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In this issue

Cardiac | Techno-College |
Techno-College – New technology meets common practice – How to enhance your surgical portfolio

Techno-College: New tools address old lead extraction in live case from Hamburg

The Techno-College commenced yesterday, consisting in live and live-in-the-box cases (many of which were presented in 3D) and lectures all reflecting the future of the profession.

Joerg Kempfert (Berlin, Germany) was joined by fellow panel members Vinayak Bapat (New York, USA), Marco Di Eusanio (Ancona, Italy), Christoph Huber (Geneva, Switzerland) and Piotr Suwalski (Warsaw, Poland), to explore the intersection of new technology and common practice, with a live case presentation by Samer Hamki and colleagues from University Medical Centre Hamburg (Germany). The team performed a pacemaker lead extraction, using a combination of technologies including laser and mechanical excision. The procedure was accompanied by discussion between Dr Hamki, the panel and audience, of the issues surrounding lead extraction, and new technologies that strive to minimise the impact of future complications.

The patient was a 66-year-old female with known tetralogy of Fallot, which was corrected surgically in 1966. More recently in 2007, surgical correction of severe pulmonary regurgitation was achieved by pulmonary valve replacement. Further history included severely depressed left ventricular ejection fraction (20%), and two episodes of ventricular tachycardia and fibrillation. As such, a dual chamber implantable cardioverter defibrillator (ICD) was implanted in 2004. In 2016 this was upgraded to a cardiac resynchronisation therapy defibrillator (CRT-D).

Presently the patient was undergoing extraction of three leads (located in right atrium, right ventricle, and coronary sinus) due to pocket fistula infection. Chest X-ray revealed cardiomegaly.

Venography did not show venous stenosis or occlusion, although multislice CT indicated adhesions at the superior vena cava (SVC) wall, which Dr Hamki noted as a potential complication. In order to address the risk of SVC tear, the team prepared a bridge occlusion balloon.

The overall strategy was to use an excimer laser system as an extraction tool, together with a rotating mechanical sheath better suited to passing regions of calcifications. In addition, femoral vein sheaths were in place providing temporary pacer and diagnostic venography, as well as precautionary preparation for cardiopulmonary bypass.

"We learned from the past that the implantation of a lot of leads is not always so healthy. We have to reduce this."

Samer Hamki

Hendrik Treede

The pocket was opened and scar tissue dissected. Leads were prepared by being disconnected and standardised with lead-locking devices. The laser sheath was cannulated and excision commenced.

After a relatively uneventful extraction of the first lead, Dr Kempert commented on the growing issue of lead extraction, emphasising the importance of cooperation in complex cases between interventional cardiologists and surgeons.

"Absolutely," agreed Dr Hamki. "The support of a cardiac surgeon for this procedure is very important because sometimes we have very old, calcified leads with very complicated adhesions, and you can have bleeding."

Commenting on the laser excimer sheath, he continued: "We have very good results. It is flexible, and very nice to control. But sometimes, if you have very calcified adhesions, you have to change to mechanical because the laser technology cannot cut the 'bone'."

As well as calcifications, the case was complicated by adhesion between two of the leads, as well as adhesions to the SVC. "If you are very aggressive, you can create a laceration in the vein wall. This is not easy to save in this area, because we have a patient with a previous cardiac surgery."

Elaborating on the strategy in such a scenario, he

Continued on page 2

Cardiac | Techno-College |
Techno-College – New technology meets common practice – How to enhance your surgical portfolio

Techno-College: New tools address old lead extraction in live case from Hamburg

Continued from page 1

said: "There is the opportunity to go on-pump using your femoral bypass, but you may have to open the chest – depending on the tear. If you have a small tear, I try sometimes from the lateral side but it is not so easy. It is easier, I think, to open the chest. But if you have a balloon, and a stable haemodynamic, then you don't have any problem – you inflate the balloon, go on bypass, then try to open the chest – you will have 20 minutes without any problems."

Asked about laser damage to adjacent active leads, he replied: "Compared to the mechanical systems the laser is very safe. You can use it when you are doing revisions and you want to excise only one lead." However, Dr Hamki advised starting with a smaller sheath, in order to minimise the risk of cutting the vein wall. "You have to upsize only if you need."

"The support of a cardiac surgeon for this procedure is very important."

Samer Hamki

The second ventricular lead was highly calcified, necessitating the switch to mechanical extraction. With only the right atrial lead remaining, Dr Kempfert asked whether the temporary femoral pacemaker would be left in place. "Yes," said Dr Hamki. "The problem is that she has been operated on two times before, and the heart is not so well-located for a left ventricular lead. I decided to put a temporary lead by percutaneous wire through the skin for one week and then we are implanting the CRT from the right side again. This is a two-staged approach that I learned from Hendrik Treede. [For local infections, this involves] percutaneous leads for one week or ten days, and then we implant. For systemic infections, we do epicardial leads."

Dr Hamki also noted that emerging technologies, techniques and attitudes are addressing the issues associated with current pacemaker devices. "What is very important in the future is to think about other solutions like the subcutaneous ICD or the Micra pacer (Medtronic, USA).

"We still don't know how to explant the Micra pacer, but we learned from the past that the implantation of a lot of leads is not always so healthy. We have to reduce this. Some patients have two-channel ICDs when they don't need it. Maybe we could switch them to sICD. Or maybe we have to be not so aggressive in implanting devices – maybe using the life vest for a short time. Leads are not easy for patients with a good prognosis."

Returning to the procedure, and the removal of the third lead, Dr Hamki noted the value of switching between mechanical and laser excision in wire removal: "Sometimes changing tools saves a lot of tears, and saves your patient's life. I recommend this in complicated cases with very old leads."

Commenting on the value of the hybrid approach to lead extraction more generally at the case's conclusion, Dr Hamki said: "I have done this in the past using the C-arm. But if you want to do it in a good setting – to save patients when you have complications – you have to go to the hybrid room. With a C-arm there is no opportunity to place a femoral sheath. I think our patients are more complicated these days, and we have to go to the hybrid room."

Cardiac | Professional Challenge | How to become a hybrid surgeon

How do I become a hybrid surgeon?

A session today explores the importance of hybrid surgery and how interested surgeons can get involved in a hybrid programme. A number of presentations examine the scope of transcatheter techniques for the surgeon, as well as a closer look at specific procedures such as TAVI, mitral and tricuspid interventions and aortic interventions.

Speaking to *EACTS Daily News*, session moderator Davide Pacini (Cardiac Surgery Department, S.Orsola-Malpighi Hospital, University of Bologna, Italy) described the state of hybrid training programmes in Italy, the unmet needs, and what attendees can expect from the session.

What is the extent of training programmes in Italy at the moment?

In Italy there are a lot of differences between centres. In the majority of centres, the training programme has still not been updated regarding transcatheter skills. We have to move in that direction.

In our department, we are not completely involved in the cath-lab work. We are part of the heart team, but interventional cardiologists are the people who perform the transcatheter work and we are just helping them in the procedure.

But I think it is really important to get the surgeon involved. I think that, now, the large majority of cardiothoracic surgeons in Europe understand the importance of transcatheter therapy. But we are at the beginning of the story. Now we have to move to changing training programmes all over Europe, in order to have the knowledge as well as the skills in transcatheter technology.

The session today includes a series of presentations discussing the roles of the surgeon, the cardiologist and the heart team. What do you want to see emerging from this discussion?

I would ask all the speakers if they

Davide Pacini

are really convinced that only a single specialist can do the procedure themself, or whether it is better to grow altogether as a heart team. In my mind at least, the heart team is the way to go. The heart team – or the 'cardiovascular team', because we can also speak about TEVAR where we have to involve the vascular surgeon – I strongly believe that such a team is the way we have to proceed in this era of transcatheter therapy.

We cannot forget open surgery, because we have to know how to go in both directions. This is the reason the hybrid surgeon has to exist.

The last presentation discusses lessons from the vascular field. What is the significance of this?

Most of the talks are on transcatheter aortic valves. I am mainly involved in aortic surgery, so what I can say is that, even in the cardiothoracic discipline, we have to think not only about structural heart disease but also about aortic disease. The knowledge of transcatheter therapy has not to be limited only to transcatheter aortic valves, but also TEVAR. Cardiac surgeons cannot leave this to the other specialties (interventional radiology or vascular surgeons) … we have to be involved even in aortic endovascular procedures.

Will we be seeing greater cross-discipline collaboration in future, reflecting the importance of the cardiovascular team?

Yes, cross-discipline collaboration is really important. In order to improve this kind of collaboration, some kind of interdisciplinary meeting between societies would be very beneficial.

"Surgical procedures in our field are evolving and more often require a 'hybrid' approach: a mixture of conventional open and new transcatheter techniques. EACTS has recognised the need to educate and train surgeons in these techniques. The President, Professor Marian Zembala, and I have established the Hybrid Surgeon Programme. The Vascular- and the Adult Domain will coordinate its development. "The programme will comprise of several initiatives, courses and fellowships to train surgeons. In this meeting, the session on how to become a hybrid surgeon is a good start for everyone interested in these developments."

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EACTS Secretary General

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Cardiac | Focus Session | From basics to challenges in mitral valve surgery

International leaders showcase challenging mitral repair and redo techniques

A Focus Session held this afternoon draws together leading international surgical experts in challenging mitral valve cases, drawing particular attention to mitral repair in cases that would often be addressed by valve replacement.

Each speaker will give a short presentation followed by a prerecorded case. Session moderator Volkmar Falk (Deutsches Herzzentrum Berlin, Germany) described the intention of the proceedings in an interview with *EACTS Daily News*: "We designed the session particularly for the more rare but difficult to treat problems in mitral valve surgery. We have invited some experts on repair techniques in very challenging situations such as rheumatic mitral valve disease, Barlow's disease, endocarditis and annular calcification. There are expert techniques for repair that we want to show and discuss.

"For the surgeons, it will provide them with knowledge of techniques that they can apply in difficult cases. It should help to increase the number of mitral valve repairs over replacement for complex lesions."

The programme commences with keynote speaker Taweesak Chotivatanapong, a world-leading expert in mitral valve repair techniques for rheumatic mitral valve disease, and Chairman of the International Academic Institute Program of the Central Chest Institute of Thailand (Nonthaburi, Thailand). Dr Chotivatanapong will discuss repair of rheumatic mitral valve disease. "Very few surgeons can master what he can do in this particular setting," commented Professor Falk. "He has a lot of tricks and tips to offer. We are delighted to have him.

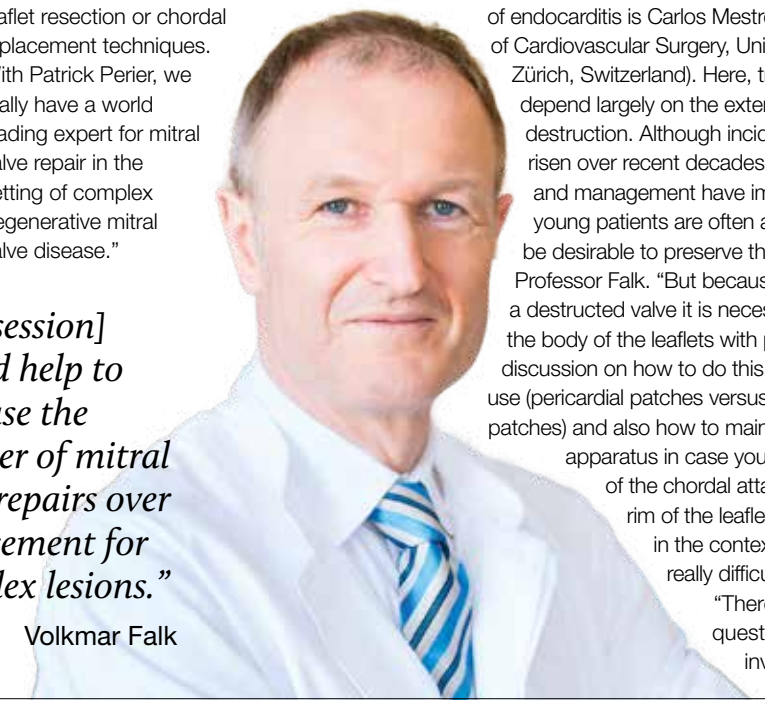
"In rheumatic disease, the problem is that usually we have calcified or thickened papillary muscles and very thickened leaflets. Unfortunately this is a problem that affects young patients, often women at childbearing age."

This young age of presentation is significant because of the risk of short-term degeneration of bioprostheses. Preserving the native valve also has the advantage of avoiding life-long anticoagulation as well as lowering the risk of endocarditis.[1]

"It is technically very challenging though because of the thickened tissue," added Professor Falk. "There are certain surgical techniques that can be applied to preserve the valve by 'shaving' the mitral valve leaflets and to deal with papillary muscle thickening and shortening. For young patients this might be of great benefit."

Dr Chotivatanapong is followed by Patrick Perier (Department of Cardiac Surgery, Herz und Gefäßklinik, Bad Neustadt an der Saale, Germany), who discusses Barlow's disease – the most severe form of degenerative mitral valve disease that affects valvular structures at all levels and segments. Dr Perier has recently published on the topic of valve repair in Barlow's disease[2], as well as evidencing the feasibility of repair of degenerative mitral valves in the minimally invasive setting[3].

The challenge of Barlow's disease lies in the presence of excessive and thickened valve leaflets, thickened, elongated and ruptured chordae tendineae, and annular dilation with abnormal annular motion[2]. The valve is thus affected in its entirety, summarised Professor Falk, going on to note different techniques that have been suggested to correct the problem: "Techniques range from very simplified approaches that correct only the annular hypermobility by implanting a ring, to very complex multisegmental leaflet resection or chordal replacement techniques. With Patrick Perier, we really have a world leading expert for mitral valve repair in the setting of complex degenerative mitral valve disease."



"[The session] should help to increase the number of mitral valve repairs over replacement for complex lesions."

Volkmar Falk

Daniel Swistel (Surgical Director of the Hypertrophic Cardiomyopathy Program, NYU Langone Health, USA) then presents on mitral valve repair in hypertrophic obstructive cardiomyopathy, wherein the mitral valve itself shows no pathology, but a hypertrophied ventricle and the obstruction of the left ventricular outflow tract creates mitral insufficiency by systolic anterior motion of the anterior mitral leaflets. "There is a need for complex decision making here," commented Professor Falk, "on whether a muscular resection of the hypertrophic outflow tract will be enough to correct mitral insufficiency, or whether additional measures at the mitral valve and chordal level need to be taken.

"This is more a difficulty in assessing the necessary approach by imaging and finding the right diagnostic pathway to see if the mitral valve really needs additional repair. Even then, it is not so easy to decide which intervention should be done. In most of the cases, resection alone will do the job and no valve intervention will be necessary. As these cases are not so frequent, it is very timely to show a video presentation of one of these cases to discuss the options and the proper diagnostic pathway."

Presenting on mitral valve repair in the setting of endocarditis is Carlos Mestres (Department of Cardiovascular Surgery, University Hospital Zürich, Switzerland). Here, treatment options depend largely on the extent of valve leaflet destruction. Although incidence has reportedly risen over recent decades, diagnostic tools and management have improved[4]. "As young patients are often affected, it would be desirable to preserve the valve," noted Professor Falk. "But because we are dealing with a destructed valve it is necessary to augment the body of the leaflets with patches. We have a discussion on how to do this, which material to use (pericardial patches versus extracellular matrix patches) and also how to maintain the mitral valve apparatus in case you have to resect some of the chordal attachments at the free rim of the leaflet. This makes repair in the context of endocarditis really difficult.

"There is also the question of how annular involvement, by abscess formation, can be tackled – whether the mitral valve can be preserved in this context or not. This is an interesting question that will be answered by Carlos Mestres, who is one of the leading experts in the field, with a large experience in reconstructive valve surgery – especially when it comes to endocarditis."

The next presentation, on mitral annular calcification, poses "a really tricky problem", noted Professor Falk, because of the possibility of calcification extending into the left ventricle, and the substantial risk that decalcification carries. Vinayak Bapat (Department of Cardiothoracic Surgery, Columbia University Medical Center, New York, USA) presents a set of repair and replacement techniques in this setting, as well as addressing whether transcatheter valve therapies are appropriate to treat mitral annular calcification: "This is a more or less new technique to replace the mitral valve without touching the calcification," commented Professor Falk, adding: "And this may be useful for certain subset of patients."

Closing the session is Laurent de Kerchove (Division of Cardiothoracic and Vascular Surgery St-Luc University Hospital, Catholic University of Louvain, Brussels, Belgium), who presents tips and tricks on redo mitral valve surgery. Dr de Kerchove has recently published insights into redo mitral valve aetiology and surgical management in a retrospective study spanning the years 1997 to 2015 at Saint Luc Hospital, Belgium.[5]

'From basics to challenges in mitral valve surgery' takes place on this afternoon from 16:30 to 18:00 in Brown 3.

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1. Long, et al., Perfusionist Techniques of Reducing Acute Kidney Injury Following Cardiopulmonary Bypass; An Evidence-Based Review. Perfusion. 2014;1-8.

Cardiac | Focus Session | TAVI registries: Outcomes, impact and access in different Countries

Making TAVI registries better is better for patients

The wealth of knowledge available through TAVI registries to improve patient outcomes around the world will be under discussion this morning. One of the moderators, Mauro Romano, a cardiovascular surgeon at the Institut Hospitalier Jacques Cartier in Massy, France, spoke to *EACTS Daily News* about the importance of such registries. Dr Romano has been involved with TAVI programmes since 2007, is the Co-PI of the ROUTE registry for the Trans-aortic approach for TAVI and has participated in important studies based on TAVI registries. "This is a very important session because TAVI registries represent a real-world picture of what TAVI is in clinical practice and provide the evidence for the choice of this treatment," said Dr Romano. "They show that the growing experience of the operators in terms of patient selection, prevention and recognition of the potential complications – together with the improvements in device technology – will improve the results of TAVI."

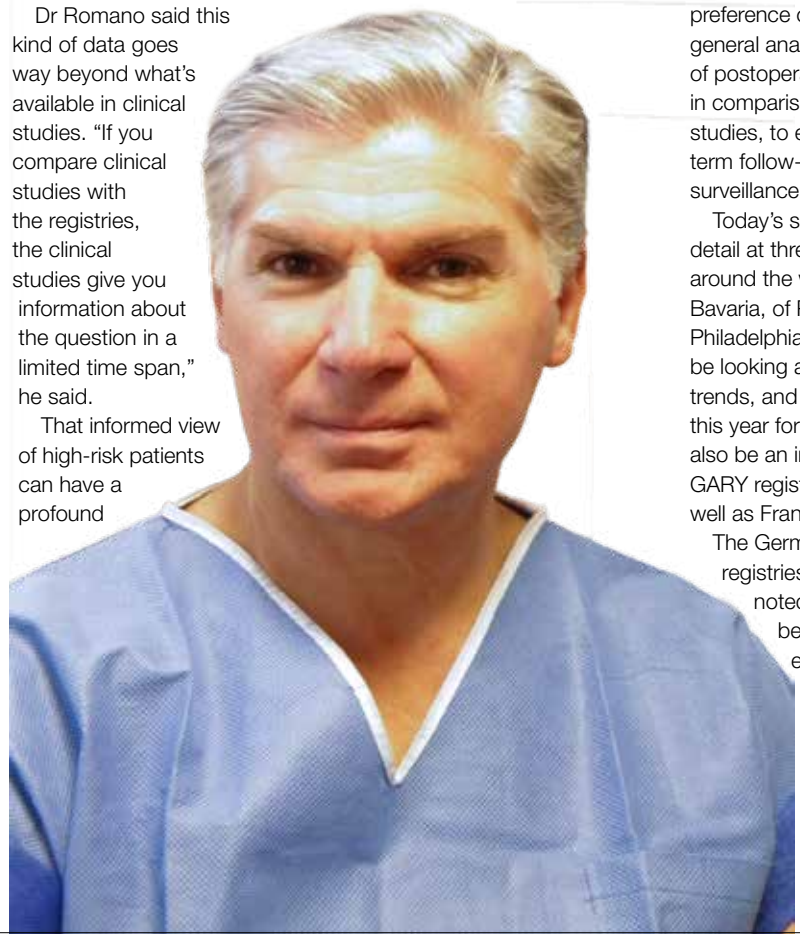
"This is a very important session because TAVI registries represent a real-world picture of what TAVI is in clinical practice and provide the evidence for the choice of this treatment."

Mauro Romano

Registries are invaluable because they can greatly influence device selection. "These registries are designed for really long-term follow-up of the patient and look at how the patients may have performed over time," he explained. "So, this information could decide the future of a technology."

Dr Romano said this kind of data goes way beyond what's available in clinical studies. "If you compare clinical studies with the registries, the clinical studies give you information about the question in a limited time span," he said.

That informed view of high-risk patients can have a profound influence upon policymakers. "You can have information about the patient outcome, the TAVI's performance and this information is useful for physicians, for the patients, for the hospitals, and political authorities to decide on the usefulness of these procedures," explained Dr Romano.



Not only that, but it's possible with the registries available to compare policies and access to treatment across countries, and regions too. "Country-specific results can be influenced by the national health policy, local referral practice and local operator's experience," he explained.

Researchers like Dr Romano have used the registries to compare different methods and procedures to understand which are the most successful. TAVI registries allow the comparison between TAVI strategies: transfemoral versus transapical versus transaortic, for example, or between different devices, he explained. "TAVI registries also help in understanding the role of the learning curve, preference of local versus general anaesthesia, the level of postoperative care and, in comparison with clinical studies, to ensure a long-term follow-up in post-market surveillance," he commented.

Today's session will look in detail at three registries from around the world. Joseph Bavaria, of Penn Medicine, Philadelphia, PA, USA will be looking at TAVR Results, trends, and adoption in the US this year for example. There will also be an in-depth look at the GARY registry in Germany, as well as France's TAVI registry.

The German and French registries are interesting, noted Dr Romano, because they were established at the beginning of the TAVI era, and now include several thousands of patients. They've been the source of hundreds of publications too. "With these registries, you have enough data to come up with some interesting pieces of information," he explained. "Actually, Germany represents the highest number of valve implants in the last 10 years."

But despite such amounts of data, Dr Romano warned that registries are still limited.

"We must move away from a voluntary basis to a mandatory basis to avoid any bias in interpretation of the results." Mauro Romano "It would be useful to have real standardisation in the future in order to achieve a better understanding of results."

Mauro Romano

For example, different registries collect different kinds of data. "It would be useful to have real standardisation in the future in order to achieve a better understanding of results," he commented. "Then registries could improve the information that is given to the physicians and patients."

In addition, patient selection can be challenging, said Dr Romano. That's because patient inclusion in existing TAVI registries is not mandatory (mandatory patient inclusion exists in other registries outside the TAVI field, he noted). "Patients can be unwilling to participate in the registry," he explained. Using voluntary data can have a profound effect on the results too.

"The message to delegates will be to include more and more patients in TAVI registries, and maybe to change the way patients are recorded," Dr Romano added. "We must move away from a voluntary basis to a mandatory basis to avoid any bias in interpretation of the results."

That said, data must be treated correctly, he continued: "Results should be accessible in terms of transparency. This does not mean the data concerning the patient will be public, but an annual public report of the results/outcomes of the patients in general could help physicians to decide the best operations to offer to their patients. Registries are useful for patients, physicians, third-party payers, manufacturers and decision makers who would take advantage of reports knowing that the vast majority of registries are known only through their publications."

Dr Romano speaks during the session 'TAVI registries: Outcomes, impact and access in different Countries', held 11:45–12:45 in Amber 5.

Pathways to breakthrough innovation in cardiac surgery: An Edwards lunchtime symposium

Sixty years of Edwards innovation are marked at the 2018 EACTS Annual Meeting in Milan with a lunchtime symposium focused on pathways to breakthrough innovation in cardiac surgery, which seeks to highlight the continuing commitment of innovative surgeons, industry partners, health authorities and patients in bringing about the betterment of standards of care.

The symposium, 'Pathways to Breakthrough Innovation in Cardiac Surgery', takes place in Brown 3 between 12:45 and 14:00 on Saturday 20 October.

It comprises a rapid fire session during which selected stakeholders are represented, followed by a debate that forms that core of the proceedings. Central to the talks and debate is the notion of the changing face of innovation: the adoption of new therapies has in the past been principally propelled by experienced, pioneering physicians; today, guidelines and standards of patient safety and device efficacy hold a more prominent role. Nevertheless, early adopters of new technologies continue to be crucial players in assessing new technologies with a view to improving upon the shortcomings of existing therapies.

"If you look at the history of Edwards, this is a company that nicely depicts how industry partnership has been done."

Hendrik Treede

With unmet patient needs not fully captured by current therapies, clinical literature and guidelines, the adoption of innovative technologies and assessing their benefit is a prominent question. In order to resolve this, an ongoing synergy is demanded between key stakeholders involved in innovation to grant access to new therapies, to define quality standards and education needs in healthcare.

Hendrik Treede

Representing the strategic role of industry during the symposium will be Donald Bobo, Corporate Vice President of Strategy and Corporate Development at Edwards. He will speak of the evolution of industry standards with respect to research and development, quality systems and clinical benchmark trials, as well as discussing the continuing role that the company plays in education and skills training in conjunction with healthcare providers. He will also discuss the role the company plays in balancing investment in innovation with other important factors: identifying patient and healthcare provider's unmet needs, and ensuring that new technologies are safe, useable, and clinically- and cost-effective.

The Chair of the EACTS New Technology Task Force, Hendrik Treede (Director of the Department of Cardiac Surgery at the Mid-German Heart Center, University Hospital Halle, Saale), will then discuss the historical development of the partnership between industry and medicine, as well as looking to its future and the critical role that surgeons play in shaping this. The EACTS New Technology Task Force develops the programme of the Techno-College, the concept-driven venture presenting the latest technologies under development in the field of cardiovascular medicine.

In an interview ahead of the Annual Meeting, Dr Treede described the changing way in which new concepts are developed and brought into broad clinical use. "Industry plays a very important role," he said. "If there is no industry partnership it is very hard to make a product out of an idea. If you look at the history of Edwards, this is a company that nicely depicts how this has been done."

Indeed, the collaboration between engineer Miles Edwards and surgeon Albert Starr that commenced in 1958 led to the creation of the world's first commercially-available artificial heart valve, the Starr-Edwards, providing the cornerstone of the company and marking a new era in the treatment of valvular heart disease. Since then a great evolution has continued, noted Dr Treede, with the development of Carpentier valve repair techniques, the PERIMOUNT valves, and more recently the promising INSPIRIS valve with the new RESILIA tissue. "These examples nicely prove how solid the cooperation between an industry partner and a developing surgeon can be, and what comes out of that.

"The standard products that we use in basic routine have been developed by surgeons who had great ideas and who got the support they needed from industry. When this happens at eye-to-eye level, then it really prioritises the patient. Edwards is a great example of this working well."

"The cooperation between industry partners and developing physicians has been more intense in recent years than what I remember it being 20 years ago."

Hendrik Treede

Asked how the relationships between different stakeholders has changed, Dr Treede continued: "Today we are more patient- and outcome-driven. We can also offer more individualised medicine, putting the patient's needs at the centre of our work because we have so many possibilities in treating the patient. This, again, has something to do with the work we have done in the past.

"A surgeon who is very innovative will often work with very small

Early adopters of new technologies continue to be crucial players in assessing new technologies with a view to improving upon the shortcomings of existing therapies.

companies and start-up companies. And the cooperation, especially when it comes to practical research, between smaller or larger industry partners and developing physicians has been more intense in the last years than what I remember it being 20 years ago."

In his concluding remarks, Dr Treede noted the changing role of the surgeon as a key theme of the symposium. "I will be looking into the future where this innovation may end up, and where surgeons can find their role in this whole field," he said.

"This symposium is an opportunity to meet and discuss, in an open forum, how we can shape the future."

Chris Young

"Of course hoping that this role is an important one."

Following this presentation, Volkmar Falk (German Heart Centre Berlin, Germany) explores whether the CE mark alone is enough to justify adopting a new practice or device, as well as the fundamental role of physicians in the post-market clinical evaluation of new technologies. Cutting-edge technologies in artificial intelligence, robotics and 3D printing are then discussed by Peyman Sardari Nia (Maastricht University Medical Center, the Netherlands).

Christopher Young (Guy's and St Thomas' Hospital, and London Bridge Hospital, UK), who co-chairs the symposium alongside Michael Borger (Heart Center Leipzig, Germany), concludes the rapid fire segment with a presentation on the topic of patient power as a way of driving change. Dr Young is Chairman of the patients' association Heart Valve Voice, which works to improve patient access to appropriate care, as well as driving research and policy in the right direction.

Much lies under the bracket of 'the patient voice', including ensured access to appropriate care, and ensuring that patients are both informed and supported. In addition, developing patient-centred outcomes in research and including patients' priorities in policy formation, are contemporaneous issues.

In an interview ahead of the Annual Meeting, Dr Young explained the need for patient advocacy organisations, and what they achieve: "Heart Valve Voice is designed as a way for patients to voice their concerns about treatment, to maximise treatment benefits, to change the way that people will pay for treatment, and to get fair treatment.

"In the UK, some areas get a lot of treatment while others get very little. And although I am a cardiac surgeon, this has nothing to do with cardiac surgery or cardiology. It is really about improving what we do."

Heart valve disease affects around 1.6 million people, he explained, an issue "largely unrecognised" in the UK. "Heart Valve Voice is about making sure that, when you get recognised, the system that you go into is the same system that delivers a fair outcome for everybody, not just for the privileged few or those with the right postal code."

Heart Valve Voice has addressed these issues by a number of different approaches. The organisation has written parliamentary white papers, taken part in parliamentary events and presented at sports and other events, in order to publicise and educate about, for example, the importance of stethoscope checks and the need to raise awareness about of heart valve disease.

Turning to the topic of his presentation, Dr Young explained how patient empowerment can not only raise standards, but can also drive change in innovation and practice: "Patients have powers they do not realise – certainly in the UK. They go to their doctor and get sent to the local hospital, but they can go anywhere they like in the country. Most of them don't know that.

"The ones that do know that, get the better care. Some know about keyhole surgery, some know about TAVI. Patients know more and more. We want to stand up for the ones that don't know as much, to highlight just how much power they have to dictate and change things.

Chris Young

"The example I use all the time is this: when I say patients should have keyhole heart surgery, some surgeons will turn around to me and say that keyhole is no better. But, if a patient says to the surgeon that they want keyhole heart surgery and the surgeon says it's no better, then the patient can ask, 'Why are you going to make a big hole in me? Why don't you make a little hole if it is just as good?' Patients have much more power, because they can persuade doctors. Patients are now better educated, they do their research, they go on the internet. What I want to say is that some patients are very powerful, know an awful lot, and effect change."

"We want to stand up for the ones that don't know as much, to highlight just how much power they have to dictate and change things."

Chris Young

The session as a whole, concluded Dr Young, serves as an opportunity to discuss how patient safety can be maintained when new technology is introduced. Another important balancing act, he added, lies in ensuring the timely development of surgeon's skills to meet new technologies. "Patient associations and charities, such as Heart Valve Voice, are increasingly powerful, and their role will no doubt feature in these conversations," he noted. "This symposium is an opportunity to meet and discuss, in an open forum, how we can shape the future."

The symposium,

'Pathways to Breakthrough Innovation in Cardiac Surgery'

takes place in Brown 3 between 12:45 and 14:00 on Saturday 20 October.

INSIDE MILAN

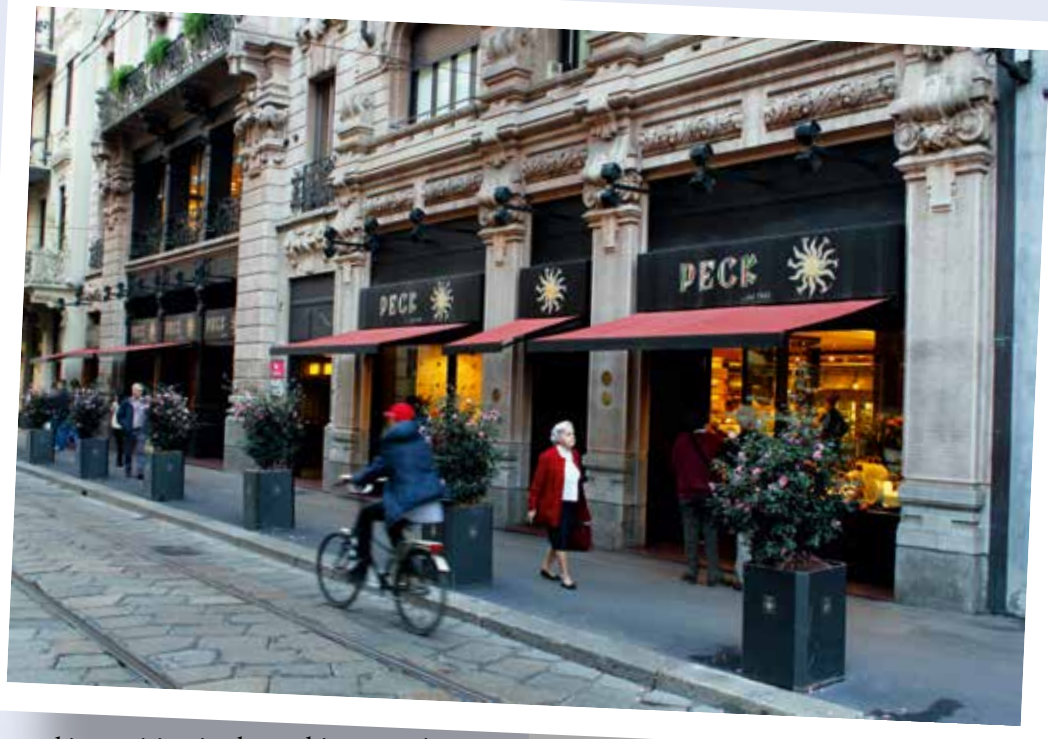
Where to go? What to do?

EATING

PECK

Feeling *Peck*ish? If you're already taking in the sights of the Duomo, a short stroll will take you to this don't-miss deli nearby. An historic venue that says more with its reputation than its size, expect a mouth-watering selection of parmigiano reggiano, caviar, seafood, pate, truffles and sweet treats such as chocolates, pralines, pastries and gelato.

Peck also features an all-day restaurant with a traditional menu, but avoid lunch time if you don't want to fight over a table with the business locals.



LA BRISA

La Brisa is the very model of modern Milanese, at least as far as the elegant seasonal menu is concerned. In truth the restaurant oozes romance, not least as you pass through the linden trees and ivy dressings of the courtyard on the way to your special table.

ALTERNATIVELY

BASARA

If sushi is your thing, you won't be hard pressed to find it in Milan. All the more reason why Basara – which has made a name for itself and elevated its position in the sushi scene – is worth a look. Lobster maki rolls, platters of raw fish and the red Sicilian shrimps simply served with salt are highlights.

DRINKS

CERESIO 7

One of Milan's primo rooftop complexes, Ceresio 7 rests aloft an old 1930s electricity company headquarters. Bars, a restaurant and even swimming pools are coupled to a fantastic view of life down below. Aperitivo might come at a price, but if you are looking for one of the coolest places to be in Milan, you've found it.

BERE BUONA BIRRA

Name your bar "Drink good beer" and you might give yourself a reputation you can't keep up. Not so at this clubhouse-cum-bar in the Porta Romana area. The informal storefront venue is all about good, craft beer both from bottle and tap, as well and take-home options you can try later.

RITA & COCKTAILS

No trip to Milan would be complete without a visit to the Navigli canal district – 100s of years of epicurean expertise packed into a heady mix of eateries, bars and atmosphere. If you are up for a cocktail – or mocktail – few beat Rita & Cocktails, a contemporary space with fresh ingredients, talented bar staff and tongue-spinning drinks.

Thoracic | Abstract | Film - Thoracic

Posterior uniportal video-assisted thoracoscopic approach for left non-anatomic S2 resection followed by completion of lobectomy (potential catastrophic event)

Davor Stamenovic ViDia Christian Clinics Karlsruhe, Germany

Video presentation doesn't belong to high-end scientific work, yet its number seems to increase, especially lately.

In my opinion, one may decide to share a video led by one of two reasons: either to share and spread the knowledge (a technique or its modification, a new approach or some curiosity within), or in order to share and spread fame, or at least success.

In both cases a video is most carefully chosen: everything is as it should be, or at least close to perfection: indication, operative technique and course – as well as postoperative period – are almost ideal.

> "All bleeding eventually ceases."
>
> Guy de Chauliac
> 1300–1368

Our video today is nothing like that, starting with indication, unorthodox operative technique and decisions, and even featuring a dramatic complication in the course of operation. However, as C. Mayo said, "The most important result of any surgical operation is a live patient," and our patient was not only alive, but also in rather good physical condition discharged from hospital.

This video illustrates not only a novel approach to one posterior lung segment by means of a posterior uniportal thoracoscopic approach, but also emphasises a fact that decisions are indeed more important than incisions.

However, even if good judge comes from experience, experience comes from bad judgment.

Davor Stamenovic

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IM-01930 A

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Perceval Plus is treated with FREE, an improved tissue treatment that combines phospholipid reduction and aldehyde neutralization with aldehyde-free storage (which does not require rinsing prior to implantation).

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The Perceval Plus XL size features a decreased ventricular protrusion, which does not affect the valve seating in the aortic root and final implant configuration, to increase the clinical outcome of the patient.

Reduced procedural time, ease of implantation and enhanced anti-calcification properties make Perceval Plus the ideal tissue valve choice for MICS and complex-combined cardiac surgeries and offers an opportunity to improve the lives of a wider patient population.

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Cardiac | Abstract | Surgery for functional mitral regurgitation: potential for improvements!

Free versus pedicled RIMA: when freedom may not be a good thing!

Dimitri Kalavrouziotis and Siamak Mohammadi Quebec Heart & Lung Institute, Québec City, QC, Canada

The use of arterial grafts for coronary artery bypass grafting (CABG) is widely thought to be better for patients in terms of increasing long-term graft patency, reducing recurrent angina, myocardial infarction, and prolonging survival. Using bilateral internal mammary arteries (BIMA) lends itself beautifully for arterial grafting. However, the optimal graft configuration for BIMA remains debated. Keeping the right internal mammary artery (RIMA) attached proximally to the subclavian artery is one option; completely dividing it and using it as a free graft is another.

The objective of our study was to examine the long-term outcomes associated with a pedicled versus a free RIMA. Between 1992 and 2017, 23,429 consecutive adult patients underwent isolated CABG at the Quebec Heart and Lung Institute in Quebec City, Canada. Among these

Siamak Mohammadi (left) and Dimitri Kalavrouziotis

patients, 2,600 underwent BIMA grafting; within this group, 136 patients had the RIMA used as a free graft and 2,464 patients had the RIMA used a pedicled graft that remained attached to the subclavian artery. Propensity score analysis using one-to-many matching was performed where 134 patients (98.5%) with free-RIMA were matched to 2,423 patients with pedicled-RIMA and patients were followed up to 25.8 years (median 11.8 years).

Operative mortality was similar among the two matched groups (1.5% for free-RIMA vs 0.5% for pedicled-RIMA, p = 0.42) as were post-operative adverse events. Cardiopulmonary bypass time was about 15 minutes longer and clamp time was seven minutes longer in the free-RIMA group. The total number of distal anastomoses were similar in the two groups but the number of arterial grafts was statistically higher among free-RIMA patients (2.2 vs 2.1, p < 0.0001).

With respect to late mortality, there was a significant survival advantage associated with patients for which the RIMA was used as a pedicled graft. Cox proportional hazards multivariate analysis showed that the use of RIMA as a pedicled graft was associated with a 35% relative risk reduction of late death (HR 0.65, 95% CI 0.48–0.88, p = 0.005) compared to using the RIMA as a free graft. However, late readmissions for cardiac reasons were similar between the two groups; approximately 11% of patients in the free-RIMA needed a repeat revascularisation procedure during follow-up compared to 9% in the pedicled-RIMA group.

These data are interesting because they suggest that leaving the RIMA attached to the subclavian artery prolongs survival. This may be due to the fact that leaving the RIMA in-situ avoids the necessity of a proximal anastomosis. Previous studies have shown that the proximal trauma that results from both dividing the RIMA and anastomosing it proximally (to the LIMA, aorta, etc.) may impair RIMA endothelial function and nitric oxide production. Using the RIMA as a pedicled graft did not decrease the number of arterial distal anastomoses in a clinically significant way and the risk of repeat revascularisation was similar in both groups.

In summary, don't mess with nature … leave the mammaries attached to the subclavian artery as nature intended!

Thoracic | Abstract | Thoracic – Featured abstracts

Novel management of a radiation-induced tracheoesophageal fistula

Monisha Sudarshan and Shanda Blackmon Mayo Clinic, Rochester, MN, USA

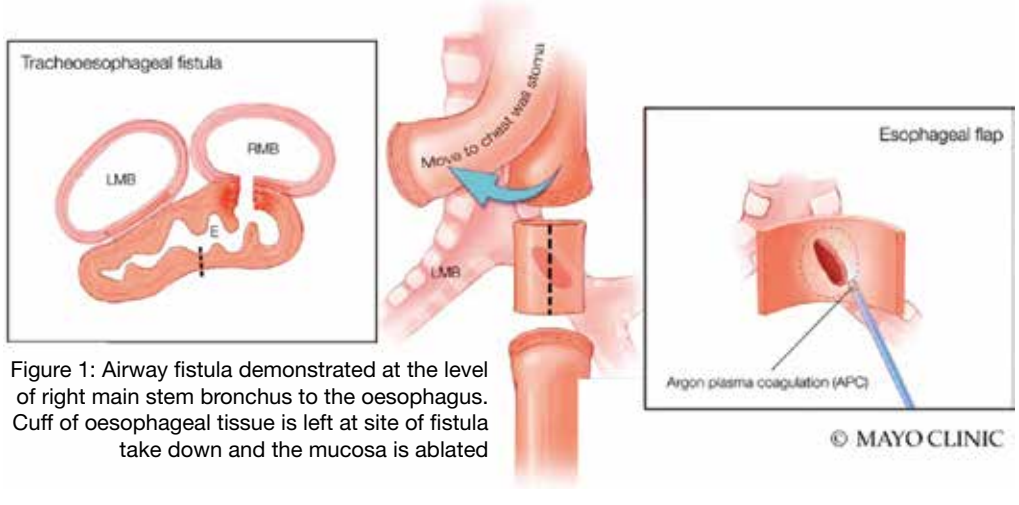

Figure 1: Airway fistula demonstrated at the level of right main stem bronchus to the oesophagus. Cuff of oesophageal tissue is left at site of fistula take down and the mucosa is ablated

Acquired tracheoesophageal fistula (TEF) is a rare but highly morbid condition. Aetiologies are variable ranging from complications of mechanical ventilation, previous surgeries and trauma. Effective management of acquired TEFs is one of the biggest challenges in oesophageal disease. One-stage closure, two-stage or multi-stage closure, suture repair of defects, use of muscle flaps, and use of stents have all been described in the literature with no clear consensus.

Patients with radiation-induced TEFs present a unique challenge in comparison with other aetiologies of acquired TEFs. These patients harbour multiple clinical issues including pulmonary contamination due to recurrent aspiration and poor nutrition. In addition, salvage of the oesophagus is often not an option due to poor tissue quality.

Today during the "Thoracic Featured Abstracts" session, we will present a case of a 70-year-old woman treated with definitive chemoradiation for oesophageal cancer at an outside institution with resultant oesophageal-airway fistula developing years later. We review our technique of esophagectomy, repair of airway defect and fistula closure. We also offer pearls in enhancing healing and recovering for this challenging issue. We hope this case presentation adds a useful technique to the armamentarium of the thoracic surgeon for the management of radiation induced TEF.

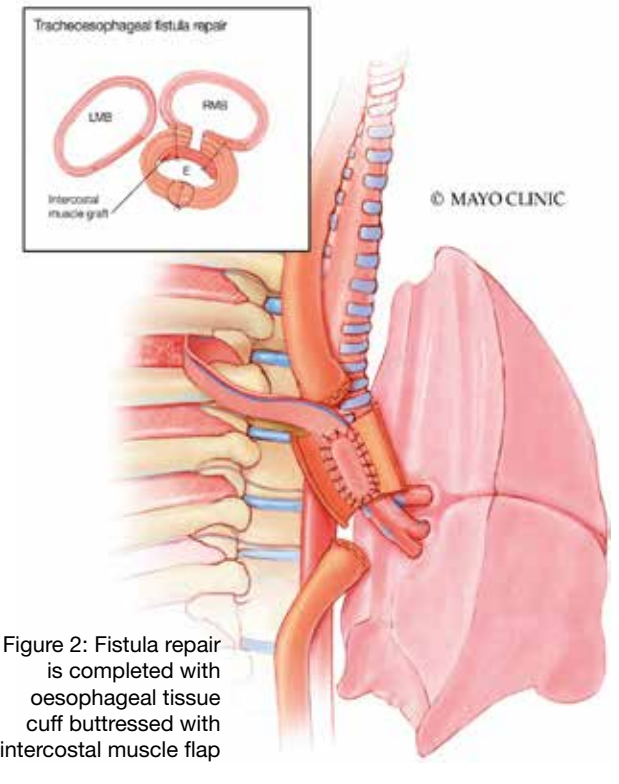

Figure 2: Fistula repair is completed with oesophageal tissue cuff buttressed with intercostal muscle flap

Cardiac | Abstract | Second conduit: choices beside RITA

How do surgeons decide? Conduit Choices in the UK

Marisa Gasparini[1], Shruti Jayakumar[2], Tom Treasure[3], Clare Burdett[4] and The Cardiothoracic Trainees Research Collaborative, UK 1. Department of General Surgery, Imperial College London, London, UK; 2. Department of Academic Medicine, St. George's University Hospital, London, UK; 3. Clinical Operational Research Unit, University College London, London, UK; 4. School of Clinical Medicine, Cambridge University, UK

Choice of conduit for coronary artery bypass grafting (CABG) is often a point of contention amongst cardiac surgeons. Conduit choice has a significant impact on graft patency and consequently on long-term outcomes, yet the quest for the second-best conduit remains unsolved. Recently, total arterial revascularisation (TAR) and use of bilateral internal mammary arteries (BIMA) has become increasingly popular in many countries. However, there is large variation in current practice, reflecting the lack of high-quality evidence with long-term follow-up. Therefore, the decision for the best second conduit remains largely based on local surgeon preferences.

In our study, we set out to investigate UK surgeons' opinions on the different conduits and their decision-making processes behind conduit choice. Ninety-seven consultant surgeons from 25 UK centres participated in the study, accounting for 42% of UK surgeons. Most surgeons routinely use the LIMA and great saphenous vein, whereas about a third of surgeons routinely use either a right internal mammary artery or radial artery.

Perspectives on the importance of using BIMA showed a distinctive bimodal distribution, with a third of surgeons on either side of the argument. Age was the commonest factor guiding surgeons' decision for BIMA, however there was no consensus amongst surgeons regarding the age limit that should be used to identify patients most suitable for BIMA. TAR was important to a quarter of surgeons but conversely, for almost 40% of surgeons, TAR is not an important part of their practice. In terms of technical preference, most surgeons preferred pedicled rather than skeletonised mammary arteries due to the latter's lack of beneficial evidence, its potential for spasm and concerns about long-term patency.

Next, the majority of surgeons highly valued a single proximal to distal anastomosis, with only a quarter of surgeons finding sequential, T or Y grafts important, mainly due to fears of potential loss of multiple anastomoses with one graft failure but also due to limited experience compared to a traditional anastomosis. When asked about the decision-making process on conduit choice, surgeons gave the highest importance to high quality evidence, followed by experience and competency of harvester. Patient choice, provision of training opportunities and theatre time were given less importance.

Marisa Gasparini, Shruti Jayakumar

Understanding current practice and decision-making behind conduit choices in CABG is important as it highlights the discrepancy between the importance surgeons give to high-quality evidence and the current lack of such evidence to develop guidelines for clinical practice. This is reflected in the wide variation in importance given to BIMA, TAR and skeletonisation by different surgeons. Furthermore, the results of this study show that practice is sometimes hindered by limited experience. Coupled with the low rating surgeons give to training opportunities when deciding on a conduit, it is unsurprising that practices are propagated within centres without sufficient opportunity to expand on their current techniques.

Therefore, professional societies need to focus on two main goals: a) synthesising and producing high-quality evidence that will support clinical guidelines for well characterised groups of patients, coupled with b) training programmes to support both trainees and consultants in developing and adopting new techniques.

Thoracic | Focus Session | Oligometastatic disease

Brain metastases in resected non-small cell lung cancer: the impact of different tyrosine kinase inhibitors

Po-Jen Yun[1], Guan-Chuan Wang[2], Ying-Yi Chen[1], Ti-Hui Wu[1], Hsu-Kai Huang[1], Shih-Chun Lee[1], Hung Chang[1] and Tsai-Wang Huang[1] 1. Division of Thoracic Surgery, Department of Surgery, Tri-Service General Hospital, National Defense Medical Center, Taipei, Taiwan, R.O.C; 2. Department of Neurosurgery, Tzu Chi Hospital, Hualien, Taiwan, R.O.C

The development of brain metastases (BM) is a devastating consequence of disease progression that affects up to 44% of advanced non-small cell lung cancer (NSCLC) patients – particularly patients with adenocarcinoma – and indicates treatment failure and poorer prognosis. However, NSCLC patients with BM now have a variety of treatment options available, including adjuvant chemotherapy, whole brain radiotherapy (WBRT) with or without stereotactic radiosurgery (SRS), immunotherapy, and epidermal growth factor receptor – tyrosine kinase inhibitors (EGFR-TKIs) for those patients harboring activating EGFR mutations.

EGFR-TKIs have been found to be more effective in the treatment of patients with BM than chemo- and/or radiotherapy, however, few studies have explored the clinical characteristics, treatment options, and prognoses of NSCLC patients with BM following surgical resection, in spite of the fact that more and more NSCLC patients are currently being diagnosed at the early stage of disease. In addition, patients with BM are especially unique due to their differing intracranial susceptibilities to the different generations of EGFR-TKIs, susceptibilities that are influenced by blood-brain barrier permeability. Therefore, we sought to determine some of the distinct characteristics of surgically resected NSCLC patients with subsequent BM, including EGFR features, tumour stages, treatment strategies, and survival. Furthermore, new generations of EGFR-TKIs have been introduced since the first-generation drug, gefitinib (Iressa®), was introduced in 2003 and first approved by the FDA to treat NSCLC in August of 2014. Hence, we evaluated the effects of different generations of TKIs in treating NSCLC with BM and sought to clarify the prognostic factors for the long-term and post-recurrence survival of patients with BM after complete resection of NSCLC.

A total of 785 cases of stage I-IIIa NSCLC were reviewed in our study. One hundred and fifty-nine (20.3%) patients developed metastatic disease and 36 (4.6%) patients were identified as having BM. Among this specific group, 21 patients had a determined EGFR mutation status, and mutated EGFRs were found in 14 patients. No association between EGFR mutation status and the incidence of BM was observed (p= 0.199). In patients with BM, the median follow-up was 41.53 months, the median overall survival was 58.42 months, and the median disease-free survival was 17.18 months. Patients with mutated EGFRs had significantly longer overall survival and post-recurrence survival than patients with wild-type EGFR mutation (p = 0.001 for both). However, there was no survival difference between patients with exon 19 and exon 21 mutations (p = 0.426). Furthermore, patients who received the second- and/or third-generation EGFR-TKIs had better survival than patients who only received first-generation EGFR-TKIs (p = 0.031). A multivariate analysis indicated that the next-generation TKIs (HR, 0.007; 95% CI, 0.000 to 0.556; p = 0.026) and a longer interval before BM development (HR, 0.848; 95% CI, 0.733 to 0.980; p = 0.025) were significant factors in longer survival.

In conclusion, EGFR-TKIs were effective in treating NSCLC patients with BM after curative pulmonary surgery, especially in those patients harboring EGFR mutations. Furthermore, the second-/third-generation EGFR-TKIs showed more promising results than the first-generation EGFR-TKIs in treating those particular patients.

Thoracic | Rapid Response | Rapid Response 1 – Thoracic

Robotic assisted lobectomy favours early lung recovery vs muscle-sparing thoracotomy: results of a prospective study

Valérie Lacroix[1], D. Kahn[2], P. Matte[1], T. Pieters[3], P. Noirhomme[1], J. Possoz[1], A. Poncelet[1] and A. Steyaert[2] 1. Cardio-vascular and thoracic surgery, Cliniques Universitaires Saint-Luc, Woluwe-Saint-Lambert, Belgium; 2. Anesthesiology, Cliniques Universitaires Saint-Luc, Woluwe-Saint-Lambert, Belgium; 3. Pulmonary medicine, Cliniques Universitaires Saint-Luc, Woluwe-Saint-Lambert, Belgium

Postoperative pulmonary recovery after lobectomy has well been studied after the emergence of video-assisted techniques. Open surgery techniques must be distinctly considered as conventional thoracotomies that imply rib(s) division and/or resection with no muscular sparing, and sparing thoracotomies.

The VATS technique has clearly been demonstrated superior over conventional thoracotomies concerning pulmonary early recovery after lobectomy[1,2].

Studies that compared VATS and sparing thoracotomy techniques showed similar postoperative pulmonary function. It has also been shown that the VATS technique reduces pain during in-hospital stay,[3] but that this advantage was lost after this early period.

Robotic assisted lobectomy procedures are now considered effective, offering benefits in terms of clinical postoperative events[4], but their advantages in terms of pulmonary recovery have not yet been distinctly studied.

We have conducted a prospective study to evaluate the pulmonary recovery after robotic lobectomy and muscle-sparing thoracotomy. Eighty-six patients undergoing lobectomy alone over a period of 29 months for oncological reasons were prospectively studied for their pulmonary function recovery during in-hospital stay, at one month, two months and six months. Forty-five patients were operated by postero-lateral muscle-sparing thoracotomy and 41 patients by a robotic approach. The preoperative pulmonary status was equivalent for the two groups.

We must point out that the postoperative analgesia protocol differed for the two groups. All patients from the thoracotomy group received an epidural pump. The patients from the robotic group received an intravenous patient-controlled analgesia device combined either with a per procedural muscular or intercostal block, with wound infiltration.

During the in-hospital stay, pain scores showed equivalence for the two groups, but for this group we have to consider the lighter perioperative analgesia protocol. Pain scores showed statistical difference at one month follow-up (p = 0.02) in favour for the robotic group. Concerning the pulmonary testing, no difference was pointed out during the in-hospital stay. At one month, we noted a significant difference for the vital capacity (p = 0.05), forced vital capacity (p = 0.04) and forced expiratory volume (p = 0.05) in favour for the robotic group (Figure 1). The maximal expiratory pressure was also significantly better for the robotic group (p = 0.02). There was no significant difference left at two-month and six-month follow-up.

It seems that the robotic technique for lobectomy improves pain relief and pulmonary recovery during the in-hospital stay. This technique clearly favours early-term lung function recovery and pain status when compared to the open, muscle-sparing technique. This functional recovery becomes equivalent at two months, and remains at six months for both techniques.

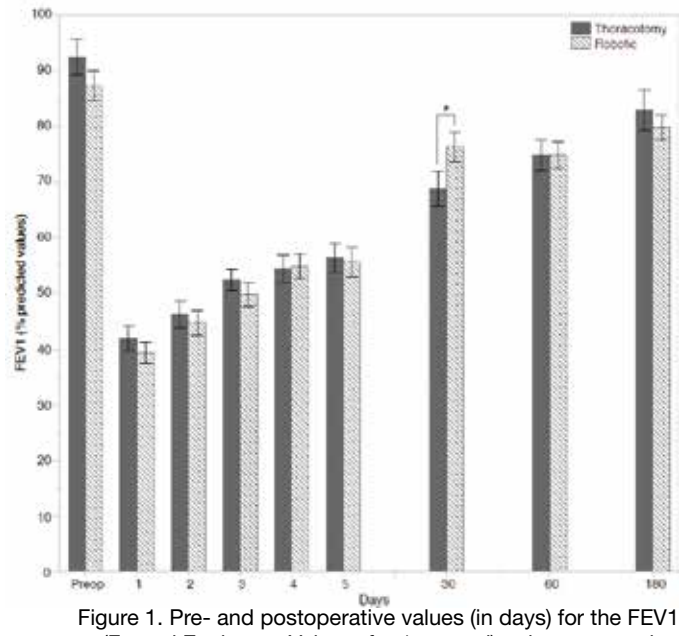

Figure 1. Pre- and postoperative values (in days) for the FEV1 (Forced Expiratory Volume for 1 second) pulmonary testing parameter after lobectomy, depending on the surgical technique (sparing thoracotomy or a robotic approach).

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Cardiac | Abstract | Regenerative medicine hypoxia preconditioning and inflammation translation from bench to clinical practice

Remote ischaemic preconditioning in isolated aortic valve and coronary artery bypass surgery: a randomised trial.

Marco Moscarelli[1,2], Francesca Fiorentino[3], M-Saadeh Suleiman[1], Costanza Emanueli[3], Barnaby C. Reeves[1], Prakash P. Punjabi[3] and Gianni D. Angelini[1] 1. Bristol Heart Institute, The Bristol Medical School, Faculty of Health Sciences, University of Bristol, Bristol, UK; 2. GVM Care and Research, Anthea Hospital, Bari, Italy; 3. Imperial College, National Heart and Lung Institute, London, UK


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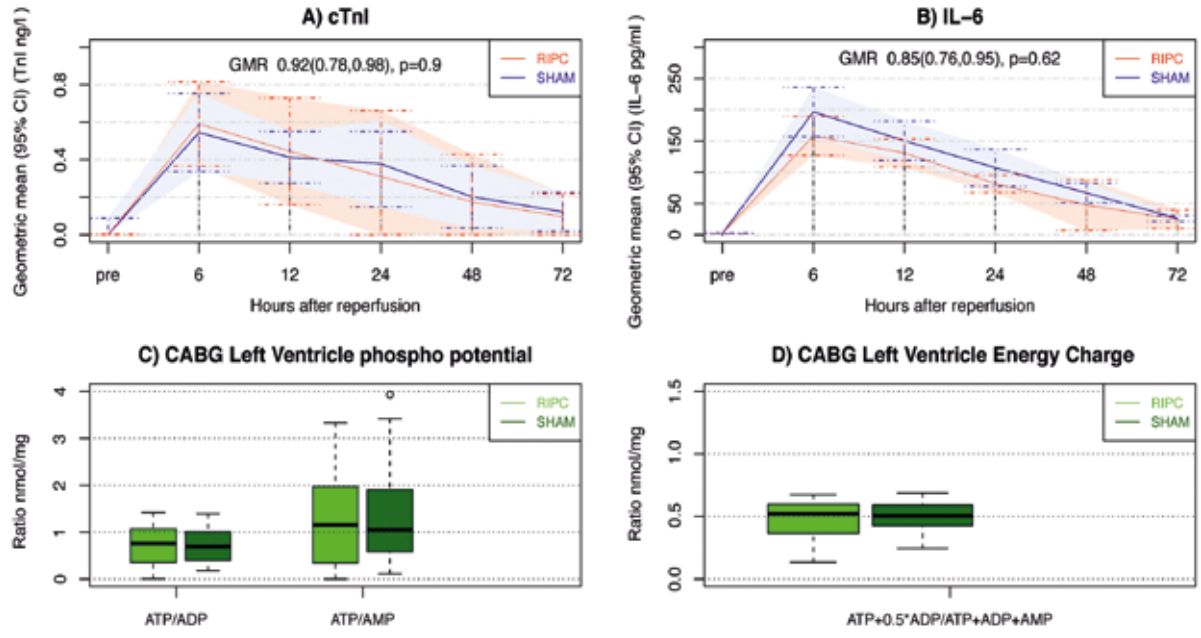
Prakash P. Punjabi


Gianni D. Angelini



Despite two recent randomised trials, ERICCA and RIPHeart, failing to show either troponin reduction or clinical benefit in patients undergoing cardiac surgery after upper limb remote ischaemic preconditioning (RIPC), the interest on the topic remains still high.

Several confounders, a heterogeneous population of patients with different pathologies and a variety of comorbidities may have significantly biased the efficacy of the intervention.

We conducted a prospective randomised controlled trial (ISRCTN33084113) between London (Hammersmith Hospital, Imperial College) and Bristol (University Hospitals of Bristol NHS Foundation Trust) focusing on a homogeneous patient population undergoing either isolated aortic valve replacement (AVR) or coronary artery bypass graft surgery (CABG). We investigated cardiac injury, metabolic stress and inflammatory response. Patients were randomised to either sham or preconditioning.

The primary outcome was troponin I, with secondary outcomes being: myocardial metabolites measured in snap-frozen biopsies obtained via tru-cut needle from the left and right ventricle 20 minutes after index ischaemia (aortic cross clamp); blood inflammatory markers interleukin (IL)-6, 8, 12 and tumour necrosis factor (TNF)-∝; blood pH; systemic metabolic stress assessed by lactate and serum creatinine level.

From February 2013 to April 2015, 124 patients agreed to participate to the study: 64 and 60 patients respectively formed the CABG and AVR population that was randomised to RIPC / SHAM.

There were no adverse events associated with RIPC intervention. Neither the primary outcome (cTnI) nor the secondary outcomes (inflammatory markers and cardiac energetics) were altered as a result of using RIPC. Clinical outcomes were also similar in between groups.

To the best of our knowledge this is the first in-human study investigating the effect of RIPC on troponin, inflammatory markers and myocyte metabolites of the left and right ventricles in two different cardiac pathologies. Coronary artery and aortic valve disease are associated with specific disease-induced cellular remodelling at the level of the left and right ventricles, may exhibit specific cellular proteomes, and may respond differently to ischaemic reperfusion injury.

In conclusion, this trial provides more evidence supporting the view that RIPC does not confer additional cardioprotection in patients undergoing isolated CABG or AVR.

Vascular | Focus Session | Endovascular fix of open failure

Optimal occlusion pattern for minimally invasive staged segmental artery coil embolisation in a chronic porcine model

Konstantin von Aspern[1,2], Josephina Haunschild[1,2], Urszula Simoniuk[2], Sven Kaiser[3], Martin Misfeld[1], Friedrich W. Mohr[1], Michael A. Borger[1] and Christian D. Etz[1,2] 1. University Department for Cardiac Surgery, Leipzig Heart Center, Leipzig, Germany; 2. University of Leipzig, Saxonian Incubator for Clinical Translation (SIKT), Leipzig, Germany; 3. University of Leipzig, Medical Faculty, Leipzig, Germany


Konstantin von Aspern

Despite various adjunctive neuroprotective strategies during and after open and endovascular thoracoabdominal aortic aneurysm (TAAA) repair, ischaemic spinal cord injury remains the most devastating complication[1,2], reported at up to 18% for Crawford type II aneurysms[2-5]. Therefore, minimally invasive staged segmental artery coil and plug embolisation (MIS2ACE) has been introduced for spinal cord injury prevention prior to open or endovascular TAAA repair[6]. During MIS2ACE, segmental arteries are occluded via multiple coils or plug insertion into the proximal portion of the artery (Figure 1).

To date no systematic evaluation of different embolisation patterns has been conducted. The aim of this study was to identify the optimal MIS2ACE occlusion pattern. For this purpose, 25 juvenile pigs were randomly assigned to three MIS2ACE occlusion patterns (two stages, five days in-between stages) and a control group (single stage, total segmental artery occlusion, n = 7). All patterns are illustrated in Figure 2.

The first pattern started with occlusion of all lumbar segmental arteries in the first stage and the remaining thoracic segmental arteries in a second stage (level pattern, n = 6). In the second intervention group an alternating approach with occlusion of every second segmental artery in a first and the remainder in a second stage was used (alternating pattern, n = 6). In the final pattern occlusion started at the watershed area between thoracic level 12 to lumbar level 2 in the first stage, and the remaining arteries in a second stage (watershed pattern, n = 6). Neurological assessment and regional spinal cord tissue perfusion measurements via microspheres as well as histopathological tissue examinations were performed.

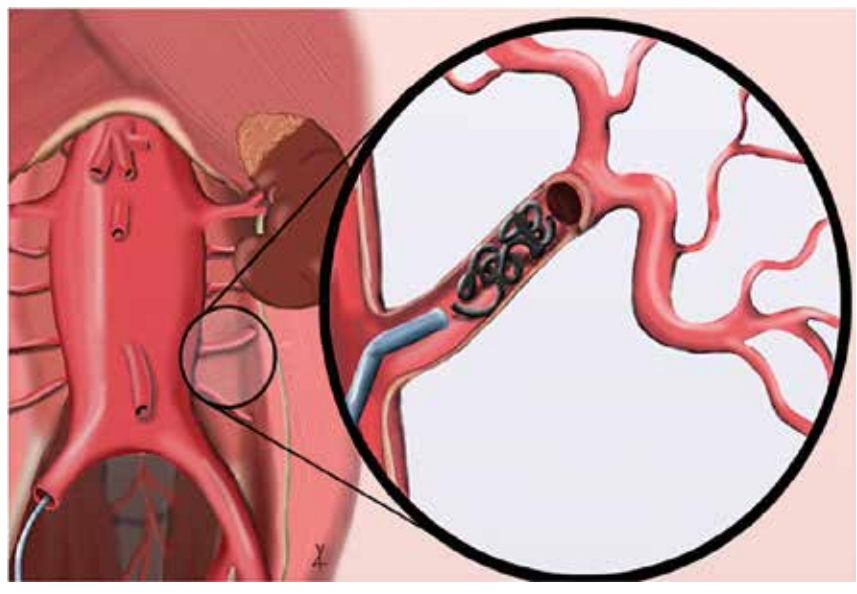


Figure 1. Schematic drawing of selective transfemoral minimally invasive Segmental artery coil embolisation (MIS2ACE). Magnification demonstrates the technically correct position of an occlusive coil in a lumbar segmental artery proximal to the first bifurcation.

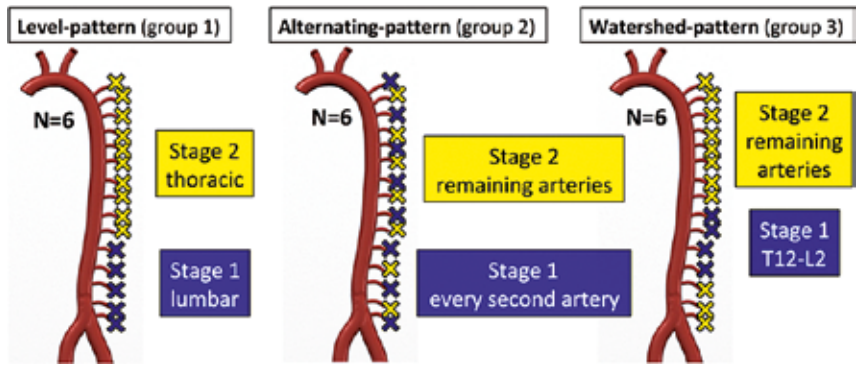


Figure 2. Illustration of the three MIS2ACE patterns; stage 1 (blue) and stage 2 (yellow).

An average of 6 ± 2 coils were used for each segmental artery. The incidence of permanent paraplegia in the control group was 57%. One animal of the alternating and watershed intervention group suffered from permanent paraplegia (16%), but no permanent paraplegia in the level pattern group occurred. Furthermore, no evidence of significant tissue damage was observed in this group ($p < 0.05$ vs control). Regional tissue perfusion of the lumbar spinal cord in the level pattern group recovered within three days after the second stage procedure, whereas mean perfusion of the other two intervention groups and the control remained significantly lower compared to baseline (all $p < 0.05$).

Our experiment provided evidence that minimally invasive staged repair via MIS2ACE can result in reduced ischaemic spinal cord injury and favourable neurological outcomes. A level-based occlusion pattern (starting with the lumbar segmental arteries in a first stage) seems to be the best two-stage approach.

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Cardiac | Rapid Response | Dusk or dawn for SAVR?

Minimally invasive aortic valve replacement with sutureless and rapid deployment valves: a report from an international registry (SURD-IR)

Marco Di Eusanio Cardiac Surgery Unit, Ospedali Riuniti, Polytechnic University of Marche, Ancona, Italy.

The impact of sutureless and rapid deployment valve prostheses on the clinical outcomes of patients undergoing minimally invasive aortic valve replacement (MI-AVR) is yet to be defined.

In this setting, the Sutureless and Rapid Deployment International Registry (SURD-IR) – the largest (n = 3,651) worldwide registry enrolling patients undergoing sutureless and rapid deployment AVR (SURD-AVR) – gave us the opportunity to perform large cohort analyses of patients treated with these new valve technologies. The aim of this study was to assess clinical characteristics and in-hospital results of patients who underwent isolated SURD-AVR through minimally invasive approaches in this large population.

Of the 1,935 patients who received primary isolated SURD-AVR between 2009 and 2018, a total of 1,418 (73.3%) underwent minimally invasive interventions and were included in this analysis. The mean age of the study population was 75.9 ± 7 years (range 41–92) with an average logistic EuroSCORE of 8.6 ± 6.2 (Table 1). SURD-AVR was performed using upper ministernotomy (MS) in 56.4% (n = 800) of cases and right anterior minithoracotomy (MT) in 43.6% (n = 618). Perceval S valves (LivaNova, UK) were implanted in 1,011 (71.3%) patients and an Edwards Lifesciences (USA) INTUITY or INTUITY Elite in 407 (28.7%). The INTUITY valve was more likely to be implanted in younger patients (73.8 vs 76.7 years, p < 0.001) while the Perceval valve in those undergoing MT incisions (53.4% vs. 19.2%, p < 0.001).

Despite the higher rate of MT, the Perceval valve was associated with a significant time benefit in terms of reduced cardiopulmonary bypass (CPB) time (81 vs 89 min) and cross-clamp (XC) times (51 vs 59 min) when compared with the INTUITY valve (p < 0.001). Conversely, the INTUITY prosthesis showed superior postoperative haemodynamic results; the mean and peak pressure gradients were 11.5 and 21.3 mmHg, respectively, in the INTUITY group and 14.3 and 24.7 mmHg in the Perceval group (p < 0.001). Post-operatively, Perceval and INTUITY were associated with similar early outcomes (Table 2). Overall in-hospital mortality and postoperative stroke rates were 1.7% and 2%, respectively. A definitive pacemaker implantation was reported in 9% of cases and significantly decreased over a short period of time, from 20.6% (2009–2010) to 5.6% (2017–2018) (p = 0.002).

Despite the minimally invasive incisions, the overall rate of successful device implantation was 98.1%, with no differences across surgical approaches or valve types. However, valve malpositioning emerged as a strong risk factor for operative mortality (OR 16.2).

In summary, our data showed that sutureless and rapid deployment valve technologies were largely embraced by SURD-IR surgeons to perform AVR through less-invasive approaches. Because of the simplified handling and faster deployment, both the Perceval and INTUITY valves make minimally invasive SURD-AVR a safe and very reproducible procedure associated with excellent early results. However, further clinical trials are needed to evaluate long-term outcomes in this setting.

Figure 1. Participating centres. 1A: Perceval™ sutureless aortic valve (LivaNova, Italy). 1B: EDWARDS INTUITY Elite™ rapid deployment valve (Edwards Lifesciences, USA).

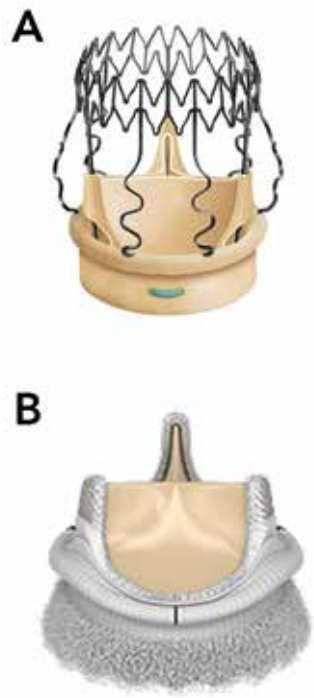


Table 1. Patients' demographics (n=1418)

	Total n	%	Perceval n	%	Intuity n	%	p-value
Male	521/1418	36.7	330/1011	32.6	191/407	46.9	<0.001
Age (n=1417), mean ± SD	75.9 ± 7		76.7 ± 6.5		73.8 ± 7.8		<0.001
NYHA class (n = 1284)							0.02
I	70	5.5	47	5.3	23	5.8	
II	619	48.2	450	50.7	169	42.6	
III	558	43.5	361	40.7	197	49.6	
IV	37	2.9	29	3.3	8	2	
Hypertension	1000/1260	79.4	697/866	80.5	303/394	76.9	0.2
Obesity	376/1393	27	267/994	26.9	109/399	27.3	0.9
BMI (n=1385), mean ± SD	27.4 ± 5		27.5 ± 5		27.4 ± 5.2		0.7
Diabetes	377/1337	28.2	270/946	28.5	107/391	27.4	0.7
Dyslipidemia	618/1151	53.7	430/784	54.8	188/367	51.2	0.3
AF	131/1202	10.9	98/912	10.7	33/290	11.4	0.7
PMK	34/1299	2.6	29/974	3	5/325	1.5	0.2
BAV	40/743	5.4	23/444	5.2	17/299	5.7	0.9
Aortic valve disease							<0.001
Aortic valve stenosis	826/1341	61.6	553/971	57	273/370	73.8	
Aortic valve regurgitation	19/1341	1.4	7/971	0.7	12/370	3.2	
Mixed aortic valve disease	495/1341	36.9	410/971	42.2	85/370	23	
Other	1/1341	0.1	1/971	0.1	-	-	
Peak AVG (n = 748) (mmHg) mean ± SD	82.1 ± 25.2		79.8 ± 25.3		84.8 ± 24.6		0.001
Mean AVG (n = 812) (mmHg) mean ± SD	51.3 ± 17.1		49 ± 17		54.6 ± 16.8		<0.001
LVEF%, mean ± SD	58.7 ± 9.5		58.6 ± 9.6		58.9 ± 8.8		0.5
LVEF > 50	1167/1385	84.3	832/994	83.7	335/391	85.7	0.4
LVEF 30-50	204/1385	14.7	150/994	15.1	54/391	13.8	0.4
LVEF < 30	14/1385	1	12/994	1.2	2/391	0.5	0.4
Dialysis	8/1219	0.7	7/911	0.8	1/308	0.3	0.7
Chronic lung disease	193/1220	15.8	146/888	16.4	47/332	14.2	0.4
Logistic Euroscore (%) (n = 1290)	8.6 ± 6.2		9.4 ± 6.5		6.8 ± 4.9		<0.001

AF: atrial fibrillation. AVG: aortic valve gradient. BAV: bicuspid aortic valve. BMI: body mass index. LVEF: left ventricle ejection fraction. NYHA: New York Heart Association. PMK: pacemaker. SD: standard deviation

Table 2. In-hospital outcomes

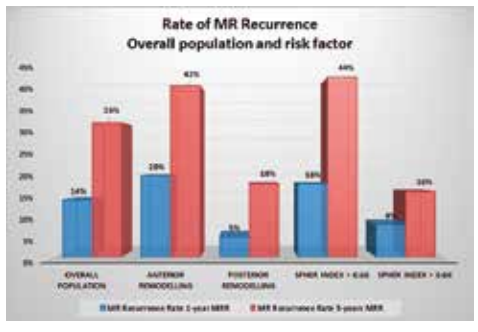
	Total n	%	Perceval n	%	Intuity n	%	p-value
Hospital mortality	23/1340	1.7	17/936	1.8	6/404	1.5	0.8
Stroke	23/1131	2	17/787	2.2	6/344	1.7	0.8
Low cardiac output	11/1059	1	10/772	1.3	1/287	0.3	0.3
Ventilatory support > 72 h	45/1418	3.2	36/1011	3.6	9/407	2.2	0.2
New onset atrial fibrillation	333/1141	29.2	254/802	31.7	79/339	23.3	0.004
New AV block requiring PMK	87/968	9	56/562	10	31/406	7.6	0.3
Aortic regurgitation (n = 1146)	52/703	7.4	38/450	8.4	14/253	5.5	0.2
Mild	43/703	6.1	31/450	6.9	12/253	4.7	0.5
Moderate	7/703	1	5/450	1.1	2/253	0.8	0.5
Severe	-	-	-	-	-	-	
Bleeding requiring revision	45/1084	4.2	29/685	4.2	16/399	4	0.9
AKI > stage 1	39/1108	3.5	28/701	4	11/407	2.7	0.3
Dialysis	11/811	1.4	8/406	2	3/405	0.7	0.2
Sepsis	24/918	2.6	23/686	3.4	1/232	0.4	0.02
Wound complications	36/842	4.3	26/660	3.9	10/182	5.5	0.4
ICU stay (n = 983) days) median (IQR)	1 (1-2)	1 (1-2)	2 (1-2.5)	<0.001			
Hospital stay (n = 1084) (days; mean ± SD)	10.8 ± 7.6	9.4 ± 6.5	6.8 ± 4.9	<0.001			

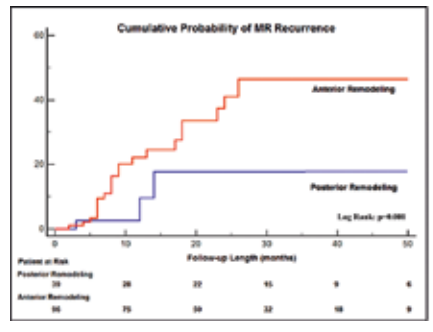
AKI: acute kidney injury. AV: atrio-ventricular. ICU: intensive care unit. PMK: pacemaker.

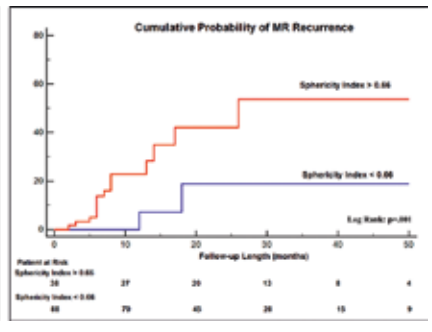
Cardiac | Abstract | Surgery for functional mitral regurgitation: potential for improvements!

Late predictors of mitral regurgitation recurrence after surgery for functional mitral regurgitation in ischaemic heart failure: Fix the left ventricle to improve mitral valve repair durability

Andrea Garatti Cardiac Surgery Unit, IRCCS Policlinico San Donato, Milan, Italy







The matter of secondary ischaemic mitral regurgitation (SMR) in terms of whether, when and how it should be corrected is one of the most controversial dilemmas faced by cardiac surgeons. Medical prognosis is very poor and surgical treatment is often risky. Furthermore, despite optimal surgical repair, a significant proportion of patients in early follow-up exhibit moderate or severe mitral regurgitation recurrence (MRR), ranging from 17% to 37% at one year, postoperatively. Among the several predictors of MRR, recently the Cardiothoracic Surgical Trials Network[1] suggested that posterior aneurysm/dyskinesis significantly affects the fate of the repaired SMR, and advised mitral valve replacement in this setting.

In the present study, we at the IRCCS Policlinico San Donato, Milan, analysed a consecutive series of 187 patients with ischaemic heart failure and SMR operated between January 2001 and March 2016 with mitral annuloplasty, myocardial revascularisation and surgical ventricular reconstruction (SVR). The aim of the study was: 1) to determine if SVR associated to MV annuloplasty could improve long-term repair durability and 2) to evaluate the impact of remodelling site on late MRR.

SVR and sequential CABG were performed in all patients according to our institutional protocol.[2] Mitral annuloplasty was performed by means of a posterior annuloplasty reinforced with Teflon strips through the ventriculotomy. Complete clinical and echocardiographic assessment at baseline, pre-discharge and at follow-up (mean: 51 ± 39 months) was available for 140 patients (75%). A MR grade > 2+ at follow-up echocardiography was considered as MRR.

Overall, MRR occurred in 27 patients (19%) and was correlated with higher mortality, rehospitalisation, functional NYHA class, and cardiac reintervention rate ($p < 0.001$). Interestingly, MR recurrence probability was affected by location of LV remodelling; MRR occurred in 23% and 9% of patients with anterior or posterior remodelling, respectively ($p = .001$; Figure 1).

Cox Regression Analysis identified anterior remodelling and postoperative sphericalisation as independent predictors of late MR recurrence (Figure 2). ROC curve analysis demonstrated a postoperative sphericity index (SI) cut-off value of 0.66 (area under curve = .75). Finally, postoperative SI was linearly associated with MV tenting area, and this relationship was stronger in patients experiencing MRR ($r2 = .36$; $p = .001$).

In conclusion, the optimal surgical treatment of secondary MR in the context of ischaemic heart failure is still matter of debate, and the issue of MV repair durability is still a major concern. In the present experience SVR seems effective in improving long-term durability of mitral annuloplasty, especially in posterior remodelling. In patients with anterior remodelling, postoperative LV sphericalisation can occur, negating the potential benefit of volume reduction achieved with SVR and translating into higher probability of late MR recurrence. In this setting, MV replacement at the time of SVR is likely advisable.

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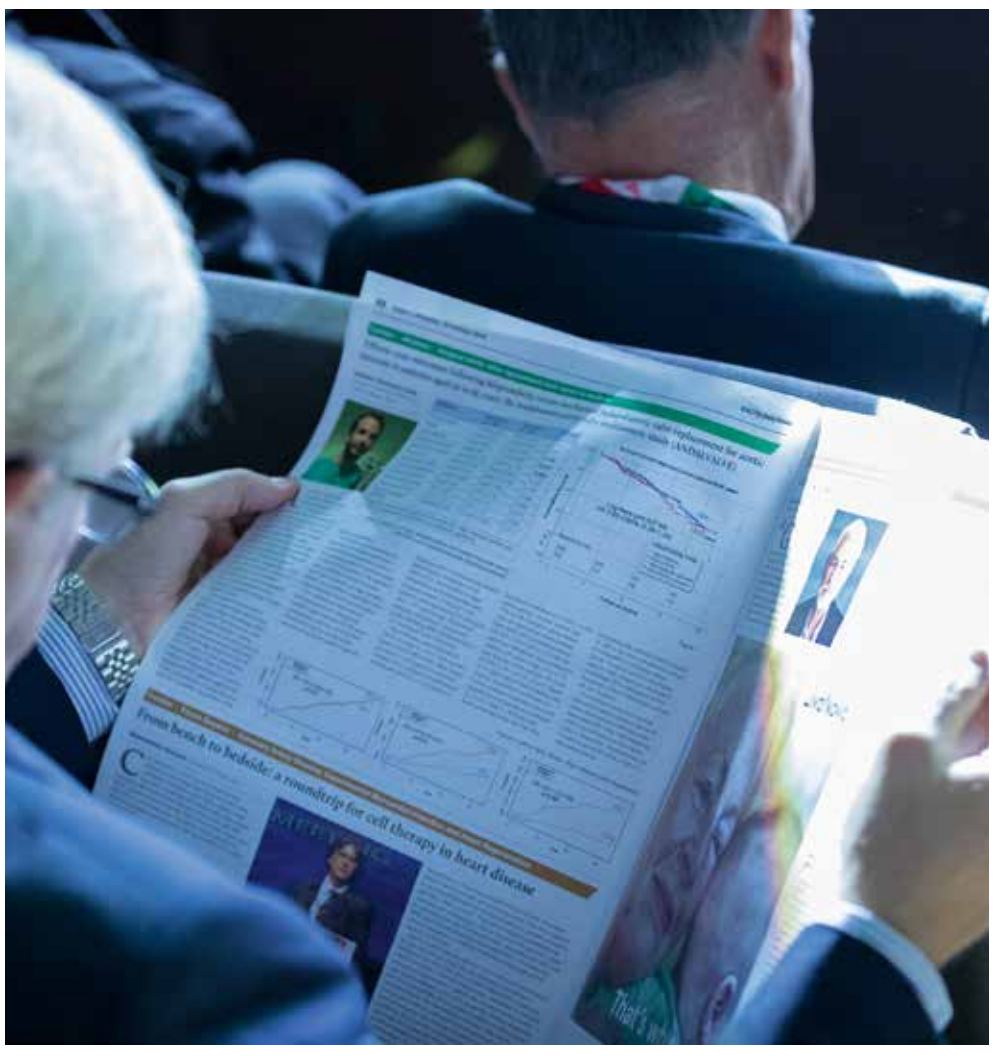

Cardiac | Focus Session | Work life balance/Diversity in cardio-thoracic surgery

Work-life balance in cardiothoracic surgery

Malakh Shrestha Hannover Medical School, Germany

It is a universally held view that cardiothoracic surgery, although fascinating, involves extreme working hours (and at odd times of the day) and is demanding on family life. The training can also last up to 10 years, with unpredictable hours and a huge workload that used to involve 80+ hours of work per week.

This has increasing put off young medical graduates, especially females, from joining this specialty. Until now, female cardiothoracic and vascular surgeons have only been "exceptions", and more male surgeons have family and children compared to women.

Nowadays, the medical school is more heavily dominated by female students, but still only a smaller group chooses to go on into a surgical career, let alone a cardiothoracic surgical one. Moreover, the younger generation of male doctors are also looking for work-life balance and therefore choosing not to join our field.

The objective of this session is to discuss this problem and try to find objective solutions. These solutions could include not only a more flexible working environment but also more personalised training. We also want to change the present image of being a "family unfriendly" profession, and strive to attract younger doctors to our field.

EACTS has taken this very seriously and has been organising this session for the past several years. What's

more, the European guideline on working hours has tried to address this problem by reducing the maximum hours one is allowed to work.

We look forward to discussing it with you later today…

The session 'Work life balance/ Diversity in cardio-thoracic surgery' takes place 11:45–12:45 today in Amber 3.

LivaNova expands Advanced Circulatory Support portfolio with TandemLife acquisition

Pittsburgh, PA-based TandemLife, a manufacturer of Advanced Circulatory Support (ACS) devices; including percutaneous Mechanical Circulatory Support (MCS) and Extracorporeal Life Support (ECLS) products, is now part of LivaNova PLC. The acquisition effectively extends LivaNova's reach into ACS with temporary cardiopulmonary support capabilities.

The demand for ECLS and MCS systems continues to grow, in order to meet the demand, technological advancements designed to increase ease of use are essential to support the growth in the hospitals that wish to access ACS procedures. TandemLife products are built around a single pump and controller, with a variety of cannulae capable of temporary left atrial-femoral artery bypass, right atrial-pulmonary artery bypass, veno-arterial ECLS, and veno-venous ECLS. The TandemLife platform enables hospitals to streamline their ACS programs with a single, simple and cost-effective solution.

The TandemLife Platform includes both the ProtekDuo dual lumen and ProtekSolo Transseptal cannulae. ProtekDuo is the only percutaneous dual lumen cannula that can be inserted at the Right Internal Jugular vein to source venous blood from the right atrium and return it to the pulmonary artery. ProtekDuo delivers flexibility to do what's right for each unique patient. The ProtekSolo Transseptal cannula provides unique cannula positioning, sourcing oxygenated blood from the left atrium, bypassing the left ventricle. Sourcing blood from the left atrium enables LV decompression and consistent unloading throughout the cardiac cycle. TandemLife products also include pumps, oxygenators and cannulae for comprehensive, acute cardiac, pulmonary or cardiopulmonary care to provide cardiopulmonary support through veno-arterial extracorporeal life support.*

The overall versatility of the TandemLife platform effectively enrich LivaNova's cardiopulmonary-focused product mix and will help to further the advancement of ACS, reaching more patients in more places.

Full product portfolio is available in the U.S. Product availability outside the U.S. may vary.

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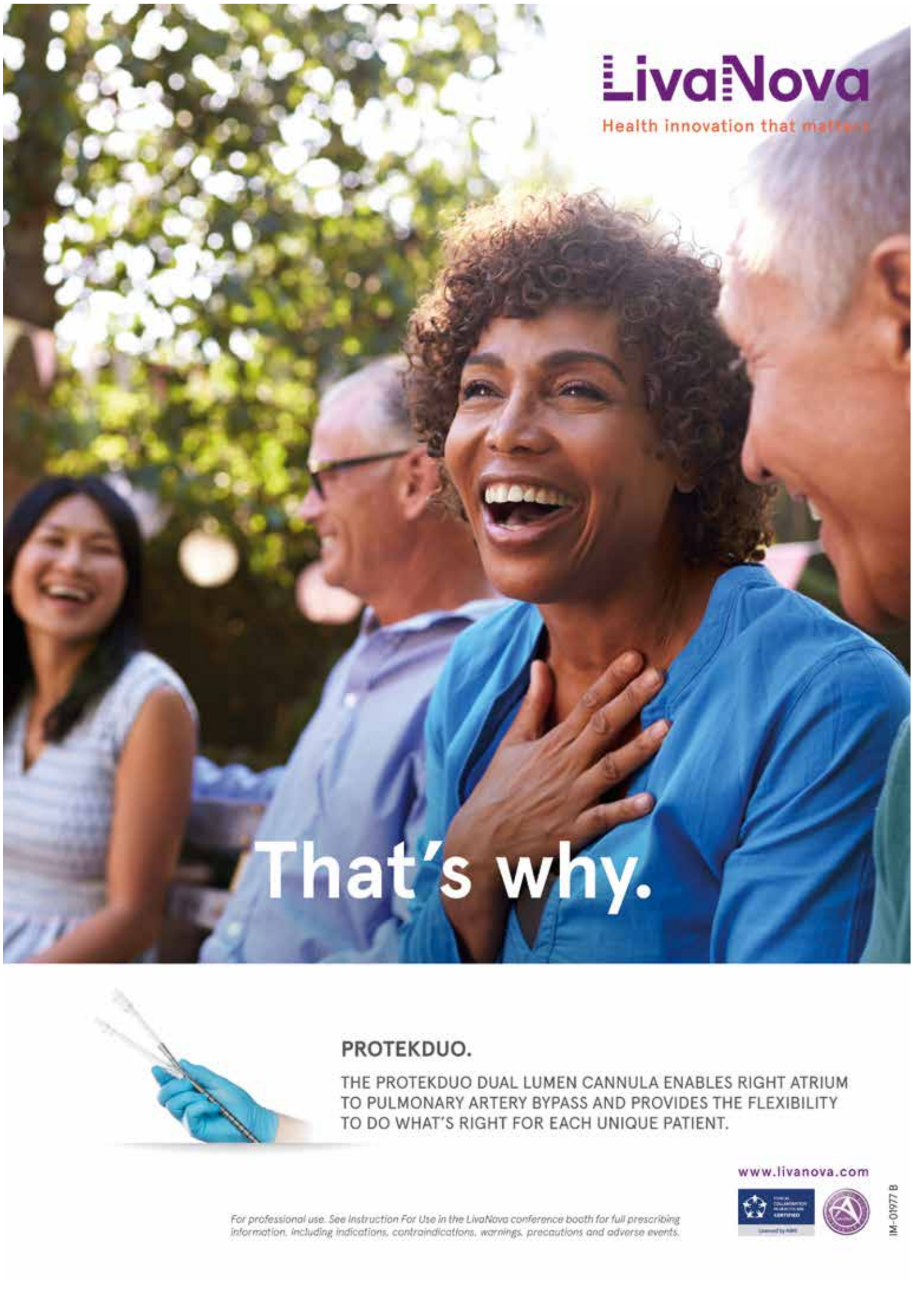

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Don't miss ISSUE 3!

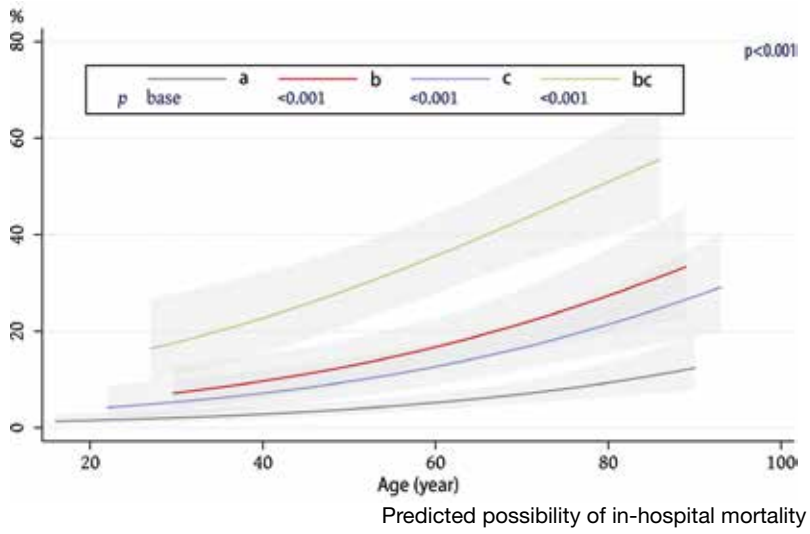
EACTS Daily News

AVAILABLE TOMORROW

Vascular | Abstract | Breaking old concepts on acute aortic dissections

Outcomes after surgery for acute Type A aortic dissection in the elderly: Age by itself is not a rational criterion to select patients

Maximilian Kreibich MD[1,2,3], Bartosz Rylski MD[1,2], Martin Czerny MD, MBA[1,2], Friedhelm Beyersdorf MD[1,2], Prashanth Vallabhajosyula, MD, MSc[3]; Wilson Y Szeto, MD[3], Joseph E Bavaria, MD[3], Nimesh D Desai, MD, PhD[3] 1. Department of Cardiovascular Surgery, University Heart Center Freiburg, Freiburg, Germany; 2. Faculty of Medicine, University of Freiburg, Freiburg, Germany; 3. Division of Cardiovascular Surgery, Hospital of the University of Pennsylvania, Philadelphia, Pennsylvania, USA



Predicted possibility of in-hospital mortality

Maximilian Kreibich

Patients with Type A aortic dissections require immediate surgical intervention to survive, independent of age, because medical treatment is highly ineffective. Nevertheless, there is still ongoing concern whether surgical treatment is justified and reasonable for elderly patients with acute Type A aortic dissections or whether these patients might be candidates for new therapeutic strategies (potentially endovascular), because of dismal conventional operative outcome.

In this study, we investigated the postoperative outcome in elderly patients with Type A aortic dissections depending on their preoperative clinical presentation, rather than by simply comparing the outcome of specific age groups. We used data from two large aortic centres (the Hospital of the University of Pennsylvania in the United States and the University Heart Centre Freiburg in Germany) and quantified the preoperative presentation and the burden of ischaemic injury by using the Penn Classification. Penn Class A is characterised by the absence of localised (branch vessel malperfusion) or systemic ischaemia (shock). Patients in Penn Class B are haemodynamically stable but with branch vessel malperfusion causing localised mesenteric, visceral, renal, cerebral, or extremity ischaemia with impaired system function. Penn Class C is characterised by shock with persistent hypotension (systolic blood pressure <80 mmHg) and severe reduction in cardiac index including coronary artery malperfusion, but no other system malperfusion. Lastly, Penn Class BC is defined as a combination of localised organ ischaemia (i.e. malperfusion) and generalised ischaemia (i.e. shock)

With this large data set including data of more than 1,100 patients, we were able to show that the clinical presentation and the distal extent of aortic dissections changed significantly with age, and that the predicted mortality increased with advancing age in all patients and in all Penn Classes. In fact, younger patients had a significantly higher likelihood to present with more extensive aortic dissections, and there was a significant difference in the localisation of branch vessel malperfusion in older patients.

In addition, we are able to conclude that age by itself is not a rational criterion to select patients for surgery. While the probability of in-hospital mortality increased with age in all Penn Classes, the probability remained below 15% across all ages in Penn Class A. Moreover, Penn Class A was not predictive of in-hospital mortality in septuagenarians or octogenarians. Thus, a surgical approach is very reasonable in all Penn Class A patients independent of age.

Patients in Penn Class B and C had a similar risk of mortality and one quarter of all patients aged 80 years and older did not survive surgery. Overall survival in Penn Class BC was very poor, with predicted mortality that increased to more than 50% in older Penn Class BC patients, while Penn Class BC patients aged 80 years and older have a 17.6-times higher likelihood of in-hospital mortality. Those patients may possibly benefit from alternative, evolving therapeutic options such as ascending endovascular treatments with an endovascular valve-carrying conduits or a TEVAR-first strategy.

Cardiac | Rapid Response | Dusk or dawn for SAVR?

New surgical implication of contemporary aspects of aortic stenosis: an analysis based on the IMPULSE registry

Alberto Clerici A.O.U. Citta della Salute e della Scienza di Torino, Turin, Italy

Treatment decisions	Total (n = 2,000) n / N (%)	Symptomatic (n = 1,608) n / N (%)	Asymptomatic (n = 392) n / N (%)
TAVR (%)	899 / 2,000 (44.9)	810 / 1,608 (50.4)	89 / 392 (22.7)
SAVR (%)	480 / 2,000 (24.0)	415 / 1,608 (25.8)	65 / 392 (16.6)
Others (%)	621 / 2,000 (31.1)	383 / 1,608 (23.8)	238 / 392 (60.7)

Aortic stenosis (AS) remains the most frequent valvular disease, and is ever increasing – especially nowadays – due to the constant aging of the population. Despite these aspects, there is a paucity of European data regarding the characteristics of patients presenting with severe AS. The rate at which condition progresses varies widely between patients, with many remaining asymptomatic for several years and, in absence of symptoms, surgical intervention is only recommended in combination with left ventricular dysfunction. Hence, once symptoms develop, the prognosis is poor, and timely treatment is essential for prolonging survival. There are now several options for treating patients with severe AS, be they surgical (including new sutureless and self-expandable devices) or via transcatheter aortic valve replacement (TAVR).

The present analysis explores and gives a contemporary overview of this kind patient and their respective treatment. The aim of the IMPULSE analysis was to evaluate the prevalence of comorbidities and ascertain how they lead the decision-making process for the heart team. Another important part of the analysis focuses on the differences in presentation, and in particular the management of, severe AS across Europe.

A prospective, multicentre registry was performed in 23 centres across nine European countries. All of the centres that were included were capable of delivering the full range of treatment options (SAVR, TAVI) on site, and were asked to record the presentation and management of patients with severe AS diagnosed on echocardiography.

A total of 2,171 patients with AS were enrolled between March 2015 and April 2017. Of these, 1,743 (80.3%) displayed symptoms attributable to AS, with 38.3% being NYHA III–IV. The mean age of the population was 77.9 ± 10.0 years, and 48% were female. Overall, patients had a high comorbidity burden with a mean logistic euroScore I of 15.6 ± 13.9%; 27.3% had a creatinine clearance of < 50 ml/min, 15.9% had atrial fibrillation (AF), 11.4% presented with chronic lung disease and 3.2% had an LVEF < 30%. While 52.9% of the patients were scheduled for TAVR, and 24.0% to undergo SAVR, there were 31.1% of patients where no intervention was chosen, and medical management / watchful waiting pursued.

Another important note of concern was the observation of significant differences in treatment across Europe, including the role of the heart team. Specifically, the heart team made a decision on the treatment of 80.6% of patients in Germany, but only 34.5% of patients seen in other countries (UK 40.2%, France 36.0%, Italy 46.5%). In addition, the strategy of choice varied between countries. Germany favoured TAVI the most (75.0%), and SAVR the least (15.8%), while TAVI rates were as low as 14.7% in other countries, and SAVR rates highest for France (34.0%).

European treatment of AS has been constantly changing and evolving over the last decades. The heart team is becoming more and more central in the decision-making process for these kinds of patients. Despite that, contemporary data from major treatment centres across Europe showed differences in the characteristics of patients with severe AS. Furthermore, treatment pathways and resulting treatment choice appear significantly different by region suggestion a strong impact of the healthcare environment. Finally, this multicentre registry demonstrated a contemporary group of patients that changed over the time. The majority of patients diagnosed with severe AS presented at an advanced stage of the disease. Patients with comorbidities were assigned more frequently to TAVI than surgery, and the intervention was performed with a shorter delay. A third of patients declined any intervention.

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Ten-year experience of extracorporeal cardiopulmonary resuscitation for out-of-hospital cardiac arrest: A comparison with in-hospital cardiac arrest

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Background

A previous publication of ours served as a preliminary report (2007-2012) of extracorporeal cardiopulmonary resuscitation (ECPR) as an acceptable therapy for out-of-hospital cardiac arrest (OHCA) patients, suggesting results might be comparable to in-hospital cardiac arrest (IHCA).[1]

Five years after that initial report, today we demonstrate the 10-year results (2007-2017) of 399 runs of ECPR for OHCA, again comparing the results with those of IHCA in a single institution.

Patients

The 399 runs of ECPR consisted of 82 OHCA and 317 IHCA patients. The basic demographic data showed similar patterns in age, gender, body size and comorbidities. Low-flow (collapse-to-ECMO) duration was shorter in the IHCA group (median 36 min vs 56 min, $p < 0.05$). The initial documented rhythm was shockable (VT/VF) in 68% of OHCA and 39% of IHCA patients. ECMO was maintained for a median of 63 hours for the OHCA patients and 48 hours for IHCA.

Important Findings

Favourable survival outcome rate (CPC 1 or 2) was 23.2% for OHCA vs 31.9% for IHCA. However, if we investigated the patients with low-flow duration > 40 minutes, the favourable survival outcomes were similar (Figure 1) in both groups (24.7% for OHCA vs 26.8% for IHCA). This implied that collapse-to-ECMO duration was the key factor affecting the outcome of OHCA.

The other important finding was that elderly patients (> 65 years) were not associated with poor outcomes. Whether they were OHCA- or IHCA patients, the favourable outcome rate remained the same with increasing age (Figure 2), which implied that elders could also benefit from ECPR.

Conclusions

Our 10-year, single-centre results demonstrate that ECPR can rescue OHCA patients refractory to conventional resuscitation and provide as comparable a neurological outcome as IHCA. Furthermore, the neurological outcomes after ECPR in those over 65 years old are as good as those under 65. Our results suggest that the use of ECPR should be considered as a standard therapy for refractory cardiac arrest in adult patients of any age.

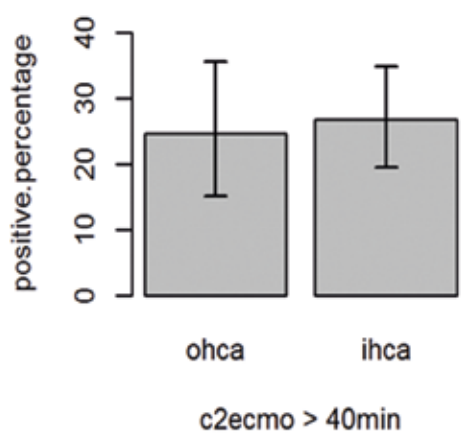


Figure 1: Favourable neurological outcome rates (% of CPC 1 or 2) in low-flow duration (collapse-to-ECMO) > 40 min in OHCA and IHCA patients

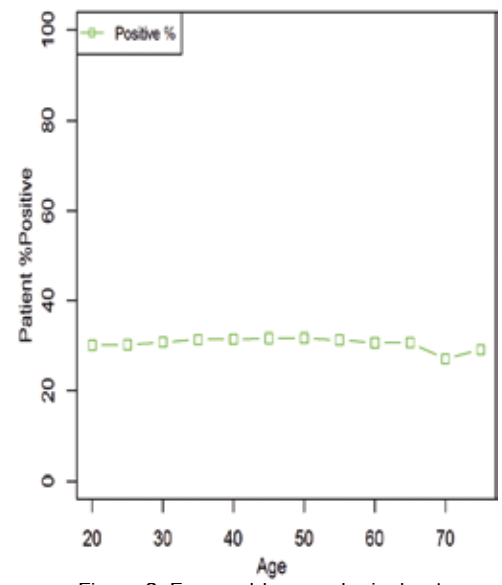


Figure 2: Favourable neurological outcome rates in ECPR patients (% of CPC 1 or 2 plotted against age)

References

1. Wang CH and Chen YS. Resuscitation. 2014 Sep;85(9):1219-24

Cardiac | Abstract | Repeat before you treat

Assessment of a newly designed low-cost simulation tool for training of aortic valve implantation

Silke Asch, Marcus Leistner, Ali Waghefi, Shekhar Saha, Heidi Niehaus, Hassina Baraki and Ingo Kutschka University Clinic Goettingen, Germany

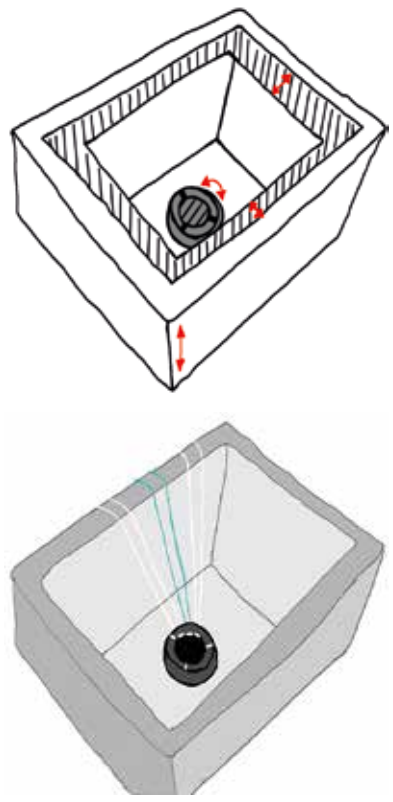
Many aspects of modern cardiac surgery, such as the increasing pressure for efficiency and decreasing numbers of routine procedures have made adequate surgical training more and more difficult. Ex vivo simulation is increasingly acknowledged as a means of surgical training. However, simulation tools are often expensive and, therefore, lack widespread accessibility. Our intention was to develop an easily accessible simulator for the individual training of cardiac surgery trainees in aortic valve replacement.

Common materials available in any hardware store were used for construction. Exposure of the simulated aortic root could be modified by angle, depth and size of the access path. For preliminary investigation of training effects, we compared two similar groups of cardiac surgery interns for a period of two weeks: Group 1 practiced five times a week, and Group 2 once a week. The results were evaluated by an independent observer according to eight pre-defined parameters. Two senior surgeons assessed individual technical accuracy as well as the risk of paravalvular leaks. Additionally, a risk score for the development of paravalvular leakage was derived from a multivariate logistic regression analysis of selected parameters, for independent evaluation and quantification of personal progress.

Silke Asch

Within two weeks, significant improvements were achieved regarding implantation time ($p = 0.05$) and overall technical accuracy ($p = 0.03$) The risk of paravalvular leaks, defined by an experienced surgeon and verified by our score, was reduced in both groups ($p = 0.09$) at the end of the training period. The simulator has shown to be quite versatile. It allowed junior trainees to learn how to deal with surgical instruments, middle trainees to be introduced to the surgical procedure and train their tasks as surgical assistants. For senior trainees, the simulator primarily served to refine their surgical technique and to increase their intervention speed. At the end of the study, all trainees stated that they would like to continue the training, three to four times a week (66%) or once to twice a week (34%).

We have demonstrated that simulator training provides an effective and time-efficient way to practice technical skills. It preserves the time in the operating room for optimisation and consolidation of acquired skills, and allows trainees to focus on other important skills that can only be trained in the operating room. Our ultimate goal is to enable better and faster surgical training and to ensure the best quality of care and patient safety.



Cardiac | Abstract | Tips and tricks to optimise your endocarditis practice

Juxta-annular prosthetic mitral valve implantation with right atrial anchoring in infective endocarditis with extensive anterior annular destruction

Hazem El Beyrouti Department of Cardio-Thoracic and Vascular Surgery, University Medical Center of the Johannes Gutenberg University, Mainz, Germany

In mitral valve endocarditis, annular extension of infection, removal of an infected prosthesis and debridement may leave the annulus disrupted and friable to the extent that it is no longer capable of providing secure anchoring of a new prosthesis. As this problem has vexed cardiac surgeons for decades, it does not come as a surprise that a variety of methods including patch reconstruction, extra-annular prosthetic valve fixation or specially designed collared prosthetic valves have been proposed.

In our first patient, we found that neither of these methods were feasible. She had undergone CABG and mitral valve replacement at the age of 50 and re-fixation of the prosthesis five years later when the prosthetic valve had torn loose from the posterior half of the annulus. Fourteen months later, she presented with prosthetic valve endocarditis. After removal of the valve and debridement, we found the anterior aspect of the annulus severely disrupted and frayed. Patch reconstruction turned out to be unfeasible, and an extremely small and thin-walled left atrium prevented extra-annular implantation. We placed six sutures from the right atrium through the septum to achieve stable fixation of the prosthesis along the anterior part of the annulus. The remaining steps of the implantation procedure were implemented in standard fashion. The patient, whose comorbidities included Child B liver cirrhosis and whose preoperative condition had been critical (EuroScore II 88%), did surprisingly well. Follow-up showed neither recurrence of endocarditis nor paravalvular leakage.

With this favourable outcome in mind, we applied the same technique in four subsequent patients in whom similar situations were encountered. Follow-up at 10 ± 4 months showed favourable outcomes with zero mortality at six months for all patients. Unfortunately, the first one died from non-cardiac causes after seven months.

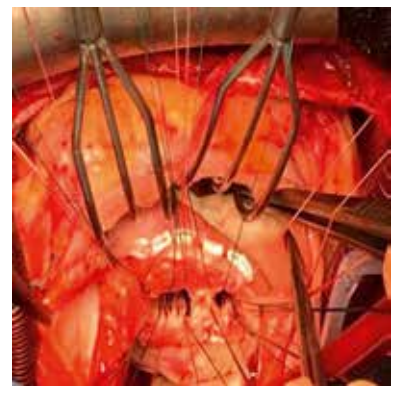


Figure 1. Exposure of the mitral valve through a transseptal incision. All sutures placed. Six transseptal sutures passed from the right atrium (pledgets visible) into the anterior ring. Upper forceps in tricuspid valve, lower forceps in coronary sinus.

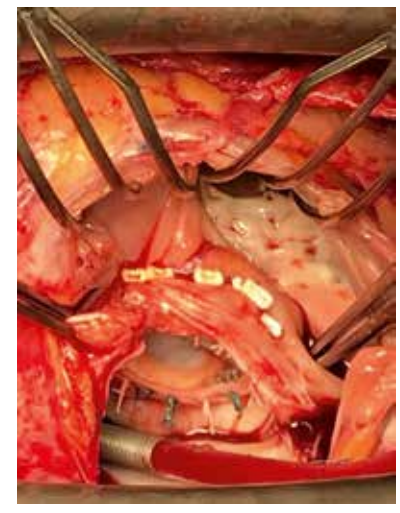


Figure 2. New prosthesis completely implanted. Again, transseptal sutures in anterior aspect clearly shown with pledgets on right atrial septal surface. Right upper forceps in coronary sinus.

We find the simplicity of our technique attractive: passing stitches from the right atrium into the mitral annulus is no more time-consuming than placing stitches into the annulus itself, and it does not reduce the diameter of the left ventricular outflow tract or change the geometry of the left atrium. Furthermore, it imposes no restrictions in terms of prosthesis size as no patches are placed along the circumference of the annulus, and some of the pledgets are placed in the right atrium rather than inside the annulus. Aggressive debridement of infected tissue can be performed along the anterior circumference of the mitral annulus without compromise, and tilting of the prosthesis into the atrium, as may occur in partially intra-atrial implantation, is avoided. If the stitches are placed with appropriate care, injury of the His bundle, coronary sinus and tricuspid valve will be avoided.

Evidently, the applicability of the technique is limited to the anterior aspect of the mitral annulus. In patients with destruction of the entire circumference, however, it may supplement patch reconstruction or other techniques. It may therefore prove a valuable addition to the surgical repertoire available to treat a very distinct cohort of patients in whom outcomes are often unsatisfactory.

Cardiac | Focus session | Progress in TEVAR/EVAR

Long-term outcomes of open surgery and stent graft treatment in patients undergoing redo thoracic aortic aneurysm repair

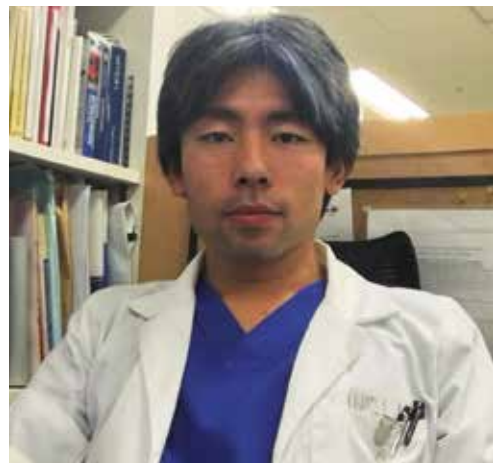
Daijiro Hori, Yohei Nomura, Sho Kusadokoro, Hiroshi Furuhata, Naoyuki Kimura, Koichi Yuri, Harunobu Matsumoto and Atsushi Yamaguchi Department of Cardiovascular Surgery, Saitama Medical Center, Jichi Medical University, Saitama, Japan

Formation of a pseudo-aneurysm or enlargement of the aorta from the previous anastomosis site is often observed after repair of thoracic aortic aneurysms. In a retrospective chart review of 11 European aortic centres, 12.6% patients undergoing elective total aortic arch replacement experienced aortic events after surgery. Among these patients, the intraoperative and in-hospital mortality of patients who needed redo surgery were 7.5% and 17.3%, respectively. On the other hand, for patients undergoing elective thoracic endovascular repair, five-year freedom from aneurysm-related death is reported to be 82.4% to 92.7%. Endovascular re-intervention was needed in 0–32.3% of the patients and secondary open surgery in 0–4.7%.

Due to the introduction of stent-graft technology, the treatment strategy for aortic aneurysms has gained many options. The purpose of this study was to compare the long-term outcomes of redo open surgical repair and thoracic endovascular aortic repair (TEVAR) in patients who previously underwent open surgical repair of a thoracic aortic aneurysm.

From January 2009 to December 2017 there were 72 patients who needed redo treatment of the aortic arch to the descending thoracic aorta from the previous anastomosis site. Thirty-eight patients were treated by TEVAR and 34 patients underwent open surgical repair. Patients were divided into two groups depending on whether the patient was treated by TEVAR – the primary goal of the treatment would have been entry closure (entry closure group) – or not (aneurysm exclusion group). Early- and long-term outcomes were compared.

For the entry closure group, there was no significant differences in patient background, including age, medication and past medical history. Procedure time was significantly longer for patients undergoing open surgical repair ($p < 0.001$). Open surgical repair was associated with longer ICU stay ($p = 0.003$) and hospital stay ($p = 0.038$), but there was no in-hospital mortality in both treatments. Although there was no significant difference in long-term mortality ($p = 0.83$), TEVAR was associated with a higher risk for re-intervention ($p = 0.017$).



For the aneurysm exclusion group, again there were no significant differences in age, medication or past medical history, and procedural time was significantly longer for open surgical repair ($p < 0.001$). The incidence of acute kidney injury (AKI; $p = 0.003$) and prolonged ventilation ($p = 0.040$) was more frequently observed in open surgical repair. Open surgical repair was also associated with longer ICU stay ($p < 0.001$) and hospital stay ($p < 0.001$), but there was no significant difference in in-hospital mortality ($p = 1$). Furthermore, there were no significant differences in long-term mortality ($p = 0.62$). Although there was no statistical significance, freedom from reintervention ($p = 0.08$) tended to be lower in the TEVAR group.

In summary, patients who underwent open surgical repair were more likely to develop postoperative AKI and experience prolonged ventilation. ICU stay and hospital stay were significantly shorter in patients who underwent TEVAR. Although there were no significant differences in long-term survival, TEVAR – with an intention to seal the entry tear – was associated with a higher incidence of re-intervention.

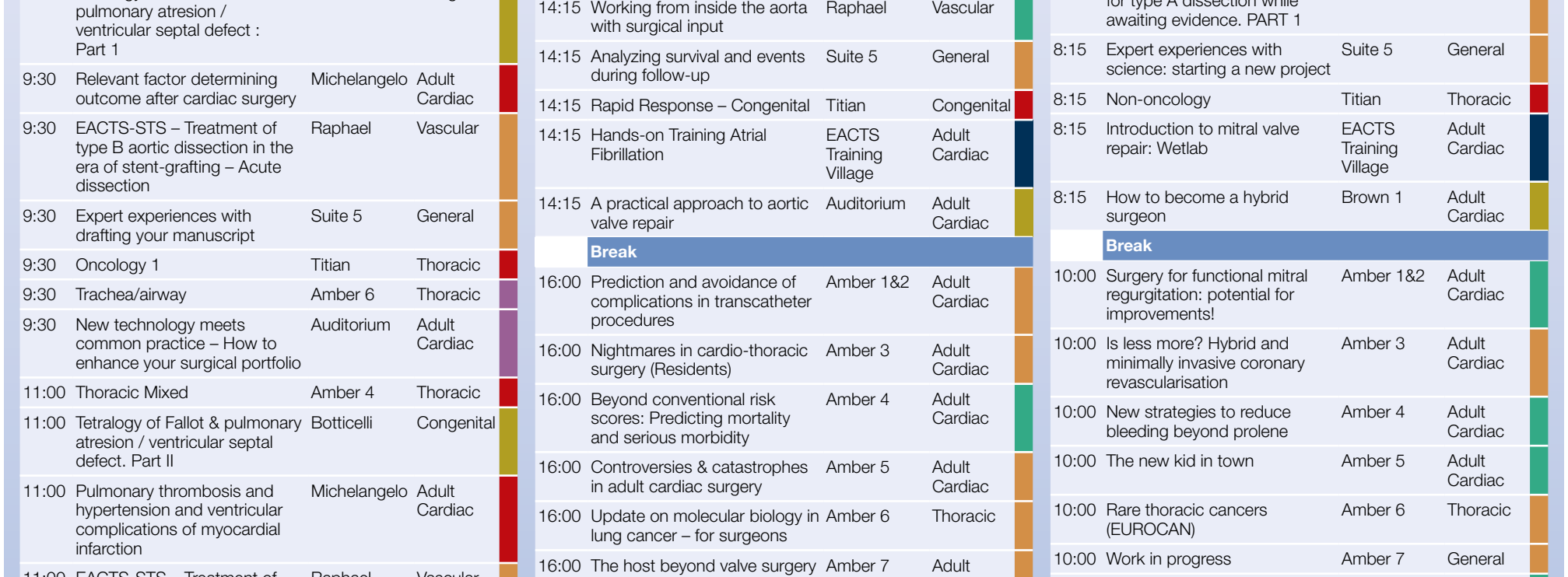
EACTS 2018 **Agenda**

Thursday 18 October

8:15	Degenerative mitral regurgitation: Bespoke management	Amber 1&2	Adult Cardiac
8:15	Conflicting evidence on patient-prosthesis-mismatch	Amber 3	Adult Cardiac
8:15	Modern antithrombotic therapy after cardiac surgery	Amber 5	Adult Cardiac
8:15	Innovations in thoracic surgery	Amber 6	Thoracic
8:15	Flow analysis and annulus modification after valve sparing surgery	Amber 7	Vascular
8:15	Heart failure and mechanical circulation	Botticelli	Congenital
8:15	The Ross procedure solves all problems!	Brown 2	Adult Cardiac
8:15	Minimising neurological risk in coronary surgery	Brown 3	Adult Cardiac
8:15	Circuit of life	Michelangelo	Adult Cardiac
8:15	MMCTS Video cases – Vascular bailouts	Raphael	Vascular
8:15	Rapid Response 1 – Thoracic	Titian	Thoracic
	Break		
9:30	Tetralogy of Fallot and pulmonary atresion / ventricular septal defect : Part 1	Botticelli	Congenital
9:30	Relevant factor determining outcome after cardiac surgery	Michelangelo	Adult Cardiac
9:30	EACTS-STS – Treatment of type B aortic dissection in the era of stent-grafting – Acute dissection	Raphael	Vascular
9:30	Expert experiences with drafting your manuscript	Suite 5	General
9:30	Oncology 1	Titian	Thoracic
9:30	Trachea/airway	Amber 6	Thoracic
9:30	New technology meets common practice – How to enhance your surgical portfolio	Auditorium	Adult Cardiac
11:00	Thoracic Mixed	Amber 4	Thoracic
11:00	Tetralogy of Fallot & pulmonary atresion / ventricular septal defect. Part II	Botticelli	Congenital
11:00	Pulmonary thrombosis and hypertension and ventricular complications of myocardial infarction	Michelangelo	Adult Cardiac
11:00	EACTS-STS – Treatment of type B aortic dissection in the era of stent-grafting – Chronic dissection	Raphael	Vascular
11:00	Insights into clinical trials	Suite 5	General
11:00	Time-pressured reactions to avoid casualties in type A dissections	Titian	Vascular
	Lunch		
12:45	Transcatheter aortic valve implantation training	Amber 7	Adult Cardiac
14:15	Transcatheter valve-in-valve implantation 2018	Amber 1&2	Adult Cardiac
14:15	Think Tank on European Cardio-Thoracic Surgery Training: Next Steps?	Amber 3	General
14:15	Oncology 2	Amber 4	Thoracic
14:15	Coronary Artery Disease, Experimental Myocardial infarction and Heart Regeneration	Amber 5	Adult Cardiac
14:15	HOCM	Amber 6	Adult Cardiac
14:15	The tricuspid valve dilemma: between confirmations and denials	Botticelli	Adult Cardiac
14:15	Nightmares in end stage heart failure	Brown 1	Adult Cardiac
14:15	Classics and novelties in the technical aspects of coronary artery bypass grafting	Brown 2	Adult Cardiac
14:15	Functional mitral valve disease	Brown 3	Adult Cardiac
14:15	Atrial fibrillation surgery: room for improvement	Michelangelo	Adult Cardiac
14:15	Working from inside the aorta with surgical input	Raphael	Vascular
14:15	Analyzing survival and events during follow-up	Suite 5	General
14:15	Rapid Response – Congenital	Titian	Congenital
14:15	Hands-on Training Atrial Fibrillation	EACTS Training Village	Adult Cardiac
14:15	A practical approach to aortic valve repair	Auditorium	Adult Cardiac
	Break		
16:00	Prediction and avoidance of complications in transcatheter procedures	Amber 1&2	Adult Cardiac
16:00	Nightmares in cardio-thoracic surgery (Residents)	Amber 3	Adult Cardiac
16:00	Beyond conventional risk scores: Predicting mortality and serious morbidity	Amber 4	Adult Cardiac
16:00	Controversies & catastrophes in adult cardiac surgery	Amber 5	Adult Cardiac
16:00	Update on molecular biology in lung cancer – for surgeons	Amber 6	Thoracic
16:00	The host beyond valve surgery	Amber 7	Adult Cardiac
16:00	Surgical videos	Botticelli	Congenital
16:00	How do I start my coronary practice: The devil is in the details	Brown 1	Adult Cardiac
16:00	Minimally invasive mitral valve surgery – start up tool box	Brown 3	Adult Cardiac
16:00	Optimising perioperative care in cardiac transplantation	Michelangelo	Adult Cardiac
16:00	Strategies to minimize end-organ damage in aortic surgery	Raphael	Vascular
16:00	EACTS/PASCaTS Joint Session	Suite 5	Adult Cardiac

Friday 19 October

8:15	How to do it (video)	Amber 3	Adult Cardiac
8:15	Repeat before you treat	Amber 4	Adult Cardiac
8:15	Heart transplantation	Amber 5	Adult Cardiac
8:15	Oligometastatic disease	Amber 6	Thoracic
8:15	Mechanical assist devices, extracorporeal support and left ventricular remodelling matrices	Amber 7	Adult Cardiac
8:15	Ventricular assist device therapy: Problem or solution	Amber 8	Adult Cardiac
8:15	New developments in left main disease	Auditorium	Adult Cardiac
8:15	Congenital miscellaneous	Botticelli	Congenital
8:15	Surgical aortic valve replacement from bench to bedside	Brown 2	Adult Cardiac
8:15	Standard of care for P2 prolapse?	Brown 3	Adult Cardiac
8:15	A Journey in coronary artery bypass surgery	Michelangelo	Adult Cardiac
8:15	“Gut feeling”: management for type A dissection while awaiting evidence. PART 1	Raphael	Vascular
8:15	Expert experiences with science: starting a new project	Suite 5	General
8:15	Non-oncology	Titian	Thoracic
8:15	Introduction to mitral valve repair: Wetlab	EACTS Training Village	Adult Cardiac
8:15	How to become a hybrid surgeon	Brown 1	Adult Cardiac
	Break		
10:00	Surgery for functional mitral regurgitation: potential for improvements!	Amber 1&2	Adult Cardiac
10:00	Is less more? Hybrid and minimally invasive coronary revascularisation	Amber 3	Adult Cardiac
10:00	New strategies to reduce bleeding beyond prolene	Amber 4	Adult Cardiac
10:00	The new kid in town	Amber 5	Adult Cardiac
10:00	Rare thoracic cancers (EUROCAN)	Amber 6	Thoracic
10:00	Work in progress	Amber 7	General
10:00	New data in atrial fibrillation ablation	Amber 8	Adult Cardiac
10:00	Trial update – ART, IMPAG and MITRA FR & COAPT	Auditorium	Adult Cardiac
10:00	Long-term outcome after surgical repair in congenital heart disease	Botticelli	Congenital
10:00	Mechanical Circulatory Support (ventricular assist device)	Brown 2	Adult Cardiac
10:00	Choosing the best valve sparing technique and how they compare with Bentalls	Brown 3	Adult Cardiac
10:00	Infections and malignancy in cardiac surgery	Michelangelo	Adult Cardiac
10:00	“Gut feeling”: management of type A dissection while awaiting evidence. Part 2	Raphael	Vascular
	Break		



11:45	The importance of simulation training for CT surgeons	Amber 1&2	Adult Cardiac
11:45	Work life balance/ Diversity in cardio-thoracic surgery	Amber 3	Adult Cardiac
11:45	Optimizing outcomes of extracorporeal life support therapy	Amber 4	Adult Cardiac
11:45	TAVI registries: Outcomes, impact and access in different countries	Amber 5	Adult Cardiac
11:45	2018 ESC/EACTS Guidelines on myocardial revascularisation	Auditorium	Adult Cardiac
11:45	Regenerative medicine hypoxia preconditioning and inflammation translation from bench to clinical practice	Brown 1	Adult Cardiac
11:45	Tips and tricks to optimise your endocarditis practice	Brown 2	Adult Cardiac
11:45	Settling the on vs off pump debate	Brown 3	Adult Cardiac
11:45	PCI: Friend and foe	Michelangelo	Adult Cardiac
11:45	Let the pachyderm proboscis freeze: FET experience is increasing	Raphael	Vascular
11:45	Flying over the arch with a parachute on board	Titian	Vascular
11:45	Quality Improvement Using Data: International Experience	Amber 8	Adult Cardiac
11:45	Thoracic – Featured abstracts	Amber 6	Thoracic
	Lunch		
13:00	How to set up and run a ventricular assist device programme	Amber 3	Adult Cardiac
13:00	Oesophagus	Amber 7	Thoracic
13:00	Nightmare cases & unsolved clinical problems	Botticelli	Congenital
13:00	ECMO/ECLS	Brown 2	Adult Cardiac
13:00	Dusk or dawn for SAVR?	Michelangelo	Adult Cardiac
13:00	Endovascular fix of open failure	Raphael	Vascular
13:00	Meta-analyses: breaking down different methods	Suite 5	General
13:00	Interventional Therapies	Auditorium	Adult Cardiac
13:00	Jeopardy	Titan	General
	Break		
14:15	Teaching root repair techniques by experts	EACTS Training Village	Adult Cardiac
14:45	LVAD Outpatient Management	Amber 3	Adult Cardiac
14:45	Rapid Fire – Congenital 2	Amber 4	Congenital
14:45	Open access – who is paying the bill: the reader or the writer?	Amber 6	Thoracic
14:45	Second conduit: choices beside RITA	Amber 7	Adult Cardiac
14:45	Optimised perfusion	Brown 2	Adult Cardiac
14:45	New solutions in mitral repair: come and see!	Michelangelo	Adult Cardiac
14:45	The bigger picture – from aortic surgery towards comprehensive aortic medicine	Raphael	Vascular
14:45	The propensity score: opening a black box	Suite 5	General
14:45	Chest Wall	Titian	Thoracic
	Break		
16:30	Key technical points in coronary surgery	Amber 1&2	Adult Cardiac
16:30	Ventricular Assist Devices	Amber 3	Adult Cardiac
16:30	Thymic surgery	Amber 4	Thoracic
16:30	The role of the cardiac surgeon during lead extraction	Amber 5	Adult Cardiac
16:30	Enhanced recovery in thoracic surgery	Amber 6	Thoracic
16:30	“Cold” Topics in Heart Transplantation	Amber 7	Adult Cardiac
16:30	Endocarditis: a battle in different directions	Amber 8	Adult Cardiac
16:30	Progress in TEVAR/EVAR	Auditorium	Adult Cardiac
16:30	Surgical videos 2	Botticelli	Congenital
16:30	Aortic valve and root infection	Brown 1	Adult Cardiac
16:30	Tough clinical decisions for improved sAVR therapies	Brown 2	Adult Cardiac
16:30	From basics to challenges in mitral valve surgery	Brown 3	Adult Cardiac
16:30	Outside the box (Residents)	Michelangelo	General
16:30	Breaking old concepts on acute aortic dissections	Raphael	Vascular
16:30	EACTS Aviation task force and NATO Research Task Group – safe surgery for safe flights	Suite 5	Adult Cardiac
16:30	Challenges in mitral surgery	Titian	Adult Cardiac

Saturday 20 October

8:15	Aortic valve surgery made cosmetic	Amber 1&2	Adult Cardiac
8:15	Rare and uncommon diseases	Amber 3	Adult Cardiac
8:15	EUROMACS	Amber 4	Adult Cardiac
8:15	S.O.S. – Save our surgeon! critical situations in cardio-thoracic surgery	Amber 5	Adult Cardiac
8:15	Enhanced recovery after surgery (ERAS)	Amber 7	General
8:15	Single ventricle 1: Can we avoid univentricular palliation	Botticelli	Congenital
8:15	Heart team perspective in atrial fibrillation	Brown 1	Adult Cardiac
8:15	Challenges and solutions in proximal aortic diseases	Brown 2	Vascular
8:15	Evidence based decision making in transcatheter aortic valve implantation	Brown 3	Adult Cardiac
8:15	Living with a ventricular assist device – living with problems?	Michelangelo	Adult Cardiac
8:15	Myocarditis, acute myocardial infarction and hypertrophic obstructive cardiomyopathy remodelling	Suite 5	Adult Cardiac
8:15	Put your lead vest on: Transcatheter aortic valve implantation under rapid fire	Titian	Adult Cardiac
8:15	Coronary	EACTS Training Village	Adult Cardiac
8:15	Anatomical segmentectomies	Amber 6	Thoracic
8:15	Managing patients with multi-vessel disease in the modern era	Auditorium	Adult Cardiac
	Break		
10:00	Bicuspid aortic valve repair: I do the best technique for my patient	Amber 1&2	Adult Cardiac
10:00	The right solution for the right ventricle	Amber 3	Adult Cardiac
10:00	How to train the next generation of cardiovascular surgeons – Joint EACTS/ BSCVS	Amber 4	Adult Cardiac
10:00	The cardiac surgeon and the anesthesiologist tell each other what is important to make a decision for their patient Joint Session EACTS – EACTA	Amber 5	Adult Cardiac
10:00	Zooming in topics	Amber 7	General
10:00	Single ventricle 2: Can we optimise univentricular palliation?	Botticelli	Congenital
10:00	Left atrial appendage management in the direct oral anticoagulants era	Brown 1	Adult Cardiac
10:00	Challenging the guidelines in thoracic aortic surgery	Brown 2	Vascular
10:00	From tricuspid valve repair to transcatheter replacement options	Brown 3	Adult Cardiac
10:00	Emerging trends in tricuspid valve repair surgery	Michelangelo	Adult Cardiac
10:00	Career development	Suite 5	General
10:00	Jeopardy Final	Titan	General
11:45	Presidential Address & Awards	Auditorium	General
	Lunch		
12:45	Allied Health – Abstracts	Amber 7	General
12:45	Residents lunch	Panorama Lounge	General
14:15	Surgery for ground glass opacities – a waste of time?	Amber 6	Thoracic
14:15	Allied Health – Workshop	Amber 7	General
14:15	Surgery in adults presenting with congenital heart disease	Botticelli	Congenital
14:15	Aortic arch repair – The brain in focus	Brown 2	Vascular
14:15	Optimisation of cardiac function and underlying mechanisms in cardiac surgery	Michelangelo	Adult Cardiac
14:15	The Lion’s den and emerging technologies	Auditorium	Adult Cardiac
14:30	Ross procedure (Reinforced Ross, Root or subcoronary Ross)	EACTS Training Village	Congenital
	Break		
16:00	Film – Thoracic	Amber 6	Thoracic
16:00	Thoracoabdominal aorta surgery – standards and perspectives	Brown 2	Vascular
16:00	Rapid fire – Congenital 3	Titian	Congenital

Cardiac | Rapid Response | PCI: Friend and foe

Ten-year follow-up of minimally invasive direct coronary artery bypass vs first generation drug-eluting stents for left anterior descending artery disease

Gaby Aphram[1], David Glineur[3], Spiridon Papadatos[2], Stefano Mastrobuoni[1], Laurent De Kerchove[1], Gebrine El Khoury[1] and Pierre-Yves Etienne[2] 1. Cliniques Universitaires Saint-Luc, Brussels, Belgium; 2. Clinique Saint-Luc, Bouge, Belgium; 3. University of Ottawa Heart Institute, Ottawa, Canada

Background

The spread of drug-eluting stents (DES) has reduced the incidence of early restenosis following percutaneous coronary interventions (PCI). Surgical revascularisation through minimally invasive direct coronary artery bypass (MIDCAB) is a good alternative to sternotomy, with preserved benefit of the internal mammary artery. Five-year follow-up was published by our team to compare these two techniques. As very few data with long-term evaluation are available, we present our 10-year follow-up.

Method

Prospective data were collected for 456 patients undergoing single-vessel LAD revascularisation. Group 1 included 260 consecutive patients operated by the MIDCAB technique (from April 1997 to February 2011). Group 2 included 196 consecutive patients who benefited from PCI with DES (from June 2002 to October 2005). We performed a non-randomised multi-centric study. Primary and secondary endpoints were 10-year survival and freedom from major adverse cerebro-cardiovascular events (MACCE). Survival and event-free survival curves were estimated via Kaplan-Meier. Calculated p values of < 0.05 were considered significant.

Results

There were no statistical differences between in hospital mortality between the two groups (MIDCABG: 0.4% vs DES 1%; p = 0.7). In terms of hospital morbidity, in the MIDCAB group, one patient was reoperated on for persistent ischaemia caused by kinking of the sequential graft between the diagonal branch and LAD, and two patients had transient ischaemic accident. In the DES group, two patients developed cerebral haemorrhage. Five patients developed non Q-wave postoperative infarction (MIDCAB: 1, DES: 4). Sixty-one (23.5%) of deaths occurred in the MIDCAB group and 37 (18.9%) in the DES group during follow-up. Ten-year survival is 79% in the MIDCAB group and 84% in the DES group (Figure 1; p = 0.15). Only 9 (3.5%) deaths were cardiac-related in the MIDCAB group while there were 16 (8.2%) in the DES group (Figure 2; p = 0.04). 10-year freedom from TVR and MACCE is 94% and 74% in the MIDCAB group versus 66% and 45% in the DES group, respectively (p < 0.0001; Figures 3 and 4).

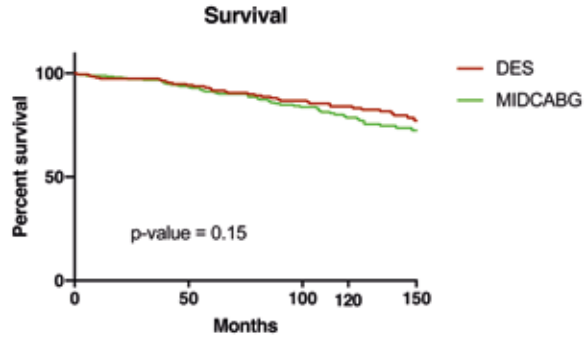


Figure 1: 10-year survival in the MIDCABG and DES groups is 79% vs 84% respectively.

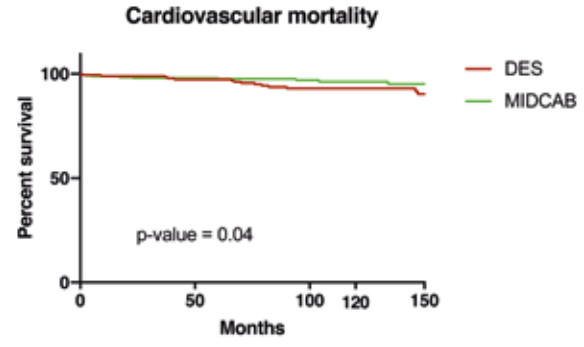


Figure 2: 9 (3.5%) cardiac-related deaths occurred in the MIDCABG groups vs 16 (8.2%) in the DES group. 10-years freedom from cardio-vascular mortality is 96% vs 93% in the MIDCABG and DES groups respectively.

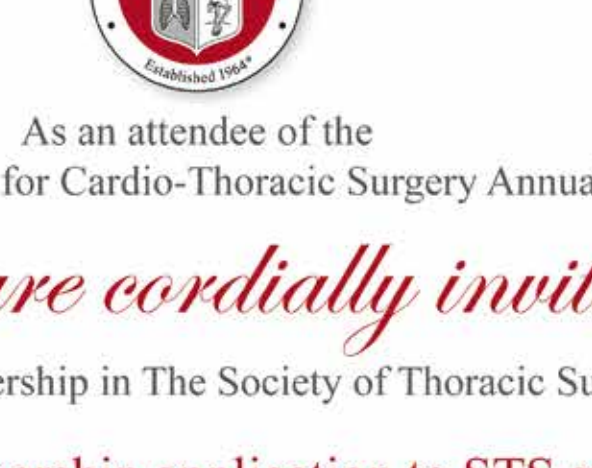


Figure 3: 10-year freedom from target vessel revascularization is 94% vs 66% in the MIDCABG and DES groups respectively.

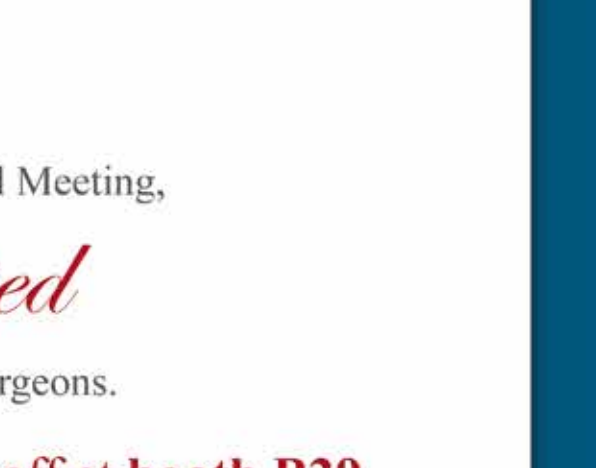


Figure 4: 10-year freedom from MACCE is 74% vs 45% in the MIDCABG and DES groups respectively.

Conclusion

Long-term patency of the left internal mammary artery provides excellent clinical results and a significantly higher freedom from target vessel revascularisation in the MIDCAB group. In addition to acute and subacute problems related to first generation DES design, occurrence of ischaemic complications remains persistent over time. In LAD and thus moreover in multivessel disease, long-term evaluation (10-years) of the next generation DES should be mandatory before modification of the international guidelines on coronary revascularisation.

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Thoracic | Rapid Response | Non-oncology

Descending mediastinitis: Is still a disease with high mortality?

Kalliopi Athanassiadi
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Descending necrotising mediastinitis is a severe polymicrobial infection spreading from the cervical region to the mediastinal connective tissue originating from odontogenic, oropharyngeal and cervical infection. It represents a virulent form of mediastinal infection, requiring prompt diagnosis and treatment to reduce the high mortality associated.

Patients with acute mediastinitis usually present with acute onset of symptoms, including fever and leucocytosis, chest pain, dysphagia, and respiratory distress. Cervical- and chest CT scan is the diagnostic tool of choice. They also play a role in guiding drainage procedures in the perioperative period.

Treatment should be directed toward the primary pathology and the clinical presentation. Intravenous administration of a broad-spectrum antibiotic, such as piperacillin-tazobactam, should be initiated and modified as culture and sensitivity results become available. Correction of hypovolaemia secondary to sepsis and third-space losses into the mediastinum with appropriate intravenous fluids should be undertaken.

Surgical drainage remains the gold standard. The consensus view seems to be that an aggressive cervical approach (cervicotomy) should be undertaken. The neck is often approached either through a longitudinal incision along the anterior border of the sternocleidomastoid muscle or through a transverse collar bilateral incision or both. The involved cervical spaces are opened, drained, and debrided of necrotic tissue and the cervical wound is left open. The wound should heal by second intention.

The upper anterior mediastinum can be entered transcervically through the pretracheal space and opened by blunt finger dissection to the level of tracheal bifurcation, while the upper posterior is entered by extending the dissection of the retropharyngeal space downward. Knowledge of the cervical fascial planes is essential to understand the pathways. When the mediastinal infection expands below the carina or the T4 vertebra, a transthoracic approach should be considered either through thoracotomy or thoracoscopy; since both expose the prevertebral and paraesophageal spaces and allow access to the ipsilateral mediastinum and the pericardium, while sternotomy or clamshell incision carry the risk of sternal osteomyelitis. The choice of site depends on the site of the collection. The operation includes opening the mediastinal pleura on a longitudinal axis, debridement of the mediastinum, and complete excision of necrotic tissue. If necessary, along with the drainage of the pleural cavity, a decortication or even insertion of chest tubes for mediastinopleural irrigation might take place. Debridement of necrotic tissue is essential. Tracheostomy is often necessary but should be performed selectively.

All procedures should be performed by a multidisciplinary team comprising a head and neck surgeon and a thoracic surgeon. In cases where an odontogenic abscess is the cause, synchronous treatment by maxillofacial surgeons is essential. Unfortunately, high mortality rates (25%-50%) still are reported, despite the introduction of modern antimicrobial therapy and CT imaging. Delay in diagnosis and delayed or inappropriate drainage of the mediastinum are the main causes for the high mortality.

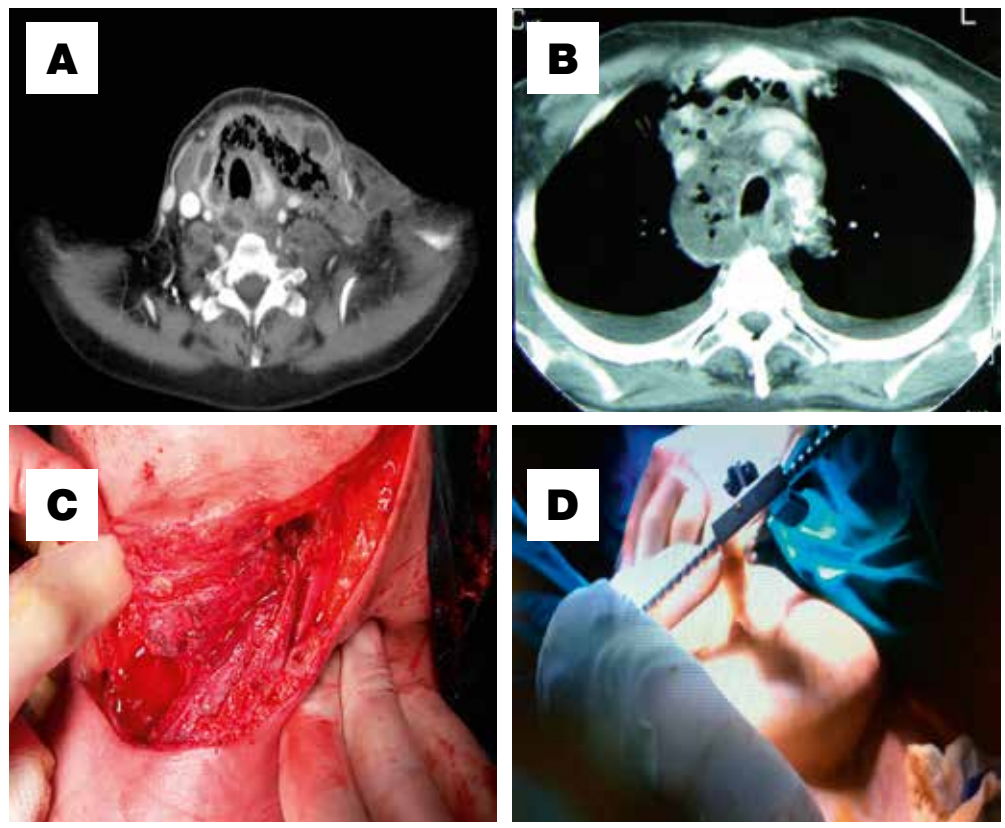

Figure. Cervical- and chest CT scan revealing gas bubbles and pleural infusion (A&B), and intraoperative drainage, irrigation and debridement (C&D)

Cardiac | Focus Session | ECMO/ECLS

State of the art paediatric ECMO/ECLS

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The use of extracorporeal membrane oxygenation (ECMO) in children started in 1976 for the treatment of meconium aspiration syndrome in a neonate. Since that time, improvements in perinatal respiratory medicine have narrowed ECMO indications, while improvements in the ECMO technique (centrifugal pumps and hollowfibre oxygenators, coated circuits) allowed physicians to recruit other kind of diseases to be supported for long time, especially paediatric acute respiratory distress syndrome (ARDS). Meconium aspiration syndrome is actually rarely rescued with ECMO due to the advent of nitric oxide, high frequency oscillatory ventilation and surfactant therapy.

Congenital diaphragmatic hernia remains the most common neonatal ECMO indication with a survival rate of around 50%. Still, debate exists on the real need to assist these patients with ECMO since no benefit has been seen from large trials (and compounded by a lack of chances to perform randomised controlled trials in such a rare disease).

Despite the recent advances in ventricular assist device (VAD) technology, ECMO remains the most commonly used system for circulatory and respiratory support in paediatric patients. The advantages of ECMO include its familiarity to cardiac surgeons involved in the management of congenital heart disease, and the capability to provide contemporary cardiac and respiratory support with relatively low costs. The disadvantages of ECMO include the need for a well-trained team, as well as intensive-care monitoring for the risk of severe complications (bleeding, thrombosis, neurological injuries, etc.).

Neonatal and paediatric cardiac indications are currently pre-operative stabilisation, peri-operative support and use beyond the peri-operative period. In particular, indications such as ECMO for intractable arrhythmias, paediatric extracorporeal cardiopulmonary resuscitation (pECPR) and ECMO in "functionally" uni-ventricular circulations are increasing. A more complex challenge is the management of paediatric patients with single ventricle physiology and ARDS with veno-venous ECMO. In these patients, timing for cannulation, type and position of cannulas, lung resting and weaning are crucial steps to be addressed before starting mechanical support.

What's more, in the last forty years, the management of anticoagulation has improved in ECMO, facilitating a reduction in mechanical complications. Anticoagulation itself is more complex in neonates and infants, and anticoagulation whilst on extracorporeal life support (ECLS) provides an additional grade of complexity. Heparin is only an indirect anticoagulant, and the "new" monitoring approach to coagulation is no longer based on simple ACT tests, rather requiring a multimodal approach with activated partial thromboplastin time, anti-Xa assay, viscoelastic tests and platelet mapping especially when dealing with long runs or ventricular assist devices.

In children, alternative forms of anticoagulation are considered such as direct thrombin inhibitors (bilivarudin and argatroban). In addition, neuromonitoring in ECMO is changing, and we are moving from the use of near infrared spectroscopy to continuous EEG monitoring. While techniques such as transcranial Doppler are emerging, they are reserved for specific diagnoses rather than continuous use at the bedside. The combination of more complex anticoagulation monitoring with multimodal neuromonitoring represents the future to reduce major mechanical complications and could impact on the mortality and morbidity of patients requiring respiratory and cardiac support.

The very strong message we got from practice is that every attempt should be done to start ECLS "urgently" rather than "emergently".

Vascular | Focus Session | "Gut feeling": management of type A dissection while awaiting evidence. Part 2

International Results of the DARTS Trial

Sabin J. Bozso University of Alberta, Edmonton, Canada

The DARTS trial is a multicentre, prospective, non-randomised, non-blinded, single-arm designed trial to evaluate the safety, feasibility and performance of the Ascyrus Medical Dissection Stent (AMDS) device for the treatment of acute DeBakey I aortic dissection. The AMDS is a novel, partially covered aortic arch hybrid graft made of Teflon fabric graft sewn to a tubular Nitinol frame designed to be implanted antegrade during hypothermic circulatory arrest into the aortic arch and the descending thoracic aorta.

From March 2017 to April 2018, a total of 24 patients (64 ± 13 years, 62% male) presented with acute DeBakey I aortic dissections and underwent emergent surgical repair with AMDS implantation. All 24 device implants were successful. Overall 30-day mortality was 8.3% (n = 2) and stroke occurred in 12.5% of cases (3/24). All 24 device implants occurred without injury to the aorta or its major branches. Positive remodelling of the aortic arch occurred in 100% of cases with complete obliteration or thrombosis of the false lumen (FL) in 14 (70%). In the proximal descending thoracic aorta, positive remodelling and stabilization occurred in 19 (95%) and complete or partial FL thrombosis occurred in 15 (75%) of cases. Overall, 90.3% of vessel malperfusions had resolved without an additional procedure due to AMDS-induced true-lumen (TL) expansion. Four patients required a secondary disease-related intervention.

The combined effects of the AMDS on the FL and TL results in effective treatment of malperfusion and induction of positive remodelling in the aortic arch and the descending aorta. This is reflected in the malperfusion treatment results discussed in this manuscript, in addition to 70% complete obliteration and healing of the aortic arch and the very high rate of positive remodelling observed during follow-up.

One unique advantage of the AMDS is the open cell technology in the stent design which permits secondary intervention if required without concern, as demonstrated in the patient that required left common carotid artery stenting as a disease-related secondary procedure. Another interesting aspect of the DARTS trial is the low mortality observed despite nearly 60% of the patients in this cohort having been diagnosed with malperfusion, and with higher anticipated mortality.

The AMDS is a safe and reproducible adjunct to the current standard-of-care surgical therapy. It allows one-stage management of malperfusion and induces positive remodelling of the aortic arch in the majority of patients treated without increasing the time of surgery or adding any additional major risks. Uniquely in this trial we observed healing of malperfusions involving the carotid branches of the aortic arch. This is due to the reduction of the pressure in the FL and the immediate expansion of the TL, as readily visible on postoperative CT scans.

New data shows reduced anticoagulation need with On-X mechanical valve

Enthusiasm for bioprosthetic heart valves over mechanical ones has "gone overboard" and is not serving the best interests of younger patients, John Puskas (Chief of Cardiovascular Surgery at Mount Sinai saint Luke, New York, USA) cautioned in a lunch symposium sponsored by CryoLife (USA) at the Annual Meeting yesterday.

Professor Puskas went on to relay that biological valve use has dramatically increased the past 20 years, now comprising 80% of all surgical aortic valve replacements (SAVR), and coinciding with the industry spending millions of dollars on biological SAVR and more than US $5 billion on transcatheter aortic valve replacement (TAVR).

He reminded the audience of the Prospective Randomized On-X Anticoagulation Clinical Trial (PROACT)[1] he led in 2014, in which INR can be safely maintained at between 1.5 and 2.0 after aortic replacement with the On-X (CryoLife) mechanical prosthesis, and that with low dose aspirin this resulted in a significantly lower risk of bleeding. This has been endorsed by FDA labelling.

"PROACT showed that the On-X has a tremendously low gradient and excellent function, and works so well that it needs less anti-coagulation than previous generations of mechanical valves," said Professor Puskas.

"Yet it is still swept aside in the rush to implant biological valves in younger and younger patients. Is there a bias among healthcare providers against mechanical AVR that is not justified by the low risk associated with warfarin with an INR of 1.8?

"The bottom line is a 50-year-old man is likely to outlive two or more biological valves, and this is just an awful lot of intervention, expense and risk. The best you can hope for is a worst gradient than you will get with an On-X valve."

He went on to note that the American Heart Association/American College of Cardiology valve guidelines published in 2017[2] now recommend a bioprosthetic or mechanical valve as a reasonable choice for patients aged 50 to 70 (instead of 60 to 70 previously).

Professor Puskas highlighted recent studies of both mechanical and bioprosthetic valves and said the data "speaks for itself". These included a 2016 Swedish study[3] where the mechanical prosthesis outlived the bioprosthesis for patients aged 50 to 69 having an aortic valve replacement. He also questioned the integrity of findings of a New York study[4] which concluded patients under 50 had similar survival at 15 years to mechanical heart valve recipients.

"If you look at the curve at 15 years there is only a couple of hundred patients in each group – most are 5 or 10 years out. They just haven't followed these patients for long enough. This is statistical mumbo jumbo. I don't think the data supports the conclusion, but it got published – why?"

Bioprosthetic patients in the New York study also had a much higher risk of reoperation at 15 years (5.9), a 6-fold higher hazard ratio of biological vs mechanical at 15 years.

"If you insert a mechanical valve in a patient, they typically never need another procedure, whereas if you put a bioprosthetic valve in a patient they have an annuity – they are coming back."

Professor Puskas flagged up another paper from California published in the New England Journal of Medicine[5] in 2017 which followed 4,000 patients from 1986 to 2013. It found the mortality benefit of a mechanical valve extended to approximately age 55 for an aortic valve and age 70 for a mitral valve.

He also probed as to whether younger patients realised that having a bioprosthetic heart valve was stage one of a two- or three-stage process, as their valve would inevitably wear out. Indeed, in Germany now, TAVR represents more than 60% of all heart valve replacements (which by definition are biological valves) even in younger patients. "I am asking the question, why is this happening? Why are we throwing the baby out with the bath water?" he said.

Professor Puskas asked the audience: "Was it the investment in and marketing hype of biological SAVR that drove biological AVR from 20 to 80% SAVR?

"First we convince the world that biological SAVR is better than mechanical SAVR for almost all patients. Second, we say catheter [-based delivery] is as good as a biological SAVR for almost all patients. And presto! We have moved AVR from a low profit surgical market to a highly profitable cardiology market.

He warned: "TAVI use is rapidly increasing within high, intermediate and low-risk patients world-wide with hardly a mention of a mechanical SAVR alternative.

"Valve-in valve remains poorly studied and while it may benefit patients with high surgical risk and/or short life expectancy it is a disservice to many patients, and it is a disservice to most 50-year-old patients!"

Also speaking during the session was Bart Meuris, a cardiac surgeon at the University Hospital, Leuven, Belgium, who asked if the pendulum should swing back to mechanical valves. He cited one study in the United Kingdom by Dunning et al[6] which showed a 20% increase in the use of bioprosthetic valves in the UK between 2000 and 2009. Alarmingly though, the steepest increase (65.2%) was in the 55–60 age group, and there was also a 38.9% increase in their use in the under 55s.

Professor Meuris relayed how younger people were being given tissue valves on "a large scale" and that the durability of such valves in younger people was being overestimated. There was no long-term follow-up on valve-in-valve operations, he added.

He also touched on a recent paper[7] which detected reduced aortic valve motion in bioprosthetic aortic valves.

He continued: "The PROACT trial findings are still not well-known and we need to get this information out there to cardiac surgeons. Some papers in 2018[8] have suggested using the On-X with NOACs might be a good solution going forward. This could be a game changer for patients aged between 40 and 60 who are now in this grey zone of wondering what [valve] to choose – the combination could provide long term durability and safe medication."

Professor Meuris concluded surgeons have to bear in mind that age is the most important driver for structural valve deterioration (SVD).

"We may have overestimated the durability of these valves in younger

"... using the On-X with NOACs might be a good solution going forward. This could be a game changer for patients aged between 40 and 60 who are now in this grey zone of wondering what [valve] to choose – the combination could provide long term durability and safe medication."

Bart Meuris

"... research shows that results for total arch transposition for endovascular techniques has a relatively high mortality of 14.8%. The native ascending aorta is not a good place for a stent graft."

Martin Grabenwöeger

"PROACT showed that the On-X has a tremendously low gradient and excellent function, and works so well that it needs less anti-coagulation than previous generations of mechanical valves."

John Puskas

patients. There is a growing cohort of younger adults with tissue valves – at the moment we have expectations about replacements and valve-in-valve for tissue valves, but please keep in mind that we have very good and very decent well-functioning mechanical heart valves with the possibilities of either self-monitoring or lower INR regimes and potentially future NOAC treatments ."

He added the future trials of newer NOACs used in combination with newer mechanical heart valves such as On-X could "potentially change the world dramatically."

Martin Grabenwöger from Vienna Hospital, Austria, also gave an update on the management of aortic arch pathology. "Complete arch replacement can be performed with excellent results even in higher risk patients," he said. "There are conventional surgical techniques which have good outcome data. Moderate hypothermia, selective antegrade perfusion and axillary artery cannulation are the cornerstones of aortic surgery in Europe, but interventional endovascular repair methods are not so good.

"In particular, research shows that

results for total arch transposition for endovascular techniques has a relatively high mortality of 14.8%. The native ascending aorta is not a good place for a stent graft."

Professor Grabenwöger also described a study published in 2017 using the hybrid Frozen Elephant Trunk (FET) technique in 251 patients over 15 years.[9] This treats the descending thoracic aorta using the antegrade release of a self-expandable stent graft. The researchers concluded that the FET graft E-vita Open Plus (CryoLife/ Jotec) allows single stage therapy with multi-segmental aneurysms and in DeBakery Type 1 FET stabilises the dissecting membrane and favours expansion of the true lumen. They said FET is an "ideal landing zone for subsequent transfemoral endovascular completion."

Professor Grabenwöger concluded: "Hybrid or endovascular techniques have to demonstrate at least similar results to verify their qualification."

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Cardiac | Rapid Response | Infections and malignancy in cardiac surgery

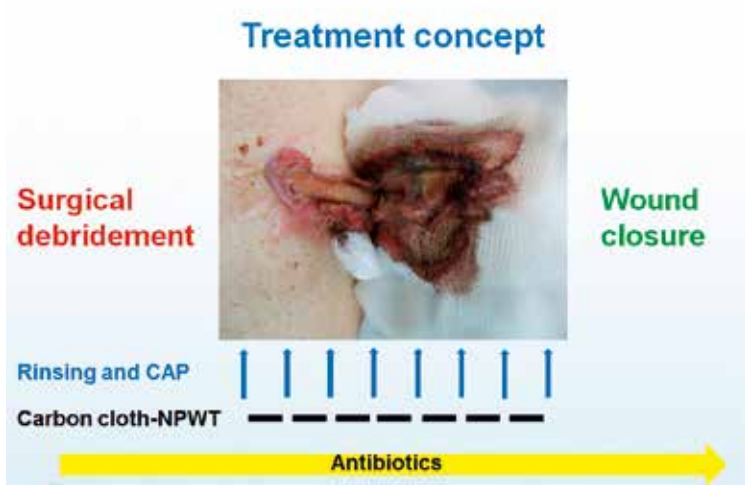
Dressing with a double layer of carbon cloth and two negative pressure foams

Heinrich Rotering, S. Martens and A. Dell`Aquila Department of Cardiothoracic Surgery, Division of Cardiac Surgery, University Hospital Münster, Germany.

Dressing with a double layer of carbon cloth and two negative pressure foams

Wound bed after removal of the dressing

Refixation with sternal plates



The wound treatment team, and the cold plasma device

Deep surgical site infections are still a severe problem in cardiothoracic surgery. A new treatment concept using cold atmospheric plasma (CAP) and advanced negative pressure wound treatment (aNPWT) – consisting of the NPWT foam and an underlay of carbon cloth – is presented as a tissue-saving approach for this problem. It has already been shown that CAP is effective due to its increased penetration depth to defeat bacteria, even under a layer of biofilm, and independent of bacterial resistance profile. The combination of carbon cloth dressing with the NPWT foam protects the wound bed in a remarkable manner and ensures the healing process.

Between April 2016 and April 2018, 52 patients with deep sternal wound infection were treated with CAP and aNPWT (34 males, mean age 67.8 years; 18 females, mean age 65.7 years). Previous cardiac procedures included CABG (63%), valve surgery (10%), CABG and valve surgery (13%), aortic surgery (6%) and others (8%). Twelve of these 52 patients already had a failed therapeutic attempt according to El Oakley classification type IV.

All patients received a resistance-adjusted antibiotic treatment after initial surgical debridement. Wounds were closed by a foam with an additional underlayer of carbon cloth dressing, as per the remit of aNPWT. The wound dressing was changed three times a week, with application of CAP on each occasion. To clean the wound before and after CAP application, a rinsing solution containing sodium hypochlorite was used. This solution releases singlet oxygen in the woundbed. Thirty patients needed refixation of the sternum: 26 of these patients were stabilised with sternal plates, three underwent refixation with wires and sternal bands, and one patient required refixation with wires. Overall, 22 patients did not require any refixation. Two patients were treated with complete removal of the wires because the sternum was already well healed. In the other 20 patients the infection was under control and a complete removal of the wires was not necessary.

Mean treatment time (debridement to wound closure) was 16 days (range 6–39 days). Thirty-one patients (60%) had negative swabs at the time of wound closure. In terms of mortality, five patients died during or after treatment, two of them due to uncontrolled sternal infection, and three from other causes not related to the infection (fulminant pulmonary embolism, bleeding due to a perforated aortic aneurysm and respiratory insufficiency due to exacerbated bronchopneumonia).

The treatment concept with aNPWT and additional application of cold atmospheric plasma is very well tolerated. Under this treatment concept the sternal infection-related mortality (2/52) is low, despite the severity of the complication. The treatment concept is a tissue-saving approach without the need for omentum majus or muscle flap plastic. Moreover, this approach allows complete regain of sternal stability.

Cardiac | Rapid Response | Challenges in mitral surgery

Early results of transapical off-pump mitral valve repair with NeoChord DS 1000 device in patients with severe mitral regurgitation due to posterior leaflet prolapse

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Krzysztof Wróbel

Katarzyna Kurnicka

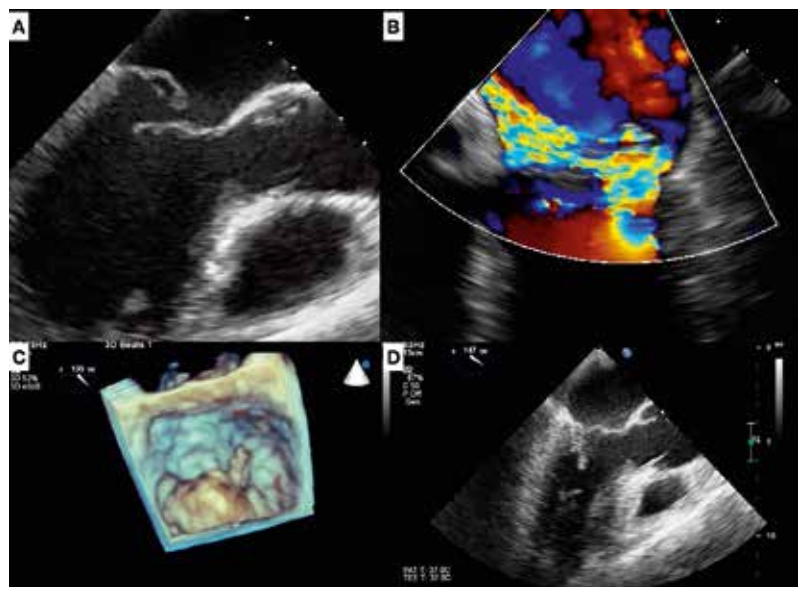


Figure. Example of a patient with P2 flail with an eccentric jet and long, healthy anterior leaflet. (A–C) preoperative exam; D) Postoperative TEE shows 9.6 mm of coaptation.

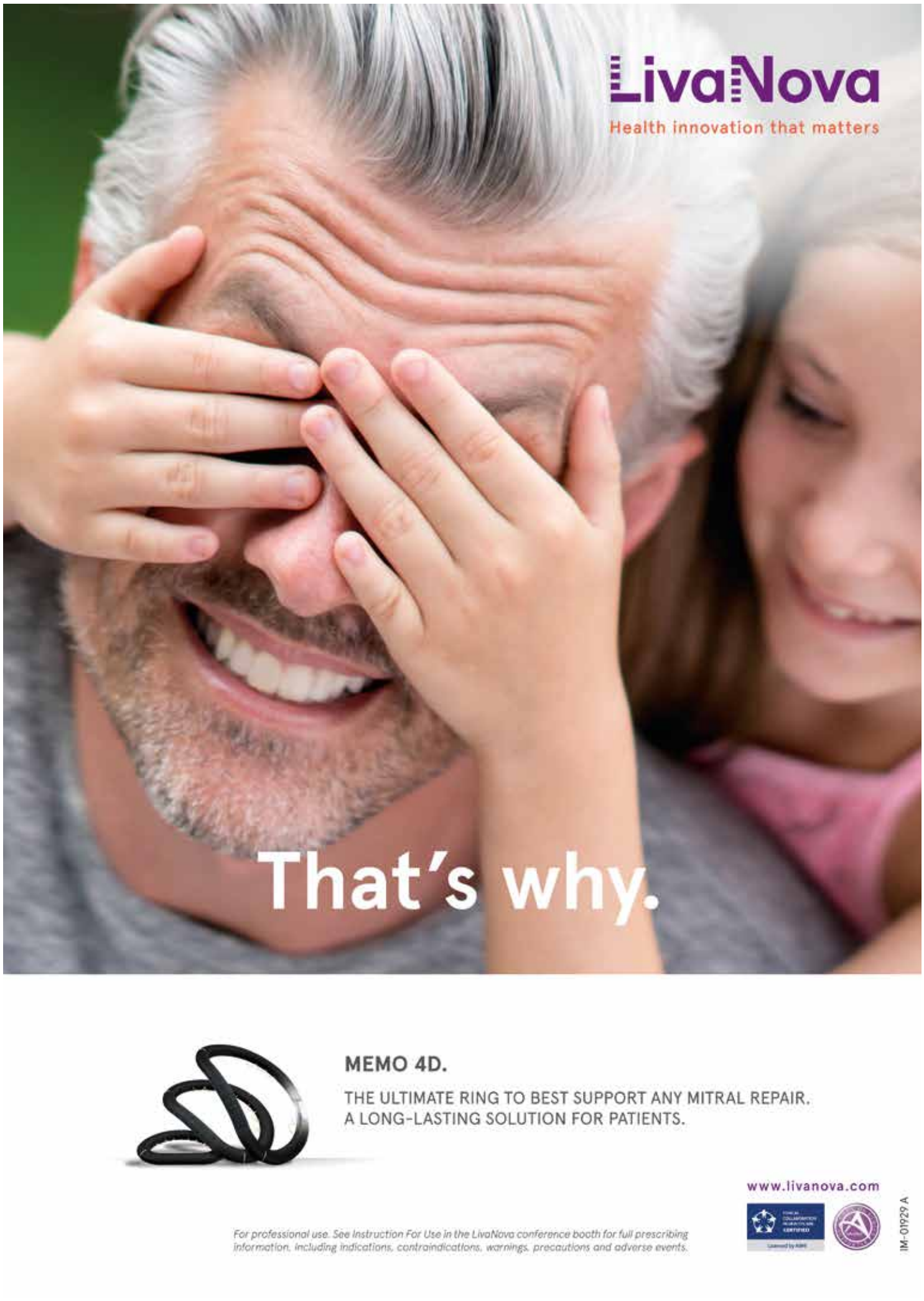
Transapical beating heart off-pump mitral valve repair is a novel surgical technique to treat mitral valve (MV) prolapse. The main benefits of this approach are mitral valve repair under physiologic conditions and avoidance of cardiopulmonary bypass. However, limited data regarding early surgical results are available.

The aim of our study was to test whether this approach is feasible, safe, reproducible and effective. Procedures were performed under general anaesthesia with full haemodynamic monitoring through minithoracotomy in the fifth intercostal space without cardiopulmonary bypass. Two- and three-dimensional (2D/3D) transoesophageal (TEE) images were obtained using the EPIQ 7C system (Philips, NL). Anatomical classification was used to describe technical difficulty of the procedure (Type A: isolated central posterior leaflet disease; Type B: posterior multisegment disease; Type C: anterior, bileaflet, paracommissural disease with/without leaflet/annular calcifications). 2D transthoracic echocardiography (TTE) focused on the assessment of left ventricle and left atrium morphology and extent of MR at six months after the surgery. All patients presented severe mitral regurgitation due to flail/prolapse of one leaflet, and all of them were qualified to MV repair after detailed analysis of TTE and 2D/3D TEE images. Twenty-seven patients (93.1%) presented with posterior leaflet prolapse (LP), and 2 (6.9%) with anterior LP. The median age was 62 years (33–80), and 24 patients (82.7%) were male.

The number of Type A, B and C patients was 18 (62%), 8 (27%) and 3 (10%), respectively. The median number of implanted chords was 3 (2–6). Four patients received 2 chords, 17 patients 3 chords, 4 patients 4 chords, 3 patients 5 chords and 1 patient 6 chords. Median blood loss was 330 ml (130–1280), and with growing experience 50–100 ml per chord. Acute procedure success (defined as successful placement of at least two neochords with reduction of residual MR to mild/trace) was achieved in all patients. No patient required conversion to open mitral surgery, and there was no in-hospital mortality, no stroke nor any bleeding events. Seven patients experienced an episode of postoperative atrial fibrillation and two patients had pleural effusion. One patient required perioperative blood transfusion.

Twenty-one patients with posterior leaflet pathology reached six months follow-up. Mean values of LV and LA dimension/volume, E wave of MV inflow, E' velocity of the lateral part of MV annulus and tricuspid regurgitation peak gradient (TRPG) decreased significantly at six months. Significant reduction of MR degree to trace/mild regurgitation was achieved in 17 patients (81%) and to mild/moderate in 4 patients (19%).

The novel procedure using the NeoChord DS 1000 device is safe, feasible and results in a significant reduction of MR and LV and LA reverse remodelling. It can be considered as an alternative option to conventional approaches in patients with suitable anatomy.



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MEMO 4D® The most physiologic solution to best support your repair

In June of 2018, LivaNova received FDA 510(k) clearance for its next-generation MEMO 4D Semi-rigid Mitral Annuloplasty Ring and achieved the first successful U.S. implant of the device.

Based on the clinically proven MEMO platform, MEMO 4D is designed to support challenging mitral repair needs. Innovation starts at its core with its unique Nitinol design allowing for unique physiological behavior—that mimics the natural function of the native mitral valve— and making it an excellent, long lasting solution for any repair.

MEMO 4D offers improved dimensions to treat enlarged annuli and reduce the risk of Systolic Anterior Motion (SAM). It is also the only mitral repair ring on the market to offer a 42 mm size and a gradually enhanced anterior saddle shaping from 34 mm to 42 mm sizes. This makes it ideal to facilitate complex repair in the presence of severe degenerative MR like Barlow's disease and enlarged annuli. Furthermore the exclusive ReChord guiding system might represent a time-saving option to implant the neochordae, and the versatile holding system is engineered to facilitate ease of placement of the MEMO 4D during MICS procedures.

The first implant of MEMO 4D was performed by Dr. Sreekumar Subramanian at TriStar Centennial Medical Center in Nashville, Tennessee. "We have a winner here with Memo 4D," explained Dr. Subramanian. "From the enlarged sewing cuff, to the increased A/P diameter, to the ease of use in pulling the ReChord system, these are all improvements that make me even more confident in the MEMO platform. Also, the new larger sizes allow us to treat more patients providing the potential to further improve patient outcomes."

"MEMO 4D simplifies and standardizes degenerative complex mitral valve repair, facilitates minimally invasive surgical approaches and preserves the mobility of the mitral valve leaflets," adds Dr. Subramanian. "With MEMO 4D, surgeons can optimize mitral repair procedures rather than replacing the entire mitral valve."

IM-01896 A

Thoracic | Focus | Open access - who is paying the bill: the reader or the writer?

Open access is crucial to advancing scientific and clinical evidence– what, why and what's next?

Iratxe Puebla PLOS ONE, Public Library of Science (PLOS)

When I was approached to participate in the EACTS conference, the subject that I was given piqued my interest: 'The open access jungle'. Like any endeavour involving multiple communities, scholarly publishing has many nuances and complexities, so why would open access be perceived as a 'jungle' compared to other publishing models? I wondered if some would raise the challenges associated with existing different open access mandates and licenses, or the shortcomings of a model based on article-processing charges, or perhaps the unfortunate existence of predatory publishing?

Open access journals allow scientific and medical evidence to be made publicly available to anyone, immediately and free of charge. Medical evidence is crucial for ensuring that adequate clinical decisions are made and that effective healthcare policy is developed; immediate and free access to the latest findings not only facilitates faster discovery and policy implementation but also makes that information available

to those who may not be able to sustain the cost of a broad range of journal subscriptions, such as those in developing countries, non-for-profit organisations, and citizens interested in reading about specific treatments or care approaches. Importantly, open access also allows research publications to be shared and re-used, which allows them to be included in educational or training materials.

The zika outbreak a couple of years ago brought to the front the value of making clinical evidence available without delay. As a response to this public health emergency a number of funders and journals signed a shared commitment to make all data related to the outbreak free to access as rapidly as possible. While free to access is not equivalent to open access (given that free access does not necessarily allow re-use), this was a laudable effort, and one that also brings the question as to why we would handle clinical information in such a way only in the context of a public health emergency.

The recent announcement of the Plan S, which will require that publications generated through grants by supporting funders (which include different European national funding councils and the European Research Council) are published open access sends a clear message that many funders and institutions in Europe are supporting open access and are willing to take steps to encourage this as the approach for the dissemination of research findings in the coming years. This and other policy developments are likely to stimulate further discussion towards making the open access model scalable and reachable to all involved in research and in clinical practice.

It appears that the conversation needs to move from whether we should make clinical findings available in an open access format to developing mechanisms that allows this to happen responsibly and as widely as possible. This is certainly a conversation that needs input by many and I look forward to engaging in this discussion with those attending EACTS.

EACTS
European Association For Cardio-Thoracic Surgery

Raising Standards through Education and Training

Academy Training 2019 COURSES

Fundamentals in Cardiac Surgery: Part I	4-8 February
Endoscopic Port-Access Mitral Valve Repair Drylab Training	11-12 February Maastricht, The Netherlands
Introduction to Aortic Surgery	14-16 March
Annuloplasty for aortic valve repair: a standardized approach	27-29 March Paris, France
Thoracic Surgery: Part I	4-6 April
Endoscopic Port-Access Mitral Valve Repair Drylab Training	29-30 April Maastricht, The Netherlands
Video-Assisted Thoracoscopic Surgery (VATS)	16-17 May Berlin, Germany
Minimally Invasive Techniques in Adult Cardiac Surgery (MITACS)	16-17 May Frankfurt, Germany
Fundamentals in Cardiac Surgery: Part II	3-7 June
Aortic Valve Repair Summit	20-21 June Brussels, Belgium
Endoscopic Port-Access Mitral Valve Repair Drylab Training	2-3 September Maastricht, The Netherlands
Thoracic Surgery: Part II	To be confirmed
Fundamentals in Cardiac Surgery: Part III	21-25 October
Congenital Heart Disease	To be confirmed
4th EACTS European Mechanical Circulatory Support Summit	To be confirmed
Thoracic Surgery: Part III	To be confirmed
Endoscopic Port-Access Mitral Valve Repair Drylab Training	9-10 December Maastricht, The Netherlands

All courses to take place at EACTS House in Windsor, UK, unless stated otherwise.

To register for these courses visit
www.eacts.org

Congenital | Rapid Response | Rapid Fire – Congenital 2

Selective antegrade cerebral perfusion versus additional lower body perfusion during aortic arch reconstruction in infants: A propensity score-matched study

Yuriy Kulyabin, Yuriy Gorbatykh, Alexey Zubritskiy, Alexey Voitov, Nataliya Nichay, Alexey Arkhipov, Alexander Bogachev-Prokophiev, Alexander Karaskov
National Medical Research Center, vNovosibirsk, Russia

Aortic arch reconstruction in infants is often challenging due to the high risk of postoperative complications. The most vulnerable target organs, such as the brain and kidneys, are already compromised due to systemic outflow obstruction and are predisposed to severe dysfunction. The perfusion method for visceral protection in these patients is selected depending on the surgeon's preference. At present, most surgeons prefer to avoid circulatory arrest as much as possible as it decreases myocardial ischaemic time and preserves visceral organ function. Selective antegrade cerebral perfusion (SACP) and continuous lower body perfusion with additional descending aortic cannulation (DAC) are modern reliable methods for effective visceral protection during aortic arch repair in infants.

Our study aimed to compare the effectiveness of SACP and continuous lower body perfusion with additional DAC in providing visceral protection during aortic arch reconstruction in infants. Sixty-two propensity score-matched patients below one year of age underwent aortic arch repair procedures with cardiopulmonary bypass between 2007 and 2017 were included in this study and divided in two groups according to the perfusion method performed: those who underwent repair with SACP under mild hypothermia (SACP group, 31 patients), and those with additional lower body perfusion under 32 °C (DAC group, 31 patients).

Only one patient died in the DAC group in the early postoperative period, whereas six died in the SACP group. More patients from the SACP group required an open chest after the operation, and patients from the DAC group had significantly shorter open chest duration and intensive care unit (ICU) stay. However, there were no differences in the need for renal replacement therapy (RRT) and rate of creatinine level progression during the first three postoperative days between groups.

We concluded that continuous lower body perfusion with additional DAC is a highly effective method in improving early postoperative results and in reducing the rate of unfavourable neurological events. However, DAC does not significantly decrease the risk of acute kidney injury (AKI), therefore this should be investigated in a larger cohort of patients with concomitant heart anomalies that may have initially compromised renal function. Patients with a body mass of less than 2 kg are highly predisposed to AKI, and the need for RRT at the first postoperative day is associated with a high risk of early mortality.

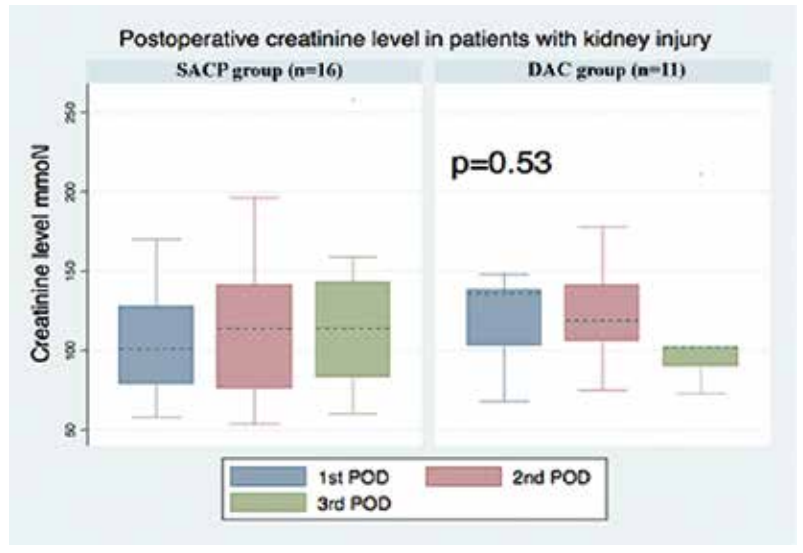

Figure 1. Box plots of postoperative creatinine level in patients with acute kidney injury after aortic arch reconstruction. SACP: selective antegrade cerebral perfusion; DAC: double arterial cannulation; POD: postoperative day.

The DAC method of visceral protection is a promising technique and could be further modified to improve outcomes. Prospective studies with a larger cohort should be performed to assess the effectiveness of renal protection.

Cardiac | Focus Session | Choosing the best valve sparing technique and how they compare with Bentalls

AVIATOR: an international registry to evaluate outcomes of aortic valve repair and sparing surgery

Frederiek de Heer and Jolanda Kluin Department of Cardiothoracic Surgery, Amsterdam Medical Center, the Netherlands

Being a technically gifted surgeon is not enough to make you a good aortic-valve-repair surgeon. There are additional requirements: you must follow your patients over a longer period, assess your results and compare them with others. Going one step further, the only way to learn which patients are good candidates for repair and which patients are not (meaning those with an initially good surgical result, but who subsequently come back within a couple of years with recurrent aortic valve regurgitation), is to assess the detailed valve characteristics of individual patients. Comparing valve and surgical details with long-term follow-up results will allow for optimisation of care for patients with aortic valve disease.

Figure 1. Participating centres

This is exactly the purpose of the AVIATOR registry that was started by the Heart Valve Society Aortic valve repair research network. The AVIATOR registry is disease specific, meaning all patients with isolated aortic valve insufficiency (including congenital mixed aortic valve disease) and/or ascending aorta aneurysms (including root and/or supra coronary aorta and aortic dissection) are eligible. This is regardless whether they undergo aortic valve repair or replacement surgery. The AVIATOR registry is open to any centre taking care of these patients and is unique in collecting detailed information of preoperative cusp analysis and cusp repair strategies. The adult surgical AVIATOR database is established and is enrolling patients, while AVIATOR-kids is in progress and enrolment will follow in the near future.

The AVIATOR registry originated in Europe, and the majority of patients enrolled at this stage are by European centres. They are responsible for the inclusion of 5,348 (89.2%) patients, followed by North America with 457 (9.5%) patients, 42 in Africa (0.8%) patients and 16 in Asia (0.5%). Valve repair is the dominant operation with 88% versus 12% replacements. Reconstructive surgery consists of 27% isolated valve repair, 23% partial root or tubular aorta replacement plus valve repair and 50% valve-sparing root replacements. Replacements include 22% isolated valve replacement, 19% tubular aorta plus aortic valve replacement and 59% root plus valve replacement (Bentall). We are very proud that large aortic valve repair centres are currently including all of their patients in the AVIATOR registry.

The HVS Aortic valve repair research network organises AVIATOR project meetings during the annual meetings of the HVS, EACTS and AV Repair Summit to which all participants are invited. A project update is given as well as outcome of research and/or audit originating from the registry.

Participation in the AVIATOR registry is free. One person of the team needs to be a member of the Heart Valve Society.
If you are interested, please send an email to: AVIATOR@HeartValveSociety.org.

EACTS is holding the largest European meeting dedicated to the developments in mechanical circulatory support therapy, offering a unique opportunity to meet and discuss the optimal treatment of patients suffering from end-stage heart failure.

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V Falk, Berlin, J Gummert, Bad Oeynhausen
Local Programme Chair
E Potapov, Berlin

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Target Audience
Cardiologists, heart failure cardiologists, emergency and ICU specialists (ECLS), cardiac surgeons, perfusionists, heart failure nurses and ventricular assist device (VAD) coordinators, medical industry representatives (cardiac devices including ECMO development and production), paediatric cardiologists and congenital heart disease surgeons

Registration Fees
Members: €550 inclusive of VAT
Non-Members: €650 inclusive of VAT

For more information visit
www.eacts.org/educational-events/programme/eums-2018

Don't forget to register your team for the third Rising Stars Quiz!
EACTS

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EACTS | Francis Fontan Fund

The EACTS Francis Fontan Fund for Education

J. Rafael Sádaba Chair, EACTS Francis Fontan Fund for Education, Complejo Hospitalario de Navarra, Pamplona, Spain

EACTS is the leading educational organisation for cardiac and thoracic surgery in Europe and among the best in the world. The EACTS Academy, launched in 2012, offers a high-quality educational programme to suit a range of levels of expertise, from trainee through to experienced surgeon. The Francis Fontan Fund (FFF) for Education is an EACTS organisation which was created in 2017 to support educational opportunities, foster professional development and promote lifelong learning in cardiac and thoracic surgery for its members. The vision of the Fund is to make independent and high-quality education accessible to EACTS members. The Fund seeks and attracts funding to support the educational portfolio of EACTS, including courses run by the Academy in Windsor and elsewhere, and a number of grants and fellowships organised by EACTS. The Fund enables partnership with industry to promote independent education in cardiac and thoracic surgery.

During 2018, the Fund has continued to grow, supporting eight grants for surgeons in training to attend EACTS Academy courses in cardiac and thoracic surgery and five visiting fellowships to enable surgeons at an advanced training stage to enhance their knowledge and skills by visiting some leading institutions of their choice. Equally, and in collaboration with the organisers of the Birmingham Review Course, three surgeons preparing for the European Board of Cardio-Thoracic Surgery examination have been awarded support to attend this course.

In 2018 we have also run two FFF fellowships. One has been the Atrial Fibrillation fellowship in partnership with AtriCure. Three surgeons from Spain, Austria and Poland have had the opportunity to attend courses included in AtriCure's AF Connect training programme, and spend four weeks at high-volume centres in Stuttgart and Warsaw. These fellows presented their experiences during the AtriCure Resident Summit on October 17. Similarly, a surgeon from Nigeria was supported to attend a Navigating the Maze course and spend time at the Hospital Clinic in Barcelona, Spain as an observer.

The second fellowship is the EACTS-MSTCVS Quality Fellowship, in collaboration with the Michigan Society of Thoracic and Cardiovascular Surgeons (MSTCVS) Quality Collaborative. Here the fellows have the opportunity to acquire understanding of a data warehouse and techniques of data review, statistical analyses, and data portrayal during the four months they spend at the MSTCVS Quality Collaborative in Ann Arbor, Michigan, USA. In January 2019, two surgeons from Italy and Kenya will start a fellowship in Postoperative Critical Care in Adult Cardiovascular Surgery at Hospital Clinic Barcelona (University of Barcelona). This fellowship has been designed to provide knowledge and competences required in postoperative care of cardiovascular surgery patients. The fellows will spend four months and Hospital Clinic in Barcelona and will be exposed to both formal teaching on postoperative care and practical experience in the daily management of these patients.

The selection process is similar for all the fellowships and it is conducted by the FFF in collaboration with the organisers of each fellowship. The applicants are requested to forward a personal letter of interest and a letter of support, together with a CV. Based on the appraisal of these items, a number of applicants are shortlisted for an online interview, after which the successful candidates are selected. Most of the fellowships are intended for surgeons towards the end of their training or in their first years of specialised practice. Their attendance to the Academy courses or their enrolment in the fellowships must be supported by their Head of Department. Good knowledge of the English language and an EACTS membership (with up to date payment of membership fees) are requirements for application. It is also important to be able to demonstrate that the candidate is in a position to be able to apply the knowledge and abilities acquired during the fellowships in his/her daily practice once the fellowship is completed.

Besides further EACTS/AtriCure AF fellowships, two new fellowships are being announced during this annual meeting and will run during 2019. The Uniportal VATS surgery fellowship will take place at the Shanghai Pulmonary Hospital in China, where the fellow will spend three months. This centre has the largest single centre volume of lung cancer surgery in the world. The fellows will be involved in a stepwise training process in uniportal VATS for patients undergoing resection for early stage lung cancer. The Aortic Root and Valve Repair fellowship aims to provide theoretical and practical knowledge in the surgical management of patients with aortic root dilatation and aortic regurgitation with special interest in the sparing of the aortic valve. It will offer attendance to basic and advanced EACTS courses on the subject and will support the selected fellows to spend time at a high-volume centre.

It is envisaged that new fellowships will be created in the coming months and years by the different EACTS Task Forces with the view to cover the whole breath of specialties of cardiac and thoracic surgery.

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Thoracic | Abstract | Thoracic - Featured abstracts

Proposal for the novel classification of lymph node in surgically resected left upper lobe lung cancer

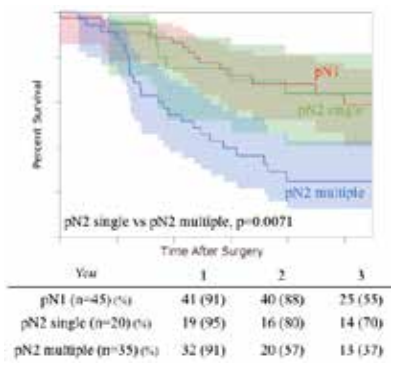
Hiroyasu Ueno, Aritoshi Hattori, Kazuya Takamochi, Shiaki Oh and Kenji Suzuki Department of General Thoracic Surgery, Juntendo University School of Medicine, Tokyo, Japan

Present nodal staging in lung cancer depends only on the anatomical extent of metastatic lymph nodes. In contrast, the anatomical boundary between hilar and mediastinal lymph nodes is obscure, particularly in the left upper lobe. This ambiguity may cause prognostic heterogeneity among patients with pN2 lung cancers located in the left upper lobe. If this heterogeneous population was classified into sub-groups, we would be able to provide appropriate treatment for pN2 patients. Therefore, we investigated the correlation of the anatomical extent and the number of metastatic lymph nodes focusing on the left upper lobe lung cancers.

Based on the background, we reviewed 368 consecutive patients who underwent pulmonary resection for left upper lobe lung cancer with systematic nodal dissection of the hilum and mediastinum. Among them, 45 were diagnosed with pathological N1, and 55 with pathological N2. We analysed prognostic factors for overall survival (OS) and disease-free survival (DFS).

In pN2 patients, the five-year OS rate was 39.5% and the median follow-up time was 35.2 months (range, 4–115 months). Of these patients, single nodal metastasis (pN2 single) was found in 20 cases, and was a significant prognosticator in univariate and multivariate analyses (p = 0.0052, p = 0.0108, respectively). The locations of the sole metastatic mediastinal node were #4L or #5 in 19 (95%) patients; pN2 single, skip metastases were revealed in 12 patients, all of which were found in #4 or #5. Based on a multivariate analysis, we divided pN2 cases into single and multiple (pN2 multiple) lesions. The OS of pN2 single was nearly identical with that of pN1 (63% vs 63%, p = 0.925, Figure 1). Therefore, when pN2 single was integrated into pN1, the survival differences were significant between the pN1 plus pN2 single group and pN2 multiple group, compared with that of the present classification (63% vs 24%, p < 0.0001, 63% vs 39%, p = 0.0219, respectively, Figure 2). Regarding the DFS, pN2 single was equivalent to pN1 (44% vs 57%, p = 0.2930, Figure 3), while that of pN2 single was significantly different compared to the pN2 multiple (44% vs 12%, p = 0.0103, Figure 3).

In conclusion, the present study was performed to elucidate the prognostic impact of the number of lymph nodes involved in patients with the left upper lobe lung cancer. Our result indicated that single nodal involvement in the mediastinal lymph node is a prognostic factor in pN2 patients. The OS curve was clearly split between pN2 single and pN2 multiple. Moreover, that of pN2 single was exceedingly equivalent with that of pN1. Therefore, pN2 patients should be prognostically sub-divided not only according to the anatomical extent but also the number of lymph nodes involved in left upper lobe lung cancer. With regards to the node descriptor of the TNM classification, nodal staging should be modified such that it becomes a simple and accurate classification that can be applied in both aspects of anatomical extent and the number of lymph node involvement.



Year	1	2	3
pN1 (n=45) (%)	41 (91)	40 (88)	25 (55)
pN2 single (n=20) (%)	19 (95)	16 (80)	14 (70)
pN2 multiple (n=35) (%)	32 (91)	20 (57)	13 (37)

Figure 1. Overall survival for patients with pN1 / pN2 single / pN2 multiple

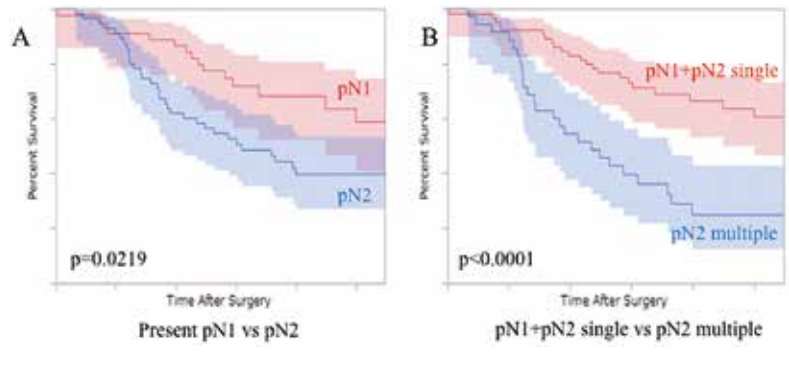
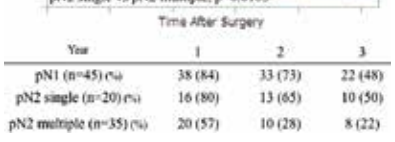


Figure 1. Overall survival for patients with pN1 / pN2 single / pN2 multiple



Year	1	2	3
pN1 (n=45) (%)	38 (84)	33 (73)	22 (48)
pN2 single (n=20) (%)	16 (80)	13 (65)	10 (50)
pN2 multiple (n=35) (%)	20 (57)	10 (28)	8 (22)

Fig 3. Disease-free survival for patients with pN1 / pN2 single / pN2 multiple

Fig 4. Disease-free survival according to the present nodal classification (A) and pN2 single was classified as pN1 (B)

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Our Optiflow venous cannulae features a special swirled tip design with multiple side holes and provides high-flow drainage without the need for double cannulation and with no increase in central venous pressure.[2] In addition, it's more compact than standard cannulae, enabling smoother insertion and removal during MICS procedures.

Rounding off the portfolio, there are cardioplegia cannulae, an extensive line of vents for left ventricle decompression and dedicated sumps, as well as vascular dilator kits for Seldinger insertion.

1. Assmann, A., Gül, F., Benim, A. C., Joos, F., Akhyari, P., & Lichtenberg, A. (2014). Dispersive Aortic Cannulas Reduce Aortic Wall Shear Stress Affecting Atherosclerotic Plaque Embolization. Artificial Organs, 39(3), 203-211. doi:10.1111/aor.12359
2. Pfeiffer et al. Superior vena cava cannulation in aortic valve surgery: an alternative strategy for a hemisternotomy approach. Interactive CardioVascular and Thoracic Surgery, Volume 20, Issue 6, 1 June 2015, Pages 863–865,

IM-01934 A

EACTS Residents Committee

Calling all RESIDENTS ...

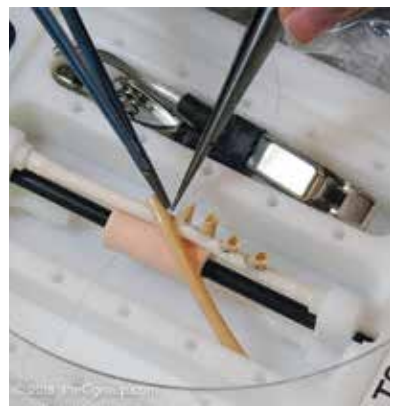
We are the **EACTS Residents Committee** – dedicated to representing the interests of European residents, improving training and promoting networking within European cardiothoracic trainees. For the Annual Meeting we have prepared a comprehensive programme of **Resident-specific sessions and activities**, so join us and seize your opportunity to talk to senior surgeons in an informal atmosphere, improve your skills at high-fidelity-simulators in the Residents' Zone at the EACTS Booth and help us to improve cardiothoracic training across Europe!

Thursday 18 October

- **14:15–15:45 / Think Tank on European CTS Training – Next Steps?**
  This session was specifically dedicated to cardiothoracic surgical training in Europe, focusing on how CTS training is organised around the world and how we can improve current training in Europe. It also showcased the innovative EACTS standardised Training Management System, aiming at improvement and transparency of training conditions across Europe. To find out more about the Training Management System, please go to the EACTS Booth, C15, Residents Zone!
- **16:00–17:30 / Nightmares in cardio-thoracic surgery**
  Can it get any worse? Here we learnt how experienced experts have solved their biggest nightmares in the OR!

Friday 19 October

- **08:15–09:45 / Residents – How to do it (video)**
  Find out how to do it! Witness sophisticated procedures, learn new techniques and discuss their implications for everyday practice with experts!



- **16:30–18:00 / Outside the box**
  Have you ever implanted an ECMO in a desert? Have you heard of virtual reality for surgical training? Think outside the box and join our session!

Saturday 20 October

- **08:15–09:45 / S.O.S. Save Our Surgeon! Critical Situations in CT Surgery**
  Severe bleeding and a crashing patien? Present your own critical case and ask for expert advice from well-known senior surgeons. How would they have proceeded? What's more, find out about experienced colleagues' biggest nightmares in CT Surgery and how you can handle them.
- **10:00–11:30 / Career Development**
  Join our career development session and learn from experts in the field how to promote your career with clinical and research fellowships abroad and profit from surgical mentoring!
- **12:45–14:00 / Residents Luncheon**
  Sit, eat and join the discussions with internationally renowned experts over lunch about the future of mitral valve surgery, hybrid approaches in cardiothoracic surgery, innovations in mechanical circulatory support and more!

To book your seat at the Residents Luncheon, please register on-site at the Social Desk.
Stay connected and join our Residents talks: #eactsresidents

Follow EACTS on Twitter, Facebook, Instagram, LinkedIn and Youtube.

New activities at the EACTS Booth Residents Zone:

We want to meet you in person!

Meet us at our **EACTS Booth, C15**: Residents Zone and find out how you can participate in shaping the future of CTS surgery in Europe.

Join in our "Network with the Experts" programme at the booth, where you can improve your surgical skills using on-site high-fidelity simulators under the guidance of top surgeons, have a chat with internationally renowned experts in cardiothoracic surgery and find out how to boost your career!

Friday 19 October

- **10.00–11.00 Miguel Sousa Uva demonstrates the Anastomosis Simulators**
- **12.00–12.45 Michael Grimm, Innsbruck, Austria**
- **15.00–15.45 Giuseppe Cardillo, Rome, Italy**

Saturday 20 October

- **14.00–15.00 Friedhelm Beyersdorf, Freiburg, Germany**
- **15.00–15.45 Ivy Modrau, Aarhus, Denmark**
  Join us for a demonstration of the EACTS Training Management System – a platform to track your surgical career development, aimed at improvement and transparency of training conditions across Europe.

Get the latest news about the EACTS Residents' activities and the famous Residents social programme!

European Residents survey: We need your help!

In recent years, CTS training in Europe has suffered several challenges and changes, including an increasing demand for structured training, reduction in working hours, and changes in the types of surgeries (fewer congenital surgeries, more percutaneous treatments and more minimally invasive treatments). As training in cardiothoracic surgery is long and the absolute number of trainees is small, there is an urgent need for pre-emptive training management to avoid both a manpower shortage, and unemployment, amongst junior doctors.

Furthermore, there is a recognised lack of curricula uniformization in Europe. To target this, the EACTS Residents are launching a Europe-wide survey to collect data on current CTS training. Come to the Residents Zone to find out more and to take part!

KEEP IN TOUCH !

Join the EACTS Residents mailing list and stay up to date for Residents activities and networking opportunities !

eacts-residents@eacts.co.uk

EACTS Academy

Brussels Live Surgery Course

Aortic Valve Repair & the Ross Operation

26–27 March 2018, Cliniques Universitaires St-Luc, Brussels, Belgium

Gébrine El Khoury and Laurent de Kerchove Course Directors

In March 2018, the first Aortic Valve Repair and Ross Operation Course took place in the Cliniques Universitaires Saint-Luc in Brussels, Belgium. This course was organised by the EACTS Academy as part of the very unique educational programme they proposed in aortic valve repair. This programme is composed of several events including the Annual Meeting, the Aortic Valve Repair Summit (AVRS) and courses organised in Brussels, Homburg, Paris and Rome. The AVRS has vocation to be a scientific meeting where all schools of thought, techniques and live cases are confronted during a two-day meeting. The courses aim to offer a deep dive into the different and renowned schools of aortic valve repair across Europe. With their limited audience (30–40 participants) and a very practical programme – including live cases, videos, lectures and hands-on sessions – the interactive courses offer the opportunity to learn, in detail, techniques of aortic valve repair developed by those centres.

In March of this year, the Brussels Course curriculum covered not only aortic valve repair but also the Ross operation. In effect, it makes sense to combine both of these procedures because in reality both treatments are very complementary, and share many common aspects for surgeons. Aortic valve repair is mainly indicated in aortic insufficiency and aortic root dilatation, whereas the Ross operation can be performed in aortic insufficiency but will likely perform better in aortic stenosis. The long-standing advantages of aortic valve repair and Ross operations in term of survival, quality of life and valve-related events justify them as key players in the armamentarium of aortic valve disease treatment in young patients. But obviously these surgeries are technically more demanding compared to prosthetic replacement and require specific surgical training and knowledge.

In both young and adult patients, aortic valve diseases leading to insufficiency or stenosis (bicuspid / unicuspid valve, connective tissue disorder ...) frequently involve not only the aortic valve but also the aortic root and ascending aorta. For this reason, aortic root surgery should frequently be performed during aortic valve repair and the Ross operation. Deep knowledge of the aortic root anatomy and of the mechanism of aortic valve regurgitation is thus mandatory to understand and recognise the lesion involved in the dysfunction. The goal in those two procedures is to preserve valve configuration and reshape and support the different structures of the aortic root, i.e. the aortic annulus, the sinuses of Valsalva and the sinotubular junction. Effectively, their stability over time is crucial in both aortic valve repair and the Ross operation.

In aortic valve repair, an enlarged aortic annulus is an independent risk factor for recurrent aortic insufficiency. To correct and stabilise annulus dilatation, several annuloplasty systems such as the external ring or the suture annuloplasty have showed their efficacy. In cases of root dilatation, the valve-sparing reimplantation technique stabilises the root at any level from the annulus to the sinotubular junction, and similar stabilisation is also obtained with the remodelling technique associated with one of the circumferential annuloplasty systems. In the Ross operation, root stabilisation is also important because the main reason for reoperation after Ross is related to the autograft dilatation leading to root aneurism and autograft valve insufficiency. Therefore, like in aortic valve repair, annuloplasty and root stabilisation techniques using either the native root or a vascular Dacron graft are indicated in patients with large annulus or aortic root to enhance durability of the pulmonary autograft.

In addition to detailed and step-by-step illustrations of all our techniques, the Brussels Course covered all of the technical aspects of aortic valve repair and the Ross operation. The Course was not only aimed at adults and congenital cardiac surgeons, but also heart teams. International expert surgeons (for example, Professor Ruggero De Paulis), as well as other expert local anaesthetists and cardiologists completed the faculty to provide a comprehensive multidisciplinary approach of the pathology, and in-depth echocardiographic assessments of the aortic valve before and after surgery.

The feedback from this first edition was excellent, and the vast majority of participants were very satisfied by the format and the content of the course – the presentations and recorded live cases of which were made available after the event. This training course will be repeated on a yearly basis in the future. The agenda and all necessary information about the next Course will be published on the EACTS website later in the year.

We warmly invite you to participate in one of the future editions of the Brussels Live Surgery Course on aortic valve repair and the Ross operation.

Course learning objectives:

1. Understand the anatomy of the normal and diseased aortic valve and root
2. Recognise echocardiographic characteristics of the different mechanisms of aortic insufficiency
3. Patient selection for aortic valve repair and the Ross operation
4. Exposition and analysis of the pathologic aortic valve and root
5. Recognise, intraoperatively, the lesions responsible for valve dysfunction
6. Techniques of valve sparing reimplantation, annuloplasty and cusp repair in tricuspid and bicuspid aortic valves
7. Techniques of the Ross operation
8. Evaluation of immediate post-repair results by echocardiography
9. Long-term results of aortic valve repair and the Ross operation, along with risk factors for failure

Laurent de Kerchove

Gébrine El Khoury

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New EACTS Members, 2018

We are pleased to confirm that we have received 289 complete EACTS Membership Applications for 2018. Please find below the list of new members elected at the General Assembly.

From now on, we are happy to receive new EACTS Membership Applications for the year 2019. Please, spread the word amongst your colleagues: **www.eacts.org/membership**

Last Name First Name	*Country*
Abbas Ghulam	*USA*
Al Shamry Adel	*UAE*
Alreweie Wael	*United Kingdom*
Andrasi Terezia	*Germany*
Andrey Boyarkin	*Russian Federation*
Ansari Aval Zahra	*Iran, Islamic Republic of*
Apaydin Tuba	*Turkey*
Arakawa Mamoru	*Japan*
Babeshko Stepan	*Russian Federation*
Bahamondes Juan Carlos	*Chile*
Bana Ajeet	*India*
Baskaev Chermen	*Russian Federation*
Beckerman Ziv	*USA*
Beckles Daniel	*USA*
Bhaskar Jayapadman	*Australia*
Bilbija Ilija	*Serbia and Montenegro*
Bisic Tahir	*USA*
Boeken Udo	*Germany*
Bouzid Abdelmalek	*Algeria*
Bulat Cristijan	*Croatia*
Cacheda Horacio	*Argentina*
Chang Chung-I	*Taiwan, PoC*
Chang Ji Min	*UAE*
Choi Jae-Sung	*Korea, Republic of*
Cirillo Marco	*Italy*
Cirillo Marco	*Italy*
Cohen Oved	*Israel*
Cornea Alexandru Mihai	*Ireland*
Del Forno Benedetto	*Italy*
Del Nido Pedro	*USA*
Demianenko Volodymyr	*Ukraine*
Denisiuk Dmitrii	*Russian Federation*
Dobrilovic Nikola	*USA*
Doev Denis	*Russian Federation*
Doikean Sukit	*Thailand*
Dolzhenko Nikolay	*Russian Federation*
Du Preez Leonard	*South Africa*
Ekimov Sergey	*Russian Federation*
Esmailzadeh Bahman	*Germany*
Forteza Alberto	*Spain*
Frasca Antonio	*USA*
Freitas Andrea	*Brazil*
Gangahanumaiah Shivanand	*Australia*
Garg Anurag	*India*
George Isaac	*USA*
Girardi Leonard	*USA*
Gramatikov Demis	*Russian Federation*
Grubb Kendra	*USA*
Harpa Marius	*Romania*

Last Name First Name	*Country*
Harrington Deborah	*United Kingdom*
Hawari Mohammad	*United Kingdom*
Isaev Maxim	*Russian Federation*
Ivaniuk Anatolii	*Ukraine*
Jamil M. Hicham	*UAE*
Jantarawan Teerawoot	*Thailand*
Jarca Angela	*United Kingdom*
Jassar Arminder	*USA*
Javangula Kalyana	*United Kingdom*
Joshi Suresh	*India*
Joskowiak Dominik	*Germany*
Kadirogullari Ersin	*Turkey*
Kadner Alexander	*Switzerland*
Kaiser Larry	*USA*
Kaleda Vasily	*Russian Federation*
Karaiskos Theodoros	*Greece*
Karnakhin Vadim	*Russian Federation*
Kaya Mehmet	*Turkey*
Khan Imran	*India*
Khan Imran	*Saudi Arabia*
Khan Niazi Attaullah	*Pakistan*
Khromeeva Liubov	*Russian Federation*
Kishor Krishna	*India*
Kobzev Evgeny	*Russian Federation*
Kogerakis Nektarios	*Greece*
Komber Mohamed	*United Kingdom*
Kondrashov Konstantin	*Russian Federation*
Kondruweit Markus	*Germany*
Kovliakov Vladislav	*Russian Federation*
Kozlov Boris	*Russian Federation*
Kravchuk Vyacheslav	*Russian Federation*
Kyuchukov Dimitar	*Bulgaria*
Lamachia Francisco	*Brazil*
Laranjeira Santos Alvaro	*Portugal*
Lau Grzegorz	*Poland*
Lau Christopher	*USA*
Lemstrom Karl	*Finland*
Lescan Mario	*Germany*
Lewis Michael	*Sweden*
Li Qing-Guo	*China*
Lloyd Clinton	*United Kingdom*
Lueck Sabrina	*Germany*
Lui Natalie	*USA*
Marinakis Sotirios	*Belgium*
Martin Suarez Sofia	*Italy*
Martins Andre Luiz	*Brazil*
Mehta Vipin	*United Kingdom*
Melek Hüseyin	*Turkey*
Meza Lopez Luis	*Mexico*

Last Name First Name	*Country*
Michel Sebastian	*Germany*
Micovic Slobodan	*Serbia and Montenegro*
Mittal Monica Maria	*Ireland*
Mokarat Bundit	*Thailand*
Mokhnatyi Serhii	*Ukraine*
Morse Christopher	*USA*
Moshinsky Randall	*Australia*
Moya Carmen	*Spain*
Mreasat Shadi	*Israel*
Mueller Erwin	*Austria*
Nakamura Shota	*Japan*
Nakhaeizadeh Reza	*Iran, Islamic Republic of*
Nanikashvili Itzik	*Israel*
Nardella Saverio	*Italy*
Nenov Ivaylo	*Bulgaria*
Neudecker Jens	*Germany*
Nihmathullah Ashiq	*India*
Nina Vinicius	*Brazil*
Odari Frankline	*USA*
Omura Atsushi	*Japan*
Özbaran Mustafa	*Turkey*
Ozeki Naoki	*Japan*
Paone Gaetano	*USA*
Park Kay-Hyun	*Korea, Republic of*
Paruchuru Pratap	*USA*
Perrin Andy	*USA*
Petersen Johannes	*Germany*
Petrou Mario	*United Kingdom*
Polyakov Igor	*Russian Federation*
Prager Richard	*USA*
Quarto Cesare	*United Kingdom*
Quinn Reed	*USA*
Raad Mahli	*Israel*
Raanani Ehud	*Israel*
Rattananont Omchai	*Thailand*
Reichert Stefan	*Germany*
Rocha Eduardo	*Brazil*
Sabbatini Armando	*Italy*
Saikia Manuj	*India*
Salem Mohamed	*Egypt*
Santo Kirkpatrick	*United Kingdom*
Santoru Massimiliano	*Italy*
Satdhabudha Opas	*Thailand*
Scherman Jacques	*South Africa*
Scott Devan	*South Africa*
Sekelyk Roman	*Ukraine*
Serban Valentin	*Germany*
Shimokawa Tomoki	*Japan*
Shrager Joseph	*USA*

EACTS – New membership applications approved by the General Assembly 2018

Last Name First Name	Country
Simone Carmine	*Canada*
Snegirev Mikhail	*Russian Federation*
Souza Leonardo	*Brazil*
Stan Alexandru	*Romania*
Stefani Alessandro	*Italy*
Strauch Justus	*Germany*
Sudus Andrij	*Ukraine*
Tagarakis Georgios	*Greece*
Thakeb Yosry	*Kuwait*
Thongcharoen Punnarerk	*Thailand*
Todurov Boris	*Ukraine*
Tribastone Salvatore	*Italy*
Trifan Bogdan Florin	*Belgium*
Tsui Steven	*United Kingdom*
Tutungi Elli	*Australia*
Uzov Peter	*Bulgaria*
Van Geldorp Martijn	*Netherlands*
Van Praet Karel	*Germany*
Vass Tamas	*Hungary*
Veshti Altin	*Albania*
Vigano Gaia	*Italy*
Vitayakritsirikul Vorapot	*Thailand*
Vogt Ferdinand	*Germany*
Voitov Alexey	*Russian Federation*
Volkov Andrey	*Russian Federation*
Vyas Raju	*India*
Waikittipong Somchai	*Thailand*
Woragidpoonpol Surin	*Thailand*
Xhymshiti Arben	*Germany*
Xi Yong	*China*
Yurdakok Okan	*Turkey*
Zhang Jing	*China*
Zhekov Igor	*Ukraine*
Zhurba Oleg	*Ukraine*
Zias Elias	*USA*
Zilla Peter	*South Africa*

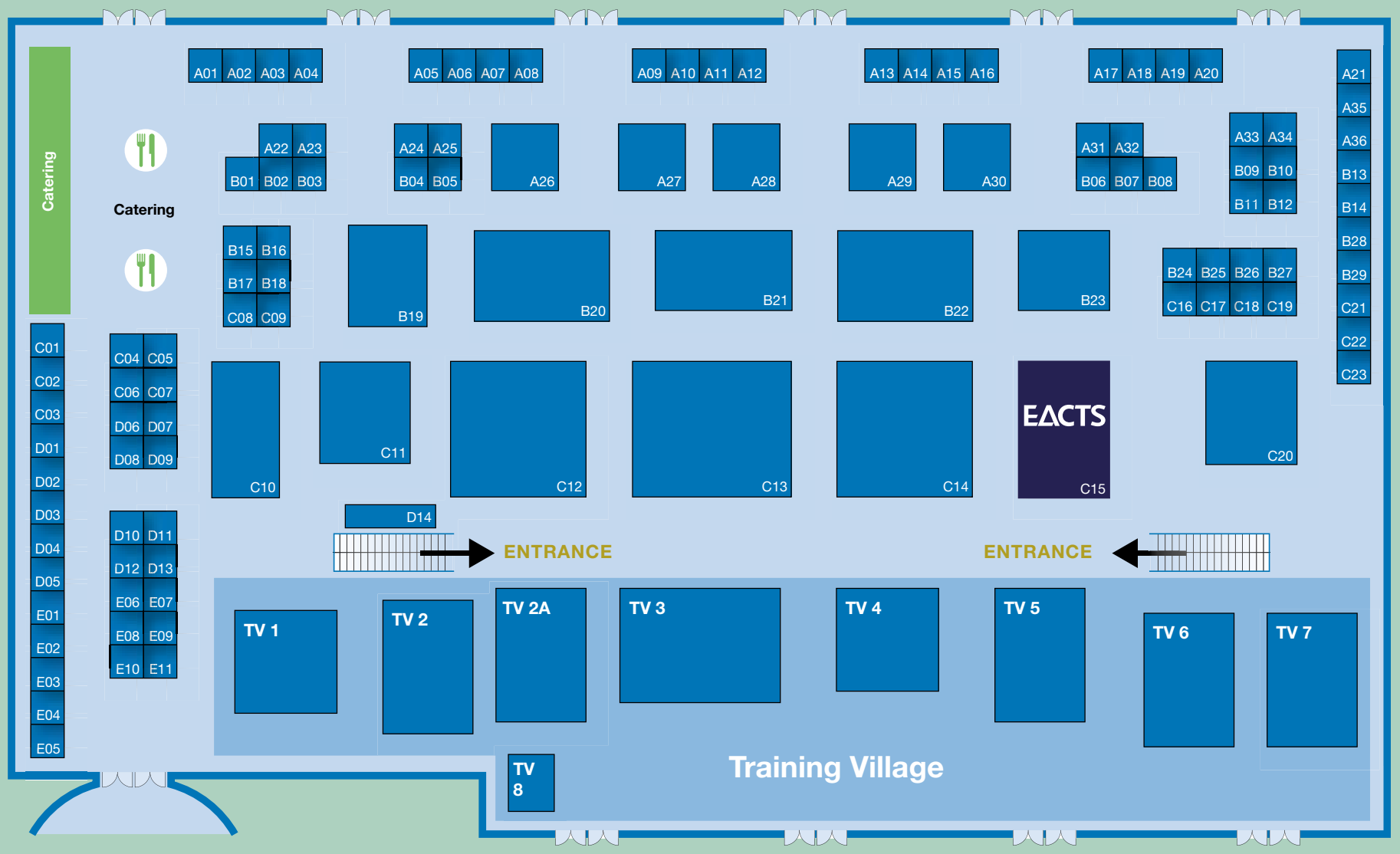
Last Name First Name	Country
Trainee Members	
Abdurakhmanov Zufar	*France*
Abouelela Farouk	*United Kingdom*
Aboul-Hassan Sleiman Sebastian	*Belarus*
Agafitei Elena	*Netherlands*
Alofesh Ahmad	*Syrian Arab Republic*
Ammannaya Ganesh Kumar K	*United Kingdom*
Angleitner Philipp	*Germany*
Armah Malik	*Slovakia*
Ayala Rafael	*Saudi Arabia*
Aydin M. Ikbal	*China*
Babadzhankov Borislav	*Netherlands*
Barajas Díaz Carolina	*Belgium*
Bayarsaikhan Urjïnkhand	*Egypt*
Baykan Devlet	*Austria*
Belluschi Igor	*Turkey*
Benfari Giovanni	*Belgium*
Bezák Branislav	*Germany*
Biondi Raoul	*Italy*
Blake John	*Germany*
Boqambar Humood	*Germany*
Boshnakov Ventsislav	*Spain*
Cerejo Rui	*Portugal*
Ceyda Hasan	*Germany*
Chandarana Karishma	*Germany*
Chigullapally Raviraju	*Italy*
Chivilgina Olga	*Romania*
Coppola Giuditta	*Belgium*
Costa Ana Rita	*France*
Cuko Enea	*South Africa*
D'Auria Francesca	*Norway*
De Vos Marie	*Spain*
Di Tommaso Ettorino	*Saudi Arabia*
Dizdarevic Ivan	*Germany*
Echieh Chidiebere	*Belgium*
Edwards Bianca	*Japan*
Ertürk Ozan	*Italy*
Federspiel Jan	*Italy*
Femia Federico	*Germany*
François Jules	*Germany*
Gioutsos Konstantinos	*Switzerland*
Gofus Ján	*Turkey*
Grigorovica Krista	*Spain*
Hansson Emma	*United Kingdom*
Hasan Mohammad	*Finland*
Hashmi Syed	*Germany*
Haunschild Josephina	*United Kingdom*
Hogan John	*Norway*
Hussein Nabil	*Netherlands*
Ibfelt Sofie	*Brazil*
Ibrahim Mohammed	*Germany*
Jarral Omar	*Russian Federation*
Jonas Karolis	*Poland*
Karalko Mikita	*Poland*

Last Name First Name	Country
Khan Abdul	*Belarus*
Kondov Stoyan	*Poland*
Korte Wilhelm	*Sweden*
Kovacev Marko	*Germany*
Kroon Henery	*Belarus*
Külahcıoğlu Emre	*United Kingdom*
Kwaśniak Ewelina	*Portugal*
Laux Magdalena	*Netherlands*
Lazzovic Dejann	*Portugal*
Madhan Vijay	*Finland*
Makarious Laham Majd	*Finland*
Marin Mateo	*Italy*
Meidrops Kristians	*United Kingdom*
Merioja Ingrid	*Germany*
Mihaylov Dimitar	*Germany*
Milojevic Milan	*Poland*
Monteiro João Pedro	*Germany*
Moussa Mohamed	*Italy*
Mustaev Muslim	*Switzerland*
Natallia Piatrovich	*Brazil*
Ngu Janet	*Italy*
Oh Timothy	*Mexico*
Onorati Ilaria	*Poland*
Osorio-Jaramillo Emilio	*Korea, Republic of*
Pamies Catalan Antonio	*Romania*
Penov Kiril	*United Kingdom*
Persson Robert	*United Kingdom*
Piedra Calle Cesar Augusto	*India*
Popevska Sofija	*Switzerland*
Prisacaru Ion	*France*
Rachid Marouf	*Germany*
Rahman S M Tajdit	*Italy*
Rajnish Rajani	*United Kingdom*
Raman Karthik	*Romania*
Ricciardi Gabriella	*Germany*
Rivas Duarte Cristina Eugenia	*Mexico*
Rösch Romina	*Germany*
Santos Silva Joao	*Egypt*
Schreurs Rick	*Switzerland*
Senanayake Eshan	*Austria*
Shalabi Ahmad	*Hungary*
Silva Manuela	*Germany*
Söderström Henna	*Brazil*
Spence David	*Greece*
Tapias Leonidas	*Finland*
Thuijs Daniel	*Finland*
Toniasso Eduardo	*Denmark*
Tripathy Amit	*Belarus*
Uchime Chimezie	*Ukraine*
Vasiloi Ion	*Greece*
Vayda Volodymyr	*Sweden*
Verhaegh Arjan	*Ireland*
Vucicevic Filip	*United Kingdom*

EACTS 2018 **Floor Plan**

Exhibition opening times:

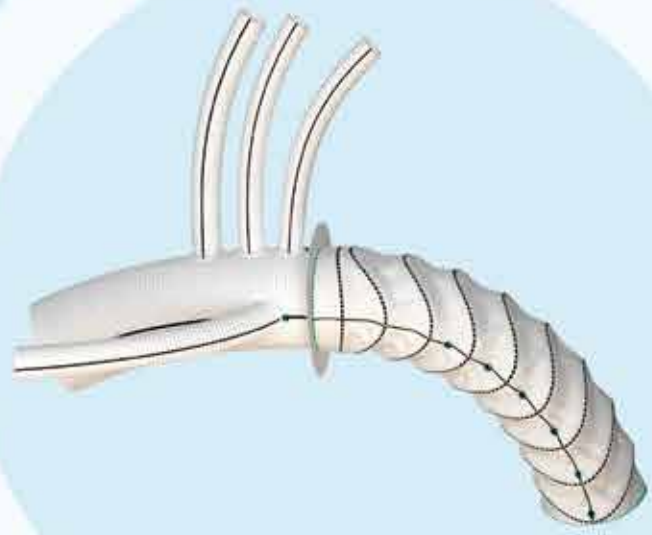
Thursday 18 October	14:00–19:00
Friday 19 October	09:00–17:00
Saturday 20 October	09:00–17:00



A09	3-D Matrix Ltd
A15, A16	A&E Medical Corporation
B28	AATS-American Association for Thoracic Surgery
C10	Abbott
TV Unit 1	Abbott
E10	ABIOMED Europe GmbH
D01	Admedus
A05	Advancis Surgical
B24	Andocor NV
D08	AngioDynamics
E09	Ansabere Surgical, S.L.
E02	Argentum Medical LLc
B07	Asanus Medizintechnik GmbH
C20	AtriCure BV
E01	Aziyo Biologics/Biomatic International, Inc.
C11	B Braun Aesculap
A29	Berlin Heart GmbH
B01	BioCer Entwicklungs-GmbH
A14	Biointegral Surgical, Inc
D03	Biometrix, s.r.o.
A13	BioStable Science & Engineering, Inc
C01	Cardia Innovation AB
B15, B17	CardiaMed B.V.
C08	Cardio Medical GmbH
B25	Changzhou Waston Medical Appliance Co., Ltd
A07	CORONEO Inc
B23	Cryolife Inc./JOTEC GmbH
TV Unit 5	Cryolife Inc./JOTEC GmbH
C21	CTSNet
C04, C06, D06	CytoSorbents Europe GmbH
D10	De Soutter Medical Limited
C22, C23	Delacroix-Chevalier
B08	Dendrite Clinical Systems Ltd
A18, A19	Dr. Franz Koehler Chemie GmbH

C15	EACTS – The European Association For Cardio-Thoracic Surgery
TV Unit 7	EACTS – The European Association For Cardio-Thoracic Surgery
TV Unit 4	Edwards Lifesciences
C14	Edwards Lifesciences
A20	Ethicon, Johnson & Johnson Medical Devices Companies
TV Unit 6	Ethicon, Johnson & Johnson Medical Devices Companies
TV Unit 8	Eurosets s.r.l.
B19	Eurosets s.r.l.
B16	Evaheart GmbH
B03	Exstent Limited
C18, C19	Fehling Instruments GmbH & Co KG
B27	Fuji Systems
A28	GEISTER Medizintechnik GmbH
A04	Genesee BioMedical Inc
C12	Getinge
C03	Heart and Health Foundation of Turkey
B02	Heart Hugger / General Cardiac Technology
A36	Heart Valve Society
A17	HMT Medizintechnik GmbH
B13	ISMICS-International Society for Minimally Invasive Cardiothoracic Surgery
D11, D13	Japan Lifeline Co., Ltd.
A01	Jarvik Heart Inc
B10	JOMDD Inc
C16, C17	KLS Martin Group – Gebrueder Martin GmbH, Co KG
TV Unit 2A	LivaNova
B20	LivaNova
E03, E04, E05	LSI Solutions
TV Unit 2	LSI Solutions
A25	Medela AG
A26	Medistim ASA
TV Unit 3	Medtronic International Trading SÁRL

C13	Medtronic International Trading SÁRL
A06	Nordic Pharma
A21	OmniGuide Surgical
A31, A32	OpInstruments GmbH
B14	Oxford University Press
E08	Paragonix Technologies, Inc.
B04, B05	Peters Surgical
D12	Philips
B06	Posthorax s.r.o
B11, B12	Qualiteam s.r.l. & SyGan Medical GmbH
A33, B09	Redax S.p.A.
A34	Rumex International Corp.
C05, C07, D07, D09	Scanlan International Inc
A27	Siemens Healthcare GmbH
E07	Somahlution
B21	Spectrum Medical
B29	STS-The Society Of Thoracic Surgeons
E11	Sunoptic Technologies
A24	SynCardia Systems Inc
E06	Tecnohealth srl & 4Medika
B22	Terumo Europe NV + Terumo Aortic
A22	Thompson Surgical Instruments, Inc.
A23	Tianjin Plastics Research Institute Co Ltd (TPRI)
A02	Tianjin Welcome Medical Equipment Co., Ltd.
B26	Transonic Europe
B18, C09	Vascular Graft Solutions
D02	Vygon
A10, A11, A12	Wexler Surgical, Inc. & TeDan Surgical Innovations & Designs for Vision
D14	Wisepress Online Bookshop
C02	WL Gore & Associates GmbH
A30	Xenios AG
A08	Xenosys Co Ltd
A03	Zeon Medical Inc
D04, D05	Zimmer Biomet



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