>
<tr>
<td>Use large bioprosthetic valves</td>
<td>Use large bioprosthetic valves</td>
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Cardiac – Abstract: Functional mitral regurgitation

Optimal results immediately after MitraClip or surgical edge-to-edge for functional mitral regurgitation: are they really stable at 4 years?

Michele De Bonis
IRCCS San Raffaele University Hospital, Milan, Italy

Recurrence mitral regurgitation (MR) is common after surgical and percutaneous (MitraClip) treatment of functional MR and its negative impact on patient outcome has been well documented. However, the Everest II randomised controlled trial suggested that, even in the challenging setting of secondary MR, patients with initially successful MitraClip therapy maintain stable results at 4 years. As acknowledged by the investigators, this finding should be considered exploratory and needs to be confirmed by other studies.

For that reason, we decided to address this issue. We assessed whether, in patients with severe left ventricular (LV) dysfunction and secondary MR, the initial favourable MitraClip results (residual MR ≤1+ at hospital discharge) remained stable at 4 years.

We reviewed the prospectively collected data of the first 85 consecutive patients with secondary MR and severe LV dysfunction (ejection fraction [EF] 28±8.5%) treated with percutaneous edge-to-edge (EE) repair (MitraClip system) who were discharged from hospital with an initial optimal result defined as no or mild (1+) residual MR. Patients with residual MR that was at least moderate (2+) at hospital discharge were excluded.

Regular echocardiographic follow-ups were performed in a dedicated outpatient clinic. According to the inclusion criteria of the study, at hospital discharge, 94.5% of the MitraClip patients had mild (1+) residual MR and 5.4% had no MR. At 1 year, the echocardiographic prevalence of MR ≥3+ was 6.8% and increased to 15% at 3 years (both p<0.001 compared with hospital discharge). When recurrent MR ≥3+ was considered, the rate of this echo finding was 32.5% at 1 year and 55% at 3 years (p<0.001 versus hospital discharge; Figure 1).

The increasing rate of recurrent MR over time translated into a freedom from MR ≥3+ of 90±2.8% at 1 year and 75±7.6% at 4 years, and a freedom from MR ≥2+ from decreasing from 87±3.8% at 1 year to 37±7.2% at 4 years. Therefore, in this series of patients with very satisfactory immediate outcomes, the initial optimal results of the percutaneous EE repair did not remain stable throughout the follow-up period.

In addition, we compared the MitraClip patients with a group of 58 patients with secondary MR in advanced dilated cardiomyopathy, who underwent surgical EE repair combined with annuloplasty with an initial optimal result (no or mild residual MR). The two groups were comparable. Only age (p=0.001) and logistic EuroSCORE (p=0.04) were significantly higher in the MitraClip group. Recurrent MR also occurred in the surgical group but the overall efficacy of surgery was significantly higher than MitraClip. Indeed, the 4-year freedom from MR ≥3+ was 75±7.6% in the percutaneous EE and 94±3.3% in the surgical one (p=0.04). Freedom from MR ≥2+ was 37±7.2% versus 82±5.2%, respectively (p=0.001).

Therefore, we observed that in patients with functional MR and optimal mitral competence after MitraClip implantation, the recurrence of significant MR at 4 years is not uncommon. Our study, although involving a limited number of patients, does not confirm previous observations reported in the Everest II trial indicating that, if the MitraClip therapy was initially successful, the results were sustained at 4 years. Moreover, when compared with the results treated in 4 years. Moreover, when compared with the results treated in 4 years. Moreover, when compared with the results treated in 4 years. Moreover, when compared with the results treated in 4 years. Moreover, when compared with the results treated in 4 years.

Figure 1.
Bilateral internal mammary artery grafting: in situ versus Y-graft: similar 20-year outcome

Antonio M Calafiore1, Angela L Iacò1, Michele Di Mauro2
1Department of Adult Cardiac Surgery, Prince Sultan Cardiac Center, Riyadh, Kingdom of Saudi Arabia
2Department of Cardiology, University of Udine, Udine, Italy

Since the basic paper from Loop, et al.1 demonstrating the overwhelming superiority of the LITA over the SVG when grafted to the LAD, LITA to the LAD became the gold standard in coronary artery bypass grafting (CABG). However, a subsequent paper from the same institution,2 demonstrating superiority of ITA grafting over single LITA, did not show the same impact on clinical practice. Data analysis from Lafer, et al.3 found that, from 2001 until 2013, BITA utilisation had been 3% in the overall CABG population and 6% in a subgroup of ‘low-risk’ patients for BITA use. A recent analysis of the Society of Thoracic Surgeons database showed that use of BITA was 3.5% in 1999 and 4.1% in 2009.4 This is partly due to the fear of sternal wound complications. However, there is a wide body of evidence that ITA skeletonisation minimises wound infections,5,6 whilst providing extra conduit length and a larger internal diameter. In addition, a recent propensity matched study from our group8 reported a better 17-year survival in patients with skeletonised BITA grafts than in those with pedicled BITA grafts. The second motive is lack of experience. Most surgeons are not accustomed to using the in situ RITA. However, using it as a free graft and anastomosing it to the LITA has many advantages. The ‘effective’ RITA length increased, especially if the graft is harvested in a skeletonised fashion. It is possible to reach distal targets, even the posterior descending artery.

Arterial revascularisation of the left side becomes easy, the only decision remaining whether or not to use another arterial graft for the right side. As with all surgical techniques, there are possible drawbacks. Grafting two territories with different run off is of the Achilles heel of Y-grafting (e.g. 90% proximal LAD stenosis of a large territory and 50% proximal circumflex artery stenosis). Grafting territories with different expected run off can be associated with lower patency rate.7,8 As flow competition presents a risk of graft failure.8–10

Our study clearly showed that both strategies yield similar results and that Y-grafting can be used safely to achieve the same long-term results of in situ grafting and makes RITA utilisation easier and user-friendly. While a propensity matched study is not as strong as a randomised controlled study, the latter would take too long. Our study includes close to 1500 propensity matched patients and, even being a single-centre experience, strongly suggests that using BITA as a composite conduit increases the possibility of grafting the lateral wall and provides long-term results similar to the in situ configuration (Figure 1). It increases the flexibility of BITA grafting and must be taken into account when planning a revascularisation surgical strategy.

References

Cardiac—Abstract: Revisiting the tricuspid valve

Midterm results of leaflet augmentation in severe tricuspid functional regurgitation

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Objective: Functional tricuspid regurgitation (FTR) is primarily due to tricuspid annulus (TA) dilation, right ventricular enlargement and dysfunction, which lead to abnormalities of tricuspid anatomy and function. FTR is usually managed surgically using various methods of tricuspid annuloplasty. However, FTR has been reported to persist post-operatively in up to 45% of patients, and severe leaflet tethering is a risk factor for such recurrence. The aim of this study is to report our clinical and echocardiographic midterm results after leaflet augmentation in patients with functional regurgitation due to leaflet tethering.

Between May 2008 and July 2014 22 patients had a diagnosis of severe FTR with tethering height greater than 8 mm; all underwent a leaflet augmentation. This involved detaching the anterior and part of the posterior leaflet from the anterior annulus, a patch of autologous pericardium is used to generically fill the gap between the anterior annulus and the detached leaflet. A running suture locked at every step is used to avoid any purse string effect.

In two patients the septal leaflet also needed to be augmented using the same technique. In all patients bar one (annular calcification) a ring annuloplasty was added. Mean age was 70.3±8.9, redo surgery was performed in 12 cases (65.5%), 11 patients (50%) had right ventricle failure and 7 (31.8%) had renal failure. The 30-day and 4-year survival were 80.5±8.6% and 70.7±10.1% respectively. At the last echocardiogram, no or mild TR was detected in 19 patients (86.3%) and moderate in three patients (13.6%). No patients needed re-intervention.

Tricuspid leaflet augmentation leads to very satisfactory clinical and echocardiographic mid-term results even in the presence of severe leaflet tethering and right ventricular failure.
Comparison of first with redo surgery for non-infective mitral valve disease

Surgical factors and complications affecting hospital outcome in redo mitral surgery: insights from a multicentre experience

The analysis from this large (n=832 patients) multicentre study is presented at the 29th EACTS Annual Meeting. It confirmed that redo mitral surgery is still associated with significant hospital mortality (12.5%) and major morbidity (Figure 1). Interestingly, injury of a patent previous LIMA graft (O.R. 2.4, 95% C.L. 1.0–1.2; p<0.01) independently predicted hospital mortality, whereas combined antegrade and retrograde cardioplegia was the only protective factor identified (O.R. 0.2, 95% C.L. 0.1–0.5; p=0.01). Of postoperative complications, acute myocardial infarction, need for IABP, intubation lasting more than 48 hours, and massive (>6 units) transfusions also predicted hospital mortality (O.R. 7.8%, p=0.002). Postoperative bleeding (1311±140 ml versus 591±62 ml; p<0.001) and subsequently more re-exploration for bleeding (10.3% versus 2.0%; p=0.04) were also significant predictors of hospital mortality. Furthermore, postoperative morbidity from stroke, respiratory or renal failure, and myocardial infarction was not significantly different.

Redo mitral valve surgery is an infrequent treatment. Only a small percentage of mitral cases are allotted to re-operative surgery; however, patients undergoing this procedure are affected by notably higher surgical risk. This resulted in higher postoperative morbidity, but mortality did not differ significantly. Redo mitral valve surgery can be performed at nearly identical surgical risk compared with first mitral surgery and, of particular note, the results are not limited by surgery itself. Nonetheless, postoperative bleeding and consecutive re-exploration remain a major issue in re-operative surgery.

Cardiac – Abstract: Degenerative mitral regurgitation

Surgical factors and complications affecting hospital outcome in redo mitral surgery: insights from a multicentre experience

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Cardiac – Abstract: Degenerative mitral regurgitation
The Bio-Medicus NextGen family of adult and pediatric sized cannulae products were made available first to CE market countries earlier this year. Since introduction, Cardiothoracic Surgeons and Perfusionists have responded with very positive feedback on the many feature enhancements and overall performance of the Bio-Medicus cannulae. The most frequently commented on new feature is the improved smoothness of the cannula tip transition that eases the insertion into the vessel. This smooth transition is possible in part by the new integrated stainless steel reinforcement with tip “fingerlets”. This tip reinforcement design contributes to ease of insertion and removal by creating smoother radius shape side hole edges. Other well appreciated features include an improved hemostasis cap design and radiopaque suture ring. Cardiothoracic surgeons comments about using NextGen include - “Smart cannulation, easy transition, limited blood loss. That’s all I need for femoral cannulation” and “Great transition. It almost enters by itself”. Versatility of the NextGen pediatric sized models is enhanced with features to allow placement either with traditional solid introducer or by Seldinger technique capable introducer over an .025” guidewire (Insertion Kit with vessel dilators and guidewire available separately). The NextGen femoral arterial length models are now additionally indicated to be used for jugular venous drainage to better accommodate advancing technics in MICS. Femoral venous models can be positioned traditionally with the tip near the IVC/Atrial junction or as a bi-caval femoral venous with tip into the SVC allowing the option of right atrial isolation with a single cannula. To accommodate a range of flow rates for large or small patients, adult NextGen models are available in a wide range of sizes (Venous from 15Fr to 29Fr & Arterial/Jugular from 15Fr to 25Fr). Perfusionists commented about using NextGen - “Pressures and flows are great, this is an excellent perfusion. The cannula does what it is supposed to do”. The thin wall and additional configurations of the Bio-medicus NextGen provide versatility to meet a variety of cannulation needs. Centers using the NextGen have routinely commented that new packaging allows easier handling and transfer into the sterile field for the OR staff.

EACTS Cardiothoracic Masters Jeopardy

The European Association for Cardio-Thoracic Surgery (EACTS) is offering a unique opportunity for two EACTS residents to attend the Society of Thoracic Surgeons (STS) 52nd Annual Meeting in Phoenix, Arizona, USA, 23–27 January 2016.

The Joint Council on Thoracic Surgery Education, Inc. (JCTSE) has organised a cognitive skills competition among US residents during the American Association for Thoracic Surgery (AATS) and STS in previous years. The competition is based on the US TV show ‘Jeopardy’. (https://www.youtube.com/watch?v=pFhSKPOF_Ii) and has been a great success among US colleagues.

This year, the EACTS has decided to organise a European version during the 29th Annual Meeting of the EACTS in Amsterdam. The competition will be entitled EACTS Cardiothoracic Masters Jeopardy. The EACTS will sponsor the winning team to go the STS 52nd Annual Meeting to compete in the final against the winning US team. EACTS will pay each team member’s registration fee for the meeting, economy travel and hotel accommodation.

Participation is voluntary with all EACTS European and other non-US residents in cardiac, cardiothoracic, cardiovascular or thoracic surgery, eligible to participate.

Prior to the Annual Meeting, anyone wishing to participate was asked to:
1. Create a team comprised of two cardio-thoracic trainees or one cardic trainee and one thoracic trainee
2. Take an individual online screening exam and answer 60 questions in 20 minutes

The European Competition

The top four national teams will compete during the Annual Meeting here in Amsterdam, on Monday 5 October 2015. Two rounds of ‘Jeopardy’ will be conducted in a live competition with the top two teams competing in the final round. The team with the best overall score will be the EACTS 2015 Resident Jeopardy Winners. The winners will go forward to play the US Resident Jeopardy Winners during the STS 52nd Annual Meeting.

We encourage you to join us for this new and exciting competition for residents.
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<th>Course</th>
<th>Dates</th>
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<td>Congenital heart disease</td>
<td>27–30 October</td>
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<tr>
<td>Mitral valve surgery</td>
<td>9–11 November</td>
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<tr>
<td>Surgical treatment of lung failure</td>
<td>16–18 November</td>
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<tr>
<td>Surgical treatment of heart failure</td>
<td>18–20 November</td>
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<tr>
<td>Endoscopic port-access mitral valve repair drylab training using high-fidelity simulators</td>
<td>19–20 November (Maastricht, The Netherlands)</td>
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<tr>
<td>Hospital leadership: the human factor</td>
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<tr>
<td>Chest wall diseases</td>
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<tr>
<td>Advanced course on anatomic correction of ccTGA</td>
<td>3–4 December (Sankt Augustin, Germany)</td>
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<tr>
<td>Thoracic surgery part II</td>
<td>8–11 December</td>
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<tr>
<td>Endoscopic port-access mitral valve repair drylab training using high-fidelity simulators</td>
<td>17–18 December (Maastricht, The Netherlands)</td>
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**SAPIEN 3 VALVE**

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<td><strong>1,800+</strong> Implanted in US and EU clinical trials</td>
<td><strong>30,000+</strong></td>
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