Jeopardy competition final held today

Don’t miss the final round of the Jeopardy competition, taking place today at 14:15-15:45 in Hall F1. Successful delegates from Sunday’s semi-finals will compete for a ticket to the next STS Annual Meeting in Lauderdale, Florida in January 2017. The winning team will represent Europe and will compete against the American winners for the ‘World Champion’ title.

Come to cheer on the teams, and test your own knowledge!

Finalists:
Madras Medical Mission, India
Castle Hill Hospital, UK
How I treat the aortic arch

In a session that explores one of the most technically challenging areas of vascular repair, Leonard Girardi (New York Presbyterian Hospital, and Weill Cornell Medicine, NY, USA) and Tilo Köbél (University Medical Center Hamburg, Germany) share their expertise in treating the diseased arch from the open surgical and the endovascular perspective.

**Open classic repair**

Ziotti et al. recently reviewed surgical options for the treatment of aortic arch pathologies, highlighting that although significant improvements in surgical outcomes have come about, the challenges of operative mortality, neurological impairment and stroke remain. Nevertheless, advances in the understanding of cerebral reperfusion and lower body tissues, and of protective techniques, are largely responsible for improving safety in open repair that has come about in recent decades, and as such open repair remains the gold standard in the arch. In conversation with EACTS Daily News, Dr Girardi described his approach to arch repair, in a field that encompasses contrasting schools of thought.

“There are a lot of different ways to protect the brain during surgery,” he began. “Institutional biases, based on experience, really guide a lot of what people do. To date there really haven’t been any randomised trials, or large meta-analyses showing an advantage for a particular brain protecting method.”

Open repair is performed with varying degrees of systemic cooling, circulatory arrest and cerebral perfusion, either antegrade or retrograde. These topics have been examined in a number of recent observational studies, meta-analyses and reviews1-5. Hypothermia reduces brain metabolic demand with variable efficacy relative to profound hypothermia alone.6 Yet in 2015, Okita et al. found comparable clinical outcomes for antegrade versus retrograde cerebral perfusion in total arch replacement6. “Antegrade cerebral perfusion is used by the greatest number of institutions performing arch surgery; however, profound hypothermia without adjunctive brain perfusion also works quite well, particularly for uncomplicated arch repairs,” Dr Girardi’s preferred strategy is retrograde cerebral perfusion. In 2014 he and colleagues published a large retrospective study demonstrating its safety and efficacy as an adjunct to profound hypothermia in hemiarch and total arch replacement7. “The truth is that it works well, in the right hands,” he noted. Advantages of retrograde perfusion include avoidance of the great vessels, maintenance of brain hypothermia, and flushing debris out of the cerebral circulation – advantages that antegrade does not provide. Could this be providing a benefit when it comes to stroke risk? “Most of these patients who have arch aneurysms (not so much dissections) have a lot of atheromatous debris,” observed Dr Girardi.

He went on: “If you are perfusing the brain throughout the entire period of your arch reconstruction and if the amount of perfusion to the brain is adequate, why then do you have stroke and temporary neurologic deficit? It must be that either that brain perfusion is inadequate, perhaps attributable to our lack of understanding of cerebral autoregulation and blood flow, or due to great vessel manipulation embolic events are being generated.”

“With retrograde we don’t see a lot of embolic strokes nor a great degree of temporary neurologic deficit, probably because those of us still using retrograde are still using profound hypothermia. The low temperatures are very reassuring.”

Cannulation is another talking point in arch repair, with different strategies favoured in different hands. “Most people using antegrade perfusion will have some form of axillary or innominate artery cannulation. There does not seem to be a difference in terms of which one you choose, but there may be instances where the axillary artery is too small or too fragile; then the innominate is an alternative site,” he continued. “This is particularly the case where the arch is more complicated and those performing these procedures with low experience, really guide a lot of what people do. To date there really haven’t been any randomised trials, or large meta-analyses showing an advantage for a particular brain protecting method.”

**“To date these discussions haven’t standardised a way of doing arch surgery.”**

Leonard Girardi

**Endovascular repair**

Several techniques exist, each with varying degrees of systemic cooling, circulatory arrest and cerebral perfusion, either antegrade or retrograde. These topics have been examined in a number of recent observational studies, meta-analyses and reviews1-5. Hypothermia reduces brain metabolic demand with variable efficacy relative to profound hypothermia alone.6 Yet in 2015, Okita et al. found comparable clinical outcomes for antegrade versus retrograde cerebral perfusion in total arch replacement6. “Antegrade cerebral perfusion is used by the greatest number of institutions performing arch surgery; however, profound hypothermia without adjunctive brain perfusion also works quite well, particularly for uncomplicated arch repairs,” Dr Girardi’s preferred strategy is retrograde cerebral perfusion. In 2014 he and colleagues published a large retrospective study demonstrating its safety and efficacy as an adjunct to profound hypothermia in hemiarch and total arch replacement7. “The truth is that it works well, in the right hands,” he noted. Advantages of retrograde perfusion include avoidance of the great vessels, maintenance of brain hypothermia, and flushing debris out of the cerebral circulation – advantages that antegrade does not provide. Could this be providing a benefit when it comes to stroke risk? “Most of these patients who have arch aneurysms (not so much dissections) have a lot of atheromatous debris,” observed Dr Girardi.

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**“We must rigorously examine the outcomes of industry-sponsored trials.”**

Leonard Girardi

Describing his approach, Dr Girardi continued: “In retrograde perfusion, we just cannulate the aorta and try to keep it simple. There isn’t a need for complexity. You don’t need a special setup and you avoid great vessel manipulation.”

This open approach remains the gold standard, investigations into hybrid and fully endovascular techniques go on in an effort to address populations at high risk for surgery. Commenting on the extent to which the endovascular field could develop in this area, Dr Girardi said: “A lot of investigation is going into endovascular approaches, both in the cardiovascular and vascular surgery communities. In vasculitis and in aneurysms, really guide a lot of what people do. To date there really haven’t been any randomised trials, or large meta-analyses showing an advantage for a particular brain protecting method.”

But these procedures are quite complicated and those performing them are unable to making sure the technology is applied in a very thoughtful way. If you dabble in complex endovascular repair you are going to have problems.”

**References**


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Endovascular repair

Continuing the session on the challenges in aortic arch repair, a number of speakers discuss strategies alternative to the classic open approach such as hybrid detranching, frozen elephant trunk and endovascular techniques. Open surgery remains the mainstay of aortic arch repair. But the benefits of surgery are not felt by those with significant risk factors that include advanced age, severe comorbidities and previous cardiac surgery. Such patients are prescribed medical therapy, but do not always respond well. Mid-term outcomes of surgical arch repair were recently published by Utzrnske et al., in a European multi centre retrospective analysis spanning from 2004 and 2013, the authors concluding that the surgical risk in elective aortic arch surgery has remained constant during the last decade despite the advancements in surgical techniques.

“Open surgery of ascending and arch pathologies requires major surgery; namely, aorto-bypass, cardiac arrest, and a significant incision through the sternum,” said Tilo Köbel (German Aortic Center Hamburg, University Heart Center, University Hospital Hamburg Eppendorf, Germany), who will speak about the progress of endovascular arch repair during the session.

“The side effects of this trauma are significant, even though some centres of excellence may offer acceptable results in young patients. Patients who have undergone this type of surgery, which requires usually months of rehabilitation and getting back to normal life (if ever), do not want to repeat this experience, especially as operations have an even higher risk. Endovascular repairs may have a shorter lifespan, but the life the patient gets after intervention is usually of better quality, with fast return to normal activities.”

Within the sub-group of aortic arch disease patients for whom the risk of surgery outweighs its benefit, there is a potential for endovascular repair – if carried out by experienced teams, and provided that the patient’s anatomy is suitable. Recently, Roselli et al. assessed just what proportion of inoperable patients would be eligible for endovascular repair outcomes, concluding a retrospective analysis of patient data within the acute type A dissection population. The authors concluded that, out of the 20% of acute type A dissection patients who were deemed inoperable, two-thirds of such cases would have potential coverage with endovascular devices.

Commenting on this work, Dr Köbel said: “With today’s techniques of using highly custom stent grafts mainly for ascending repair, which Roselli et al. address, I agree that a significant percentage is treatable with endovascular. But I would estimate this to be 50%. I expect to see new devices combining stent grafts with valves which may overcome this limitation in the foreseeable future.

Where does the state of data lie with regard to endograft types and configurations?” Talligras et al. (2016) showed that fenestrated and branched endografts are important in specific patient anatomies in a retrospective comparative study. They specified that fenestrated thoracic endografts could typically be used to extend the landing zone, which was previously described by Kölbel et al. in 2016, in two patients with acute type A dissection. However, aortic morbidities may allow for fenestration to appose to target vessels, if not, the authors favoured a branched endograft – which, they said, is also suitable where aneurysm covers the greater part of the aortic wall.

Data on branched endografts is limited. Tazaki et al. (2017) found acceptable repair outcomes, as well as establishing safety and efficacy, in the long-term study of the Innove branched endograft for arch aneurysms. However, the authors highlighted the need to cross-reference outcomes with other studies.

Lee (2016) reviewed the current status of branched aortic endografts, writing that they likely represent the most promising treatment in the future of aortic arch disease, adding that branched endograft prototypes would include a number of diameters and branch configurations. The use of branched endografts in tandem with tubular grafts in the endovascular repair of the aortic arch and descending aorta was also described by Kölbel et al. in 2016, in two patients with acute type A dissection.

Giving an impression of the state of development of branched endografts, Dr Köbel said: “Three companies offer a custom-modified arch graft in Europe at the moment. The inner branch technology appears the furthest developed. Both Cook Medical [USA] and Boston Medical [USA], who produce these grafts, offer limited retrospective data so far. We have now a series of around 100 and 100 arch grafts with fenestrations and branches and will soon report on the outcome, which shows around 5% mortality and 5%-8% stroke rate.”

While the fully-endovascular field continues to grow, the hybrid approach is perhaps better established. A study by Martin et al. (2016) of the short- and long-term outcomes of the hybrid arch repair found short-term outcomes comparable to open repair. The authors highlight issues, such as type ia endoleaks following chimney grafting, that need to be addressed to make the endovascular approach more promising.

References

Should patients’ wishes come before the dead donor rule?

During a session examining ethical issues in organ transplantation that included adult heart allocation, immunosuppression, and dual transplantation, Robert Sade (Institute of Human Values in Health Care, University Medical Center, Amsterdam, the Netherlands and co-chair with Dr. Boer of the EACTS/EACTA Guidelines on Patient Blood Management for Adult Cardiac Surgery) said that the audience gave its insights into the collaboration which has produced the first joint guidelines between the two societies.

Implemeting a multidisciplinary team approach to patient management in cardiac surgery can minimise blood loss, help reduce transfusion requirements and costs, as well as improve patient outcomes, say new guidelines.

Professor Boer, who was involved in drawing up the guidelines with EACTS, said the whole issue of patient blood management was now a hot topic with cardiac surgeons and was “coming out of the shadows.” She added, “I looked back at the programmes for cardiovascular surgeons at the meetings from a few years ago and there wasn’t any mention on patient blood management, but now there are. It’s a subject that’s gaining much more attention and rightly so. Patient blood management is a hot topic now because it can save blood, blood is really now a blood donation decline, and also blood transfusion is being used as a quality endpoint, so if you perform surgery without needing transfusion you are really a hero. Patient blood management has now really become a general interest in the cardiothoracic field for the last few years – but now there is much more awareness and surgeons are much more interested.”

Professor Boer underlined that patient blood management in cardiac surgery can minimise bleeding, reduce blood transfusion needs, and help maintain perioperative haemostasis. Both high blood product transfusion requirements and reperfusion for bleeding have been associated with adverse clinical outcomes.

“Patient blood management is managed by cardiologists, the anaesthesiologist and the clinical perfusionist,” explained Professor Boer. “In a joint effort, EACTS and EACTA have produced joint guidelines for patient blood management in adult cardiac surgery.”

Professor Boer says the guideline initiative came from the surgical side as there seemed to be so much variation in blood management between different centres in Europe. “There had been a need for guidelines on blood management in cardiac surgery for a long time, as none currently exist,” he explained. EACTS recognised the need to involve cardiology anaesthesiologists too. “Both realise that in order for blood transfusion to be used, it must be done as a last resort,” Professor Boer explained. “Both believe that patient blood management cannot be just done by one health profession, it needs input from cardiologists, anaesthesiologists and perfusionists.”

“One of the challenges you have to deal with is that you have evidence, and then you have your opinion, so there would be a debate between evidence and what was published in the literature, and these were the most challenging discussions,” the knowledge levels of the whole group increased as a result of the discussions though.”

Professor Boer said the guideline authors found some practices were not based on the individual experience. “Some of these are widely used in clinical practice but they don’t have a strong evidence base. For instance, in cardiac surgery we have the opportunity to use a very expensive drug to stop bleeding called “DDAVP,” and there is huge variation in its use. Some centres use it all the time and some centres don’t use it at all. The problem is the number and quality of studies available on its effectiveness is very low, most of the studies don’t have a powerful design. The guideline recommendation had to be handled very sensitively, as obviously we don’t want to put the drug out of business, it is needed and it is there for a place. We are not saying it doesn’t work, just that more evidence is needed of its effectiveness.”

Professor Boer went on to note that more large trials were needed to know the drugs work and regular updates should be published, saying: “The most important recommendations in the guidelines relate to how you can optimise your patients before surgery to reduce blood loss, transfusions and deaths. For instance, in my own centre we did a lot of investigations on patient blood management and we observed a 75% decrease in use of blood products, just by using a couple drugs patients take nowadays such as antiplatelet drugs and anticoagulants. These drugs all increase the risk of blood loss, so we try to give very practical schemes and tools for a physician so they can optimise their patients in a better way.”

“The surgical procedure, we provide algorithms for dealing with a patient who is losing blood, and although there is no perfect algorithm, at least introducing a protocol in your institution where you describe what you do when a patient starts to lose blood, can be very beneficial in reducing blood transfusions.”

What is of course very different from other surgical specialties is that we have the heart/lung/bypass machine, and we also provide recommendations on the use of the heart/lung machine. There is a lot of variation on how use of the machine is approached. That is also the reason that there is now an expert opinion available on cardiopulmonary bypass.”

Professor Boer noted that they have now made recommendations on the volume of fluids used in cardiopulmonary bypass, and also the use of anticoagulant drugs during this period. “These days, surgeons and anaesthesiologists have clinical protocols on cardiopulmonary bypass, but how the bypass machine is operated by the perfusionists is an aspect of cardiac surgery which needs more emphasis.”

She added that the guidelines also stressed the importance of the multidisciplinary team in patient blood management. One Class I (C) recommendation is the involvement of the multidisciplinary team (cardiologists, surgeons, anaesthesiologists and perfusionists) discuss optimal surgical strategy based on clinical status, morbidity and bleeding risks and team expertise.

The collaborative approach recommended reflects “the need not only for the surgeon to apply meticulous haemostasis and patience with respect to clot formation,” but with recognition that these measures are only effective when paralleled by interventions that minimise haemostasis, normothermia, appropriate anticoagulation and haemostatic monitoring during the procedure.

Other key recommendations include: limitation of haemodilution; use of anti fibrinolytics, transfusion of PRBC based on the clinical condition of the patient rather than haemoglobin levels, and PRBCs of all ages.

The guidelines say the following transfusion thresholds: aspirin should be continued in CABG, cell salvage, MVR and RAD should be implanted, heparin level management should be considered over ACT-guided heparin management, and protamine-to-heparin dosing ratio should be less than 1:1.

The following approaches are recommended: FFP based on the use of topical sealants, AT sup to reduce bleeding following CPB, protamine to factor level, DDAVP or FVIIIa.}

Professor Boer will dive into intraoperative anticoagulation, and the Guidelines, in more detail during this afternoon’s session “2017 Perioperative blood management guidelines”.

References
Continued from page 5

Dr Sade, is that consenting donors facing imminent death be considered on whole still alive to remove vital organs. While this proposal seems as though it may introduce ambiguity to the rules of organ donation, Dr Sade stressed that no less ambiguity is associated with the donor rule, viewing it as in favour of organ donation, even in scenarios directly violating the dead donor rule: 85% of a 1,000-strong sample agreed that they were willing to donate organs after death, 76% of whom agreed that they would donate in the scenario of irreversible coma with organ removal causing death. The rate of organ donation in the US has continuously increased over the last 30 years, with very few, if any, blips in that linear increase,” noted Dr Sade. “I also believe that the biggest slope concerns that are in opposition to arguments that favour honouring the patients’ self-determination, that is, the overriding importance of personal autonomy, even if expressed through the controlling factor in how his wish is permitted the determination of death by neurological criteria, many patients who didn’t care, and believed that taking organs under those circumstances was perfectly acceptable.”

Public values evolve as new ethical challenges emerge in medicine. For example, noted Dr Sade, at the dawn of the donation era, ‘good samaritan’ donors were viewed with intense suspicion, and were not accepted by most donor centres for fear they might be mentally ill. “Ultimately, most programs that wish to accept such donors, recognising that many of them are simply altruistic offerings requiring only a thorough neurological examination before being accepted. In recent years, several hundred good samaritan donors provide a kidney to the general pool of organs every year.”

Ethical challenges of greater relevance today include stem-cell research, prenatal genetic testing, public health policy, data protection, and physician-assisted dying – and have demonstrated that public opinion shifts as those concepts become familiar. Drawing analogies across issues can also be helpful: “Physician-assisted death is a good analogy to DID,” said Dr Sade. “Consider this also: the concept of brain death was first proposed in 1968 in the US and was codified into law in 1981. Although many states did not adopt this law until the mid-1980s. During the (roughly) 15 years when there was no law permitting the determination of death by neurological criteria, many patients who were near death, but were legally still alive in an intensive care unit on a ventilator and many other modalities of life support, were taken to the operating room and their organs removed for transplantation. Although these procedures were technically illegal, in those 15 or more years, there was not a single instance of protest by any individual, organisation, or prosecutor. The general public simply didn’t care, and believed that taking organs under those circumstances was perfectly acceptable.”

Dr Sade speaks during the session ‘Ethical and surgical issues in organ transplantation’ taking place this morning from 8:15 in Hall K2.

Should patients’ wishes come before the dead donor rule?

Withdrawal of life support always requires judgment calls...donation by patients who will die very shortly or imminently: a completely voluntary, no coercion or undue pressure, desire to donate, and well-informed consent to be an organ donor. ‘From a practical perspective, the dead donor rule has resulted in about 10,000 unnecessary deaths every year. In my talk, I will show that if the dead donor rule were abandoned, the waiting list for heart patients would be wiped out in one year and for kidneys, livers, and lungs in 2-3 years.”

The manner in which the dead donor rule should be abandoned, explained existing mechanisms by which decisions are made to withdraw life support in any patient who is near death. “Death occurs after withdrawal of life support in 60-90% of patients in medical intensive care units in the US. In donation by the imminently dead (DID), the decision to withdraw life support must be taken before organ donation is considered or offered to patients or families; that is, there must be complete separation between the decision to withdraw life support and a decision to donate organs. Current protocols for the widely accepted DCD also require that this separation be maintained, so this is nothing new. Withdrawal of life support always requires judgment calls, and those are associated with some ambiguity, but DID is not different from DCD in community of transplant physicians and surgeons. Transplant surgeons will still be concerned about the possibility of prosecution for killing a patient. Several pathways could be taken to make organ donation acceptable before the patient is pronounced dead.”

Arguments against physician-assisted death generally are based on slippery slope concerns that are in opposition to arguments that favour honouring patients’ self-determination, that is, the right of individuals to control the fate of their own bodies and lives. “The ethical foundation of DID is similar: when a patient is about to die, honouring his right to self-determination or autonomy, even if expressed through a surrogate decision maker, should be the controlling factor in how his wish is handled. In the US, physician-assisted death was illegal in every state 20 years ago. Today, increasing acceptance of the overriding importance of personal self-determination has changed: physician-assisted death is now legal in 6 states, and legalisation is being considered in at least a dozen more. My hope is that DID will gradually be accepted similarly in both Europe and the US.”

Dr Sade concludes: “Withdrawal of life support always requires judgment calls...donation by patients who will die very shortly or imminently: a completely voluntary, no coercion or undue pressure, desire to donate, and well-informed consent to be an organ donor. ‘From a practical perspective, the dead donor rule has resulted in about 10,000 unnecessary deaths every year. In my talk, I will show that if the dead donor rule were abandoned, the waiting list for heart patients would be wiped out in one year and for kidneys, livers, and lungs in 2-3 years.”
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**Vascular | Focus | How to approach the aortic valve in a dilated root**

**Cusp configuration and cusp plasty is the clue in tricuspid aortic valve repair**

Hans-Joachim Schäfers, Dept. of Thoracic and Cardiovascular Surgery, Saarland University Medical Center, Homburg/Saar, Germany

In the past 15 years, aortic valve repair has become an alternative to valve replacement for the treatment of regurgitation. In tricuspid aortic valves, the most frequent cause of aortic regurgitation is cusp prolapse, at least in a central European environment. In order to establish normal postoperative valve function, restoration of normal valve form is essential. This also requires a normal amount of cusp tissue, i.e. an absence of relevant retraction.

Previous repair approaches have relied primarily on visual judgment of valve configuration and the results of the repair interventions. In the absence of objective data on valve form the results were not always predictable. In order to generate better information we have analysed both failures of aortic valve repair and also functionally normal valves. The height difference between cusp margin and basal plane in diastole – termed effective height – was found to relate to root size in normal valves with a mean of 9 to 10 mm in adults, thus was an quantitative indicator for cusp configuration.

In a retrospective analysis, this effective height was also associated with a high probability of a good functional result and durability. In order to define normal values for tissue, we have also measured the maximum tissue height between insertion and free margin in the centre of the cusp, termed geometric height. More than 90% of the individuals studied had a geometric height of 18 mm or more. Initially, geometric height is measured and the concept of repair pursued if it is 18 mm or more. Using a graded calipper, effective height is then measured, yielding objective and quantitative information on cusp configuration. An effective height of less than 8 to 9 mm (depending on values of geometric height) indicates prolapse. Prolapse can be corrected in most instances by central plicating sutures on the free margin, if necessary also extending into the body of the cusp. The cilter, in conjunction with visual assessment, can therefore be used to evaluate the result of the surgical intervention.

Using these principles, repair of the tricuspid aortic valve has become a rational and widely reproducible procedure. The elimination of retracted cusps helps to identify the valves suitable for repair. Using a determination of effective height, the cusp repair can be tapered to need, and is less dependent on surgical judgment.

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**Cardiac | Rapid Response | Extra corporeal life support – Always a good solution**

**Outcome of ECMO support for treatment of primary graft dysfunction after heart transplantation**

Fardad Esmailian, Sadia Dimbil, Ryan Levine, Jignesh Patel, Michelle Hamilton, Lawrence Czer, Francisco Arábia, Jon Kobashigawa Cedars-Sinai Institute Los Angeles, CA, USA

ECMO offers support for cardiogenic shock, improvement in haemodynamic function, and increased patient survival with end-stage heart disease. In heart transplantation, ECMO can be an effective approach in treating patients with severe PGD in the immediate post-transplant course. Our goal was to assess the efficacy of ECMO use in treatment of patients with severe PGD at our large single centre.

Between 2010 and 2015, we assessed 581 patients undergoing heart transplantation. Of those, 22 patients required ECMO support within 24 hours of heart transplantation. The indications for ECMO included PGD (n = 16), and secondary graft dysfunction (n = 6), primarily due to intraoperative bleeding and thrombotic events. We assessed one-week, one-month, six-month, and one-year survival along with one-year freedom from cardiac allograft vasculopathy (CAV) as defined by stenosis >30% by angiography. Additionally, one-year freedom from non-major adverse events (NF-MACE) defined as: myocardial infarction, new congestive heart failure, percutaneous coronary intervention/stent, implantable cardioverter defibrillator/pacemaker implant, stroke, one-year freedom from any-treated rejection, acute cellular rejection, antibody-mediated rejection, and biopsy negative rejection was also assessed. Kaplan-Meier survival and Chi-square analysis were performed using SPSS (IBM) software.

In the secondary graft dysfunction group, 4/40 patients died within one week post-heart transplantation, and one additional patient died at six months post-heart transplantation. Of the 16 patients with severe PGD, survival was as follows: one-week survival (91.3%), one-month survival (75.5%), six-month survival (60%), and one-year survival (52.5%).

There was no significant difference in one-year freedom from cardiac allograft vasculopathy, non-fatal major adverse cardiac events, and all types of rejection between the two groups. It appears that ECMO is a viable option in the treatment of patients with severe PGD as it portends acceptable outcome. However, due to the haemodynamic instability of the secondary graft dysfunction patients, the use of ECMO is associated with poor outcomes. Larger numbers are warranted to validate these findings as these numbers are small. Additionally, better understanding of the pathophysiological mechanisms of PGD will help to improve treatment options for these patients.

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**Congenital | Focus | Nightmare cases**

**Nightmare cases session: Univentricular heart**

Takahiko Sakamoto, Department of Pediatric Cardiovascular Surgery, Children’s Medical Center, Matsudo City General Hospital, Chiba, Japan

**Introduction**

We will present of nightmare case focusing on univentricular heart. First Fontan completion was not accomplished and the following nightmare course was experienced.

**Case**

The patient was diagnosed as Dextrocardia, Asplenia, (A,L,D) SVC, DORV, PSS, CAV, CA, bilateral SVC, left PA/PCV, VAA. She underwent PVBET and the following bilateral BDG at the age of three months and seven months, respectively. Cardiac catheterisation data revealed RAP of 13 mmHg, VCP of 6 mmHg, Rp of 2.7 unit - m², PA index of 141 mm²/m², RVEDV of 224 % of Normal and RVSP of 61%. SpO2 was 85-90%. She underwent extracardiac TCPC without fenestration at the age of two years, and successfully weaned from CPB with AOP of 69/42(52) mmHg, CVP of 12 mmHg and LADP of 6 mmHg. Tracheal tube was removed at two hours after surgery, and she was moved to general ward on POD 2. Last CVP was 15-16 mmHg. However, there was much increase in bilateral pleural effusion, and she underwent creation of additional fenestration (4 mm) on POD 9 but it was naturally closed and finally she was taken down to BDG on POD 13 due to unstable haemodynamics. Moreover, sudden intestinal perforation occurred and resection of the perforated portion was performed on POD 24. She was discharged from hospital two months later (failed Fontan). Our team discussed the future plan, and she underwent aggressive col embolization for coliculitis and surgical cleaning of left subclavian artery. The following cardiac catheterisation data showed RAP of 12-13 mmHg and VCP of 6 mmHg, and finally she successfully underwent redo-fenestrated TCPC (5 mm). Final postoperative CVP was 14 mmHg and SpO2 was 90% around under 02 11/min.

**Figure 1:** BDG with many collaterals

**Figure 2:** right. Fenestrated TCPC with oxygen

**Discussion**

In this case, SpO2 after fenestrated TCPC was almost the same as that at BDG, and VCP (CVP) elevated from 6 to 14 mmHg. Cardiac output is also the same. The time course was no difference as well as the patient. The question is which is better for the patient, BDG with many collaterals or fenestrated TCPC with oxygen inhalation?
Haemodynamics during rest and exercise: A comparison of two stented aortic valve bioprostheses and a healthy control group in small aortic annuli

Sina Stock, Inga Lohmann, Ulrich Stierle, Doreen Richardt, Hans-Hinrich Stevers
Department of Cardiac and Thoracic Vascular Surgery, University of Luebeck, Germany.

In recent years, surgical aortic valve bioprostheses (SAVbs) have shown increased acceptance even in younger patients, since SAVbs offer certain advantages compared to mechanical valve substitutes. But the price to be paid for the avoided need of lifelong anticoagulation and the lack of valve noise is a significantly higher rate of re-operations. Thus, it is essential that SAVbs provide excellent long-term data and are compared to mechanical valves. But while SAVbs reduce valvular obstruction significantly, some kind of residual stenosis is left as an intrinsic shortcoming of the devices or the procedure itself. According to the Hagen–Poiseuille law, a proportional relation of forward flow to a radius of an orifice area, especially in small aortic annuli this may lead to pressure loss and aortic valve insufficiency (pAVI) causing a functional aortic valve stenosis (pAS), which is known to significantly impair postoperative outcome. Thus, most studies assess echocardiographic characteristics of SAVbs only at rest, representing some kind of “low-flow” state and only one splitter of everyday haemodynamics. Since blood pressure and heart rate increase during exercise, it is essential to additionally evaluate SAVbs under these conditions, potentially revealing changes in the incidence of pAVI and pAS.

The purpose of this study was to determine rest and exercise haemodynamics of two differently designed SAVbs, the Perimount Magna Ease (Edwards Lifesciences, USA) and the sVARC-2 (simplified VARC-2) classification based on excerpts of the simplified VARC-2 consensus document to determine prosthetic valve haemodynamics. The final categorisation of each patient to sVARC-2 (insignificant dysfunction), II (moderate dysfunction) or III (severe dysfunction) was defined by the worst parameter representing the maximum impairment of SAVb function in each patient (Table 1).

Comparing Trifecta and Perimount Magna Ease, a significant superiority of Trifecta was seen at rest in pEOA (1.57 versus 1.29 mm²) and EOA (1.57 versus 1.48 mm²), during exercise in all parameters (pE 1.16 versus 1.29 mm², pEOA 1.77 versus 1.62 mm², pEOAI 0.96 versus 0.67 cm²/m²). Trifecta showed a physiological increase of EOA during exercise. Therefore, the gap in haemodynamic performance between Trifecta and Perimount Magna Ease cohort, leading to a shift to better sVARC-2 categories in the Trifecta group and to worse ones in the Perimount Magna Ease group (Figure 1).

Table 1. Simplified VARC-2 (sVARC-2) classification for prosthetic valve dysfunction (7)

<table>
<thead>
<tr>
<th>sVARC-2</th>
<th>Prosthetic valve stenosis</th>
<th>Prosthetic-patient mismatch</th>
<th>EOA (cm²)</th>
<th>pEOA (cm²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>&lt; 20</td>
<td>&gt; 0.85</td>
<td>&gt; 0.74</td>
<td>&gt; 0.95</td>
</tr>
<tr>
<td>II</td>
<td>20–40</td>
<td>1.1–0.8a</td>
<td>0.85–0.65</td>
<td>0.7–0.85</td>
</tr>
<tr>
<td>III</td>
<td>&gt; 40</td>
<td>&gt; 0.6a</td>
<td>&gt; 0.65</td>
<td>&gt; 0.75</td>
</tr>
</tbody>
</table>

The worst parameter defines the category.

References

Figure 1. Percentage distribution of simplified VARC-2 categories at rest and maximum exercise in the healthy control, Trifecta and Perimount Magna Ease (PME) groups. The worst determined parameter defines the category.

Figure 2. Vegetation on noncoronary leaflet

Figure 3. New autopericardial valve (Ozaki procedure)

Figure 4. After operation – aortic insufficiency 0

Heart valve disease...
INSIDE VIENNA
Where to go? What to do?

SIGHTS

SCHÖNBRUNN PALACE
With over 1,400 rooms, the former imperial palace is as grand in size as it is in style. Tickets can be purchased for a dedicated tour of the building, or perhaps just stroll its gardens and Roman ruins, taking in the view as you go.

"THE GIANT WHEEL"
There are few better views that aboard the Riesenrad – Vienna’s giant Ferris wheel. Whether you just want to take it for a spin, or perhaps sit for a candlelit dinner, you can be sure that the vista below will take centre stage.

OPERA HOUSE
Orchestral members of this eminent and beautiful opera house are regularly plucked by the Vienna Philharmonic – widely known as one of the most accomplished orchestras in the world.

FOOD AND DRINK

WIENER SCHNITZEL & BEER
The classic Viennese combo can be found in many great restaurants across the city, but there are a few special mentions! Salm Bräu has its own brewery, crafting delicious beers with their years of expertise. Figlmüller prides itself as being home of the schnitzel for more than 100 years, keeping to a small menu done to perfection. On the other side of the coin, modern Skopik & Lohn offers the dish in a bright, 21st century atmosphere.

VINEYARDS OF VIENNA
Wine-making within a large capital metropolis may seem unlikely, but Vienna not only proves it’s possible, it leads by example. A trip to an authentic Viennese Heurige (a shorthand for "this year’s wine") is a real treat. Expect communal tables, beautiful backdrops, and of course a fine glass of (predominantly) white wine. Head to www.wien.info for locations.

NASCHMARKT
The central market of Vienna is over a kilometre long, offering a great way to work up an appetite before tucking into the delicacies that adorn the stalls (open Monday to Saturday).
CATCHING A GLIMPSE OF FROZEN ELEPHANT TRUNK SPECIALTIES

Lunch Symposium
Monday, October 9th, 12:45 h – 14:00 h, Level -2, Room -2.47 / -2.48
Chair: Prof. Aung Oo, MD, London, United Kingdom

Scientific Topics
Mini-Sternotomy during FET-procedure
Petar Risteski, MD, Frankfurt, Germany

Hemi-Arch Surgery in Acute Type A dissection
approves the formation of chronic dissections
Prof. Andreas F. Zierer, MD, Linz, Austria

Panel discussion
Prof. Aung Oo, MD, London, United Kingdom
Petar Risteski, MD, Frankfurt, Germany
Prof. Andreas F. Zierer, MD, Linz, Austria
Prof. Heinz Jakob, MD, Essen, Germany
John Kokotsakis, MD, Athens, Greece

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Cardiac implantable electric devices: Is surgeon–electrophysiologist cooperation key to success?

The surgeon's role in cardiac implantable electric devices

This afternoon will feature a session focussing on the surgeon's role in cardiac implantable electric devices. Co-moderted by Brigitte Osswald, Professor of Cardiothoracic Surgery at Heinrich-Heine-Universität, Dusseldorf, Germany, the session hopes to explore the cooperation between cardiothoracic surgeons and electrophysiologists, and how to improve cardiological and surgical outcomes.

In an interview with EACTS Daily News, Professor Osswald gave an introduction to the session, touching upon the key topics that should be discussed, and emphasising the need for continuous education.

How is the role of a surgeon changing in the cardiac implantable devices field?

Electronic cardiac devices have been implanted since the 1960s and 1970s (pacemakers) and in the early 1990s (ICDs) by cardiac surgeons. Most surgeons have predominately performed implantations and device exchanges, although some have moved into electrophysiological aspects of patient care. The number of implantations required has increased, and the range of procedures has expanded. There are now different types of devices for different indications, and the indications are constantly changing. The inclusion criteria for surgery have also changed, and the devices are becoming more sophisticated.

Are there any issues that you would particularly like to highlight?

There are many issues that we would like to highlight, but the most important one is the need for continuous education. The field is constantly evolving, and there are many new developments and technologies being introduced. Surgeons need to be aware of these developments and be prepared to adapt their practice to them.

What are your predictions for the future?

We predict that the role of the surgeon will continue to change, and that there will be more collaboration between surgeons and electrophysiologists. The use of new technologies and techniques will also increase, and surgeons will need to be prepared to adapt to these changes.

What are the key topics that will be discussed in this session?

The session will focus on the cooperation between surgeons and electrophysiologists, and how to improve outcomes. It will cover a range of topics, including the indications for surgery, the selection of patients, and the management of complications.

Are there any specific cases or case studies that will be discussed?

Yes, there will be case studies presented, including cases of complex and difficult situations. These will illustrate the importance of cooperation between surgeons and electrophysiologists, and the importance of ongoing education.

Are there any particular highlights that you would like to mention?

We would like to highlight the importance of collaboration between surgeons and electrophysiologists, and the importance of ongoing education. We believe that this will lead to better outcomes for patients, and that it is essential for the future of the field.

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Cardiac | Rapid Response | Is no-suture the future for aortic valves?

Ten-year follow-up of 334 Perceval sutureless valves: very low mortality and no explants for valve degeneration

B Meuris | Department of Cardiovascular Sciences, KU Leuven, Leuven, Belgium

Due to the rapid deployment system, the Perceval sutureless valve enables significant shortening of surgical procedure times in cases of single or combined aortic valve replacement (AVR). First-in-man implants were performed in 2007 in our centre, together with Paris (Professor Laborde) and Hannover (Professor Havercost), which means we have up to 10 years of follow-up in this first patient cohort. The Perceval valve is now in routine clinical use in our centre and is used by both experienced surgeons and trainees. The speed of the implantation process facilitates minimal access surgery in single AVR and it is responsible for a significant shortening of the cross-clamp time in more complex or combined cases.

We reviewed our entire single-centre experience from 2007-2016 with Perceval (n = 334) and studied early and late mortality, stroke and hospital readmission rates within 30 days and all available echocardiographic data. We now have 326 patients in follow-up, with a length of follow-up ranging from 1 to 10 years (mean 3.5 years). Even in this aged population (mean age 79.9 years, mean EuroSCORE II 5.6), the 30-day mortality was only 2.4%. Single AVR cases (mean EuroSCORE II 3.6) had only 0.6% 30-day mortality and 1.9% stroke rate. The early mortality in multiple valve cases (mean EuroSCORE II 8.7) was only 1.7%. Readmission rates at 30 days varied between 4% (single AVR) and 8% (combined cases). All-cause mortality at two years was, again, taking into account the advanced age at implantation, only 14% in single AVR, 18% in AVR+CABG and 11% in multiple valve cases. Echocardiography at discharge showed a peak gradient of 28 +/- 9 mmHg and a mean gradient of 15 +/- 3 mmHg. Paravalvular leak is rare and never caused any clinical problems. At the latest echocardiographic follow-up, we saw peak gradients of 24 +/- 5 mmHg and mean gradients of 14 +/- 3 mmHg.

The only explants that have been performed so far are three cases of late endocarditis. All these patients did well after their reoperation. We observed one case of structural valve degeneration (SVD) at 6.5 years postoperatively in a patient with renal failure and vascular disease, showing a peak gradient exceeding 65 mmHg. She refused reoperation or transcatheter treatment given her advanced age. No explants for SVD have been performed yet in this series, nor did we have to treat any Perceval valve with a TAVI valve-in-valve. Even in a population with clearly elevated risk, the Perceval sutureless valve provides an early survival benefit up to 83% than what is predicted by EuroSCORE II, in combination with low stroke rates and low hospital readmission rates. The overall mean STS-score of this whole patient cohort was also 5.8, thus a similar risk profile of patients that were enrolled in recent prospective clinical trials comparing TAVI to surgery. Given our observed early (30-day) death rate of only 2.4% and a death rate of only 15% at 2 years (lower than what is reported in these trials), it might be that AVR using sutureless valves will have to be considered as a separate entity within the ‘surgical’ arm of future trials.

EACTS launch the new digital Portfolio Management System

EACTS is constantly developing initiatives to implement our stated aim of “Raising Standards Through Education and Training”. Existing approaches include the Skills programme delivered through our Academy Programme and MIMCTS.

During the last two years we have worked to develop a tool which will further advance this noble ambition.

We are therefore proud to announce the launch of the Portfolio Management System. A further twentynine centres are in the process of registering. The international nature of this platform is a significant development towards the harmonisation of resident training, facilitating a uniform platform to assess training for all countries. The system also introduces Entrustable Professional Activities as a framework for the assessment of residents, ensuring performance is measured by quality, not quantity, in a resident’s training portfolio.

The Portfolio Management System is offered free for EACTS members; heads of training are required to be EACTS members and residents are encouraged to apply for membership. To register your centre to the portfolio, go to www.eacts.org/educational-events/portfolio-management-system or visit the EACTS booth (#69), where you can also see a demonstration of the Portfolio Management System.
Differences in laser lead extraction of infected vs non-infected leads

Simon Pechaj and Samer Hakmi
Department of Cardiovascular Surgery, University Heart Centre Hamburg, Hamburg, Germany

In recent years, the number of pacemaker and ICD/CRT implantations has been increasing. Furthermore, the number of device-related infections has been rising. In those patients, complete device and lead extraction is recommended by the guidelines; complete lead extraction has been shown to reduce mortality and morbidity. In this study, we investigated the effect of systemic infection or lead endocarditis on the difficulty and success rate of laser lead extraction (LLE) procedures.

Between January 2012 and March 2017, 184 patients underwent laser lead extraction (LLE) at our institution. All laser lead extractions were performed using a Glide Light 80 Hz Excimer Laser. Indications for lead extraction were reviewed, and patients were divided into groups. In group A (n = 52 patients, 112 leads) patients with systemic infection and/or lead vegetation were included, while in group B (n = 132, 239 leads) all patients with local pocket infection or non-vegetative indications for extraction were included. A retrospective data analysis was conducted and success/comisation rates between groups were compared. Mean time from initial lead implantation (103.4 vs 89.6 months; p = 0.1203) and ratio of ICD and pacemaker leads did not differ significantly between the two groups. Complete procedural success was signiﬁcantly higher in group A compared with group B (100% vs 94.5%; p = 0.03; Figure 1). Furthermore, the laser treatment and ﬂuoroscopy time was signiﬁcantly shorter in group A. Minor and major complications were rare in both groups without statistically signiﬁcant differences (Group A: one minor complication (1.9%), no major complication; Group B: one minor complication (0.7%), three major complications (2.3%). No procedure related mortality was observed in any of the groups, however two patients of group A with preoperative septic shock died during hospital stay from multiorgan failure.

In conclusion, the presence of systemic infection or lead endocarditis in LLE procedures allows for higher complete procedural success. When compared with LLE of non-infected leads, the infected leads require shorter laser and ﬂuoroscopy times. No statistically signiﬁcant differences were observed in minor as well as major complication rates. However, especially in patients with systemic infection and preoperative septic conditions, an intensive postoperative treatment regimen with ICU care and differentiated antibiotic and haemodynamic management is necessary.

Figure 1. Complete procedural success was signiﬁcantly higher in group A (infected) compared with group B (non-infected)
Aortic coarctation repair through left thoracotomy: results in the modern era

Emile S Farag1, Jolanda Kluin1,2, Frederiek de Heer1, Yunus Ahmed1, Vladimír Sojak1,2, David R Koolbergen1,2, Nico A Blom1, Bas AJM de Mol1, A Derk Jan ten Harkel3, Mark G Hazekamp1,2

1. Department of Cardiothoracic Surgery, Academic Medical Center, Amsterdam, the Netherlands; 2. Department of Cardiothoracic Surgery, Leiden University Medical Center, Leiden, the Netherlands; 3. Department of Cardiology, Leiden University Medical Center, Leiden, the Netherlands

Coarctation of the aorta (CoA) is a complex congenital cardiovascular malformation characterised by a narrowing of the thoracic aorta most typically located near the ductus arteriosus. Surgical treatment of CoA is often possible through left thoracotomy and without the use of cardopulmonary bypass, but life-long follow up is recommended in literature due to risks of hypertension and recoarctation. Large recent studies reporting outcome after CoA repair through left thoracotomy are scarce, but may aid in the identification of patient-specific characteristics that are associated with post-operative complications and mortality. Therefore, the aim of this study was to evaluate the results of primary CoA repair through left thoracotomy and without the use of cardopulmonary bypass in children (<18 years). The analysis included 295 patients, consisting of 118 neonates, 81 infants and 96 older children, who underwent surgical CoA repair between January 1995 and December 2016. Patients who underwent catheter-based interventions, such as balloon angioplasty or stent placement, as initial treatment or underwent primary surgical repair of CoA through median sternotomy were excluded. The majority of patients underwent repair with end-to-end anastomosis (146 patients, 49%) or extended end-to-end anastomosis (125 patients, 42%). Peri-operative mortality was 2.0% (n = 6) and overall mortality was 2.7% (n = 8). Reinterventions due to recoarctation were performed in 9.8% (n = 29) of the cohort consisting of catheter-based interventions in 24 patients and surgical repair in five patients. Recoarctation occurred more often in patients treated in the neonatal period than in older children (p < 0.001). In conclusion, CoA repair through left thoracotomy is a safe procedure and is associated with low rates of mortality. However, recoarctation requiring reintervention is still a significant cause of morbidity and mandates long-term follow-up and future research. At present we are performing 4D flow MRI studies in patients after CoA repair to study abnormal blood flow and wall shear stresses as this may contribute to the aetiology of postoperative aortopathy resulting in recoarctation or aortic aneurysm formation.
Left atrial appendage resection is not only effective but also safe and minimally invasive

Takafumi Inoue
Cardio-Thoracic Surgery, The University of Tokyo, Bunkyo-ku, Japan

Left atrial appendage occlusion (and prevention from stroke) features the following: Only LAA resection is performed, with no other manipulation; the procedure is performed in total endoscopic fashion; it takes approximately 30 minutes, and postoperative hospital stays are four days. Through our experience of this operation, we can evaluate the effect of LAA resection on cardiac function. LAA resection is usually performed combined with other cardiac operation, so it is difficult to evaluate the isolated effect of resection. Meanwhile, no other procedure than LAA resection was conducted in thoracoscopic left atrial appendectomy. Excluding other manipulation influence such as cardiopulmonary bypass, cardiac arrest or valve surgery, evaluation of isolated LAA resection can be achieved.

We examined consecutive 87 patients who had undergone thoracoscopic left atrial appendectomy. In our results, the mean volume of bleeding in the operation was 3.6±1.7 ml. The mean length of the postoperative hospital stay was 3.8±1.8 days. All of the patients were discharged while maintaining their preoperative activities of daily living without major complications. With regards to cardiac function, the left atrial diameter, ejection fraction and brain natriuretic peptide (BNP) levels were not significantly different after surgery than before. 43±5 mm to 43±5 mm, p = 0.8; 43±5 mm to 43±5 mm, p = 0.8; 116±107 pg/ml to 95±108 pg/ml, p = 0.09, respectively. (Figure 1)

These results showed that LAA resection did not have negative effect on the cardiac function and can be performed safely. In any operation, the cutting method always carries a risk of bleeding. To reduce the risk of bleeding, ligation or sutures are often chosen for LAA occlusion, and resection is not preferred. With the development of the auto-stapling linear cutter, the bleeding risk has been drastically reduced, and a linear cutter is usually used for cutting tissues during surgery. Its application for LAA resection was therefore natural (Figure 2), and little bleeding was detected in result. The LAA is reported to function as the left atrial reservoir, so we were concerned that the cardiac function might be negatively influenced by LAA resection. However, we found that LAA resection had no effect on the ventricular contraction. Compared with other ways of LAA occlusion, resection has the merits that no re-canalisation could happen after resection because the resected LAA can never develop again. In addition, no residual ischaemic tissue remains in the body (Figure 3).

In conclusion, LAA resection does not negatively affect the heart function, and the bleeding risk does not increase. LAA resection should therefore be aggressively considered in applicable cases.

EACTS Aortic Valve Repair Summit 2018
A new EACTS event in Paris: June 18-19, 2018

Emmanuel Lansae, on behalf of the AVRS scientific committee

The Aortic Valve Repair Summit (AVRS) was created three years ago in Brussels from a collaboration between Professor Gaétane El Khoury and Professor Hans Joachim Schäfers’s teams, joining their experiences for the widespread of aortic valve repair. Initial success was confirmed with the last edition in Ottawa. This coming year, AVRS 2018 – held June 18-19 in Paris – will be conducted by EACTS for the first time. EACTS’ implication in aortic valve repair is in compliance with recent European 2017 guidelines for Heart Valve Disease, which recommends “a Heart team discussion in selected patients with pliable, non-calcified tricuspid or bicuspid aortic valve insufficiency in whom aortic valve repair may be a feasible alternative to valve replacement” (class I indication). New guidelines also overcome the initial valve-sparing debate on remodelling versus reimplantation by recommending (since 2014) “aortic valve repair using the re-implantation or remodeling with aortic annuloplasty technique, in young patients with aortic root dilatation and tricuspid aortic valves” (class I indication).

AVRS is the world’s largest scientific meeting, gathering together the different schools of thought in aortic valve repair. It will cover all aspects of the disease including medical therapy, imaging, patient selection and surgical techniques focused on patient outcomes. The aim is to integrate state-of-the-art into daily practice, as well as to challenge the current knowledge via high level scientific debates on the main burning topics of aortic valve repair. Abstract submission is strongly encouraged in order to stimulate the scientific debate and enlarge the community of AVRS.

This two-day session will also provide an in-depth overview on aortic valve repair from valve-sparing root replacement to isolated aortic valve repair for tricuspid, bicuspid and unicusp valves. It will feature five surgeries, offering a fascinating overview of the whole procedure, which will be combined with a short video session illustrating specific lesions and technical issues. In addition, specific facets of aortic dissections as well as the paediatric population will be addressed. The programme will also include a ‘failure session’, in which attendees will discuss cases all the way from echo analysis to surgical repair, learning how to identify predictors of repair failure and bailout techniques in such conditions.

El Khoury and Professor Hans Joachim Schäfers’s teams, joining their experiences for the widespread of aortic valve repair. Initial success was confirmed with the last edition in Ottawa. This coming year, AVRS 2018 – held June 18-19 in Paris – will be conducted by EACTS for the first time.

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Vascular | Focus | How far away are we from setting guidelines for arch surgery?

Total arch replacement during thoracic endovascular aortic repair for aortic arch aneurysm: comparison of long-term outcomes in octogenarians

Yoshimasa Seike1, Hitoshi Matsuda1, Tetsuya Fukuda2, Jiro Matsuo3, Yosuke Inoue1, Atsushi Omura1, Kyoko Uehara1, Hiroaki Sasaki1, Junjiro Kobayashi1

Uehara1, Hiroaki Sasaki1, Junjiro Kobayashi1, Yuriy Pya6, Thomas Krabatsch7, Jan Schmitto8, Michiel Morshuis9, Joyce

includes a fully magnetically levitated rotor, wide

mark-approval in 2015. The distinctive design

US), a newly designed LVAD, received the CE

these interrelated events is of great clinical interest.

However, complications attributable to LVAD

reason the ELEVATE registry – a prospective

ELEVATE™ Registry: 30-Day Outcomes is consistent with CE Mark Study

From the HeartMate 3™ Left Ventricular Assist Device Post-Market Multinational ELEVATE™ Registry: 30-Day Outcomes is consistent with CE Mark Study

Jens Garbade1, Finn Gustafsson2, Steven Shaw1, Jacob Lavee3, Diyar Saeedi4, Yury Pyla5, Thomas Krabatsch6, Jan Schmitto7, Michiel Morshuis8, Joyce Chung9, Daniel Zipf11

1. Department of Cardiovascular Surgery, Heart Center Leipzig, University of Leipzig, Leipzig, Germany; 2. Department of Cardiac Surgery, University Hospital of Duesseldorf, Duesseldorf, Germany; 3. National Research Cardiac Surgery Center, Astana, Kazakhstan; 4. German Heart Center, Berlin, Germany; 5. Department of Cardiothoracic, Transplantation and Vascular Surgery, Medizinische Hochschule Hannover, Hannover, Germany; 6. Department of Cardiothoracic Surgery, Heinz- und Diabetenzentrum NRW, Bad Oeynhausen, Germany; 7. Abbott (Formerly St. Jude Medical), Pleasanton, CA; 8. Department of Surgery, Division of Cardiac Surgery, Medical University of Vienna, Vienna, Vienna; 9. Abbott, Abbott Park, IL, US.

When aortic arch repair has benefits in octogenarians, total arch replacement (TAR) or detachment thoracic endovascular aortic repair (dT-TEVAR) should be selected in accordance with the risk for surgery and anatomical features of the aorta.

Advanced age is generally a powerful independent predictor for early postoperative complications after conventional TAR. In contrast, there are increasing evidences that dT-TEVAR can provide acceptable early results in patients deemed to have a high risk for open surgery. Since 2008, we have applied dT-TEVAR for treating aortic arch aneurysms, mainly for selected elderly patients. For elderly patients whose anatomical features of the aneurysm are inappropriate for performing the usual dT-TEVAR, we indicated a special technique – the chimney stentgraft technique for proximal zone D landing. However, some patients still have no choice but to undergo TAR to treat their arch aneurysm. The aim of this study was to reveal the differences of long-term outcomes between TAR and dT-TEVAR and to identify risk factors for adverse events after aortic arch repair in octogenarians. We reviewed medical records of 125 patients aged ≥80 years who underwent surgical intervention for aortic aneurysm between 2008 and 2016. Of these, 60 underwent conventional TAR (43 men; age, 82 ± 2.2 years) and 65 underwent dT-TEVAR (49 men; age, 84 ± 3.4 years). We primarily chose dT-TEVAR to treat aortic arch aneurysms in “high-risk” patients. The contraindications for dT-TEVAR were as follows: (a) diameter of the ascending aorta (n = 22); (b) severe atherosclerotic changes of the aorta (n = 9); (c) unstable preoperative haemodynamics due to rupture (n = 5); (d) indication of concomitant procedures (n = 5); and (e) connective tissue disorder (Loeys-Dietz syndrome; n = 1). Freedom from all causes of mortality at two and four years was similar (82% and 66% in TAR, 80% and 51% in dT-TEVAR, p = 0.17). Freedom from aortic death at two and four years was similar (98% and 88% in TAR, 90% and 80% in dT-TEVAR, p = 0.86) (Figure 1).

In conclusion, TAR in octogenarians with COPD and/ or malignancy showed higher mortality rates; dT-TEVAR is more appropriate in these situations. The prevention of perioperative stroke, which is related with poor prognosis in both groups, is critical.

References

Figure 1. Survival curve: (A) Probability of freedom from all causes of mortality, (B) Probability of freedom from aortic death.

Table 1. Predictors of all-cause mortality (multivariate analysis by group). HR; hazard ratio, TAR; total arch replacement, d-TEVAR; debranching thoracic endovascular aortic repair, COPD; chronic obstructive pulmonary disease

<table>
<thead>
<tr>
<th>Group</th>
<th>Covariate</th>
<th>HR</th>
<th>95% CI</th>
<th>P value</th>
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<td>Malignancy</td>
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<td>Perioperative stroke</td>
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<td>1.76-90.4</td>
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<td>Postoperative pneumonia</td>
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<td>d-T-TEVAR</td>
<td>Neurologic dysfunction</td>
<td>2.97</td>
<td>1.23-7.18</td>
<td>0.016</td>
</tr>
</tbody>
</table>

Figure 1. 30-day survival rate of the ELEVATE registry. (A) Freedom from all-cause mortality, (B) Freedom from aortic death.

From the HeartMate 3™ Left Ventricular Assist Device Post-Market Multinational ELEVATE™ Registry: 30-Day Outcomes is consistent with CE Mark Study

Mechanical circulatory support with a durable continuous-flow left ventricular assist device (LVAD) has become an option for the growing population of patients with end-stage heart failure. However, complications attributable to LVAD therapy are still the challenge and limit the overall effectiveness of therapy. Reducing the incidence of these intertwined events is of great clinical interest. The HeartMate 3 LVAD (Abbott, Chicago, IL, US), a newly designed LVAD, received the CE mark-approval in 2015. The distinctive design includes a fully magnetically levitated rotor, wide blood flow gaps, and an artificial pulse, which are intended to optimise haemocompatibility. Since the HeartMate 3 LVAD became commercially available, its clinical use has expanded worldwide. For this reason the ELEVATE registry – a prospective observational multinational registry (26 centers, both experienced and non-experienced) was implemented to collect clinical data for assessing the post-market real-world experience in a 24-month timeframe. Data collection in the ELEVATE registry was similar to that of the CE Mark trial (CEM). After adjustment for baseline differences, a comparison of outcomes at 30 days post-implant was performed between the clinical trial results and the post-market clinical experience. Compared to the CEM trial (n=50), the ELEVATE group (n=459, primary implant only) was more severely ill with lower baseline hematocrit (p = 0.008) and more patients classified as INTERMACS profile 1-2 (32% vs 10%, p<0.001). After adjustment for differences in baseline characteristics, in the 30-day survival the differences were comparable between ELEVATE and CEM groups (88% vs 98%, p = 0.44; Figure 1); 10% of the patients were imputed via a less invasive (LS) approach and 6% were off-pump implants, in contrast to the CEM trial where 100% were implanted via sternotomy on CPB. In both the CEM and ELEVATE groups, bleeding and infection were the most common adverse events. In the ELEVATE group, the stroke rate at 30 days post-implant was 3%, despite 7% of patients having previous stroke history and 11% having pre-operative MICS, which may be risk factors for developing embolism or stroke. An important result from this post-approval registry is that there were no pump thrombosis events at 30 days post-implant. Despite the principle limitation that this is a multinational, non-randomised, voluntary, post-market registry, our preliminary data confirm the short-term results from the CEM trial. However, the longer 24-month follow-up of the ELEVATE registry is mandatory to determine the impact of the HeartMate 3 pump design on long-term outcomes, GI-bleeding, infection, and neurological and thromboembolic events.

References
Hybrid aortic repair using the frozen elephant trunk in acute DeBakey type I aortic dissection

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The extent of emergent surgery for acute DeBakey type I aortic dissection is discussed controversially. Common practice is a proximal repair up to the arch leaving the distal dissected aorta untreated. But in the long term the downstream aorta has been proven to be the major cause of aorta-linked mortality or high-risk re-intervention due to dilation, aneurysm formation and rupture. The frozen elephant trunk (FET) technique in addition to ascending and arch repair offers simultaneous hybrid treatment of the descending aorta. Moreover, the FET promotes aortic remodelling in the descending aorta by inducing false lumen thrombosis and hereby reduces the rate of secondary re-interventions and the mortality rate linked to the downstream aorta. Concerns exist about the complexity of the procedure and prolonged cardiopulmonary bypass and circulatory arrest times, which implicates an elevated risk of perioperative mortality and neurologic complications, especially spinal cord injury.

We therefore analysed our data with the FET (Jotec E-vita open plus®) in acute aortic dissection which is among the largest single centre experiences in Europe so far. Between October 2009 and December 2016 a total of 72 patients underwent emergent hybrid aortic repair using the FET for acute DeBakey type I aortic dissection at our centre. Our implant criteria include a minimum aortic diameter of 20 mm, according to the size of hybrid prostheses available (as oversizing is not recommended), and absence of multiple re-entries or extremely kinking in the descending aorta due to increased risk of false lumen placement and stentgraft-induced aortic injury. The neuroprotective strategy is a consequent use of selective antegrade cerebral perfusion combined with mild systemic hypothermia. Clinical presentation of patients at admission was cardiogenic shock in 20.8%, a neurologic deficit in 26.6% and malperfusion in 26.4%, reflected by a mean logistic EuroSCORE of 40%. Overall 30-day mortality was 15.3% and univariate analysis identified as risk factors preoperative cardiopulmonary resuscitation (p = 0.02), preoperative cardiogenic shock (p = 0.008), postoperative low cardiac output syndrome (p = 0.0001), and length of ICU stay (p = 0.005). Interestingly, preoperative malperfusion did not have an impact on postoperative survival (p = 0.46). New postoperative stroke was only seen in 2.8%, and spinal cord injury in 4.2%. In follow-up (mean 33.3 ± 23.0 months) cumulative survival was 75.9% with freedom from distal reintervention in 96.7% and false lumen thrombosis in the descending aorta in 92.6%.

We conclude that hybrid aortic repair using the FET in acute DeBakey type I aortic dissection does not elevate the perioperative risk of mortality and provides excellent aortic remodelling with low distal reintervention rate in midterm follow-up.

Nora Goebel
Ten-year results of thoracoabdominal aortic aneurysm treatment with hybrid thoracic endovascular aortic repair

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The treatment of thoracoabdominal aortic aneurysms (TAAA) in great vessels is still challenging, as the early results of the operation are not very promising compared with other aortic operations, and the incidence of spinal cord ischemia is relatively high. In Japan, which is becoming a super-aging society, the method of performing minimally invasive operations remains a major issue. At our facility, we have been performing renocircular debranching thoracic endovascular aortic repair (TEVAR) to resolve these issues. Sixty patients underwent surgery consisting of hybrid repair for the treatment of aortic pathologies in the thoracoabdominal region between 2007 and 2016. The mean age was 72.7 years. Most were older patients, with 31 (51.6%) in their 70s and 20 (33%) in their 80s. Patients aged 70 years of age accounted for 68% of the total. Seventeen patients (28%) had chronic obstructive pulmonary disease. Forty-two patients (70%) showed chronic kidney disease of G3 or higher. Thirty-five (58%) had a history of aortic surgery. True aneurysm was found in 44 (73%) and chronic dissection in 16 (27%). The standard operative procedure of renocircular debranching involves replacing the abdominal aorta with a bifurcated graft. The quadrifurcated graft is anastomosed to the left leg of the bifurcated graft, and the visceral arteries are then reconstructed using the quadrifurcated graft. Renocircular debranching and stent-grafting were performed as a two-stage procedure. In hospital death occurred in three cases (5.0%), including two cases of aneurysm rupture while waiting for TEVAR and 1 myocardial infarction after hybrid TEVAR. Two patients (3.3%) suffered from spinal cord ischemia after the stenting procedures. One patient (1.7%) newly required haemodialysis. The overall survival was 75.9% at two years, 65.2% at five years and 42.5% at eight years. The long-term all-cause survival rate tended to be low because of many elderly patients. The rate of freedom from aortic events was 92.9% at two years, 80.5% at five years and 72.5% at eight years. Four patients (7.4%) required additional treatment during the follow-up period. There were no aneurysm-related deaths in the long-term among patients who completed hybrid TEVAR. Renocircular debranching surgery for TAAA is not minimally invasive in terms of surgical invasion beyond bifurcation graft replacement for abdominal aortic aneurysms. However, relatively after renocircular debranching surgery is fast because it does not require thoracotomy or extracorporeal circulation. In addition, staged TEVAR gives a low recurrence rate of paraplegia. Renocircular debranching TEVAR for TAAA is a better option for elderly patients, re-do cases and high-risk patients who are hesitant to undergo conventional open surgery. However, further long-term follow-up is necessary to extend the indication to younger patients.
A multicentre phase II clinical trial of isolated lung perfusion with melphalan in 107 patients with resectable lung metastases.

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1. Department of Thoracic and Vascular Surgery, Antwerp University Hospital, Edegem, Belgium; 2. Department of Thoracic Surgery, Leiden University Medical Centre, Leiden, the Netherlands; 3. Department of Thoracic Surgery, St. Antonius Hospital, Nieuwegein, the Netherlands; 4. Department of Thoracic Surgery, Easmas Medical Centre, Rotterdam, the Netherlands; 5. Department of Cardiac Surgery, Antwerp University Hospital, Edegem, Belgium

Hilar lymphadenectomy can be omitted in selected patients with oesophageal squamous cell cancer

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1. Department of Thoracic Surgery & section of oesophageal surgery, Shanghai Chest Hospital, Shanghai Jiao Tong University, China

Radical lymphadenectomy is the mainstay in the surgical treatment of oesophageal squamous cell carcinoma (ESCC). However, aggressive and skeletonised lymph nodes dissection could lead to increased postoperative complications, especially vocal cord paralysis and pulmonary events. In the Japanese Esophageal Society (JES) or the American College of Surgeons (ACS), the standard surgical treatment is in most cases esophagectomy with the en bloc resection of hilar lymph nodes. The type and number of dissection is not uniform in the standard surgical treatment. The hilar lymph nodes dissection is also considered as a main factor of surgical complications.

In this study, we tried to examine the pattern of lymph node spread at the hilar region and clarify the possibility of sparing of lymphadenectomy for selected patients with thoracic ESCC in the hilar area. Between January 2015 to March 2017, a series of 414 consecutive patients with thoracic ESCC underwent McKeown oesophagectomy with two-field lymphadenectomy in the Shanghai Chest Hospital. The hilar lymph nodes were defined as in the region along the carinal trachea and main bronchus, which include subcarinal nodes (No. 7), left main bronchus nodes (No. 10L), right main bronchus nodes (No. 10R) and left tracheobronchial nodes (No. 4L) according to AJCC 7th edition staging system (Figure 1). The insuling results showed that the hilar lymph node metastasis was noted in 29 patients (7%–3.9%) in No. 7, 1.4% in No. 10R, 2.7% in No. 10L and 0% in No. 4L, and multiple hilar station metastasis was observed in three patients. A total of 97 patients received lymphadenectomy in the No. 4L station and none was pathologically confirmed with lymph nodes metastasis.

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Univariate analysis showed that pathologic T stage (P = 0.026), tumour length (P < 0.001) and lymph node metastasis in non-hilar stations of chest (P < 0.001) were related to the hilar nodes metastasis. And the multivariate analysis revealed that the non-hilar station metastasis in the chest (odds ratios = 7.337, 95% confidence interval = 2.580–20.870, P < 0.001) and longer tumour length (odds ratios = 2.179, 95% confidence interval = 1.145–4.147, P = 0.018) were the predictive factors for positive hilar lymph nodes.

In conclusion, the hilar lymph nodes metastasis in ESCC was rare. For patients with pathologic T1 stage, upper thoracic tumour location, and shorter tumour length (< 3 cm), the lymphadenectomy in the hilum, especially at No. 4 L station, could be omitted.

Figure 1. Hilar lymph nodes.

10L: left main bronchus nodes; 10R: right main bronchus nodes; 4L: left tracheobronchial nodes; 7: subcarinal nodes; 10L: left main bronchus nodes; 10R: right main bronchus nodes.
LUNCH SYMPOSIUM PROGRAM

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THAT’S WHY INNOVATION MATTERS

Monday, October 9, 2017 · 12:45 pm – 2:00 pm
Room K1 (Brown Level -2)
AUSTRIA CENTER VIENNA
Bruno-Kreisky-Platz 1

Moderators:
M. Borger, Leipzig - Germany
P. Perier, Bad Neustadt an der Saale - Germany
R. Rosenhek, Vienna - Austria

Speakers:
- AVR PATIENT SELECTION IN A CHANGING LANDSCAPE
  C. Mureretto, Brescia - Italy
- PERCEVAL, 10 YEARS OF CLINICAL USE
  B. Meuris, Leuven - Belgium
- ANNULOPLASTY ROLE IN COMPLEX SURGICAL MITRAL REPAIR
  T. Chotivatanapong, Bangkok - Thailand
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ISMICS was created over 20 years ago by a group of first adopters, pioneers in minimally invasive cardiac surgery, literally the “cowboys” of their era in the new frontier of innovative and minimally invasive surgery. Many who watched ISMICS’ birth believed that the innovation would fade and the traditional ways would triumph, or that ISMICS would eventually be swallowed up by larger organizations. That has not happened – ISMICS has not only lasted, but has grown, and embraces an international membership around the world, welcoming innovators and early adopters in cardiac, thoracic and cardiovascular surgery.

ISMICS remains the true forum for the latest, the newest, and the “out there on the edge” of what is happening, always willing to ask “what’s next?” in our specialty. The ISMICS Annual Scientific Meeting in Rome in June celebrated our 20th Anniversary, and had record-breaking attendance. Our largest meeting to date featured a keynote address about “Creativity Principles: How to Challenge the State of the Art” presented by Professor Giovanni E. Corazza of Bologna and the Kit Arom Lecture was given by Dr. Alan B. Lumsden of Houston, Texas on “What Cardiothoracic Surgeons Can Learn from Vascular Surgery: Experience from Development of Endovascular Techniques by Surgeons - for Surgeons”. Dr. Lumsden congratulated ISMICS on having the foresight and open-mindedness to have a vascular surgeon present a keynote lecture.

The Rome Annual Meeting also featured an outstanding Presidential Address by Dr. Johannes Borratti, who spoke on “Pathways to Innovation in Cardiothoracic Surgery.” The ISMICS tradition of honoring innovation was expanded in Rome with the first ever awarding of the Subramanian Innovation Award, supported by a generous grant from ISMICS Past President Dr. Valavanur A. Subramanian. The 2017 recipient was Dr. Muralidhar Padala of Emory University in Atlanta. Dr. Padala was selected through a detailed application process, which culminated in three finalists presenting their work in Rome, and being judged by a panel of innovators, as well as a live audience vote. ISMICS embraces its partnership with industry in seeking the newest technologies and treatments.

ISMICS is an inclusive society – welcoming members from all areas of the world and inviting them to attend our Annual Meetings, as well as our Winter Workshops, and to publish their work in our indexed and citable journal, INNOVATIONS. ISMICS 2018 will be held 13 to 16 June 2018 at the Westin Bayshore in Vancouver, Canada. The Abstract Submission site, including award categories and instructions, is open now. Submit your work, come to Vancouver and be part of the society that embraces innovation, and continues to push the envelope forward in a welcoming and inclusive atmosphere.

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Raising Standards Through Education and Training
Foundations of mitral valve surgery: Is repair better than replacement in degenerative MR?

This afternoon’s session ‘Beyond Artificial Chords’ will feature a historical overview of both valve replacement and valve repair surgery, with Prem Shekar, Chief of Division of Cardiac Surgery at Brigham and Women’s Hospital and Assistant Professor of Surgery at Harvard Medical School, Boston, USA offering his insights for the audience.

During his presentation, Dr Shekar will pose the question of whether mitral valve repair is better than replacement for degenerative mitral regurgitation, starting with a look back at the early beginnings of treatment. “The history of mitral valve surgery stretches all the way back to 1923 when the first mitral valve repair operation was carried out at the Peter Bent Brigham Hospital, performed by Dr Elliot Cutler,” said Dr Shekar.

“At that time, there was no heart-lung machine so surgeons did what we call closed mitral valve surgery, and it was primarily directed towards mitral valve stenosis from rheumatic fever, and that’s what surgeons did for several years until the heart-lung machine became available.”

Mitral valve surgery was revolutionized by the development of the first mitral valve prosthesis in the early 1960s, and the work of Dr Albert Starr and Lowell Edwards at the University of Oregon. “In the 1960s and 1970s, there were suddenly more choices and refinements for treating mitral valve disease. We had the caged ball valve for instance, then we had the tilting disc valve and in the late 1970s the bi-leaflet mechanical valve,” said Dr Shekar.

In the 1980s though, heart surgeons began revisiting heart valve repairs. “There were surgeons who began experimenting with simple repair techniques who then moved onto more complex techniques,” said Dr Shekar.

“Over the decades, with longitudinal follow-up, surgeons have been able to prove that mitral valve repair is first of all, durable, and number two that it is actually better for a patient’s heart. The heart functions better when the heart valve is repaired rather than replaced. Repair is better for all-round survival – people live longer with repaired valves rather than replaced valves. It also takes away some of the big issues, such as mechanical valves needing blood thinners and animal valves needing to be replaced every 15 years. So it took a lot of things out of the equation, and that’s how it became more popular,”

Dr Shekar said that in 1983 Dr Alain F Carpentier, from the University of Paris, published a seminal paper called ‘The French Correction’ in the Journal of Thoracic and Cardiovascular Surgery, which later inspired many surgeons to perform mitral valve repairs. “The increasing success of the surgery resulted in cardiologists referring patients earlier for mitral valve repair and repairs overtook replacements as the most-performed surgery for mitral valves,” says Dr Shekar.

He also flagged up the work of Dr Lawrence Cohn and colleagues from Brigham and Women’s Hospital, Boston, MA, USA, and Dr Detos Cosgrove III, from Cleveland Clinic, Ohio, who pioneered mitral valve techniques including minimally invasive mitral valve surgery.

Dr Shekar also highlighted the important work of Professor David H Adams from the Department of Cardio Thoracic Surgery at the Mount Sinai Hospital New York, who set up the hospital’s Mitral Valve Reference Center.

“In the 1960s and 1970s, there were suddenly more choices and refinements for treating mitral valve disease. We had the caged ball valve for instance, then we had the tilting disc valve and in the late 1970s the bi-leaflet mechanical valve,” said Dr Shekar.

“What we have seen in the development of mitral valve surgery is a continued process of discovery, innovation and progress, almost as if it had been plotted on a graph.”

Prem Shekar

“On the other hand, it doesn’t mean that mitral valve replacement is a bad thing – so long as you have attempted to do a repair first. Sometimes mitral valves don’t render themselves to repair, and sometimes repairs are not successful – which is okay. In the end, it is the outcome for the patient that is paramount.”

“Foundations of mitral valve surgery: Is repair better than replacement in degenerative MR?”, 16:00–17:30, Tuesday 10 October.

References
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Adult Cardiac | Focus | When saphenous veins are a necessary choice use them wisely and for the appropriate target

**How to harvest a vein graft: The Swedish Experience**

Domingos Souza1, Mats Dreifaldt1, Mikael Arbeus1, Michael Dashwood1, Bruno B. Pinheiro2, Tomislav Kopjar4, Ninos Samano1

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For many reasons, the saphenous vein (SV) will continue to be a very important conduit in CABG surgery. Therefore, every effort should be made to improve both the short and long term patency of saphenous vein grafts (SVGs). Indeed, while much progress has been made to advance both percutaneous coronary intervention (PCI) and the development of new stents, there has been no progress regarding the improvement in the outcome of SVGs.

One of the most important reasons for the high incidence of SVG occlusion is due to the trauma inflicted to the vein wall during harvesting. This is mainly due to the fact that SV is prepared using the conventional (C) technique, which was described when CABG was first introduced. With this technique, the vein is stripped of its outer layer of tissue, distended to overcome spasm and stored in saline (Figure 1). Since the early 1990s we have used a novel technique, the ‘no-touch’ (NT) technique, whereby the vein is neither stripped nor manually distended, but is instead harvested together with its fat pedicle (Figure 2). This prevents the occurrence of spasm, thereby obtaining the need for high pressure distension and consequently providing a better preservation of endothelial nitric oxide synthase (eNOS)1. Preservation of endothelial nitric oxide synthase activity is more important for saphenous veins than saphenous arteries. Angiology, 2013;64(4):293-9.

A study using intravascular ultrasound assessment showed slower progression of atherosclerosis in SVs harvested by the NT technique compared with those prepared by the C technique3. This was confirmed by post-mortem biopsies which revealed a clear macroscopic difference in the atherosclerosis process between the two techniques. This fat pedicle also protects the SV from kinking; a function that facilitates the application of sequential grafts4. Together, we believe these findings contribute to the long-term success of SVs treated with the no-touch technique as demonstrated recently in a longitudinal randomised trial. Furthermore, in this trial, patients underwent clinical and angiographic assessment at mean time intervals of 1.5, 8.5, and 16 years postoperatively. The main finding in all these studies was that the patency rate of the NT grafts, but not the C vein grafts was comparable to that of the left internal thoracic artery (LITA)5-10. (Figure 3)

We have been using NT SVs to bypass the left anterior descending (LAD) artery in elderly patients with multiple comorbidities. Recently we reported the results of a retrospective observational study whereby we evaluated the patency rate of the NT SVG to the LAD artery at a mean time of six years.11

**References**

Through the years thoracic endovascular aortic repair (TEVAR) has rapidly gained interest, as it offers a less invasive option to open aortic repair and is increasingly being used in a wide variety of thoracic aortic pathology such as aneurysms, dissections and traumatic transactions. Nowadays, TEVAR is progressively used to treat descending thoracic aortic pathology extending into the distal aortic arch. However, for optimal sealing and fixation, a proximal landing zone of at least 2 cm is generally recommended, creating the necessity to cover the left subclavian artery (LSA) in approximately 40% of all endovascularly treated cases. Simply covering the LSA is, however, not without consequence and may potentially increase the risk of stroke, spinal cord ischemia (SCI) and left arm malperfusion. Several fully endovascular options are available today to preserve LSA flow, such as scalloped or fenestrated stentgrafts. Unfortunately, these are often custom-made and therefore not readily available for every patient. Making the surgical revascularization through subclavian-carotid bypass (SCB) or transposition (SCT) is still a relevant alternative. While the goal of this procedure is stroke prevention, the procedure itself can also cause a stroke during the temporarily clamping of the left common carotid artery (LCCA). Hence, the debate on surgical revascularization is ongoing.

In our centre, with an experience of around 650 TEVAR procedures beginning in 1997, a total of 101 surgical LSA revascularizations were performed, all prior to, concomitant to, or following TEVAR, through supraclavicular incision and with the use of perioperative left-sided transcranial Doppler and EEG monitoring. When a signal drop of >50% was observed (especially when associated with EEG changes), this was corrected by induced hypertension until the signal had returned to above 50% of normal. In total, 63 subclavian-carotid bypasses and 38 transpositions were performed. Most patients were operated in an elective setting (77%) and the LSA was most often revascularized to prevent stroke (57%). Sadly, two patients suffered ischemic stroke (2%): one resulted in a right-sided hemiplegia, possibly caused by the several attempts made to correctly place the stentgraft; the other resulted in cerebellar infarction due to an intentionally covered LSA, unfortunately terminating as a posterior inferior cerebellar artery (PICA), not known pre-operative. Both recovered greatly after rehabilitation. However, in the groups of patients in which the surgical revascularization of the LSA was performed prior to or secondary to TEVAR no strokes were observed, increasing the likelihood that the strokes may have been caused during the placement of the stentgraft. No in-hospital mortality or permanent paraplegia was observed in our cohort.

With this study, we showed that surgical revascularization of the LSA proves to be a safe treatment option to preserve antegrade LSA flow in the context of TEVAR. Patients may be selected based upon the anticipated risk of (posterior) stroke, SCI and left arm malperfusion.

References
Feasibility of lobectomy and mediastinal node dissection by video-assisted thoracoscopic surgery following neoadjuvant chemoradiation therapy for stage IIIA N2 non-small cell lung cancer: Propensity score-matched analysis

Yeong Jeong Jhon1, Yong Soo Choi1, Kyung Jong Lee1, Se Hoon Lee1, Hongryull Pyo1, Joon Young Choi1

1. Department of Thoracic and Cardiovascular Surgery; 2. Division of Pulmonary and Critical Care Medicine, Department of Medicine; 3. Division of Hematology-Oncology, Department of Medicine; 4. Department of Radiation Oncology, 5. Department of Nuclear Medicine, Samsung Medical Center, Sungkyunkwan University School of Medicine, Seoul, Korea

The application of VATS for patients with stage IIIA N2 NSCLC who have undergone neoadjuvant therapy remains controversial. However, as experience with VATS has increased, surgeons have successfully performed VATS lung resection and MND with comparable outcomes. We evaluated the feasibility of lobectomy and MND by VATS following neoadjuvant therapy for stage IIIA N2 NSCLC.

We retrospectively reviewed selected patients with pathologically or radiologically stage IIIA N2 lung cancer who received neoadjuvant treatment followed by surgery using VATS (group V) or thoracotomy (group T). The patients who were eligible for VATS (preoperative tumour size of less than 7 cm, non-bulky N2, less than four positive N2 station and simple lobectomy or bilobectomy) were included in both group. The patients were matched using a propensity score based on age, sex, diabetes, pulmonary function (forced expiratory volume in 1 second %, diffusing capacity for carbon monoxide), histologic type, method for diagnosis of N stage, with a 1:3 ratio (group V: group T). Survival analyses were performed by Cox proportional hazards model and the Kaplan-Meier method.

From November 2009 to December 2013, 199 patients with stage IIIA N2 NSCLC were enrolled including 15 patients in group V and 184 patients in group T. Forty-four patients were matched (group V, 12 vs group T, 32 patients). After propensity matching, the mean age was 65 years old, and adenocarcinoma was present in 27 patients (group V, 7 (58.3%) vs group T, 20 patients (62.5%)). Patients who diagnosed N2 disease by mediastinoscopy were 5 (41.7%) and 11 patients (34.4%) after matching. In matched comparison, postoperative hospital day and perioperative complications were not significantly different between both group. There were no differences in the number of lymph nodes dissected (19.6 ± 8.1 vs 17.1 ± 9.4, p = 0.42). The median follow-up duration was 31.6 months. No significant differences were found in 5-year survival rates (group V, 66.7±13.6% vs group T, 62.7±12%, p = 0.80) and recurrence-free survival rates (50±14.4% vs 43.7±10%, p = 0.97) in two groups (Figure). Completeness of adjuvant chemotheraphy was a significant prognostic factor of overall survival (p = 0.01) and recurrence-free survival (p = 0.05).

In conclusion, the VATS approach following neoadjuvant treatment was feasible in selected patients for the treatment of stage IIIA N2 NSCLC, without compromising oncologic efficacy. Large and randomly assigned prospective analyses of long-term outcomes for locally advanced lung cancer following induction treatment need to be performed to validate the oncologic efficacy of VATS.
When peace returned, Dean Boland arranged colleagues in the allied forces medical services. The book starts in a bomb-damaged Guy's Hospital, situated in a devastated area of London's dockland, as it embarks upon its recovery plans. Brock returned Blalock's 1947 visit, heading out at Hopkins. He reported this experience at the 1949 book at the Wisepress stand in the Exhibition Hall.

The risk of surgery for severe tricuspid regurgitation

Bettina Pfannmüller Heart Center Leipzig, University of Leipzig, Germany

Patients with severe tricuspid valve regurgitation (TR) have a low life expectancy. This fact was impressively presented by Nath et al. (JACC, 2004) by the retrospective analysis of echocardiographic data of more than 5,000 patients to determine the association between severe TR and mortality. The authors concluded that mortality increases with increasing severity of TR. Additionally it was shown that patients with severe TR were older with lower left ventricular ejection fraction, a more dilated right heart, and a higher rate of right heart dysfunction in regard to patients with less TR.1

Clinical symptoms, caused by severe TR, develop usually very late in the pathologic process. The surgical risk of tricuspid valve surgery is reported with an elevated operative mortality of up to around 25%. For these reasons, severe TR is often equated with a low life expectancy and elevated operative mortality, while clinical symptoms for severe TR appear very late. Patients with severe TR do not uncommonly present to the surgeon late in their pathologic process with severe clinical symptoms as anasarca, ascites, renal failure and/or cardiac cirrhosis due to venous congestion. Only 25% of patients suffering from severe TR do so due to a primary genesis with structural modifications of the tricuspid valve. This is seen, for example, in patients with Ebstein's disease, with rheumatic diseases, in patients with Lupus erythematosides, in patients with fibrosis and restriction of the TV due to previous radiation, and in patients with tricuspid valve endocarditis. Severe TR without structural modifications develops secondary in more than 75% of severe TR patients due to left sided valve disease, pulmonary hypertonus, pulmonary embolism or dilative cardiomyopathy.

Both patient types suffer from severe TR – the patient with TV endocarditis and the patient with severe TR after previous mitral valve surgery (Figure 1). Which parameters are responsible for the operative risk in patients with severe TR? Which factors can be determined to estimate the operative risk? Which preoperative investigations are the most effective? Which criteria lead to an indication for surgery? Is it a good idea to perform surgery for an asymptomatic patient with isolated severe TR? These questions will be pursued in this presentation.

Reference


The Heart Club

Six children operated on by the Guy's surgeon Russell Brock during a one month exchange visit to Baltimore in 1949, during which he introduced surgery for both pulmonary and mitral stenosis to his colleagues at Johns Hopkins.

TOM TREASURE London, UK

The Heart Club by Tom Treasure is centred around a unique and infrequent unknown written account of the work of Russell Brock in 1945 to 1956. The book starts in a bomb-damaged Guy’s Hospital, situated in a devastated area of London’s dockland, as it embarks upon its recovery plans.

Brock had provided surgical care amidst the bombs and rockets while Roland Boland, dean of the medical school was at the front with American bombs and rockets while Roland Boland, dean of Brock had provided surgical care amidst the dockland, as it embarks upon its recovery plans.

Brock was present when Harken operated to remove bullets and the 10 months following June 6, 1944, when the many injured soldiers that would arrive after the D-Day landings. During the 10 months following June 6, 1944, Brock performed the first two mitral valvotomy operations to be carried out at Hopkins. He reported this experience at the Club meeting in February 1950, adding them to his run of successful operations for both pulmonary and mitral stenosis at Guy’s. He published his results in the British Heart Journal and the British Medical Journal that year.

The Heart Club provides a transcript of the minutes of this and all the other meetings. View a copy of the book at the Wisepress stand in the Exhibition Hall.
Conduction disorders after aortic valve replacement with rapid deployment bioprostheses: a real issue?

Augusto D’Onofrio, Lorenzo Bagozzi, Chiara Tessari, Annalisa Francescato, Giorgia Cibin, Erica Mantan, Besola and Gino Gerosa
Division of Cardiac Surgery, University of Padova, Padova, Italy

The onset of new conduction disorders is a well-known complication after surgical aortic valve replacement, with both biological and mechanical valves, and it has been associated with worse prognosis. A recently introduced rapid-deployment aortic bioprosthesis (Intuity, Edwards Lifesciences, USA) features pericardial leaflets similar to the Magna Ease valve, and has a balloon-expandable stent placed below the cusps, anchoring into the annulus and the leaflet outflow tract (LVOT) – based on the Sapien TAVI mechanism. Since the Intuity stent anchors at the annular level, but also goes deep into the LVOT, it is a matter of debate whether this valve might provide a low rate of postoperative conduction disorder.

Therefore, the aim of this retrospective single-centre study was to evaluate the occurrence of conduction disorders following Intuity rapid deployment bioprosthesis implantation. The primary endpoint was the occurrence of new onset conduction disorders (LBBB, right bundle branch block, RBBB, atrio-ventricular block requiring pacer-maker implantation (PPI)) as well as worsening/evolution of pre-existing rhythm abnormalities. Secondary endpoints were the assessment of QRS duration changes, the average QRS duration change and the identification of transient conduction disorders.

The study population included 44 consecutive patients who underwent Intuity implantation at our institution. Patients were divided into two groups according to preoperative conduction characteristics: absence of preoperative conduction disorders (Group 1) or (31.8%) and presence of preoperative conduction disorders (Group 2) (36.8%; in particular, LBBB in 6 cases and complete RBBB in 1 case. One patient required PPI (4%) because of complete atrio-ventricular block (A-V block). Worsening of pre-existing conduction disorders was found in seven patients in Group 2.

In particular, Group 1 new-onset persistent abnormalities were found in seven cases (28%). These were all LBBB. One patient required PPI (4%) because of complete atrio-ventricular block (A-V block). Worsening of pre-existing conduction disorders was found in seven patients in Group 2 (36.8%). In particular, LBBB in 6 cases and complete RBBB in 1 case. One patient required PPI (4%) because of complete A-V block.

New-onset conduction disorders in Group 1 are shown in Figure 1, while worsening of pre-existing conduction disorders of Group 2 is shown in Figure 2. Overall, transient conduction disorders were present in three patients (8.9%), two in Group 1 and one in Group 2; these were all LBBB that spontaneously disappeared before discharge. Comparing the two groups, there were no statistically significant differences in new-onset/worsening of conduction disorders, both permanent and transient, and in PPI. The mean changes in QRS duration throughout the study period are shown in Figure 3. Overall, we observed a significant increase of QRS duration (mean duration 95±20 ms preoperatively versus 111±28 ms at discharge; p = 0.001) with an average increase of 16±23 ms. Multivariable logistic regression analysis identified aortic cross clamp time as the only independent predictor of primary end-point (OR: 1.020; 95%CI: 1.002-1.081; p = 0.048).

In conclusion, new onset conduction disorders or worsening of pre-existing rhythm abnormalities occur in one-third of patients after aortic valve replacement with Edwards Intuity Valve System. Although the incidence of postoperative PPI is low, strict follow-up is mandatory in order to identify the potential need for PPI in a timely manner especially in patients with persistent LBBB. Aortic cross clamp time seems to be directly related to the primary end-point of this study.
ETHICON Skills Training at EACTS 2017

Ethicon continues to provide hands on training opportunities for trainees and surgeons alike, throughout this year’s EACTS meeting.

PROGRAM OVERVIEW

Sunday
Anastomotic Skills Lab - 09:00 - 12:00
Aortic Skills Lab - 13:00 - 17:00

Monday
Anastomotic Skills Lab - 09:00 - 12:00
Aortic Skills Lab - 13:00 - 17:00

Tuesday
Mitral Valve Skills Lab - 09:00 - 12:30
A scientific approach to SSI reduction in sternal closure - 14:00 - 16:00

All courses are free of charge, please arrive ahead of time to register and avoid disappointment.
All courses led by Professor Sergeant and Dr De Raet. With guest trainer’s tbc.
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www.myvirtualanastomosis.com
www.myvirtualaorticvalve.com
www.myvirtualmitralvalve.com
Cardiac | Abstract | Minimally invasive aortic valve replacements

Full sternotomy, partial sternotomy and right anterior mini-thoracotomy for aortic valve replacement: is there any difference? A propensity matched analysis

Elisa Mikus1, Simone Calvi1, Gianluca Campo2, Marco Parisi1, Eliana Ravil1a, Marco Panzavolta1, Rita Pavasini2, Roberto Ferrari1,2, Mauro Del Giglio3

1. Cardiothoracic and Vascular Department, Maria Cecilia Hospital, GVM Care & Research, Cormano, Milan Italy; 2. Cardiovascular Institute, Azienda Ospedaliero-Universitaria di Ferrara, Corf, (FE), Italy.

In the last decades, the number of patients affected by aortic valve disease (AVD) requiring invasive treatment is increasing. While minimally invasive approaches for AVR, such as partial upper hemisternotomy (PLH) and right mini-thoracotomy (RAT), have been described and encouraging results reported. On the other hand, there is a lack of data about clinical benefits in comparing different minimally invasive techniques. The study compares perioperative results and mortality rates of different techniques to perform AVR and describes possible predictors favoring one approach over the others.

Between January 2010 and March 2017, 1907 patients underwent isolated aortic valve replacement through a ministernotomy (N = 820), a mini-thoracotomy (N = 448) or a sternotomy (N = 59). After propensity score matching, we obtained three groups composed by 377 patients, homogeneous for baseline characteristics. In the three surgical approaches the same surgical techniques were used to perform aortic valve replacement, such as the technique for extracorporeal circulation, total central cannulation and cardioplegia (with the exception for the double lumen ventilation used for RAT).

Regarding intraoperative variables, we observed significant differences between groups. Skin to skin time was significantly higher in the RAT group (193±54 minutes vs 168±34 minutes in PUH, p = 0.01) and vs 169±52 minutes in MS, p = 0.01, respectively; Figure 1). On the contrary, cardiopulmonary bypass and cross-clamp times were lower in the RAT group (57±20 minutes vs 69±21 minutes in PUH, p = 0.009 and vs 67±28 minutes in MS, p = 0.01, 45±36 minutes vs 68±19 minutes in PUH, p = 0.01 and vs 54±22 minutes in MS, p = 0.03, respectively). In-hospital mortality did not differ between groups (p = 0.9). Overall, only renal failure (OR 5.4; 95%CI 2.3–11.4; p < 0.0001), extra-cardiac arteriopathy (OR 2.9; 95%CI 1.1-6.7; p = 0.017) and left ventricular ejection fraction (OR 0.96; 95%CI 0.93-0.99; p = 0.009) emerged as independent predictor of inhospital mortality. We did not observe any significant difference in secondary outcomes.

The only exception was the occurrence of wound infection, which was significantly higher in the MS group (p = 0.01).

To the best of our knowledge, this is the biggest study database, using a propensity score analysis, comparing different standardised and reproducible surgical approaches for AVR.

Cardiac | Techno College | New techniques: the developers corner

Live-in-a-box: LAA management & minimally invasive LVAD-implantation to prevent thromboembolic adverse events

J Schmitto, A Martens
Hannover Medical School, Germany

Whether atrial fibrillation (AF) poses an additional risk for thromboembolic events in left ventricle assist device (LVAD) patients is still controversial. Nonetheless certain subgroups of patients (e.g. enlarged left auricle appendage (LAA), difficult INR management) most likely will benefit from LAA occlusion during LVAD implantation. With minimally invasive access surgery becoming standard of care in most conditions, including redo operations and LAA occlusion devices being available, that allow fast and easy LAA occlusion from different angles and distances, routine LAA occlusion in VAT patients with risk factors for thromboembolic (TE) events is a worthwhile consideration.

We present a live-in-a-box case, in which minimally invasive access (LVAD implantation (HVAD; Heartware, Medtronic)) was performed in a patient who had previously undergone aortic valve replacement for low gradient, low flow aortic valve stenosis. The patient suffered from intermittent AF, which led to recurrent hospitalisations for heart failure. The decision was made to combine HVAD implantation with occlusion of the LAA using the AtriClip PRO2 (AtriCure Inc.) device. (Figure 1)

Operative technique: Upper hemisternotomy is performed as a J-incision after partially removing sternal wires. The aorta is freed and purse string sutures are placed for arterial access. Subsequently a left anterior thoracotomy is performed to access the LV apex. The pericardium is not opened. The HVAD sewing ring is placed on the apex under transoesophageal echo (TEE) guidance and fixed with interrupted, pledgeted sutures. Heparinization is initiated thereafter. A femoral vein and the aorta are cannulated and cardiopulmonary bypass (CPB) is commenced. With the heart unloaded, transosternal dissection around the pulmonary artery is performed to enable free access to the LAA up to its base. Care is taken to not free the right ventricle (RV) from the pericardium to preserve RV dimensions. The AtriClip PRO2 is used to occlude the LAA through the upper hemisternotomy. Subsequently the LV is opened and the HVAD is placed into the LV apex. The system is de-airied and the outflow graft tunneled through the left pleural cavity to the aorta. The graft is anastomosed to the ascending aorta after side clamping. VAD flow is increased and the patient is weaned from CPB. Drains are placed through the right chest into the mediastinum. The patient had an uneventful recovery.

Conclusion

Less invasive LVAD implantation can be combined even in re-do conditions with occlusion of the LAA using the AtriClip PRO2 device. Routine LAA occlusion should be considered in LVAD patients presenting with AF. Further studies have to clarify which patients benefit the most from this approach.

References


Figure 1. (left) Minimally Invasive Incision: (centre) the AtriClip PRO2 device (AtriCure Inc.); (right) the Heartware HVAD system (Heartware, Medtronic).
Bridge to transplant in patients with cardiogenic shock. ECLS or BVAD?

ECLS (extra-corporal life support) is considered the first choice of treatment for patients with cardiogenic shock because of its ready availability, limited invasiveness and quick implantation. On the other hand, BiVentricular Assist Devices (BVADs) may allow long-term support and transplantation in more stable conditions, reducing perioperative complications.

At long-term, there was a tendency of higher incidence of rejections, infections and tumors in the ECLS group. ECLS and BVAD are both effective as bridge to transplant in patients with cardiogenic shock, showing an acceptable early mortality rate after implantation and long-term survival after transplantation. BVAD permits longer support and transplantation in more stable conditions, reducing perioperative complications.

### Table 1. Preoperative data

<table>
<thead>
<tr>
<th></th>
<th>ECLS (n=44)</th>
<th>BVAD (n=28)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years, median, range)</td>
<td>55.8 (24.6-72.7)</td>
<td>54.5 (14.8-68.3)</td>
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</tr>
<tr>
<td>Female sex, n (%)</td>
<td>7 (15.9)</td>
<td>1 (3.6)</td>
<td>0.10</td>
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<tr>
<td>Etiology</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Ischemic cardiopathy, n (%)</td>
<td>19 (43.2)</td>
<td>11 (42.9)</td>
<td>0.74</td>
</tr>
<tr>
<td>Dilated cardiomyopathy, n (%)</td>
<td>11 (25)</td>
<td>12 (42.9)</td>
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</tr>
<tr>
<td>Myocarditis, n (%)</td>
<td>4 (9.1)</td>
<td>4 (14.3)</td>
<td>0.38</td>
</tr>
<tr>
<td>Other, n (%)</td>
<td>10 (22.7)</td>
<td>1 (3.6)</td>
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</tr>
<tr>
<td>Diabetes, n (%)</td>
<td>9 (20.5)</td>
<td>6 (21.4)</td>
<td>0.32</td>
</tr>
<tr>
<td>Hypertension, n (%)</td>
<td>20 (45.5)</td>
<td>7 (25)</td>
<td>0.06</td>
</tr>
<tr>
<td>COPD, n (%)</td>
<td>0</td>
<td>2 (7.1)</td>
<td>0.15</td>
</tr>
<tr>
<td>Renal failure, n (%)</td>
<td>14 (31.8)</td>
<td>10 (35.7)</td>
<td>0.73</td>
</tr>
<tr>
<td>Liver dysfunction, n (%)</td>
<td>8 (18.2)</td>
<td>7 (25)</td>
<td>0.49</td>
</tr>
<tr>
<td>Peripheral vascular disease, n (%)</td>
<td>4 (9.1)</td>
<td>2 (7.1)</td>
<td>0.57</td>
</tr>
<tr>
<td>Atrial fibrillation, n (%)</td>
<td>12 (27.3)</td>
<td>5 (17.9)</td>
<td>0.36</td>
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<tr>
<td>ARF, n (%)</td>
<td>25 (56.8)</td>
<td>14 (50)</td>
<td>0.57</td>
</tr>
<tr>
<td>Mechanical ventilation &gt; 36 hours, n (%)</td>
<td>14 (31.8)</td>
<td>10 (35.7)</td>
<td>0.19</td>
</tr>
</tbody>
</table>

### Table 2. Results after Mechanical Circulatory Support

<table>
<thead>
<tr>
<th>Complications</th>
<th>ECLS (n=44)</th>
<th>BVAD (n=28)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device-related infection, n (%)</td>
<td>11 (25)</td>
<td>9 (32.1)</td>
<td>0.51</td>
</tr>
<tr>
<td>AKI, n (%)</td>
<td>22 (50)</td>
<td>10 (35.7)</td>
<td>0.23</td>
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<td>CRRT, n (%)</td>
<td>13 (29.5)</td>
<td>9 (32.1)</td>
<td>0.62</td>
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<tr>
<td>Liver dysfunction, n (%)</td>
<td>10 (22.7)</td>
<td>7 (25)</td>
<td>0.86</td>
</tr>
<tr>
<td>Atrial Fibrillation, n (%)</td>
<td>9 (20.5)</td>
<td>5 (17.9)</td>
<td>0.79</td>
</tr>
<tr>
<td>Ischemic stroke, n (%)</td>
<td>3 (6.8)</td>
<td>1 (3.6)</td>
<td>0.49</td>
</tr>
<tr>
<td>Pump thrombosis, n (%)</td>
<td>2</td>
<td>0</td>
<td>0.49</td>
</tr>
<tr>
<td>Leg Complications, n (%)</td>
<td>25 (58.6)</td>
<td>3 (10.7)</td>
<td>0.06</td>
</tr>
<tr>
<td>Femoral site infection, n (%)</td>
<td>11 (25)</td>
<td>0</td>
<td>0.01</td>
</tr>
<tr>
<td>Mediastinitis, n (%)</td>
<td>2</td>
<td>2 (7.1)</td>
<td>0.15</td>
</tr>
<tr>
<td>Sternal Re-exploration, n (%)</td>
<td>4 (9.1)</td>
<td>19 (67.9)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Pulmonary emema, n (%)</td>
<td>4 (9.1)</td>
<td>0</td>
<td>0.13</td>
</tr>
<tr>
<td>Time of device assistance (days, median, range)</td>
<td>8 (0-32)</td>
<td>32.5 (0-385)</td>
<td>0.01</td>
</tr>
<tr>
<td>Early mortality, n (%)</td>
<td>8 (18.2)</td>
<td>3 (10.7)</td>
<td>0.31</td>
</tr>
<tr>
<td>In-hospital mortality, n (%)</td>
<td>9 (20.5)</td>
<td>8 (28.6)</td>
<td>0.43</td>
</tr>
<tr>
<td>Hospital stay (days, median, range)</td>
<td>16 (6-97)</td>
<td>45 (0-146)</td>
<td>0.10</td>
</tr>
<tr>
<td>Patients transplanted, n (%)</td>
<td>30 (68.2)</td>
<td>17 (60.7)</td>
<td>0.52</td>
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<tr>
<td>Weaning, n (%)</td>
<td>3 (6.8)</td>
<td>3 (10.7)</td>
<td>0.43</td>
</tr>
</tbody>
</table>

### Figure 1

![Image](image1.png)

### Figure 2

![Image](image2.png)
Clipping of the left atrial appendage in persistent atrial fibrillation; effects on stroke volume, E- and A-velocities and left-atrial pressure. A clinical observational study

Gilbers MD, Heijmans JH, Lozekoot PWJ, Picoon LAPG, La Meir M. Maastricht University Hospital, Maastricht, the Netherlands

Introduction

In order to prevent thrombus formation in persistent atrial fibrillation, clipping of the left atrial appendage (LAA) is part of the guideline recommendations. The contribution of the LAA blood flow to the total left-atrium blood flow in this situation is not known. The purpose of this clinical observational study is to investigate the effect of clipping of the LAA on changes in stroke volume, E- and A-velocities, and Left Atrial Pressure (LAP) in persistent atrial fibrillation patients.

Methods

After medical ethical approval and approval from the responsible medical ethical committee, clinical data were collected on 16 elective hybrid atrial fibrillation ablation surgery patients. During surgery under general anesthesia and single lung ventilation (left lung deflation), stroke volume (SV) (MostCareUp, Vygon), E- and A-velocities (TEE) and left atrial pressure (trans-intra-atrial septum puncture) were recorded during sinus rhythm before and after clipping of the LAA.

Results

Fourteen male and two female patients with an age range of 51-69 years were included. Stroke Volume (SV) was 58.4 ml (SD 20.0 ml) before clipping and 55.1 ml (SD 19.8 ml) after clipping (p = 0.356). E-velocity was 56 cm/s (SD 10) before clipping and 55 cm/s (SD 9) after clipping (p = 0.805). A-velocity was 27 cm/s (SD 7) before clipping and 24 cm/s (SD 5) after clipping (p = 0.212). Left Atrial Pressure was 14.8 mmHg (SD 6.2 mmHg) before clipping and 15.3 mmHg (SD 6.9 mmHg) after clipping (p = 0.415).

Conclusions

There are no significant changes in SV, E- and A-velocities and LAP after clipping the LAA in sinus rhythm of persistent AF patients.

Erik M von Meyenfeldt, Geertruid MH Marres, Eric van Thiel, Ronald AM Damhuis. Department of Thoracic Oncology, Lung Cancer Centre, Albert Schweitzer Hospital, Dordrecht, the Netherlands; 3. Department of Research, Netherlands Comprehensive Cancer Organization, Utrecht, the Netherlands

The concept of Enhanced Recovery After Surgery (ERAS) has been around for almost two decades and has led to improvement in perioperative care for several categories of patients. ERAS protocols can potentially reduce Length of Stay (LOS), complications, readmissions and cost. Enhanced Recovery After Thoracic Surgery (ERATS) protocols have been developed and evaluated as well. Even though a short LOS should be considered to be a consequence of a good perioperative care programme and not a goal in itself, one of the main outcome measures when evaluating these ERATS protocols is post-operative LOS.

Rather than evaluating a single institution experience, we set out to detect variation in LOS after lung resections for lung cancer nationwide, using Netherlands National Cancer Registry (NNCR) data (study period 2010-2015). Since LOS after lung cancer surgery is not solely influenced by peri-operative care and discharge criteria, but also by patient characteristics, tumour characteristics, surgical technique, hospital volume, postoperative complications, insurance coverage and availability of healthcare services, we wanted to take these factors into account.

Our objective was to determine whether variation in LOS after resections for lung cancer is present between hospitals in the Netherlands, after controlling for these known parameters. Result: Variation in LOS would suggest important differences in perioperative care protocols and discharge criteria. In this retrospective database analysis, we observed an unexplained difference in postoperative LOS after lung resection for NSCLC between hospitals. After case-mix correction, residual between-hospital variation in mean LOS is observed, ranging from 1.5 days shorter to almost 2.5 days longer.

In contrast to previous publications, hospital volume and patient gender did not seem to influence LOS. In Insurance and geographical influences were not analysed, considering the small size of the country, the distribution of hospitals providing lung cancer surgery and universal healthcare insurance coverage. Age, extent of resection and surgical approach were confirmed as important factors determining LOS. Using LOS as a measure for quality of perioperative care has limitations. Since LOS is dependent on many factors, care should be taken not to equate short LOS with good perioperative care, even after correction for known case-mix variables. Post-operative mortality, related to LOS, was also evaluated as quality check. In our analysis, shorter LOS was not associated with a higher 30-day or 90-day mortality. Even though the extent of case-mix correction was limited due to sparse data on comorbidities in the NNCR and even though the lack of readmission data and complication data limited our ability to fully appreciate the relationship between LOS and quality of post-operative recovery, our analysis of the Netherlands National Cancer Registry data shows a clinically significant difference in case-mix adjusted LOS after anatomical lung resection for NSCLC, with a sign of increased mortality related to early discharge.

References

Thoracic | Abstract | Oncology-preoperative assessment

Is there a role for pleural fluid cytology in the diagnosis of malignant pleural effusions?

Aleksander Mani, Martin P Hayward, Matus Petko, David Lawrence, Marco Scardi, Nikolaos Panagiotopoulos, Robert S George
Department of Thoracic Surgery, UCLH at Westmoreland Street, London, United Kingdom.

Malignant pleural effusions (MPEs) are an important cause of cancer-related mortality and morbidity, and carry a poor prognosis. MPEs are usually diagnosed by respiratory physicians either using medical thoracoscopy or tapping of the pleural effusion. BTS guidelines confirm a low diagnostic yield from pleural fluid cytology (60%). Moreover, both procedures can be associated with an increased risk of infection and pleural space-related mortality and morbidity.

Video-assisted thoracoscopic surgery (VATS) allows to drain the pleural space. Pleural biopsies for diagnostic purposes and pleurodesis or indwelling pleural catheter insertion. Intra-operatively patients have multiple pleural biopsies acquired under direct vision and 20 ml or more of pleural effusion is sent for cytology. The purpose of our study was to compare the sensitivity of pleural fluid cytology and pleural biopsies obtained during VATS for MPEs. We also evaluated the in-hospital, 30- and 90-days mortality.

We retrospectively reviewed 466 patients who underwent VATS drainage of pleural effusion and pleural biopsies and either pleurodesis or insertion of an indwelling pleural catheter in our institution between January 2014 and December 2016. Out of 466 patients, 274 were identified to have MPE. Mesothelioma was the most frequent histological diagnosis (83 patients-30%), lung adenocarcinoma was the most frequent diagnosis on cytology (56 patients-21%). Among 274 patients, 268 (99%) had positive histology and 110 (41%) had negative cytology despite confirmed malignancy on concomitant histology (X² = 32.5, p < 0.001). Diagnostic yield of cytology and histology was assessed in two groups of patients, those with mesothelioma and those with non-mesotheliomatous malignancy. Histological analysis had 99% sensitivity and 98.7% specificity in diagnosing mesothelioma as compared to cytology (36.7% sensitivity, 25.8% specificity). Fifty (63%) mesothelioma patients had negative cytology, compared to 45 (26%) non-mesotheliomatous patients (X² = 32.5, p < 0.001). Cytological analysis for non-mesotheliomatous related MPEs had better sensitivity and specificity (74.1% and 63.3%, respectively) compared to MPEs caused by mesothelioma. 30- and 90-days mortality was 7.7% and 22.1%, respectively. There was no significant difference in 90-days mortality between patients with positive and negative cytology (p > 0.073; Figure 1). 90-days mortality was significantly higher in the histologically diagnosed non-mesotheliomatous group compared to mesothelioma group (p < 0.005; Figure 2).

Our results indicate a weak correlation between cytological and histological findings in patients operated for MPE. Pleural fluid cytology can be considered unreliable in diagnosing malignancy in patients with non-mesotheliomatous MPE (74.1% sensitivity, and 63.3% specificity). We assume that there may be no role for cytological analysis in patients with suspected mesothelioma due to its weak association with the disease (63% of patients had negative cytology with 36.7% sensitivity and 25.8% specificity). Therefore histological diagnosis is paramount to either confirm or exclude malignancy. Surgical approach for diagnosing MPEs remains the most effective approach and provides the opportunity to treat the pleural space with either pleurodesis or indwelling pleural catheter insertion.
Join the discussion during our lunch symposium on Monday October 9th, 12:45-14:00
Room 0.31/0.32

**SURGICAL ABLATION: WHY, WHEN AND HOW IN THE FACE OF AN EPIDEMIC**

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