MIMVR simulator wins 2014 EACTS Techno-College Innovation Award

EACTS Daily News is pleased to announce the 2014 EACTS Techno College Innovation Award was won by Dr Peyman Sardari Nia (Maastricht University Medical Center (MUMC), Maastricht, The Netherlands), for the ‘Minimally invasive mitral valve repair (MIMVR) simulator’, which was developed with the help of the Instrument Development Engineering & Evaluation department (IDEE) at the Maastricht MUMC.

I developed and designed the minimally invasive mitral valve repair simulator, in conjunction with colleagues from the IDEE, to enable residents, fellows and surgeons to develop skills in MIMVR and practice those skills endoscopically,” Dr Sardari Nia told EACTS Daily News. “We believe the MIMVR simulator provides users with an objective, reproducible way to practice and train skills instead of developing skills in patients.”

MIMVR simulator

The simulator can be used for the following surgical approaches:

- MIMVR endoscopically
- MIMVR through direct vision
- MIMVR with robotic-assistance using the available ports
- Conventional mitral valve repair by opening the thorax

The mitral valve component is disposable and developed from special material that mimics the tissue characteristics of the mitral valve so that a true suturing experience can be created. The simulator also gives feedback about the exact depth and length of each suture, and provides a picture of each suture. The depth and length of each suture attempts can be pre-set and the simulator will provide feedback about the suture attempts with regard to pre-set values. In addition, the disposable papillary muscles for suturing the neochordae are available. The disposable mitral valve can theoretically be replaced by 3D-printed mitral valve of an individual patient for pre-operative practice and pre-planning of complex mitral valve repair.

The simulator, which was successfully tested for the first time during the EACTS Academy Minimally Invasive Techniques in Adult Cardiac Surgery course (Maastricht, June 2014), will also be available during the meeting in Milan.

“During the 28th EACTS Annual Meeting we have organised six dyslays where participants can develop insights into the skills needed to for starting a MIMVR programme,” he added. “Participants will work with long-shafted instruments for developing suturing techniques, placement of annuloplasty ring and neochordae. I look forward to welcoming delegates to the dyslays during the meeting.”

Nurse, Practitioners and Physician Assistants

Amber 5

Warm to the core

A quantitative study of the effect of prewarming on inadvertent perioperative hypothermia

Charlotte Rosenkilde
Copenhagen University Hospital, Odense, Denmark

Cold is not cool for surgical patients: “To keep the air he breathes as pure as the external air, without chilling him”.

Keeping the patient warm during surgery is still a challenge in the 21st century. Research estimates that 50% to 90% of surgical patients experience inadvertent perioperative hypothermia during surgery. Inadvertent perioperative hypothermia often occurs as a result of impaired thermoregulation induced by anesthesia and by exposure to a cool environment such as an operating theatre. Even mild hypothermia (core temperature below 36°C) has considerable clinical implications.

For more than half a century it has been widely accepted by both surgeons and physicians that coronary artery bypass grafting (CABG) was the “gold standard” treatment in patients with left main stem disease who required revascularization. Indeed, until a few years ago both in European and North American guidelines CABG had a Class I recommendation for all types of left main disease while stenting had a Class III recommendation (ie contraindicated as potentially harmful or dangerous) except in patients who were deemed ineligible for CABG.

The results of two randomized trials (PRECOMBAT and SYNTAX) as well as evidence from observational studies have suggested that coronary artery stenting is a valid alternative to CABG in a certain group of patients with left main stem disease. Two experts from the field discuss the evidence and what it means for practice.

Coronary Gold Room

Revascularization in left main disease: changing concepts

David Taggart
University of Oxford, UK

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Warm to the core

Continued from page 1
less than 36.0°C) can be dangerous for the patient, consequently leading to increased blood loss and transfusion requirement, surgical wound infection, and prolonged hospitalization and recovery. Consequently, nurses working with the surgical team, often proactively implement nursing initiatives to prevent or minimize the risk of hypothermia.

Preventing for a minimum of 30 minutes with Forced Air Warming (BairHugger) is a method that is proven to prevent hypothermia. Further research is needed regarding other warming methods.

Therefore, the aim of this study was to determine the effectiveness of a self-warming blanket in reducing the occurrence of inadvertent perioperative hypothermia in patients undergoing either a total hip or a knee arthroplasty.

The results are compelling, and they will be presented at the EACTS on Sunday, October 12, 2014.

Revascularization in left main disease: changing concepts

Continued from page 1
several meta-analyses have dramatically changed the dogma that CABG is the only effective revascularization strategy for all left main stem disease. The PRECOMBAT Trial by Dr SJ Park and colleagues in South Korea of 600 patients with left main disease randomized to PCI or CABG, reported no difference in death, myocardial infarction and stroke between CABG and PCI. However, those patients that were younger in the PCI group and this is an important factor in determining which patient is best served by CABG or PCI. After more than five years, the five year outcomes in the SYNTAX Trial for the 705 patients with left main disease report that starting with drug-eluting stents is equally effective as CABG regarding mortality and myocardial infarction but with a lower risk of stroke and a higher risk of repeat revascularisation. Indeed it was only in patients with more complex left main disease (ie those with SYNTAX scores >32, and largely indicating involvement of two or more epicardial coronary arteries) who had significant clinical benefit from surgery.

The overall results for left main disease are in marked contrast to those in the 1,100 SYNTAX patients with three vessel coronary artery disease where CABG significantly reduced overall mortality, all-cause to a marked reduction in cardiac death, myocardial infarction and the need for repeat revascularisation. And in contrast to patients with left main disease there was no increase in the risk of stroke.

Why the difference in outcomes between left main and three vessel coronary artery disease? This may likely explain the difference in outcomes in isolated left main disease, especially if ostial or mid shaft and without additional proximal coronary artery disease, that there is too much competitive flow for bypass grafts.

European and North American guidelines have already changed to “upgrade” recommendations for certain anatomical datasets of left main disease. A definitive answer to optimal revascularisation of left main disease will await the outcomes of the EXCEL and NOBLE trials which together will randomise over 3,000 patients with left main disease to surgery or stenting.

Basic Science Programme Amber 6

Bioreactor and tissue-engineered trachea

From bench to bedside; the Würzburg experience

Maria Stieveke
University Hospital, Würzburg, Germany

Tissue Engineering was coined as a new therapeutic concept in 1984 and until today holds the promise to overcome the shortage of donor organs in organ transplantation. Significant research efforts have been spent in all surgical specialties including cardiovascular surgery. With the engineering complete organs for transplantation still represents a scientific utopia, engineered tissues such as heart valves or arteries have been implemented successfully in individual patients and are currently tested in the first clinical trials. In our group, we apply the concept of tissue engineering as illustrated in Figure 1, we create different types of ean tissue from patient biopsies, expand them and seed them on a biological vascular scaffold (BioSeal). After maturation in specific microenvironments, the tissue-engineered products can be used as autologous implants or as 3D in vitro test systems for research applications. The talk entitled “Airway tissue engineering: From bench to bedside; the Würzburg experience” will focus on the evolution of a unique airway tissue engineering approach spanning from a versatile biological scaffold (Bioreactor) to a next generation new bioreactor design to governmental process authorisation. Above that an additional airway tissue engineering application other than transplantation, the use in current and future biomedical research will be outlined: our group succeeded in generating a 3D in vitro tissue model for the human airway mucosa with high in vitro – in vivo -correlation. Besides fully differentiated primary airway epithelial cells the tissue model consists of fibroblasts that maintain the surrounding connective tissue and play an important role in basement membrane formation. Since morphology and barrier characteristics resemble the natural situation, this test system appears to be highly suitable for different applications.

We are especially interested in analysing virulence mechanisms of airway pathogens such as Bordetella pertussis. A major research problem with pertussis is the fact that they have obligate human pathogens. Due to the lack of good animal models and cell culture model systems which most closely resemble the natural situation, the real impact of these factors for infection and disease remains in part speculative. Using our 3D tissue-engineered human airway mucosa model, we perform infection experiments with supernatants of different pertussis cultures. Our current data will be presented during the talk.

Owing to Würzburg’s interdisciplinary team consisting of surgeons, biologists and engineers we successfully translated an airway tissue engineering approach from bench to bedside. In future, this concept will be applied to improve the quality of research in research and clinical implementation.

Aortic Valve Repair

Early surgery, better outcome?

Rafael Sadaba
Hospital de Navarra, Pamplona, Spain

Aortic stenosis (AS) is the most common valvular heart disease in Europe and North America. It is present in 2–7% of people above 45 years of age and 5–10% of the population over the age of 75. It is a progressive disease and it is characterized by a long latent period during which the patient remains asymptomatic. Once symptoms appear, it is very poor and five-year survival is as low as 15%. Current guidelines recommend treatment in the presence of moderate to severe aortic valve replacement (AVR) once symptoms (or ventricular dysfunction), typically dyspnoea, angina or syncope, appear. The optimal timing and management of timing in symptomatic patients with preserved LV function is far from settled. Those who support a strategy of watchful waiting, argue that the mortality associated to AVR (2–4%) is higher than the risk of sudden death in the asymptomatic patient (<1%). On the other hand, those in favor of early surgery argue that this is a heterogeneous group of patients, some of them with poor prognosis and with a risk of developing reversible myocardial changes which can negatively affect surgical and long term results. In the few retrospective studies published, early surgery appears to carry benefits in terms of outcomes. Nevertheless, these potential benefits associated with early AVR must be further established in more robust studies.

One of the debated issues is that relying on symptoms as the main indication for surgical treatment may not be appropriate. The absence or presence of symptoms in this group of patients must be evaluated with caution. The prevalence of severe aortic stenosis is highest in the elderly, and so the potential symptoms could be disregarded by an adaptation of these patients to their actual physical capabilities. In this context, an abnormal exercise test, can help to unmask the apparent lack of symptoms. Similarly, an elevation of plasma levels of natriuretic peptides represent a more objective measurement of functional status and therefore both have a role in the decision making process.

The analysis of myocardial fibrosis has emerged as another tool to assess the status of the disease. In severe AS, the presence of myocardial fibrosis represents a transition from well-compensated hypertrophy to overt heart failure and risk of sudden cardiac death. Recent published data says that late gadolinium enhancement in cardiac magnetic resonance (CMR), which represents myocardial replacement fibrosis, can be an earlier marker of more advanced disease in this group of patients. The value of myocardial extracellular volume measured by CMR can be used to assess diffuse myocardial fibrosis in severe AS is a matter of current research.

The debate on the best timing for AVR in patients with severe AS is still open. Based on the high prevalence of the disease in the ageing western population, achieving a consensus is important. Tools to discriminate between those asymptomatic patients with severe AS who would benefit from early surgery must be further developed and evaluated.
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REFERENCE: 1. Pinto A, on behalf of the SAPIEN 3 Investigators. 30-day outcomes from the SAPIEN 3 Trial. Paper presented at: EuroPCR 2014 meeting; May 23-25, 2014; Paris, France.

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Coronary – Better decisions, better outcome

50 years since the first LIMA bypass operation

A tribute to V.I. Kolesov

Alexander Kolesov
50 Petersburg Proctor State Medical University, Russia

As Wilielmus' famous saying goes, diseases are the principal cause of mortality in the adult population, and the most widespread among them is the ischemic heart disease. In the 20th century, many surgeons were made a lot of effort to combat the disease. They were surgeons from different countries – Alexei Carvalho at the beginning of the century in USA, Vladimir Dementiev in USSR and Gordon Murray in Canada in the 1950s laid the foundation for the study of coronary bypass surgery on dogs for the restoration of coronary flow using systemic anastomosis.

On the 25th of June 1960 in New York, Robert J. Goetz was the first to anastomose the right internal mammary artery and subscapular artery to the patient using tangential rings. As a result of this operation, the doctor performed by his colleague R. Goetz never performed such an operation again.

Professor Vitaly Kolesov in Leningrad (Russia) studied all previous experience of non direct revascularization and performed a lot of experiments on dogs to optimize the technique of direct anastomosis between left internal mammary artery (LIMA) and coronary arteries. After nine years of experiments Professor Kolesov finally had approved that direct LMA CABS is feasible at the site of non-damaged part of coronary artery: the left circumflex artery (LCX) or the left anterior descending artery (LAD).

On February 25 1964 Professor Kolesov successfully performed the first sutured anastomosis between the left internal mammary artery (LIMA) and the left circumflex artery. It was the beginning of the new era of coronary by-pass operations started to be carried out on a regular basis to re-establish coronary flow in case of the ischemic heart disease. Twenty years later this operation in combination with the new look and the new operation method of using the sapheneous vein in coronary surgery (1987, Cleveland, USA) became the most commonly performed surgical procedure in the world.

Nowadays there is hardly any clinic exists in the world that does not perform Professor Kolesov's operation – the coronary artery bypass grafting (CABG) procedure using LIMA for LAD anastomosis. The best option of the anastomosis (LIMA-LAD) is the sutured anastomosis just as it was 50 years ago. A load invasive access and off-pump operation reduces the post-operative trauma and can be an option in case of the LAD occlusions. These are the ideas which Professor Kolesov massively promoted in his book 'The Coronary Artery Surgery (1977) which summarizes the first period of coronary surgery developments. Its efficiency and long-term implementation have been proven by decades of its use. The fact that Professor Kolesov's principles of the using of the LIMA in case of coronary artery bypass are still up-to-date after 50 years of their first implementation is an evidence of the great importance of his personality in the coronary surgery development.

Somahlution Launches Flagship Product – DuraGraft® Vascular Conduit Solution

DuraGraft is the first Endothelial Cell Damage Inhibitor (EDD), developed to address the pivotal step of vascular conduit handling and storage in bypass and vascular surgeries. Despite advances in medical management and surgical techniques, there has been little improvement in bypass outcomes. Vein graft failure (VGF) remains one of the leading causes of poor-in-hospital and long-term outcomes after CABG and peripheral bypass surgeries, with 12-month VGF rates of 46%. These failures most often lead to additional surgeries, further interventions or increased medical management, resulting in increased morbidity and high healthcare costs.

Preserving the structure and function of the endothelium is critical to long-term outcomes of CABG and Peripheral bypass surgeries, and the prevention of VGF. Unlike the clinically-unproven and unapproved solutions that are currently in use, DuraGraft uniquely protects vascular endothelium and its associated ‘architecture’ from oxidative and other damages. DuraGraft is a simple and safe pH and osmotically balanced sterile solution containing salts, antioxidants and other components that are pro-endotheial and pro-vasomotor function preserving. DuraGraft is intended for the preservation, storage and flushing of vascular conduits prior to grafting in vascular surgeries. It is a premeasured, ready-to-use solution that can help minimize the risks and liabilities associated with unproved hospital and pharmacy-compounded mixtures that are currently in use. DuraGraft solution is manufactured using USP/EP grade materials, in a controlled environment under cGMP in an ISO 13845 certified facility for maximum quality control to ensure patient safety.

Consistent with the predictions based on in vitro studies performed by Dr. Thatte of Harvard Medical School which demonstrated maintenance of the structure, function and viability of the endothelium by DuraGraft, the five-year clinical data has shown that use of DuraGraft is associated with significantly improved clinical outcomes that are markers of improved long-term vascular graft patency, including mortality, MI and repeat revascularization. Researchers from Duke Clinical Research Institute performed a sub-analysis of data from the prospective Prevent-IV trial which included over 4,000 patients in one year angiographic evaluation and 5-year clinical outcomes and determined that patients whose grafts were preserved in a buffered saline solution, similar to DuraGraft, had lower VGF rates and long-term clinical outcomes that trended towards being better compared to outcomes of patients whose grafts were preserved in saline or blood-based solutions. At the one year scheduled angiographic follow-up VGF rates were reduced by as much as 25% and repeat revascularization was reduced by about 37% in patients who received veins preserved in a buffered solution.

Similarly, a review of patients undergoing CABG demonstrated that DuraGraft improved clinical outcomes of revascularization by nearly 50% up to 5 years post-surgery. Additional improvements were shown in reduced myocardial infarction, mortality and MACCE, which may lead to improved quality of life for these patients. There are currently more than 1.5 million bypass procedures performed in Europe and the United States alone that require viable vein grafts.
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Management of pulmonary veins stenosis

There are two different forms of pulmonary vein stenosis (PVS). Primary “congenital” PVS, which is isolated or associated with congenital heart disease, has a severe prognosis. Accurate recognition of PVS, which occurs most commonly after repair of total anomalous pulmonary venous return (TAPVR), fosters a better prognosis. PVS following radiofrequency ablation of atrial fibrillation is seen in the adult population. Surgical management has evolved over the past two decades, with traditional patch enlargement techniques eventually replaced by the suturesless repair for durability in many centers. In a recent multicentric study of 107 patients with PVS stenosis, with the EFCHA, the suturesless repair showed significant better outcomes for mortality and recurrence (35.9%) than the traditional techniques and catherization (55.8%) p < 0.01. Low body weight, prematurity, bilobar forms and high severity PV score are significant increasing factors for mortality. Interventional cardiology procedures have not provided better results and are predominantly used in recurrent PVS. New pharmacologic agents that may improve progression of the pulmonary venous obstructive disease are currently under investigation. Pulmonary venous stenosis is a rare, challenging, and often lethal condition among pediatric heart diseases, with a guarded prognosis and elevated risk of recurrence. The pathophysiology is poorly understood, and the search for an effective treatment remains a source of frustration.

Suturesless repair, left side (from the outside) with atrio-pericardial suture (right)

Complex VENUS Anomalies

Amber 1&2

Paul Van Schil
Antwerp University Hospital, Belgium

Long-term follow-up after resection of lung cancer with a femoral bone metastasis

Generally accepted indications for lung cancer resection include patients with stage IA non-small cell lung cancer (NSCLC) who otherwise have no cardiopulmonary contra-indications for a major surgical procedure. Stages IIA and III NSCLC can remain investigational and resection can only be recommended in selected cases. Today, mortality remains within a multidisciplinary team. Patients with single or multiple metastases are classified as stage IV disease and surgery is only performed in exceptional cases. Examples include patients with a single brain or adrenal metastasis who are treated by a dedicated and experienced multidisciplinary team. Recently, the concept of oligometastatic disease has arisen defined as patients with a limited burden of metastatic disease. For this patient category no specific guidelines exist at the present time. However, several reports show that a reasonable long-term survival can be obtained when patients with one to three metastases are treated with radical multimodality therapy including surgery. However, precise timing of surgery within combined modality therapy and its precise extension remain to be determined. We present a case of a 53-year-old patient who presented with a femoral bone metastasis from a primary right upper lobe lung cancer in 2006. There were no other metastatic sites. Initially, patient was treated with chemotherapy and radiolabeled yttrium for the primary lung cancer and bone metastasis which was also stabilized by plate osteosynthesis (figure 1). Two years later the primary tumour started growing again and so-called “salvage surgery” was performed with lobectomy of the right upper lobe together with a systematic nodal dissection. Current follow-up extends to five years without signs of local or distant recurrence. Several other cases will be presented illustrating that oligometastatic disease represents a specific entity for which aggressive multimodality therapy may result in long-term survival in carefully selected patients.

Osteosynthesis of left femur for a single bone metastasis of a right upper lobe lung cancer which was treated two years later by ‘salvage surgery’
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Extracorporeal rewarming of deep accidental hypothermia victims

The role of the International Hypothermia Registry

Beat Walpolh
Geneva University Hospital, Switzerland

Deep hypothermia, with or without cardiac arrest, takes the lives of otherwise healthy adults and children each year. The population at risk is considerable due to increasing outdoor leisure activities by inexperienced persons. Furthermore, persons working daily in cold environments such as fishermen, military, construction workers are particularly vulnerable.

Mild therapeutic hypothermia has become a treatment option for cardiac arrest or stroke patients but should not be considered for our Registry. Non-accidental deep hypothermia is frequently induced for cardiovascular surgery and is fairly well managed. On the contrary, accidental moderate to deep hypothermia (body temperature less than 32°C) is less frequent and its management remains a real challenge for medical and scientific teams worldwide, mainly due to lack of outcome predictors, consensus and guidelines.

Cases of successful treatment of accidental deep hypothermia, using extracorporeal rewarming by CBP or ECMO with little to no sequelae are sporadically reported such as a case treated at the University Hospital in Geneva in 2007 of a 65-year-old woman with witnessed cardiac arrest due to hypothermia after antidepressant drug abuse outdoors in the snow. Lowest core temperature was 20.8°C. After continuous manual CBP for 288 minutes, she underwent 332 minutes of invasive rewarming by Coronary Bypass (CBP). Cardiac function was restored at 30°C by defibrillation which enabled

CBP wearing at 36°C after 520 minutes (8h 40’) of mechanical circulatory support. Five years later, a cardiac echocardiography proved complete recovery of the left ventricular dysfunction she had suffered as a post rewarming complication. This case is the longest reported therapeutic cardiac arrest with an excellent long-term survival.

Even though long-term survival rates of 47% have been reported, many patients die from post-rewarming complications that are inevitable. Negative outcomes are rarely published and the majority of positive outcomes are under-reported, but much could be learned from them. Several treatment algorithms have been published (see Table, Walpolh BH et al., 2nd edition, Handbook of Resuscitation which should help the emergency team in the decision making. Studying these rare and fascinating cases is then only possible through international networking and gathering of standardized data in a registry.

The International Hypothermia Registry (IHR): We therefore created the web-based Registry to collect and analyze relevant information about accidental hypothermia in the hope of establishing guidelines for prevention, treatment and outcome of such victims. The IHR is open to all rescue, emergency organizations, hospitals as well as governmental and non-governmental organizations dealing with hypothermia victims. The internet-based Registry is hosted on a highly secured server of the University hospital of Geneva and patients’ information is anonymized. Inclusion criteria are accidental hypothermia with a core body temperature lower than 32°C from any cause, with or without survival. The Registry is composed of three parts, namely a) pre-hospital; divided in accidental and medical features, b) hospital; divided in pre-rewarming management of the patient, data on rewarming and intensive care after rewarming, c) outcome: on a yearly basis until full recovery. Data retrieval, analysis and publication can only be made by the International Working Group on Accidental Hypothermia (IWAH). However, each centre is free to publish its own data.

Data for the IHR are collected worldwide (over 50 centres from all five continents are actively entering cases) and a peer-reviewed analysis by the IWAH will establish new consensus guidelines for the treatment of accidental hypothermia victims.

Acknowledgement

The IHR team of the University Hospital in Geneva, comprises the following members:

Beat H. Walpolh, Marie Meyer, Philipp Baumann, Christian Louis, Patrick Myeys, Marc Licker, Yvan Gasche, Afkarianos Kalanges and the data entry is made on behalf of:

The International Working Group on Accidental Hypothermia (IWAH)
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Impact of surgical experience on outcome in surgery of acute type A aortic dissection

Paul P Urbanski
Cardiovascular Clinic, Bad Neustadt, Germany

Despite current progress in aortic surgery, the mortality and neurological morbidity in the surgery of acute aortic dissection have not been significantly decreased for decades and still average about 15 to 25%, especially in multicenter reports. On the other hand, these reports demonstrating excellent results with an exceptionally high rate of early survival, regardless of the surgical method used or the extent of surgery. Yet, the latter very often have one characteristic in common—they reveal that only one or very few surgeons performed all procedures, which indicates that surgical experience and performance could have a decisive impact on surgical outcome.

Between August 2002 and March 2013, 162 consecutive patients (mean age 63±14 years) underwent surgery for acute type A aortic dissection at our center. All patients were operated on by one of the clinic’s attending surgeons with wide experience in cardiac surgery (at least 2,000 procedures performed personally). The most recent 56 patients (75 patients, 46%) was operated by the aortic team (AT) surgeons with profound experience in complex aortic pathologies. All peroperative data were collected prospectively and retrospective statistical analysis was performed using un- and multi-variable logistic regression models to identify predictors for surgical adverse outcome (AO) containing in hospital and 90-day mortality and new permanent neurological and organ dysfunction.

AO was observed in 36 patients (22.3%) including in-hospital mortality in 22 (13.6%). Multivariate logistic regression analysis identified several predictors not performed by the AT as a strongest predictor for AO (OR 14.1, 95% confidence interval, 3.5-55.6, p<0.001) followed by any malperfusion, myocardial infarction, and creatinine level. Two groups were built according to the surgery performed by the AT (Group AT) or by the surgeons not on the AT (Group No-AT). The comparison of the groups showed no differences regarding the preoperative characteristics, especially compromised consciousness, malperfusion and extent of dissection. Yet, the outcomes in Group AT vs. No-AT were significantly different presenting AO: 8.0% vs. 34.5% (p<0.001), in-hospital mortality: 4.0% vs. and 21.8% (p=0.001), new permanent neurological defects: 2.7% vs. 11.5% (p<0.05), even if valve-sparing repairs and complete arch replacements were much more frequent in Group AT. The groups also differentiated significantly in regard to cannulation and perfusion management, which might play a decisive role in surgical outcome.

In our opinion, the key for optimal surgical outcome in acute aortic dissection is a very individual, patient-tailored operative strategy as opposed to a standardized approach. Special experience in aortic surgery does help in choosing an optimal operative strategy and to perform it properly, and therefore, the surgeon’s experience plays a decisive role in outcome.

The basis for optimal strategy is CTangiography, which translates to only a few minutes of delay on the way to the operating theatre and is a prerequisite for choosing an optimal surgical strategy. We believe that neither cannulation site nor the extent of aortic repair is a remedy for successful surgery of acute aortic dissection. Certainly, the cannulation technique and perfusion strategy are also very important aspects of dissection surgery, and there are several situations in which the proper execution of these techniques can be critical for patient survival. An overall improvement of surgical results in the surgery of acute aortic dissection can be achieved, however, by improving results in challenging cases, especially those presented with any malperfusion. The best way for reaching this aim is the surgical flexibility combined with a well-considered strategy and surgical experience, rather than a generalized standard approach.

Improving Perfusion, Part 1 Rafael

Veno-venous extracorporeal membrane oxygenation (ECMO) has become increasingly recognized as a therapeutic option in patients with severe acute lung failure refractory to conventional treatment strategies. ECMO can be applied in critically ill patients as a bridge to recovery, further diagnostics or transplantation. However, given its invasive character, high costs and resource use, ECMO should rather be initiated or continued once started unless there is a “reasonable expectation of good outcome.”

Thus, parallel to the increasing interest and use of ECMO over the last decade, a growing need for risk prediction tools that objectively supplement clinical decision-making and assure an ethical and fair use of hospital resources has arisen.

In our recent study including 304 VV ECMO cases, we found that advanced age, cardiogenic shock, pre-ECMO ventilation time, as well as poor organ function and functional reserves were of prognostic importance. The University Medical Center of Regensburg (UKR), a broad spectrum of clinical, laboratory and cardiovascular parameters are routinely registered in our ECMO database, permitting use of biological as well as clinical data for mortality risk prediction. Our pre-ECMO and Day-1 prediction models indicated that inclusion of biological data as markers of underlying function and illness increased the predictability. Addition of data from the 1st day of ECMO support improved the ability to discriminate between low-risk patients with high regenerative capacity and reversible disease, and those with poor health condition, reduced functional reserves and irremittable (fixed) diseases. However, up to date, few other ECMO centers have routinely been registering biological data. Thus, we have not yet found a suitable external validation cohort for the UKR scores.

Over the last two years, various different risk prediction models have been presented, all aiming to improve mortality prediction above that of general intensive care unit-scoring systems. These models vary with respect to the final number of items included, involvement of biological data, size of the study population, number of centers included, application of up-to-date statistical methods and verification in external ECMO-centers.

The RESPscore® was a large multicenter trial based on patient data (n=2,395) from the international Extracorporeal Life Support Organization (ELSO). They did not have the opportunity to include biological parameters, which might perhaps improve prediction. Furthermore, their model was developed in patients receiving either VV or veno-arterial ECMO, and 28% of the patients were encoded with lung infection without further details. However, the RESPscore® showed excellent performance in a French validation cohort of 140 patients.

In general, the models agree that the severity of the respiratory state before initiation of ECMO is of low prognostic value. While patients with primary lung failure, for example due to trauma or influenza, seem to benefit from ECMO support, patients with underlying extra-pulmonary sepsis and who seem to be systematically exhausted, should be evaluated even more carefully before initiating ECMO. But the question we all still try to answer is, how can we do this with the highest accuracy?

In our opinion, time has come where we need to put our heads and forces together. The next step from here should be to summarize what available data tell us about factors that determine patient outcome, and assess whether results have been reproducible. A major challenge with research on ECMO patients is the heterogeneity in underlying diagnoses and clinical pictures. Furthermore, we have still not reached an international consensus on the indicators for vV ECMO support. Thus, we need to evaluate whether published prediction tools are generalizable for all ECMO indications.

As an important first step onwards, further validation of published models is strongly warranted. Both the RESPscore® and the UKR models have been made easily available on internet. We encourage centers practicing ECMO to start registering the included variables and evaluating the performance of these prediction tools in their populations. This will contribute to resolving unanswered questions regarding validity, and can help to improve ECMO practice locally and on an international level. Furthermore, we hope that we can continue building bridges between centers and researchers at the upcoming Euro-ELSO meeting in Regensburg May 2015.

Prediction of mortality following veno-venous extracorporeal membrane oxygenation

Tone Bull Enger
Norwegian University of Science and Technology, Trondheim, Norway

E-vita OPEN PLUS – ultimate in perfomance

The E-vita OPEN PLUS Hybrid Stent Graft System allows optimized Frozen Elephant Trunk Procedure to treat complex lesions in the thoracic aorta. The combination of the endovascular treatment allows a one-stage aortic reconstruction, where two surgical procedures would otherwise be required. The combination of E-vita OPEN PLUS treats the surgically inaccessible part of the thoracic aorta. The woven vascular graft section allows secure fixation and serves as a link to the classical vascular reconstruction of the aortic arch. The latest product update comes with two key-features, which enhance overall product usability and performance.

The new inflatable and deflatable balloon-tip guarantees safe and smooth vascular access during insertion and facilitates retraction of the delivery system after stent graft deployment. The device is designed to withstand the transition of stent graft sections to the vascular graft section or an easy circular anastomosis of aortic wall and E-vita OPEN PLUS. These innovations in combination with the already proved features like the positioning aid, which guarantees precise stent graft placement and the blood tight polyester graft material, which guarantees perfect handling, make the E-vita OPEN PLUS the state of the art device and the No.1 product, when it comes to Frozen Elephant Trunk Procedure.

The international E-vita OPEN PLUS Registry with over 400 patients testifies to the excellent therapeutic success that has been achieved in this study. Worldwide, over 3,000 patients have been successfully treated to date with E-vita OPEN PLUS.

Since December 2013 the use of E-vita OPEN PLUS has been recommended by the UK agency NICE (National Institute for Health and Care Excellence) for the treatment of complex thoracic lesions of the aorta. Especially the long term cost effectiveness of the Frozen Elephant Trunk Procedure is carried out by this recommendation. Cost savings of up to 35,000 £ ten years after the procedure compared to current two-stage repair are estimated.
E-vita OPEN PLUS
The proven hybrid stent graft system that combines surgical reconstruction with aortic stenting for successful single-stage repair of complex disease of the thoracic aorta.

Lunch Symposium:
"E-vita OPEN PLUS – Experiences and Latest Techniques in the Treatment of Complex Aortic Disease"
Monday, 13th October 2014, 12:45–14:00h, Amber Room 8

Visit us at the JOTEC booth
D aspite major advances in our understanding, as well as improvements in treatment of coronary artery disease, acute myocardial infarction remains still represents a significant cause of mortality and morbidity worldwide. Indeed, the number of following AMI, cardiomyopathies begin to die, and if the blood supply is not quickly restored, irreversible damage occurs. The heart is affected not only by acute myocardial infarction but also by chronic diseases such as hypertension, diabetes, and obesity, leading to chronic ischemia of the heart muscle.

To date, the majority of animal and preliminary human studies of ASC therapy following AMI have demonstrated an improvement in functional cardiac recovery. Myocardial and vascular regeneration were initially proposed as mechanisms of stem cell therapy. However, in many cases, the frequency of stem cell engraftment and the number of newly generated cardiomyocytes and vascular cells, either by transdifferentiation or cell fusion, appear too low to explain the significant cardiac improvement observed.

Instead, there is a growing body of evidence supporting the hypothesis that paracrine mechanisms mediated by factors released by the ASCs play an essential role in the reparative process observed after stem cell injection into ischemic hearts. It has been shown that ASCs, particularly mesenchymal stromal cells (MSC), produce and secrete a broad variety of cytokines, chemokines, and growth factors that are involved in cardiac repair. The paracrine factors influence adjacent cells and exert their actions via several mechanisms. Myocardial protection and neovascularization are the most extensively studied. Furthermore, the postinfarction inflammatory and fibrogenic processes, cardiac metabolism, cardiac contractility, and/or endogenous cardiac regeneration may also be positively influenced in a paracrine fashion. It is likely that the paracrine mediators are expressed released in a temporal and spatial manner varying different effects depending on the microenvironment after injury. In addition, these released factors may exert autocrine actions on the stem cells themselves. Thus, the paracrine hypothesis broadens the traditional concept of stem cell niche to include the influence of stem cell-released factors on the microenvironment in which they modulate stem cell biology and tissue responses.

**Distal aortic reintervention after surgery for acute DeBakey type I or II dissection: open versus endovascular repair**

**Bartosz Rybicki**

Heart Centre Freiburg University, Freiburg, Germany, Hospital of the University of Pennsylvania, Philadelphia, Pennsylvania

In most acute ascending aortic dissection patients, the dissection process extends beyond the left subclavian artery and emergency proximal aortic repair does not eliminate all dissected aortic segments. The residually-dilated aortic3 prows and some, especially younger, survivors develop later dissected aortic aneurysm requiring secondary intervention. Within recent decades, endovascular techniques have been widely adopted to treat even complicated thoracic and abdominal aortic disease. However, since currently available stent-grafts were designed for aortic aneurysm and not dissection repair, much controversy exists over the role of endovascular treatment among patients presenting a chronic dissection process. Our aim was to examine the outcomes of open versus endovascular reinterventions on distal aortic pathologies after surgery for acute ascending aortic dissection.

We pooled databases from Heart Centre Freiburg University and Hospital of the University of Pennsylvania in Philadelphia covering 14 years of aortic interventions. One hundred and forty one consecutive patients underwent 152 distal reinterventions after previous DeBakey type I or II dissection repair. Among them, 87 patients underwent open (20 hemiarch, 32 total arch, 39 descending aortic repair) and 54 endovascular reinterventions (four hybrid arch, 30 descending aortic repair). Figure 1. We found that patients who underwent endovascular aortic repair and distal reintervention were longer in the open group (P=0.02, 0.001). There was one invertebral spinal and one stroke in the open group, and one stroke in the endovascular group. Seven patients in the open and none in the endovascular group required re-exploration for bleeding. Seven open and four endovascular patients required more than one distal reintervention (8% vs. 7%, P=0.853). Open-repair patients experienced higher in-hospital mortality (13% vs. 2%, P=0.055) and lower survival at 1 and 5 years (85% vs. 94% vs. 3%, 76% vs. 5% vs. 90% P=0.043, respectively, Figure 2). We think that open surgical repair is the gold standard for treating acute aortic events. However, we are now observing a shift in the paradigm for distal aortic dissections in favor of endovascular therapy over open surgery. This study is the first evaluation of open vs. endovascular procedures in patients with distal aortic pathologies following proximal repair for acute type I or II dissection. Endovascular intervention in experienced hands offers a benefit when treating late aortic complications after ascending aortic dissection repair. Endovascular repair is associated with lower in-hospital mortality and better survival, and does not increase the likelihood of later reinterventions at mid-term follow-up.

**An evaluation of a frailty tool for preoperative trans-catheter aortic valve implantation (TAVI) patients**

**M. Roberts, Dr C Teiul, Mr M Kudskull, Dr M. Deasmond, Mr A Ds.**

Liverpool Heart and Chest Hospital, United Kingdom

T AVI was first developed in the human, adult population in 2002 (Cribier et al 2002) where the aortic valve is replaced using a percutaneous, surgical option (Burgazzi et al, 2012). The prevalence and incidence of heart failure increases with the person’s age and has become a serious public health concern (Murad & Kitzman, 2012).

Currently, patients are scored using the European System for Cardiac Operative Risk Evaluation (EuroSCORE) and the Society of Thoracic Surgeons (STS) scores (Sunderman et al, 2011).

Frailty was first defined as a clinical phenotype, a ‘failure to thrive’ (Khandelwal et al, 2012) while current medical literature states that frailty is defined as a reduction of a person’s natural reserve, with the human body being unable to compensate (McClure & Cohn 2012). In this study a variation of the Edmonton Frailty Scale (Parnidge, 2012), a validated measure of frailty was used.

Aims of the Study

1. To evaluate the usefulness of a frailty tool in assessing the pre-operative TAVI patient
2. To investigate the patient’s conceptualisation of their own frailty compared to what the medical tools and the clinicians view.

Method

A qualitative methodology was used and a sample of seven, pre-operative, TAVI patients interviewed utilizing a semi-structured format. The first part of the interview was the frailty score while the second part focused on the following five questions:

1. In general how would you describe your health?
2. Do you still work and if so what do you do?
3. How do you care for your family?
4. Do you fill your day?
5. Who do you socialise with?

The final part focused on the comparative analysis of the tools’ perspectives, the patients’ views of their own frailty and the frailty scores.

**Results**

1. An Analysis of the Frailty Tool Results

   The frailty scores made reference to functional capacity and frailty as a potential progression in life. 2. An analysis of the five discussion questions

   Auto; which are often associated with the ageing process
   A strong sense of not giving up life
   A positive attitude and a need for drive to carry on,
   A pride that they had worked in their lives
   Forming social networks, regaining independence and
   Engaging in physical or mental exercise.

3. Comparison of Participant and Medical Practitioners’ Perceptions of Frailty

   The results were based on clinical judgement rather than by choice of procedure.

**Conclusions**

There was some evidence that the frailty test did not adopt the correct format for these patients and that the participants were deluded with their own views of themselves, with the researcher expecting higher scores due to their own associations with previous TAVI patients. However, evaluation of the frailty tool through the exploration of the patients conceptualisation of their own frailty was successful.

**References**


**Images**

Figure 1. Rate of endovascular distal aortic reinterventions per year throughout the study period

Figure 2. Survival after distal aortic reintervention in patients with history of type I or II dissection repair
Aortic arch surgery after previous Type A dissection repair
Early to midterm results

Pietro Bajona, Eduard Quintana, Marta Bell Schaff, Richard Daly, Joseph Deans, Kevin Groven, Alberto Pochettino
Mayo Clinic, Rochester, Minnesota, US

Primary repair of acute Type A aortic dissection or exclusion of the intimal tear forms the basic principle of the surgical repair. Dissecting disease can evolve and different mechanisms are responsible for possible reoperations in the future such as increasing aortic valve regurgitation, progressive dilatation of the aortic root and/or of the distal segments of the native aorta, pseudoaneurysm development and malperfusion syndromes. Open aortic arch surgery in patients who have undergone previous Type A repair can be not only technically challenging but also affected by a higher mortality and morbidity rate. We sought to review our experience for this particular patient population. In particular we looked at causes for reoperation, indications for redo procedures and surgical strategies.

From 2000 to 2014, we identified 85 patients that required aortic arch surgery after a previous Type A dissection repair. Medical records were available for review including CT angiograms, cerebral protection strategies and follow up.

The mean interval from previous Type A dissection repair to aortic arch surgery was 5.7 ± 5.4 years. At reoperation 36 patients (65.4 %) had total arch replacement and 19 (34.6 %) had term arch replacement. Indications for reoperations were: enlarging aneurysm in 27 (49%), impending rupture in 12 (21.8%), chronic dissection in 10 (18.1%) and mycotic aneurysms in six (10.9%). Arterial peripheral cannulation was used in 89% of patients. Selective antegrade cerebral perfusion was used in 35 patients (63.6 %) and retrograde perfusion in 2 (3.6%). There were three perioperative deaths (5.5 %) and four permanent strokes (7.3%). Survival was 90.3%, 84.8% and 77.3% at one, three and five-years follow-up, respectively. Five-year survival was 10% lower than that of an age and sex matched population (p<0.001). The only predictor of follow-up mortality was older age (OR 1.07, 95% CI 1.02–1.13, p=0.007).

Our results show that reoperation after acute dissection repair can be accomplished, safely guaranteeing an acceptable long-term prognosis. Cerebral perfusion strategies likely contribute to positive outcomes. Favorable mid-term survival justifies performing such difficult reoperations. Life-long routine imaging and clinical follow-up are mandatory for an early reveal of complications and to evaluate the unreacted aortic segments. A redo procedure for a previously repaired Type A dissection should be referred to highly specialized centers in order to assure the good prognosis of this patient population.

Surgical indications and operative data

<table>
<thead>
<tr>
<th>Indications for surgery</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aneurysm</td>
<td>27 (49 %)</td>
</tr>
<tr>
<td>Impending rupture</td>
<td>12 (21.5 %)</td>
</tr>
<tr>
<td>Chronic dissection</td>
<td>10 (18.1 %)</td>
</tr>
<tr>
<td>Mycotic aneurysm</td>
<td>6 (10.9 %)</td>
</tr>
<tr>
<td>Total arch</td>
<td></td>
</tr>
<tr>
<td>Hemiehara</td>
<td>19 (34.6 %)</td>
</tr>
<tr>
<td>Emergent</td>
<td>3 (5.5 %)</td>
</tr>
<tr>
<td>Urgent</td>
<td>4 (7.3 %)</td>
</tr>
</tbody>
</table>

Perfusion data

| Cardiopulmonary bypass (min) | 219.9 ± 40.8 |
| Cardiac ischemia (min)       | 219.9 ± 40.8 |
| Circulatory arrest body (min) | 22.2 ± 23.6 |
| Circulatory arrest brain (min) | 19.6 ± 14.2 |
| Lower Temperature (core) achieved (Celsius) | 37.2 ± 10 |
| Arterial cannulation         |                  |
| Aorta                     | 11 (21.5 %) |
| Arterial                   | 38 (71.1 %) |
| Femoral                    | 6 (11.0 %) |
| Venous return              |                  |
| Central                    | 43 (78.3 %) |
| Femoral vein               | 12 (21.8 %) |

Concomitant cardiac procedures

| Bentall                  | 22 (40.0 %) |
| CABG                    | 10 (18.2 %) |
| Aortic valve replacement | 6 (10.9 %) |
| Redo root replacement   | 4 (7.3 %) |
| Homograft implantation  | 3 (5.4 %) |
| Valve sparing root replace | 2 (3.6 %) |
| Mitral value repair     | 1 (1.8 %) |
| Tricuspid valve surgery | 1 (1.8 %) |

Data shown as n (%) or mean ± SD

Adapted from: CARE, coronary artery bypass graft.

Postoperative outcomes and complications

<table>
<thead>
<tr>
<th>Indications</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypotension</td>
<td>3 (5.4 %)</td>
</tr>
<tr>
<td>Follow-up mortality</td>
<td>15 (27.3 %)</td>
</tr>
<tr>
<td>ICU length of stay (days)</td>
<td>2.5 ± 3.3</td>
</tr>
<tr>
<td>Hospital length of stay (days)</td>
<td>9.5 ± 8.7</td>
</tr>
<tr>
<td>Complications</td>
<td></td>
</tr>
<tr>
<td>Stroke (permanent)</td>
<td>4 (7.3 %)</td>
</tr>
<tr>
<td>Stroke (transient)</td>
<td>2 (3.6 %)</td>
</tr>
<tr>
<td>Spinal cord deficit</td>
<td>1 (1.8 %)</td>
</tr>
<tr>
<td>Reperfusion for bleeding</td>
<td>6 (10.9 %)</td>
</tr>
<tr>
<td>Tamponade</td>
<td>2 (3.6 %)</td>
</tr>
<tr>
<td>Low cardiac output syndrome</td>
<td>2 (3.6 %)</td>
</tr>
<tr>
<td>Myocardial infarction</td>
<td>1 (1.8 %)</td>
</tr>
<tr>
<td>Renal failure delay</td>
<td>1 (1.8 %)</td>
</tr>
<tr>
<td>Respiratory (pneumonia/dehiscence)</td>
<td>6 (10.9 %)</td>
</tr>
<tr>
<td>Mesenteric (ischemia/hemorrhage)</td>
<td>1 (1.8 %)</td>
</tr>
<tr>
<td>Spine</td>
<td>1 (1.8 %)</td>
</tr>
<tr>
<td>Wound complication (infection/dehiscence)</td>
<td>2 (3.6 %)</td>
</tr>
<tr>
<td>Laryngeal nerve injury</td>
<td>5 (9.0 %)</td>
</tr>
</tbody>
</table>

Data shown as n (%) or mean ± SD

Adapted from: ECMO, extracorporeal membrane oxygenation; IABP, intra-aortic balloon pump; ICU, intensive care unit.
Mitrval regurgitation surgery in PTS with ischemic cardiomyopathy and ischemic mitral regurgitation
Factors that influence survival

Ottavio Alfieri
S. Raffaele University Hospital, Milan, Italy

Mitrval regurgitation (MR) in patients with ischemic cardiomyopathy is usually due to changes in LV geometry, producing dislocation of the papillary muscles, and leaflet tethering. Annular dilatation is almost invariably present. Disynchrony in contraction and decreased closing forces secondary to severe LV dysfunction may contribute to MR. Under these circumstances, the surgical risk is not negligible. Old age, comorbidities and frailty, are factors incrementing the operative mortality, when present.

According to a recent meta-analysis, mitral valve repair with undersized annuloplasty is associated with an advantage in short- and long-term survival compared with valve replacement. Improvement in symptoms and LV reverse remodeling are often obtained following annuloplasty.

However, mitral repair carried out in this clinical scenario can be associated with recurrence of MR in a high proportion of patients, as reported in a recent prospective randomized study comparing mitral valve repair and replacement in severe ischemic MR. Recurrence of MR, which occurs when LV reverse remodeling is not obtained, is strongly negatively affecting survival in the follow-up.

To improve the overall results, it is important to identify patients in whom undersized annuloplasty is not expected to offer an effective and durable repair.

First of all, it is unlikely that patients with advanced LV remodeling (excessively dilated ventricle with a sphericity index more than 0.7 and a very low ejection fraction) and long-lasting congeous heart failure can have a benefit from annuloplasty.

In addition, many other well-defined predictors of poor outcome following annuloplasty can be identified with echocardiography: systolic tenting area > 2.5 cm², coaptation distance > 10 mm, posterior leaflet-anular plane angle in systole > 45°, distal anterior leaflet-anular plane angle in systole > 125°, and systolic interleaflet muscle distance > 20 mm. When these predictors of unfavorable outcome are present, mitral valve repair using annuloplasty should be avoided and valve replacement should be the preferred option. Under special circumstances, other procedures (like ventricular wall resection/ pllication, secondary chordal cutting, leaflet extension, papillary muscles sling or relocation, etc.) can be added to annuloplasty in order to enhance effectiveness and durability of mitral valve repair.

In conclusion:

a) old age, comorbidities, and poor LV function are associated with lower short and long-term survival in patients submitted to mitral valve surgery in the context of ischemic cardiomyopathy

b) mitral valve repair with undersized annuloplasty, when effective and durable, is offering a better survival (leaflet late), compared to valve replacement.

c) predictors of recurrent MR following mitral repair can be identified preoperatively.

d) recurrence of MR following mitral repair is negatively affecting the survival in the follow-up.

e) valve replacement should be reserved to patients in whom recurrence of MR is expected.

f) when surgery is too risky, percutaneous methods to correct MR should be considered.

Basic Science Programme
Amber

Secretion of stressed mononuclear cells is effective in acute experimental infarction and chronic ischemic left ventricular dysfunction: from porcine AMI model to molecular biology

Mariann Gyorgyosi
Medical University of Vienna, Austria

Intravenous injection of secretome of irradiated apoptotic pig myocardial cells (APOSEC) suspensions restored cardiac dysfunction and acute myocardial infarction (AMI) model. Cell culture supernatants derived from irradiated apoptotic porcine myocardial cells (APOSEC) were collected from pigs and prepared for intravenous and intramyocardial injections.

Closed-chest reperfused AMI was induced in pigs. APOSEC was injected either: 1) intravenously as a single infusion during the coronary occlusion phase of AMI, or 2) percutaneously intramyocardially in the border zone of AMI in a chronic phase of LV dysfunction, during the remodeling process of the left ventricle. Ad 1) Single intravenous dose of APOSEC resulted in a reduction of scar tissue formation, and higher values of ejection fraction (57.8 ± 40.5%, p < 0.01) and cardiac output (4.6 vs. 2.4 l/min, p < 0.001) and a reduced extent of infarction size (13.6 vs. 6.9%, p < 0.02) as determined by magnet resonance imaging (MRI).

Ad 2) In chronic AMI model, injection of APOSEC significantly decreased infarct size (p < 0.05) and improved cardiac index and myocardial viability compared to controls. Gene expression analysis revealed significant downregulation of caspase-1, tumor necrosis factor and other inflammatory genes in APOSEC-treated areas. Real time PCR showed higher expression of myogenic factor Mef2c (p < 0.05) and downregulated caspase genes (p < 0.05) in APOSEC-affected areas. Altered gene expression one-month post-APOSEC treatment proved the long-lasting effects of cell-free therapy with paracrine factors.

In conclusion, intravenous or intramyocardial injection of APOSEC attenuates myocardial remodeling in experimental acute and chronic AMI models. This effect is probably due to the activation of pro-survival signaling cascades in the ischemic-injured cardiomyocytes.

For further information, please contact info@cardiarsurgery@sorin.com
Access to homologous blood transfusion can be made more effective by the Sorin cardiac surgery solutions. This is possible by combining the use of Inspire low Dynamic Operating Volume (DOV) oxygenators to minimize impact on hemodilution, Inspire Dual chamber reservoir for the segregation of activated suction blood, and XTRA autotransfusion system for the treatment of the separated blood. Connect and GDP Monitor can then provide information to make homologous transfusions only when really needed.
Traditional percutaneous cannulas used for peripheral cannulation oblige the blood flow from the collateral iliac veins, the renal veins, and the hepatic veins to travel towards the right atrium prior to entering the cannula lumen. In contrast, the new meshed 24F Smartcanulas® ST developed for minimally invasive cardiac surgery (MICS) and extra-corporeal membrane oxygenation (ECMO) allow for direct venous drainage at all levels of the caval axis, which in turn improves flow rate due to both a simplified flow path and a larger relative drainage lumen within the meshed cannula.

This can be demonstrated for simulated collateral venous drainage during cardiopulmonary bypass (CPB) over the caval axis by comparison of the new meshed 24F Smartcanulas® ST which are designed for use with augmented venous drainage and constricted to 23F versus percutaneous control 23F cannulas (Biomedicus®) in vitro. Flow (Q) is measured sequentially for simulated right atrial + hepatic + renal + iliac drainage using a centrifugal pump in an experimental bench set-up and a flexible caval substitute for an afterload of 60mmHg. It comes to no surprise, that the meshed cannula designed for use in combination with augmented venous drainage provides better drainage at a fraction of the negative pressure required for traditional percutaneous cannulas. The superior performance of the new 24F Smartcanula® ST is also evident in vivo.

NEW 24F Smartcanula® ST designed for MICS and ECMO provides superior collateral venous drainage at all levels!

Traditional percutaneous cannula with evident cannula orifice obstruction due to augmented venous drainage

The new 24F Smartcanula® ST designed for augmentation provides more efficient direct venous drainage at all levels.
BETTER BLOOD BALANCE™

Now manage INR at 1.5–2.0 for reduced bleeding risk and improved quality of life.

Only the On-X® Plus 1.5™ Aortic Heart Valve reduces bleeding risk by 60% without increasing thrombotic events and provides the reassuring longevity of a mechanical valve with lower warfarin dosage.¹

Visit booth #107 to learn more.


The approval of a lower INR recommendation through the EU regulatory process applies only within that jurisdiction and others that accept EU review. This therapy is not approved in the US or other countries that have reviews independent of the EU. In these countries On-X Life Technologies, Inc. continues to recommend standard anticoagulation therapy as presently prescribed by various professional societies for the On-X valve.
### EACTS Academy Programme 2014

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<td>27-31 October</td>
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<tr>
<td>Advanced Module: Heart Failure: State of the Art and Future Perspectives</td>
<td>10-14 November</td>
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<tr>
<td>Thoracic Surgery: Part II</td>
<td>2-5 December</td>
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<tr>
<td>Extra Corporeal Membrane Oxygenation</td>
<td>20-21 October</td>
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<tr>
<td>Advanced Course on the Mitral and Tricuspid Valve</td>
<td>19-21 November, Munich, Germany</td>
</tr>
<tr>
<td>Valve Sparing Aortic Root Replacement and Aortic Valve Repair</td>
<td>28-29 November</td>
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<tr>
<td>4th EACTS Meeting on Cardiac and Pulmonary Regeneration and Stem Cell Technology</td>
<td>12-13 December, Bern, Switzerland</td>
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### EACTS Academy Programme 2015

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<td>2-6 February</td>
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<tr>
<td>Advanced Module: Open and Endovascular Aortic Therapy</td>
<td>17-20 March</td>
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<tr>
<td>Thoracic Surgery: Part I</td>
<td>13-17 April</td>
</tr>
<tr>
<td>Fundamentals in Cardiac Surgery: Part II</td>
<td>8-12 June</td>
</tr>
<tr>
<td>Advanced Module: Congenital Surgery</td>
<td>26-30 October</td>
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<tr>
<td>Advanced Module: Heart Failure: State of the Art and Future Perspectives</td>
<td>9-13 November</td>
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<tr>
<td>Thoracic Surgery: Part II</td>
<td>7-11 December</td>
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<tr>
<td>Functional Mitral and Tricuspid Regurgitation</td>
<td>20-21 February</td>
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<td>Transcatheter Aortic Valve Implantation</td>
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<td>Ventricular Assist Device Coordinator Educational Course</td>
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<tr>
<td>Modern Perspectives on Atrial Fibrillation Surgery</td>
<td>7-8 May</td>
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<tr>
<td>Perioperative Skills in Cardiac Surgery</td>
<td>22-23 June</td>
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<tr>
<td>Infection in Cardiac Surgery</td>
<td>2-3 July</td>
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<tr>
<td>Advanced Aortic and Mitral Valve Reconstructive Surgery</td>
<td>10-11 July</td>
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<tr>
<td>Heart and Lung Transplantation</td>
<td>7-8 September</td>
</tr>
<tr>
<td>Chest Wall Diseases</td>
<td>2-4 December</td>
</tr>
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All courses to take place at EACTS House in Windsor, UK, unless stated otherwise.

- Foundation Courses  | Specialist Courses

Raising Standards Through Education and Training

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Valve Sparing Aortic Root Replacement and Aortic Valve Repair Course

In 28-29 November this year, the EACTS will host the Valve Sparing Aortic Root Replacement and Aortic Valve Repair Course at EACTS House, Windsor, UK. We talked to one of the course directors, Dr Emmanuel Lansac, about the importance of the course...

“The objective of this highly-focused course is to provide a dedicated teaching platform on surgery for aortic insufficiency and/or aortic root aneurysm, particularly examining the role of valve repair,” stated Dr Lansac. “The course will provide a standardised approach to management of these patients from their pre-operative analysis to select good candidates for valve repair, to surgical technique. Aim of the course is that attendees learn a step-by-step, systematic approach to valve sparing root replacement and aortic valve repair surgery, in order to spread diffusion of these techniques to all teams who want to offer it to their patients.”

He said that course delegates could include cardiac surgeons and echocardiographers (cardiologists and anaesthesiologists) who are willing to start or are already part of a valve sparing aortic root replacement and aortic valve repair programme. He added that the appeal of the course reflects the multi-disciplinary aspect of aortic root replacement and aortic valve repair.

The programme will begin with an examination of the functional anatomy of the aortic valve and the rational of aortic annuloplasty for a standardised aortic valve repair, which will include all the important parameters which need to be taken into account when considering aortic valve repair.

Dr Lansac explained that the course will include presentations from different schools of aortic valve repair such as Diana Aicher (Homburg), Dr Laurent De Kerchove (Brussels) and Alan Bieriebi (Paris), among others.

The course will also feature “live on tape” case studies focusing technical detail for valve sparing root replacement, aortic valve repair and ring annuloplasty technique.

“Each video will clearly demonstrate to attendees the various surgical techniques in a step-by-step approach depending on the phenotype of the ascending aorta such as aortic root aneurysm, supra coronary and isolated aortic insufficiency” he added. “The videos will show common cases and more complex cases for both tricuspid and bicuspid aortic valve.”

The programme will also include a failure session, in which attendees will discuss the case from echo analysis to surgical repair, and how to identify predictors of repair failure and bailout technique in such conditions.

The course will end with a workshop bringing together the theoretical knowledge with a practical application. This will include an analysis of the anatomy of the aortic root, valve assessment including measurement of cup effective height, valve sparing root replacement and annuloplasty technique.

“Right now, the question regarding aortic valve surgery is no longer “can we do aortic valve repair?”, because we know it is feasible with satisfying long-term results thanks to the work of pioneering surgeons such as Magdi Yacoub, Trone David, Gabrine El Khoury and Joachim Schaffter among others,” he added. “Now we are asking, ‘how can we standardise the technique in order to ease its widespread use among every team?’” Aside the ones who advocate remodelling of the aortic root or who support re-implantation of the aortic valve, we know now that the more physiological the root reconstruction, the better.

“Moreover, the need of cup effective height resuspension and aortic annuloplasty are now recognised as key component for a predictable and durable repair. Standardisation of the root reconstruction and valve repair is the aim of this course. Dr Rafael Saldaba, who is the co-director of the session, and myself are looking forward to the first edition in November where we will discuss and debate all these fascinating aspects of aortic root and valve repair surgery.”

I am honored and pleased to announce the scientific programme for the Annual Meeting in Milan. In 2008, the Surgical Training and Manpower committee was in charge of organizing a single session called “the residents meeting” outside the main programme of the Annual Meeting. Today the STMP committee has a full programme dedicated to training and novel techniques. As our Association has changed from an exclusive club of European surgeons to the most inclusive international society in cardiothoracic surgery, the STMP committee has changed with it, and is now at the forefront of activities dedicated to training, research and innovation.

We represent the views of young surgeons and residents, the future of our specialty and we embrace the future with all its fullness. We believe that training, research and innovation are the fundamentals of our practice and future of our specialty.

We believe that excellence in training, research and innovation should be recognised, pursued and applauded. And we have supported and initiated this by awarding each year different prices for research (Young Investigators Awards), for training (Leonardo DaVinci award for excellence in surgical training) and for innovation. We organise courses on new procedures, and have introduced new initiatives such as a minimally invasive courses in adult cardiac surgery and drylab trainings.

During the forthcoming Annual Meeting in Milan you will have the opportunity of joining us for a number of activities.

On Monday we will have our yearly session titled “Work in progress abstract session”. Although there is enough room during our Annual Meetings to present data regarding the individual studies, less opportunity exists to discuss ongoing research projects. Therefore, three years ago we introduced a new session for our young colleagues to present their preliminary results. The idea is to give an opportunity to innovative work and thinking, and create a medium whereby new ideas could be exchanged and new cooperations created. The focus is on the project as a whole, possible implications for our specialty and future perspectives.

Also on Monday we will organise a new session titled “Pro and Cons debates”. During this session prominent surgeons are invited to clash intellectually with each other regarding contemporary subjects within cardiac surgery. The session is designed to broaden one’s perspectives and remind all of us that there are no absolutes in medicine.

Another session on Monday is “Nightmares in cardiothoracic surgery”. This session was so packed last year that we could not accommodate dozens of participants wanting to enter the room. During this session cardiothoracic surgeons present their nightmares and difficult cases in an interactive manner. The idea is to stimulate discussion about the process of decision making and problem solving.

On Tuesday we are organizing a completely new session with a new concept, “Meet the Experts”. We have identified four subjects within thoracic, adult cardiac, congenital and vascular surgery and invited a panel of experts for each subject. The participants have been invited to submit case reports. During this session case reports sent by delegates will be discussed with the expert panel and the audience. The idea is to stimulate discussion on difficult cases and discuss the problems in detail with the expert panel.

We are also organizing our yearly session on training, “Training in minimally invasive cardiothoracic surgery”. We will explore the necessities for starting the minimally invasive training programme, the ways to incorporate it when training residents and the ways that the industry can help the education in new techniques.

Also on Tuesday we are organizing the “residents luncheon” for the fourth time. The subject and title of this year’s luncheon is “The Clash of the Titans returns!”. The luncheon consists of seven tables, each having been designated a specific subject within cardiothoracic surgery. Prominent surgeons with expertise in related subjects are invited to moderate at each table. Residents can register at the Annual Meeting on-site to attend the luncheon. Questions can be sent in advance and will be compiled in envelopes to be opened at tables to facilitate discussions and interaction.

Another new initiative on Tuesday is “Pitfalls and trouble shooting in minimally invasive surgery”. This session is dedicated to pitfalls and problems occurring during minimally invasive procedures. As most of the sessions during the Annual Meeting are focused on the positive results or how to do certain things, the focus of this session is what are the pitfalls and nightmares and how one can avoid them.

On Wednesday we will have our yearly session titled “How to do it: Live in-box”: This session is fully dedicated to techniques in adult cardiac surgery. Live-in-a-box videos of different techniques are presented. The emphasis is on the technical aspects of each procedure and pitfalls related to these techniques. The aim of this session is to stimulate discussion, exchange ideas and give the young surgeons a stimulating introduction to the challenging techniques.

This year from Monday to Wednesday we are also organizing six drylabs on minimally invasive mitral valve repair (MMV/R) on high-fidelity simulators. Dexterity of open surgery is insufficient for starting a MMV/R and new dexterity should be developed in endoscopy and working with long shafted instruments. Most critical technical steps are working with long-shafted instruments endoscopically and placing sutures on mitral valve annulus. Therefore, the learning curve of MMV/R is steep and unfortunately still being underutilised in patients. These drylab sessions will enable residents, fellows and surgeons to develop skills in MMV/R and practice those skills endlessly on the simulators. We as the representatives of the STMP committee hope that the proposed activities serve the surgeons. Much energy was put into these innovative sessions and a prominent faculty is involved in it. We are sure that the format of the sessions and quality of the faculty will create a highly-instructive atmosphere. We look forward to seeing you in Milan.

Programme details:

Work in progress
Day/Date: Monday, October 13, 2014
Session Time: 08:15 – 09:45
Room: Amber 6

Pro and Cons debates
Day/Date: Monday, October 13, 2014
Session Time: 10:15 – 11:45
Room: Amber 6

Nightmares in cardiothoracic surgery
Day/Date: Monday, October 13, 2014
Session Time: 14:15 – 15:45
Room: Amber 6

Meet the experts
Day/Date: Tuesday, October 14, 2014
Session Time: 08:15 – 09:45
Room: Amber 6

Training in minimally invasive cardiothoracic surgery
Day/Date: Tuesday, October 14, 2014
Session Time: 10:15 – 11:45
Room: Amber 6

Luncheon:
The Clash of the Titans returns!
Day/Date: Tuesday, October 14, 2014
Session Time: 12:45 – 14:15
Room: Amber 3

Pitfalls and trouble shooting in minimally invasive surgery
Day/Date: Tuesday, October 14, 2014
Session Time: 10:15 – 11:45
Room: Amber 6

How to do it: with live in a box
Day/Date: Wednesday, October 15, 2014
Session Time: 09:00 – 12:00
Room: Brown 1

Endoscopic port-access mitral valve repair drylab training using high-fidelity simulators

Dates and times:
6 drylabs from Monday to Wednesday, 13–15 October 2014
90-minute session during the main programme.
Fourth Allied Profession PostGraduate Course

This year the Fourth Allied Profession PostGraduate Course will be held during EACTS 28th Annual Meeting. The goal of this PostGraduate Course is to enhance the knowledge and professional standards of those involved in cardio-thoracic surgery. The audience will consist of nurse practitioners, physician assistants, nurses, physical therapists and others who are involved in the team of the cardio-thoracic surgeon.

The programme this year offers an array of subjects of interest to the delegate. In the field of cardiac surgery, physician assistant Rianne de Jong, will offer an insight to the current standards of endoscopic vein harvesting addressing the advantages and limitations. Surgeon Bart van Putte will give an overview in the field of treatment of lone atrial fibrillation via surgical ablation. There will be a presentation on ECMO from Ms Jo Fowkes from Papworth hospital, UK. Furthermore new guidelines in advanced cardiac life support after cardiac surgery will be presented and demonstrations will be given.

In the field of thoracic surgery, surgeon Lee Maas will deliver a lecture on the current insights on treatment of mesothelium. Physician Joe Costa will present on his work and research in organ harvesting in the lung transplant programme.

We also offer a platform for allied professionals to present their scientific work. Abstracts will be presented on analgesic treatment for patients undergoing VATS, assessing frailty in patients and avoiding inadvertent perioperative hypothermia.

We cordially invite allied professionals to join us in beautiful city of Milan and ask members of EACTS to help make it possible for these colleagues to attend this PostGraduate Course. We all strive to deliver excellent care and know the result of successful cardio-thoracic surgery is determined not only by the quality of the surgeon but also the talent and quality of multidisciplinary team to enhance the patient experience and outcome.

Simulation of video-assisted minimal invasive mitral valve surgery – A new device for training programs

Suitable simulation is an appealing approach to improve surgical skills outside the operating room. Our aim was to build a cost-effective compact size device for training and education in minimal invasive mitral valve surgery.

The device consists of an aluminium pipe with a sliding drawer on which two panels can be mounted. One panel simulates the mitral valve composed of two layers of disposable microfiber membranes. The first layer simulates the annulus and the atrial tissue, the second layer simulates the anterior and posterior leaflet. The second panel is mounted behind the first one and contains the papillary muscle dummies made from replaceable foam rubber. Both panels can be adjusted in different distances from the access at the front of the pipe, which provides several levels of difficulty for the user. At the front of the pipe you find the access opening of 6cm diameter, which holds acrylic glass inserts of various size to simulate the access through the chest wall.

An USB Camera with LED light source is integrated for video assisted surgery. The USB camera can be connected to any available computer which offers the opportunity to practice video-assisted surgery in various locations at work or at home. The device is designed to mount all required instruments and disposables inside the aluminum housing to make it easy for storage and transportation. A handle bar helps to carry the device and to adjust angle and height of the device during surgical practice. For teaching purposes the simulator can be used with open lid to provide a good view for the mentor, while the trainee is practising the minimal invasive approach through the front access. Closing of the lid and using the camera, perfectly simulates the reality of minimal invasive, video-assisted surgery. The device comes optionally with suitable economically priced training instruments. To further improve the sense of realism special mitral valve dummies made of silicon are available and can be mounted in the device.

In conclusion, this portable simulator provides suitable education and training options in the field of mitral valve surgery. Since it covers a wide range of current techniques such as annuloplasty, sliding plasty, leaflet resection, placement of neochordae or valve replacement, it may significantly contribute to improve training programs and learning curves.
Heart Failure
State of the Art and Future Perspectives

In November 2014, the EACTS will host its third Advanced Module: Heart Failure – State of the Art and Future Perspectives course at EACTS House in Windsor, UK. EACTS News talked to one of the course directors, Professor Gino Genosa (Padua, Italy), about the course...

“In the third Heart Failure Course we will again try to incorporate all aspects of heart failure from diagnosis and epidemiology, imaging and biomarkers, to advanced therapies such as UHDS, tissue engineering and the total artificial heart,” said Genosa. “The aim to provide a comprehensive overview of the current status of the available treatments for heart failure patients.”

The course, which is aimed at residents and experienced cardiac surgeons with an interest in the heart failure field, will include a world-class faculty of heart failure experts including cardiac and congenital surgeons, cardiologists and scientists.

The course will begin with two presentations by pathologist Professor Angelini (Padua); who will explain the development of heart failure, why certain diseases lead to heart failure and the diagnosis of the condition. Professor Fabio (Padua) will then examine the role of biomarkers in heart failure and Dr Oswald (Bad Oeynhausen, Germany) will then assess the current alternatives to medical therapy such as implantable cardioverter-defibrillator resynchronisation therapy and biventricular pacemakers.

Dr Schulze (New York) will then discuss optimal medical therapy and provide a cardiologist’s point of view by evaluating the current medical therapies available for treating heart failure. “We will also examine the surgical options for heart failure including mitral valve repair and replacement, as well as myocardial revascularisation,” added Genosa. “It is important that all the current therapies and treatment options are explained, discussed and understood. Heart failure is a highly complex condition and one that has multiple solutions, choosing the right solution is key.”

Case reports “We will again be presenting some case reports and asking the group for their opinion, allowing the group to discuss different treatment options and take part in the decision-making process,” explained Genosa. “The case reports discussions provide delegates with an opportunity to see how treatments options are evaluated depending on the conditions of the heart failure patient. The discussions from this session are always very interesting.”

The course will then discuss heart transplantation and specifically the issues surrounding donor shortage. “In many countries the availability of donor hearts is decreasing at fewer people with healthy hearts are dying early, as a result there is a real concern regarding the shortage of donor hearts, explained Genosa. One solution could be found in tissue engineering, and during this year’s course the ‘Organ factory’ session will discuss regenerative medicine and the possibilities it can offer the heart failure patient.”

“It took almost 40 years from when mankind made the first transatlantic flight to when we took our first step on the moon,” said Professor Genosa. “Now, almost 40 years on from the first heart transplant, we are close to realizing a similar dream – the bioengineered heart.”

Webcast
The course will also include the ever popular webcast, sponsored by Thoratec. This is a hands-on session that allows attendees to implant Thoratec’s HeartMate device.

“The webcast session gives delegates an opportunity to apply their knowledge in a practical setting,” he added. “It gives them the chance to assess and improve their surgical technique, as well as receive one-to-one advice from world renowned experts.”

The course will also include a session on mechanical circulatory support with an assessment of short-term assist devices options and total artificial hearts.

The final day of the course is dedicated to industry presentations and allows companies to showcase their devices, giving the attendees the opportunity to see the latest technological advances and ask questions regarding patient selection, implantation and modification techniques.

“Overall, this course provides attendees with the opportunity to spend five days talking directly to heart failure specialists,” similar dream – the bioengineered heart.”

For further information, please visit the EACTS website: www.e-dendrite.org.

Gino Genosa
Advanced course on the mitral and tricuspid valve

The progressive course brings together world-leading figures in mitral valve disease to discuss the interdisciplinary approach to evolving information around diagnostics and advanced imaging of mitral valve disease, state of the art mitral valve repair techniques, minimally invasive and interventional approaches, and long term outcomes.

Focusing on the technical aspects of mitral surgery and interventions, the course will emphasise the success of teamwork through demonstration of six challenging live cases, debates around controversial areas of mitral and tricuspid management and the future of mitral valve repair.

Cardiac surgeons and cardiologists will have the opportunity to collaborate and determine the optimal approach and timing for mitral and tricuspid valve disease and discuss the clinical data supporting management of functional and degenerative mitral valve disease as well as participate in workshops.

This two-day interactive course will be conducted at the Munich Heart Centre on 28-29 November with Rüdiger Lange, MD, serving as Course Director. For more information please visit the EACTS website at www.eacts.org/academy. The Advanced Course on the Mitral and Tricuspid Valve is part of the EACTS Skills Programme.

The 3f Enable valve shows excellent results @ 5 years: the longest sutureless valve paper published

A snapshot from the interview released by Dr Englberger to the Confluence Journal

Could you tell us a little bit about Enable and what makes it unique and different from other valves available?

The uniqueness of Enable is that it is first of all made of equine pericardium, which is a good tissue, comparable to bovine pericardium. In addition, the platform of the Enable development is a stentless biologival valve, which has shown good clinical results, the so-called “3f” valve (Medtronic Inc.). Despite good clinical results, the only problem with the 3f valve was, as for other sutureless valves, that you have to implant it in the aortic root in an exact geometric fashion. It was, therefore, a good step to combine the 3f with a nitinol frame which keeps the geometry of the leaflets in a perfect position ensuring optimal performance of the valve.

Why are long term data important for such valves?

Traditional surgical aortic valve replacement procedures deliver excellent results and, therefore, new valve technologies must be at least at this level. This means that when you create or introduce a new valve in clinical practice, it must meet a number of requirements. Firstly, it has to be easy to be implanted and the introduction process itself should not be complicated. Secondly, the occurrence of paravalvular leaks should not be accepted. Thirdly, we must consider the durability of the valve. Patients who undergo surgical valve replacement tend to be younger and at lower risk compared with TAVI patients, the valves need to last longer.

Can you tell us about the 5-year data for Enable?

The 5-year follow-up of the first patients implanted with the Enable valve has recently been published in the Journal of Thoracic and Cardiovascular Surgery1. These data show excellent results from both haemodynamic (single digit gradients at 5 years) and durability standpoints (94% Freedom from valve related mortality at 5 years). We expected this though, because the platform of the Enable is the 3f stentless valve, which has also shown good haemodynamic results. In the initial patients, we saw some paravalvular leakage, however, these problems were overcome after a learning curve. The five year data gives us confidence in the valve.

As I said, a new sutureless valve should not have disadvantages not normally seen with the placement of sutured valves. The Enable valve fulfils the expectations. If the sutureless placement of a valve is quick, safe and reproducible without a higher rate of paravalvular leakage compared to standard implant techniques, the sutureless valves, will really replace the conventional sutured biologic valve types in the future.

Reference

29th EACTS Annual Meeting
Amsterdam, The Netherlands
3 - 7 October 2015

Abstract deadline 30 April 2015
To find out more or to register for the event visit:
www.eacts.org

Raising Standards through Education and Training
Exhibition opening times
Saturday: Closed. Sunday: 15:00–19:00. Monday: 09:00–17:00. Tuesday: 09:00–17:00. Wednesday: Closed.
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References

For more information on Prescriptive Oxygenation™, please visit us at EACTS, booth # 120.
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