EACTS Daily News
European Association For Cardio-Thoracic Surgery
The official newspaper of the 28th EACTS Annual Meeting 2014
Monday 13 October

In this issue

New challenges in cardio-thoracic surgery

Paul Van Schil

The Professional Challenges sessions are just some of the highlights of Monday's sessions during this year's meeting. Today begins with two Acquired Cardiac sessions examining the mitral valve, whilst the Thoracic, Congenital and Vascular Domains will concentrate on oncology, atroventricular septal defect and aortic arch interventions, respectively.

Today will also witness this year's Presidential Address by Paul Van Schil, entitled "The versatile beauty of the hand: mysterious, powerful and ingenious." In addition, there will also a chance to hear the latest data from on-going clinical trials (Late Breakers I and New nuggets from late-breaking clinical trials), the opportunity to try an endoscopic port-access mitral valve repair drylab using high-fidelity simulator (da Vinci room), the challenges cardiovascular surgeons face in emerging economies and in the southern hemispheres, as well as the current challenges and opportunities in atrial fibrillation.

Elsewhere, the will be a focus on small incisions and sutureless valves, left ventricular assist devices, extracorporeal support, the technical aspects of CABG, and a session discussing conduits and myocardial ischaemia.

Additional sessions will concentrate on the clinical and surgical anatomy of the right ventricle, mediastinum, concomitant atrial fibrillation ablation, high risk surgery, and rapid deployment aortic valve replacement and whether it makes a difference. There will also be a debate session looking at repair or replacement in ischemic mitral regurgitation, the pros and cons of aneurysm resection and left ventricular reconstruction, and hybrid repair of aortic aneurysms vs. conventional repair of aortic aneurysm.

As ever, Monday also offers attendees the first opportunity to listen to all the latest papers from around the world, as delegates present their research in the Abstract Sessions.

Today's Satellite Symposia

Sponsor	Location	Time
Admedus	Amber 6	12:45-14:00
AtriCure Europe	Amber 3	12:45-14:00
Edwards Lifesciences	Michelangelo	12:45-14:00
JenaValve Technology	Amber 4	12:45-14:00
JOTEC	Amber 8	12:45-14:00
Maquet	Brown 1	12:45-14:00
Medistim	Amber 5	12:45-14:00
Medos Medizintechnik	Amber 7	12:45-14:00
Medtronic	Botticelli	12:45-14:00
On-X Life Technologies	Brown 2	12:45-14:00
Sorin Group	Raphael	12:45-14:00
St Jude Medical	Titian	12:45-14:00
Vascutek	Amber 1&2	12:45-14:00

Vascular – Professional challenges

Total aortic arch replacement with Frozen Elephant trunk technique: EACTS position paper

Martin Czerny and Malakh Shrestha
on behalf of Vascular Domain, EACTS.

Combined disease of the aortic arch and the proximal descending aorta remains a surgical challenge. Classical 'elephant trunk' technique (ET) was initially proposed by Borst and colleagues to facilitate staged aortic replacement with the help of intra-vascular placement of a surplus distal graft part during the initial operation. The main advantage is that due to the ET a proximal anastomosis between the distal aortic arch and the descending aortic graft during the second stage operation becomes unnecessary.

The main drawback of this otherwise excellent and time-tested technique is the need for two operations with its associated mortality and morbidity as well as the fact

Continued on page 2

Cardiac – Focus session

New 2014 ESC/EACTS Guidelines on Myocardial Revascularization

Philippe Kolh[1], Stephan Windecker[2]
1 University Hospital (CHU) of Liege, Belgium;
2 Bern University Hospital, Bern, Switzerland

Philippe Kolh

Previous European Society of Cardiology (ESC)/European Association for Cardio-Thoracic Surgery (EACTS) Guidelines on Myocardial Revascularization were published in 2010.[1] The therapeutic benefit of revascularization in coronary artery disease (CAD) is emphasised in the 2014 version of these Guidelines, also developed jointly by ESC and EACTS.[2,3]

Continued on page 2

Monday 13 October

Professional Challenge

Part I: Understanding the mitral valve

Gold Room

Moderators: R. Lorusso, Brescia; P. Perier, Bad Neustadt

08:15 **Anatomy of the mitral valve** *Horia Muresian*

08:30 **Pathophysiology and natural history of functional mitral regurgitation** *Marta Sitges*

08:40 **Assessment of functional mitral regurgitation** *Jean-Louis Vanoverschelde*

09:10 **Coronary revascularization alone or with mitral valve repair** *W. Clark Hargrove*

Abstract

Basic Science: Conduits and myocardial ischaemia

Titian

Moderators: D.J. Chambers, London; A. Diegeler, Bad Neustadt

08:15 **Decreased DNA disruption in the porcine neocortex with erythromycin preconditioning during prolonged hypothermic circulatory arrest: Evidence for neuroprotection** *Charilaos-Panagiotis Koutsogiannidis*

08:45 **Levosimendan impairs ATP production by limitation of electron transport chain function followed by loss of Ca2+ retention capacity in healthy myocardial mitochondria and during ischaemia reperfusion injury** *Sebastian-Patrick Sommer*

09:00 **Endoscopic vein harvesting is associated with increased endothelial microparticle secretion: A randomised ex-vivo analysis** *Bhuvaneswari Krishnamoorthy*

09:30 **Inhibition of restenosis of the vein graft with degradable PLGA vascular external sheaths with slow-release bosentan** *Tianxiang Gu*

Small incisions and sutureless valves: A perfect marriage

Michelangelo

Moderators: M. Amrani, Harefield; S. Cánovas, Murcia

08:30 **Right anterior mini-thoracotomy for isolated aortic valve replacement: Ten-year experience in 484 patients** *Mattia Glauber*

08:45 **Propensity score analysis of outcomes following minimally invasive versus conventional aortic valve replacement** *Sharaf-Eldin Shehada*

09:15 **Aortic valve replacement through an anterior right mini-thoracotomy with central aortic cannulation is safe** *Michael Bowdish*

Left ventricular assist devices: Softening the blow

Raphael

Moderators: F. Beyersdorf, Freiburg; J. Rich, Norfolk (US)

08:15 **How can we reduce the morbidity of ventricular assist device support?** *Jeffrey Rich*

08:30 **Is antiplatelet therapy required in HeartMate II patients: Preliminary results from the European TRACE Study** *Jan Schmitto*

08:45 **Minimally invasive surgical and anaesthetic approach for ventricular assist device implantation: A single-centre experience** *Tomaso Bottio*

09:30 **First results of 111 minimally-invasive left ventricular assist device implantations at a single centre** *Jan Schmitto*

Prediction: art or science

Amber 5

Moderators: F. Barili, Cuneo; S. Grant, Manchester

08:30 **Improved prediction by dynamic modelling: An exploratory study in the adult cardiac surgery database of the Netherlands Association for Cardio-Thoracic Surgery** *Sabrina Siregar*

08:45 **National administrative data produces a very accurate risk prediction model for short- and long-term mortality following cardiac surgery** *Dincer Aktuerk*

09:00 **Validation and quality measurements for EuroSCORE and EuroSCORE II in the Spanish population: A prospective and multicentre study** *Antonio Garcia-Valentin*

09:15 **The EuroSCORE: A neglected measure of medium-term survival following cardiac surgery** *Ahmed Habib*

Focus Session

Extracorporeal support – When all else fails

Continued on page 4

New 2104 ESC/EACTS Guidelines on Myocardial Revascularization

Continued from page 1

As part of their update, the Task Force performed a systematic review of the evidence including 100 trials in 93,553 patients with 262,090 patient years in the field of coronary revascularization.[4]

Stephan Windecker

The key finding was that among patients with stable CAD, coronary artery bypass grafting (CABG) reduces the risk of death, myocardial infarction and repeat revascularization compared with medical treatment. All stent based coronary revascularization technologies were found to reduce the risk of repeat revascularization, whereas new generation drug-eluting stents (DES) but no other percutaneous revascularization technology improved survival compared with medical treatment.

Following the results of the SYNTAX trial, the importance of this angiographic risk score is summarised and a useful algorithm to calculate the SYNTAX score is included. Revascularization is recommended based on symptomatic and prognostic indications. As compared with the previous 2010 edition, percutaneous coronary intervention (PCI) now assumes a similar Class and level of evidence as CABG in patients with proximal LAD disease (IA), simple left main disease (Syntax Score<22; IB) and simple three-vessel disease (Syntax Score<22, IB). Conversely, PCI was downgraded among patients with complex three-vessel disease (Syntax Score >22, IIIB) and left main disease (Syntax Score >32, IIIB). Based on the results of the FREEDOM trial, CABG is the favoured revascularization therapy among diabetic patients with multivessel CAD and acceptable surgical risk (IA).

The new guidelines favour DES over bare metal stents in nearly all patients and lesion subsets. DES receive a Class I indication among patients with ST-segment elevation myocardial infarction (STEMI) undergoing primary PCI.

Antithrombotic therapy in revascularization is the largest chapter and had numerous updates. In patients with non-ST-segment elevation acute coronary syndrome (NSTE-ACS), pretreatment with prasugrel before PCI is not recommended following the results of the ACCOAST trial. Recommendations on the duration of dual antiplatelet therapy (DAPT) after DES implantation in patients with stable CAD were changed to six months.

The guidelines encompass the full extent of CAD treatment and expected outcomes, including managing patients with stable angina or acute coronary syndromes, patients with diabetes, associated renal failure, associated carotid or peripheral artery disease, or who require cardiac valve interventions. Recommendations are made on all treatment options, from the technical aspects of stent implantation or coronary artery bypass grafting to the use of imaging technologies, and from risk management to follow-up activities.

A new chapter on the volume-outcome relationship for revascularization procedures has been added. It provides the first guidance on minimal numbers of PCI and CABG procedures for physicians and institutions, plus recommendations for training to ensure high quality of care.

In conclusion, revascularization requires input from cardiologists, surgeons and interventionalists and the Task Force brought together experts in these fields. We hope the guidelines help clinicians make the best use of the revascularization techniques currently available and improve quality of care.

The joint guidelines are published on-line on the EACTS Website and on the ESC Website (www.escardio.org/guidelines), in the *European Journal of Cardio-Thoracic Surgery*[2], in the *European Heart Journal*[3], and in *EuroIntervention*.

References

1 Guidelines on myocardial revascularization: The Task Force on Myocardial Revascularization of the European Society of Cardiology (ESC) and the European Association for Cardio-Thoracic Surgery (EACTS). Wijns W, Kolh P, Danchin N, Di Mario C, Falk V, Folliguet at al. European Heart Journal 2010; 31:2501-2555.

2 2014 ESC/EACTS Guidelines on myocardial revascularization. Kolh P, Windecker S, Alfonso F, Collet JP, Cremer J, Falk V et al. Eur J Cardio-thorac Surg 2014;46:517-592.

3 2014 ESC/EACTS Guidelines on myocardial revascularization. Windecker S, Kolh P, Alfonso F, Collet JP, Cremer J, Falk V et al European Heart Journal. 2014 doi:10.1093/eurheartj/ehu278

4 Revascularisation versus medical treatment in patients with stable coronary artery disease: network meta-analysis. British Medical Journal. 2014;348:g3859 doi: 10.1136/bmj.g3859

Cardiac – Abstract session

Endoscopic vein harvesting is associated with increased endothelial microparticle secretion – A randomised *ex-vivo* analysis

Bhuvaneswari Krishnamoorthy
University Hospital of South Manchester, UK

Endoscopic vein harvesting (EVH) has revolutionised conduit retrieval since its introduction, with well documented improvements in cosmetic outcome, post-operative pain and the incidence of wound infection. However, doubts have also been raised regarding long-term patency rates, which have led to many centres avoiding the use of this technique. Previous studies have postulated that EVH causes damage to the endothelial lining of the vessel, potentially leading to denudation, which could contribute to a predisposition to occlusion and ultimately vein graft failure. Importantly, neither the effect of EVH on endothelial integrity nor the effect of endothelial denudation on long-term clinical outcomes has been appropriately investigated. In this study, we aimed to determine whether EVH is associated with elevated endothelial microparticle release compared with traditional open vein harvesting. Endothelial microparticles are released during endothelial cell activation and apoptosis and provide a sensitive marker of damage to these cells. Our study utilised conduits obtained by either traditional open vein harvesting (n=10) or EVH (n=5). Two metal clips were placed 2cm apart at the distal end of the conduit, which ensured that heparinised patient blood was retained within the sample. These conduits were then gently flushed with 0.5ml phosphate buffered saline and these samples were subsequently microcentrifuged to deplete platelets. The supernatants from these samples were then analysed using flow cytometry to enumerate both apoptotic microparticles and apoptotic endothelial (CD31+) microparticles. Our findings indicate that EVH is associated with a significant increase in the release of total apoptotic microparticles (mean 4,558.4 vs 1,238.3, p=0.027) and apoptotic microparticles of endothelial origin (454.0 vs 86.5, p=0.001). This increase in apoptotic endothelial microparticle release is indicative of significantly greater endothelial damage induced by the EVH technique compared to the traditional open technique. However, a subsequent follow-up analysis of these patients demonstrated non-inferiority between the two techniques when considering their clinical outcomes at three years. Indeed, all patients survived to three years without repeat angina or myocardial infarction, although one patient in each group required the fitting of a permanent pacemaker within the first two months post-surgery (p=1.000). As such, we conclude that there is an evident difference in the extent of endothelial damage induced between EVH and open vein harvesting, which could contribute to poorer graft quality due to a loss of endothelial function. However, our clinical follow-up indicates that this does not in fact translate into any apparent alteration in clinical course over the time course investigated.

EACTS position paper

Continued from page 1

that at least some mortality in the interval between the two operations is due to the rupture of the untreated segment of the aorta.

In recent years, A combination of the classical 'elephant trunk' technique and the endovascular stent technology resulted in the so called 'frozen elephant technique' (FET). In this potentially single stage technique, the aortic arch is replaced conventionally and an endovascular stent-graft is placed into the descending aorta in an antegrade manner through the open aortic arch. The distal landing site of the stent graft can be at the non-diseased portion of the descending aorta.

Martin Czerny

Malakh Shrestha

For a true single stage operation with FET, the disease has to be limited to the upper part of the descending aorta. If the patients are not carefully selected or if the disease progresses into the downstream aorta, second stage operations may be imperative, thereby negating the potential benefits of the FET.

Initially this FET was performed in aneurismal diseases. Over the years, the indication has been expanded to include aortic dissections, both acute and chronic.

The purpose of this 'position paper' from the Vascular Domain of the EACTS is to provide a recommendation for the use of frozen elephant trunk technique.

Edwards SAPIEN 3 Transcatheter Heart Valve

DESIGNING THE FUTURE OF TAVI

The SAPIEN 3 valve was designed to meet the most critical needs in TAVI, with an outer skirt to minimise paravalvular leak and an ultra-low delivery profile that reduces vascular and bleeding complications. Together, we're designing the future of TAVI.

LEARN MORE AT SAPIEN3.COM

Edwards Lifesciences | edwards.com
Route de l'Etraz 70, 1260 | Nyon, Switzerland
USA | Japan | China | Brazil | Australia | India

Edwards

Continued from page 2

Botticelli

Moderators: G. Lebreton, Paris; G. Trummer, Freiburg

08:15	**Extracorporeal support in acute heart failure**	*Jan Gummert*
08:45	**Optimal drainage**	*Susanna Price*
09:00	**The art of weaning**	*Jolanda Kluin*
09:15	**Off site extracorporeal support**	*Frederic Collart*
09:25	**Right ventricular assist device and extracorporeal membrane oxygenation**	*Matthias Siepe*
09:40	**Wrap up**	*Georg Trummer*

Quick Fire

Adult cardiac rapid response 1

Brown 3

Moderators: V. Falk, Zurich; A.P. Kappetein, Rotterdam

08:15	**Treatment of aortic valve stenosis: Five years of experience with an integrated 360° approach in a high-volume centre**	*Manuel Wilbring*
08:24	**Clinical and haemodynamic outcomes in 804 patients receiving the Freedom SOLO stentless aortic valve: Results from an international prospective multicentre study**	*Herko Grubitzsch*
08:33	**Surgery in aortic valve regurgitation and left ventricle dysfunction**	*Pedro Correia*
08:42	**TRIBECA study: (TRI)fecta (B)ioprostheses (E) valuation versus (C)arpentier Magna-Ease in (A) ortic position**	*Andrea Colli*
08:51	**Durability after aortic valve replacement with the Mitroflow versus the Perimount pericardial bioprosthesis: Single-centre experience in 2393 patients**	*Per Nielsen*
09:00	**Morphologic and functional consequences of transradial coronary angiography on the radial artery: Implications for use as a bypass conduit**	*Alessandro Leone*
09:09	**Off-pump coronary artery bypass reduces early stroke in octogenarians: A meta-analysis of 18, 000 patients**	*Salah Eldien Altarabsheh*
09:18	**Pressure-controlled vein graft flushing results in superior histological quality: A randomised trial**	*Mani Arsalan*
09:27	**Acute coronary angiography for myocardial ischaemia after coronary artery bypass grafting**	*Karin Hultgren*
09:36	**Sutureless aortic valve replacement with a Perceval S prosthesis: Three-year single-centre experience in 390 patients**	*Mattia Glauber*

Professional Challenge

Part I: A lifetime living with atroventricular septal defect

Amber 1&2

Moderators: C. Brizard, Melbourne; A. Frigiola, Milan

08:15	**Morphology of atrioventricular septal defect**	*Andrew Cook*
08:30	**An overview of surgical repair of atrioventricular septal defect**	*Tjark Ebels*
08:45	**Does outcome of staged repair for complex isolated complete atrioventricular septal defects differ from primary correction? A single-centre experience comprising 540 patients**	*Thomas Günther*
09:00	**Long-term outcome with pericardial patch augmentation for redo left atrioventricular valve repair in atrioventricular septal defect**	*Koichi Sughimoto*
09:15	**Biventricular repair for common atrioventricular canal defect with parachute mitral valve**	*Patrick Myers*
09:30	**A single-centre 37-year experience with reoperation for atrioventricular septal defect**	*Vladimir Sojak*

Abstract

Thoracic oncology I

Brown 2

Moderators: G.J. Kocher, Berne; P.B. Licht, Odense; F.M. Melfi, Pisa

08:15	**The prognostic impact of lymph node dissection in pulmonary metastasectomy**	*Satoshi Shiono*
08:30	**Endobronchial ultrasound-guided transbronchial needle aspiration is a highly-sensitive method to evaluate patients who should not undergo pulmonary metastasectomy**	*Jens Eckardt*
09:15	**Extended pulmonary metastasectomy: Is it worthwhile?**	*Monica Casiraghi*
09:30	**Intraoperative diagnosis of lymph node metastasis in non-small-cell lung cancer by semi-dry dot-blot (SDB) method**	*Koichi Tomoshige*

Continued on page 6

Cardiac – Abstract session

Inhibition of restenosis of the vein graft with degradable PLGA vascular external sheaths with slow-release bosentan

Tianxiang Gu

Tianxiang Gu *China Medical University, Shenyang, China*

Saphenous vein is one of the main vessel conduits to revascularize the myocardium. The major setback of using saphenous vein as a conduit is its low patency rate. Short-term (30 days to two years post-CABG) failures are ascribed to the development of intimal hyperplasia. Using the biodegradable material poly(lactic-co-glycolic acid) (PLGA) and fibrin, a high porosity external sheath carrying bosentan with a stratified internal spiral structure was made by grouping mould extraction and low temperature deposition techniques. In a rabbit model of carotid bypass with ipsilateral jugular vein graft, the novel sheath was found to prevent the restenosis of vein grafts and improved the patency significantly. In addition, by combination of slow-release bosentan to the novel designed external sheath, the beneficial effects against restenosis were further improved. As PLGA is biodegradable, the external sheath was absorbed 9 weeks after interposition. Therefore, the sheath would initially support the graft against over-distension and confer the benefits of external stenting on the vein graft. While the graft arterializes and adapts to new pressures and flows, the stent is degraded over time, leaving an arterialized vein graft with a thin intima. The special internal spiral structure let the external sheath possess the specialties both of the tight stent and the loose stent and may be much more beneficial. Other drugs rather than bosentan may be also carried to the sheath with a slow-release manner to further improve the therapeutic effects. We believe that our novel designed external sheath possesses a potential clinical value in prevention of the restenosis of the vein grafts in coronary artery bypass grafting.

Cardiac – Abstract rapid response session

Off-pump coronary artery bypass reduces early stroke in Octogenarians

A meta-analysis of 18,000 patients

Salah Altarabsheh

Salah Altarabsheh and Salil Deo
Queen Alia Heart Institute, Amman, Jordan

Data comparing results of off-pump and conventional surgery in Octogenarians is very limited. Thus we chose to compare early adverse events between off-pump (OPCABG) and on-pump coronary artery bypass grafting (ONCABG) in patients above 80 years. A systematic review of multiple databases was done to obtain original studies fulfilling search criteria. End-points viz. early mortality, stroke, respiratory failure, atrial fibrillation and myocardial infarction were compared between the two cohorts. A random-effect Mantel Haenzel analysis was performed using the trim-fill adjustment where necessary. Results are presented as risk ratios (95% confidence interval); p<0.05 is considered statistically significant.

Sixteen retrospective studies (9744 ONCABG&8566 OPCABG patients) were included in the systematic review. OPCAGB patients had significantly lower grafts (2.54 +/- 0.16) as compared to ONCABG (3.22 +/- 0.41). Early mortality was comparable at 4.6% and 5.2%in the OPCABG and ONCABG cohorts respectively [RR 0.91(0.64 – 1.28): p= 0.598]. Stroke rates (8566 OPCABG; 9744 ONCABG) were higher with conventional surgery [RR 0.65(0.49 – 0.87); p <0.01].Respiratory failure was higher with ONCABG as compared to OPCABG [RR = 0.74 (0.57 – 0.97); p= 0.03]. New onset renal failure (p=0.99), atrial fibrillation (p=0.27) and myocardial infarction (p=0.99) were comparable.

Coronary artery bypass in octogenarians can be performed with low early mortality. Number of grafts is lesser in the OPCABG cohort. While stroke rates are higher with conventional surgery, all other adverse events are comparable.

Future randomized trials are needed to define the role of off-pump surgery in this high-risk cohort.

We think that this material is important input in the current era were we see more advances in the coronary artery bypass surgery, especially in the elderly groups of patients whom are prone to develop more complications after surgery owing to their comorbidities.

BE PART OF THE

GoPro SURGICAL CHALLENGE

WITH DuraGraft®

Vascular Conduit Solution

Discover the 1 solution for CABG and vascular surgery success.

DuraGraft is the first Endothelial Damage Inhibitor (EDI) developed to address vascular conduit handling and storage—the pivotal step in bypass and vascular surgery.

Stop by Somahlution's booth at the **EACTS Annual Meeting** to learn how you can use a GoPro camera to become part of this exciting breakthrough.

See more details at Booth #22
or online at Somahlution.com

somahlution

Advancing Human Health

Continued from page 4

Thoracic non-oncology I

Amber 8

Moderators: G. Cardillo, Rome; B. Feil, Bolzano; M. Zielinski, Zakopane

08:15 **Recurrent primary spontaneous pneumothorax is more common than previously reported** *Winnie Olesen*

08:30 **Risk factors for postoperative recurrence of spontaneous pneumothorax treated by video-assisted thoracoscopic surgery** *Andrea Imperatori*

08:45 **Juvenile catamenial pneumothorax: An institutional report and review** *Takashi Inoue*

09:00 **Postoperative air leak management with intrapleural instillation of fresh frozen plasma** *Konstantinos Potaris*

09:15 **Digital versus analogue chest tube drainage following lobectomy: A randomised trial** *Marike Lijkendijk*

09:30 **The predictive role of "physiological" heterogeneity in the outcome of lung volume reduction surgery** *Sara Tenconi*

Professional Challenge

Part I: Aortic arch interventions: Debranching, rebranching, stenting and beyond

Brown 1

Moderators: M. Grabenwöger, Vienna; M. Luehr, Leipzig; J.L. Pomar, Barcelona

08:15 **The evolution of aortic arch surgery** *Thierry Carrel*

08:25 **Open aortic arch replacement in high risk patients: The gold standard** *Mauro Iafrancesco*

08:40 **Dismantlement of a hybrid arch repair** *Eduard Quintana*

09:15 **Debranching the aortic arch with and without cardiopulmonary bypass** *Heinz Jakob*

09:25 **Frozen elephant trunk implantation – a position statement from EACTS** *Malakh Shrestha*

Part II: Understanding the mitral valve

Gold Room

Moderators: R. Lorusso, Brescia; P. Perier, Bad Neustadt

10:15 **Leaflet and chordal procedures in functional mitral regurgitation** *Ruediger Lange*

10:30 **Safety and feasibility of a new adjustable mitral annuloplasty ring: A multicentre European experience** *Martin Andreas*

10:45 **Prosthesis?patient mismatch due to small ring annuloplasty in patients with degenerative mitral insufficiency** *Naonori Kawamoto*

11:00 **Artificial chordae in a variety of leaflet prolapses: Different approaches using the folding leaflet technique** *Rafael Garcia Fuster*

Abstract

Transcatheter aortic valve implantation: Today's routine

Titian

Moderators: H. Treede, Hamburg; N. Van Mieghem, Rotterdam

10:15 **Valve in valve transcatheter aortic valve implantation – implications for choice of initial surgical bioprosthesis** *Neil Moat*

10:25 **Video: Where valves can go** *Christoph Huber*

10:40 **Marginal differences between full and partial sternotomy and trans-catheter aortic valve replacement: A EuroSCORE matched analysis** *Daniele Camboni*

10:55 **Conventional aortic valve replacement or transcatheter aortic valve implantation in patients with previous cardiac surgery** *Daniel Wendt*

11:10 **Trends in surgical aortic valve replacement in more than 3000 consecutive cases in the era of transcatheter aortic valve implantation** *Miriam Silaschi*

11:25 **Patient-prosthesis mismatch: clinical and haemodynamic outcome of redo patients undergoing transcatheter aortic valve-in-valve implantation versus sutureless aortic valve replacement** *Lars-Eric Pietsch*

11:40 **Wrap up** *Thomas Walther*

Concomitant atrial fibrillation ablation: Refining the standards

Michelangelo

Moderators: N. Ad, Falls Church; S Nashef, Cambridge

10:30 **Concomitant surgical ablation for atrial fibrillation in patients with significant atrial dilation greater than fifty-five millimetres: Worth the effort?** *Simon Pecha*

10:45 **Dilated left atrium as predictor of late outcome**

Continued on page 8

Cardiac – Abstract rapid response session

Remarkable differences in bioprosthetic valve durability set off a new high standard for bio-prosthetic aortic valve replacement

Per Nielsen *Aarhus University Hospital, Denmark*

In a single centre study from Aarhus University Hospital, Denmark, we examined the dura-bility of the two major pericardial bioprostheses, we have used for aortic valve replacement from 1999 until now. In the years 2002-07 we had a general policy to implant the Mitroflow bioprosthesis in the smaller aortic annuli (label size 19 and 21) and employed a total of 440 Mitroflow bioprostheses. Risk of reoperation due to structural valve deterioration (SVD) was 2.7% at 10 years after the implantation of these valves. In contrast, only two patients of a total of 1953 CE Perimount bioprostheses were reoperated due to SVD giving an incidence at 10 years after surgery as low as 0.1%. None of 647 CE Perimount bioprostheses of valve size 19 or 21 were reoperated because of SVD.

The incidence rate of reoperation of any cause was 3.9% for Mitroflow and 1.0% for CE Perimount.

The actuarial ten-year freedom from explant due to SVD was higher for CE Perimount than for Mitroflow (99.5% vs 95.5%, P < 0.001). (See figure 1)

There was a tendency towards better survival at 10 years for CE Perimount (42.7%) than for Mitroflow (32.9%).

Conclusion:

The midterm durability of the Mitroflow bioprosthesis is in accordance with previous obser-vations by Yankah, Jamieson, Minami and others. It is contrasted by the remarkable low risk of SVD of the CE Perimount bioprosthesis that propose the CE Perimount bioprosthesis as a new high standard for bioprosthetic valve durability.

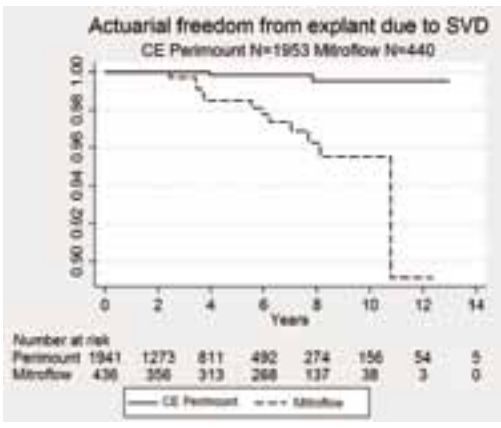
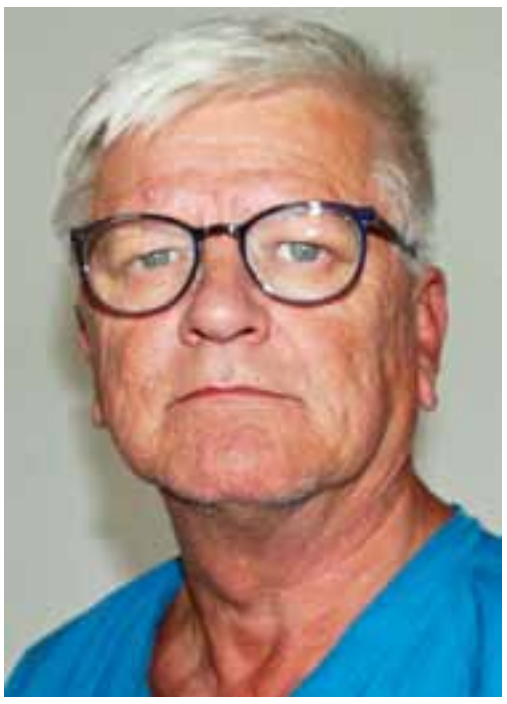


Figure 1



Per Nielsen

Cardiac – Abstract session

European multicenter experience with sutureless perceval valve: clinical and hemodynamic outcomes up to five years in over 700 patients

Malakh Shrestha *on the behalf of three European multi-center Perceval trial group,*

Objectives

This report summarizes the five-year clinical and haemodynamic data from three prospective, European multicenter trials with the Perceval suture-less aortic valve.

Methods

From 4/2007 to 8/2012, 731 consecutive patients (mean age 78.9 years; 68.1% females; mean logistic EuroScore 11.04%) underwent AVR with the Perceval valve in 25 European centers. Isolated AVR was performed in 507 (67.2%) patients. Minimally invasive approach was performed in 189 (25.0%) cases. Cumulative follow- up was 729 patients-year.

Results

In isolated AVR, mean cross-clamp and CPB times were 30.7 and 50.3 min in full sternotomy, and 37.3 and 64.5 min in minimally invasive approach, respectively.

Early Cardiac-related deaths occurred in 1.9%. Overall survival at one and five years were 92.1% and 74.7%, respectively.

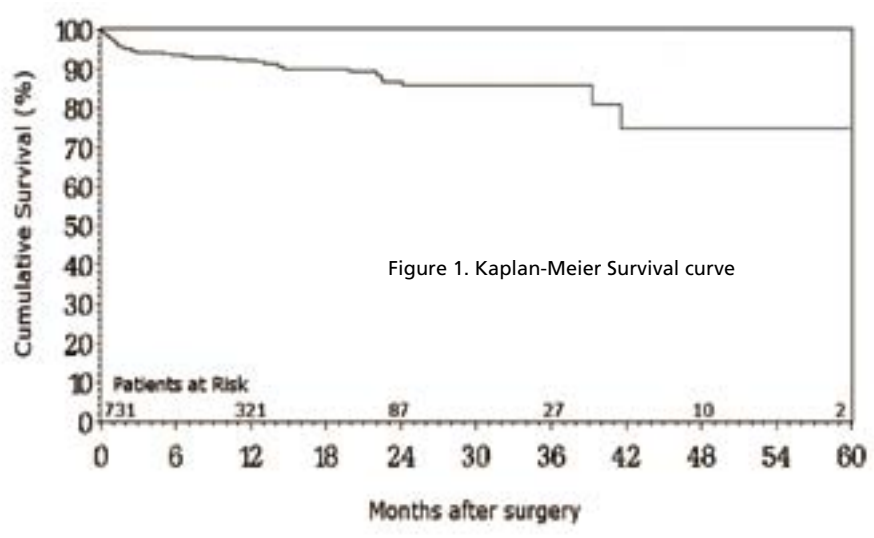


Figure 1. Kaplan-Meier Survival curve

Major paravalvular leak occurred in the 1.4% (early) and 1% (late follow up), respectively. Significant improvement in clinical status was observed postoperatively in the majority of patients.

Mean and peak Gradients decreased from 42.7 and 73.7mmHg preoperatively, to 7.7 and 16mmHg at three-year follow-up. LV-mass decreased from 256.7g to 177.4g at three years.

Conclusions

This European multi-center experience with largest cohort of patients with sutureless valves till date, shows excellent clinical and haemodynamic results that remain stable even up to five-years follow-up. Even in this elderly patient cohort with 40% octogenarians, both early and late mortality were very low. There were no valve migrations, structural valve degeneration and valve thrombosis in follow-up.

The sutureless technique is a promising alternative to biological AVR.

JOTEC®

PURE EXPERIENCE

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, 12:45–14:00 h, Amber Room 8

Visit us at the JOTEC booth

SOLUTIONS FOR VASCULAR DISEASE

Continued from page 6

	after pulmonary vein isolation concomitant with aortic valve replacement and/or coronary artery bypass grafting	*Satoshi Kainuma*
11:00	Better sinus rhythm restoration and congestive heart failure protection of left atrium volume reduction in a giant left atrium	*Jae Hyun Kim*
11:15	Long-term results of concomitant video-assisted minimally invasive atrial fibrillation cryoablation validated by clinical and electrophysiological assessment	*Giovanni Marchetto*
11:30	Concomitant surgical closure of the left atrial appendage in patients with atrial fibrillation reduces risk for postoperative thrombo-embolic events and improves survival	*Manuel Wilbring*

High risk surgery

Raphael

Moderators: R.M. Suri, Rochester; B.M. Fabri, Liverpool

10:15	Short- and long-term outcomes (including quality of life) after cardiac surgery in patients with postoperative acute kidney injury	*Jayanta Nandi*
10:30	Patients with lupus erythematodes and antiphospholipid syndrome undergoing cardiac valve surgery	*Rawa Arif*
10:45	When size matters: obesity paradox and parallax for cardiac surgery patients. Analysis of 3, 977 patients and review of the literature	*Mohamed Zeinah*
11:00	Outcome of cardiosurgical patients influenced by Parkinson's disease	*Maximilian Vondran*

Focus Session

Health Technology

Brown 3

Moderators: S. Livesey, Southampton; M.J. Underwood, Hong Kong

10:15	Harvi iPad App (Fundamentals of Hemodynamics)	*Daniel Burkhoff*
10:45	Remote Proctoring Software (Seelight)	*Mattia Glauber*
11:15	Natural User Interfaces; touchless management of information in sterile environments	*Rafael Sádaba*

Rapid deployment aortic valve replacement ? does it make a difference?

Botticelli

Moderators: M. Borger, Leipzig; B.K. Podesser, St Polten

10:30	Minimal invasive vs conventional aortic valve repair: results from the randomized, controlled, multi-centre CADENCE-MIS Trial	*Pascal Dohmen*
10:45	What are the advantages of rapid deployment aortic valve replacement in small annulus?	*Frederic Collart*
11:00	Rapid deployment valves in real life: the pan-European FOUNDATION Study enrolling 500 patients	*Christopher Young*
11:15	Evolution of minimal invasive surgery – aortic valve replacement and why this is the right time to get involved. Our right thoracotomy experience	*Gunther Laufer*

Professional Challenge

Part II: A lifetime living with atrioventricular septal defect

Amber 1&2

Moderators: S. Cicek, Istanbul; M. Pozzi, Ancona

10:15	How can we help the surgeon	*Jan Marek*
10:35	Australian technique for atrioventricular septal defect repair	*Tom Karl*
10:55	What are the limits of biventricular repair	*Christian Pizarro*
11:15	Re-operations: Tips and tricks	*Mark Redmond*

Abstract

Thoracic oncology II

Brown 2

Moderators: M.F. Jimenez, Salamanca; D.A. Waller, Leicester

10:15	Preresectional and intraoperative photodynamic therapy in locally advanced central non-small-cell lung cancer	*Andrey Akopov*
10:30	Surgical outcomes after pulmonary resection for non-small-cell lung cancer with unexpected pleural metastasis first detected during surgery	*Jae Kwang Yun*
10:45	Video-assisted mediastinoscopic lymphadenectomy combined with video-assisted thoracic surgery for left-sided lung cancer: Experience from 225 consecutive cases	*Ho Jin Kim*

Continued on page 10

Congenital – Professional challenges

Biventricular repair for common atrioventricular canal defect with parachute left atrioventricular valve

Patrick Myers
Geneva University Hospitals, Geneva, Switzerland

Comolete common atrioventricular canal (CAVC) defect is a complex congenital lesion, spanning the spectrum from simple forms, to unbalanced forms with ventricular hypoplasia or dysplasia of the papillary muscles. Simple forms can be repaired with excellent long-term results. Unbalanced CAVC can also benefit from biventricular repair or conversion, although some patients must still be palliated to a single ventricle Fontan circulation. When the left AV valve leaflets are supported by a single papillary muscle, or closely spaced papillary muscles, closure of the anterior cleft creates a parachute left AV valve, with limited leaflet mobility and subvalvar stenosis. Biventricular repair in these patients is thus often avoided. The (un-) natural history and long-term consequences of Fontan physiology in general, as well as within this specific patient population, is now being experienced by most centres.

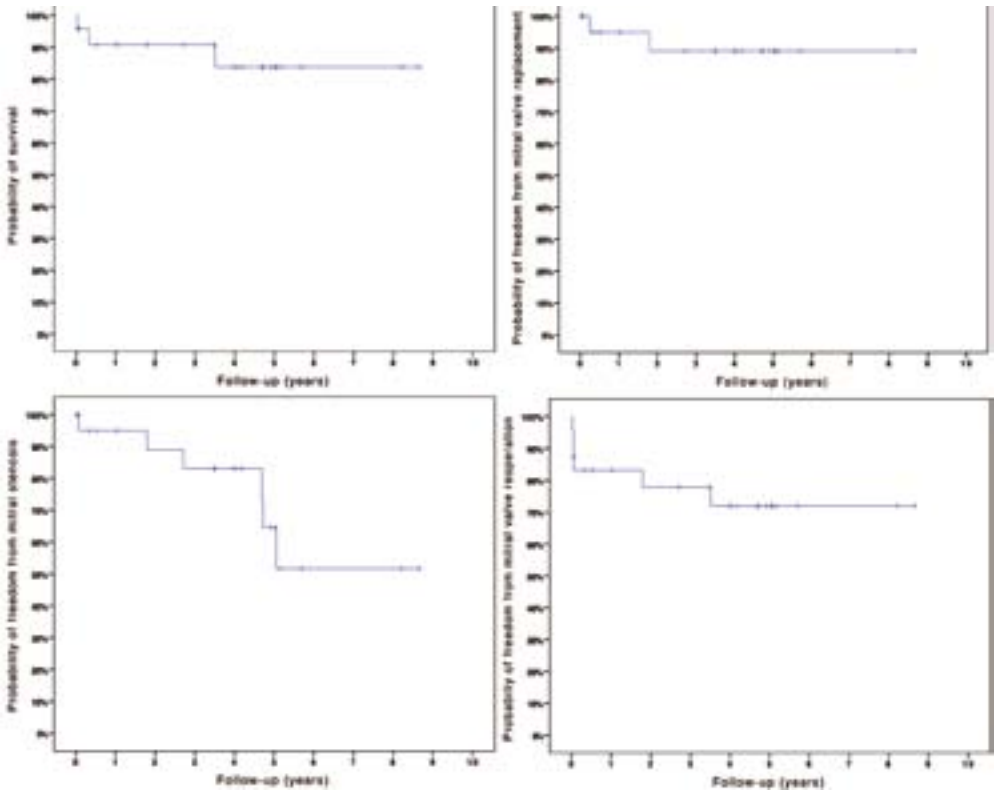
Twenty-four patients with parachute or form fruste parachute left AV valve underwent biventricular repair at our institution from 2001 to 2012 (10% of CAVC repairs). This was a complex group of patients, with unbalanced CAVC in 67%, associated cardiac lesions in 46% and prior operations in 54%. The left AV valve opening was assessed, and an attempt at cleft closure was made starting at the base and extending towards the chords. With this approach, the cleft was left open in 13%, closed partially in 54% and completely 33%, and 25% had splitting of the papillary muscle. There was 1 early death (4%). During a median follow-up of 3.7 years, there were two late deaths (8%), 25% of patients presented significant left AV valve stenosis and 8% required valve replacement. Complete cleft closure was associated with a more late left AV valve stenosis (38% with complete closure, 23% with partial closure and 0% with no closure, P = 0.55), while incomplete cleft closure wasn't associated with a more significant regurgitation (25% with complete closure, 31% with partial, 33% without closure, P > 0.99).

Sharma et al. previously reported the Mayo Clinic 33-year experience in 28 patients with partial and complete CAVC and parachute left AV valve.1 The overall mortality was similar, although they had more late valve replacements (25%), all due to regurgitation. With our more aggressive approach to cleft closure and fewer patients without cleft closure, our results differed: 40% of reoperations were for stenosis or mixed disease, and we were able re-repair all but one patient (re-repair rate 80%).

In summary, biventricular repair in parachute left AV valve and CAVC is feasible with acceptable mortality and freedom from stenosis. The burden of reoperation on the left AV valve remains significant, although a majority of patients could undergo re-repair and avoided valve replacement. Single ventricle management can be avoided in the vast majority of these patients, and the long-term consequences of this approach remain to be determined.

References

1. Sharma V, Burkhart HM, Schaff HV, Cetta F, Cabalka A, Dearani JA. Management of zone of apposition in parachute left atrioventricular valve in atrioventricular septal defect. Ann Thorac Surg 2013;95:1665-1669.



Use of a bioprosthesis valve for mitral valve replacement: very long-term outcomes in different age groups

Thierry Bourguignon
Tours University Hospital, Tours, France

Explant due to SVD by Age Group – Competing Risk Estimates

Prob.\ Age	50y	55y	60y	65y	70y	75y	80y
5%	7.0	7.6	8.1	8.7	10.0	10.8	11.9
10%	8.1	8.7	9.3	10.7	11.9	16.8	-
15%	9.0	10.0	10.9	12.6	17.9	-	-
20%	9.3	10.7	11.9	16.8	-	-	-
25%	10.3	11.5	14.5	21.8	-	-	-

For example, a 60-year-old patient has a probability of 20% to need a reoperation due to SVD after 11.9 years; and the probability increases up to 25% after 14.5 years.

The use of bioprosthetic valves has considerably increased in the past decade and has led to a substantial reduction of mechanical valve implantations. This trend might be justified by an increasing number of studies reporting the improved long-term durability of the most recent tissue valve models.

However, when mitral valve repair is not possible, which type of prosthesis should be selected for mitral valve replacement according to the patient's age remains a controversial issue.

The current European Society of Cardiology guidelines, revised in 2012[1], and the American College of Cardiology and American Heart Association guidelines, revised in 2014[2], indicate that bioprostheses are reasonable for mitral valve replacement in patients older than 70 years (Class IIa), and either a bioprosthetic or mechanical valve is reasonable in patients between 65 and 70 years of age.

Indeed, due to a lack of empirical long-term follow-up data, it largely remains unclear as to exactly how long a mitral bioprosthesis may last in a patient operated in their 50's or 60's. Undoubtedly, accurate information concerning structural valve deterioration (SVD) and the risk of reoperation is just as important for patients who present for valve replacement surgery at a young age, as for the physicians who treat them.

We recently reported our 25-year experience with the Carpentier-Edwards PERIMOUNT pericardial mitral bioprosthesis implanted in 404 consecutive patients between August 1984 and March 2011[3]. The mitral bioprosthesis was considered to have deteriorated on strict echocardiographic assessment when severe regurgitation or stenosis was observed, even if the patient was asymptomatic.

Results from our study revealed an overall actuarial freedom from SVD of 83.9 ± 2.7% at 10 years and 23.7 ± 6.9% at 20 years. Expected valve durability remained satisfactory long-term, with a median survival time (MST) of 16.6 years (95% C.I. [14.5–19.1]) before valve deterioration. For the specific 50 to 60 years old patient group, the expected valve durability remained above 15 years (15.7y). Freedom from reoperation due to SVD was 86.3 ± 2.5% at 10 years and 40.5 ± 8.0% at 20 years with a MST of 19.0 years.

Using competing risk regression analysis, an attempt was made to present the patient's point of view: depending on age at surgery, we estimated the risk and the number of years before a need of a reoperation due to SVD. (Table)

Finally, when comparing expected valve durability with sample life expectancy after mitral valve replacement for different age groups, we were able to demonstrate that the expected valve durability was higher, at least for 90% of the cohort (patients older than 55 years at implantation).

In terms of recommendations for the use of mitral bioprosthetic valves, these long-term outcomes appear to support their use in patients at least from the age of 60. Regardless of any consensus at this point though it was one of the primary goals of our study to evaluate the empirical data and present it in a form usable by the physician and patient to make a fully informed decision.

1. Joint Task Force on the Management of Valvular Heart Disease of the European Society of Cardiology (ESC), European Association for Cardio-Thoracic Surgery (EACTS), Vahanian A, Alfieri O, Andreotti F, Antunes MJ, et al. Guidelines on the management of valvular heart disease (version 2012). European Heart Journal. 2012. pp. 2451–96.

2. Nishimura RA, Ottocm, Bonow RO, Carabello BA, Erwin JP, Guyton RA, et al. 2014 AHA/ACC guideline for the management of patients with valvular heart disease: A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. J Thorac Cardiovasc Surg. 2014 Jul;148(1):e1–e132.

3. Bourguignon T, Bouquiaux-Stablo A-L, Loardi C, Mirza A, Candolfi P, Marchand M, et al. Very late outcomes for mitral valve replacement with the Carpentier-Edwards pericardial bioprosthesis: 25-year follow-up of 450 implantations. J Thorac Cardiovasc Surg. 2014 Feb 20.

Edwards Pericardial Valves

Built on a proven trusted valve platform

CARPENTIER-EDWARDS
PERIMOUNT
PERICARDIAL AORTIC BIOPROSTHESIS

CARPENTIER-EDWARDS PERIMOUNT
MAGNA EASE
PERICARDIAL AORTIC BIOPROSTHESIS

EDWARDS INTUITY Elite Valve System

EDWARDS SAPIEN 3
TRANSCATHETER HEART VALVE

For professional use. See instructions for use for full prescribing information, including indications, contraindications, warnings, precautions, and adverse events.

Edwards Lifesciences devices placed on the European market meeting the essential requirements referred to in Article 3 of the Medical Device Directive 93/42/ECC bear the CE marking of conformity.

Edwards Lifesciences | edwards.com
USA | Switzerland | Japan | China | Brazil | Australia | India

Edwards

Continued from page 8

11:00	Surgical results of lung cancer with synchronous multiple ground-glass opacities and the management of the residual and new lesions	*Yoshihisa Shimada*
11:15	A comparison study of the proposed classifications for the revision of the N descriptors for non-small-cell lung cancer	*Geun Dong Lee*
11:30	Pathologic risk factors for recurrence in early stage lung adenocarcinoma	*Eunjue Yi*

Mediastinum

Amber 8

Moderators: E. Belcher, Oxford; E. Bishay, Birmingham; E.A. Rendina, Rome

10:15	Surgical treatment of recurrent thymoma: Is it worthwhile?	*Giuseppe Marulli*
10:30	Surgical management of thymoma and thymic carcinoma: Results in 158 patients	*Maurizio Infante*
10:45	Predictive factors of myasthenic crisis after extended thymectomy for patients with myasthenia gravis	*Takeshi Ando*
11:00	Pleural recurrence of thymoma: Surgical resection followed by hyperthermic intra-thoracic perfusion chemotherapy	*Stylianos Korasidis*
11:15	The contact length between the tumour contour and lung on computed tomography is a risk factor for pleural recurrence after complete resection of thymoma	*Taketo Kato*
11:30	Clinical results of surgical resection of mediastinal teratoma: Efficacy of video-assisted thoracic surgery using the cyst score	*Su Kyung Hwang*

Professional Challenge

Part II: Cannulation issues in aortic surgery: Doing things right or doing the right things

Brown 1

Moderators: R. De Paulis, Rome; W. Harringer, Braunschweig

10:15	Cannulation issues in aortic surgery – More confusion or more clarity?	*Jean Bachet*
10:35	Subclavian artery cannulation with side graft	*Sandra Folkmann*
10:40	Subclavian artery cannulation without side graft	*Diana Reser*
10:45	Carotid artery cannulation	*Aristidis Lenos*
10:50	Brachiocephalic cannulation	*Marco Di Eusanio*
10:55	Direct ascending cannulation	*Konstantinos Tsagakis*
11:00	Femoral artery cannulation	*Maximilian Luehr*

Focus Session

Pro and Cons debates

Amber 6

Moderators: R. Ermel, Lyon; M. Siepe, Freiburg

10:15	Repair or replacement in ischemic mitral regurgitation – Pro repair	*Martin Misfeld*
10:30	Repair or replacement in ischemic mitral regurgitation – Pro replacement	*Michael Acker*
10:45	Aneurysm resection and left ventricular reconstruction – Pro	*Lorenzo Menicanti*
11:00	Aneurysm resection and left ventricular reconstruction – Con	*Jose Luis Pomar*
11:15	Hybrid repair of aortic aneurysms versus conventional repair of aortic aneurysm – Pro conventional	*Jean Bachet*
11:30	Hybrid repair of aortic aneurysms or conventional repair of aortic aneurysms – Pro hybrid	*Joseph Bavaria*

Plenary

Presidential Address

Gold Room

11:50	Presidential Address	*Paul Van Schil*

Abstract

Minimally invasive mitral valve surgery

Gold Room

Moderators: N. Doll, Stuttgart; M. Moon, St Louis

14:15	Is minimally invasive mitral valve repair here to stay?	*Patrick Perier*
14:30	Video-assisted right mini-thoracotomy versus full sternotomy for isolated mitral valve repair: A propensity-matched comparison	*Thomas Günther*
14:45	Twenty-five-year experience of chordal replacement with expanded polytetrafluoroethylene in mitral valve repair	*Hiroki Hata*
15:00	Early and long-term outcomes of minimally invasive mitral valve surgery through right	

Continued on page 12

Thoracic – Abstract

The prognostic impact of lymph-node dissection on pulmonary metastasectomy

Satoshi Shiono, Noriyuki Matsutani, Sakae Okumura, Jun Nakajima, Hirotoshi Horio, Mitsutomo Kohno, Norihiko Ikeda, Masafumi Kawamura

The Metastatic Lung Tumor Study Group of Japan

Satoshi Shiono

Background

Pulmonary metastasectomy has an important role in the treatment of neoplastic pulmonary metastasis and is generally recognized as a mainstay of therapy for selected patients. The addition of lymph-node dissection to the procedure, however, remains controversial. According to a survey of members of the European Society of Thoracic Surgeons (ESTS), 55.5% of surgeons perform mediastinal lymph-node sampling at the time of pulmonary metastasectomy, and 13% perform a complete mediastinal lymph-node dissection. The prevalence and characteristics of lymph-node metastasis have not been thoroughly investigated in patients with pulmonary metastases from various primary neoplasms. To investigate the prevalence of lymph-node metastasis and its associated outcomes, we conducted a review of patients who underwent lobectomy for pulmonary metastasis. The aim of this study is to investigate the prevalence and characteristics of lymph-node metastasis in patients with pulmonary metastasis and to evaluate the impact of lymph-node dissection with pulmonary metastasectomy.

Method

We retrospectively reviewed the database of the Metastatic Lung Tumor Study Group of Japan. Between November 1980 and June 2013, 4363 patients underwent resection of pulmonary metastases. After selecting for patients who underwent lobectomy, 683 patients (15.7%) were analysed. The presence of lymph-node metastasis, outcomes and prognoses were investigated.

Results

The primary tumour site was colorectal in 350 patients, head and neck in 73 patients, kidney in 41 patients, uterus in 41 patients, and bone/soft tissue in 31 patients. The overall five-year survival rate after pulmonary metastasectomy was 50.1%, and the 10-year survival rate was 36.4%. Lymph-node metastasis was more frequently found in uterine (26.8%) and head and neck cancers (29.2%). Five-year survival rates were 53.8% in patients without lymph-node metastasis, 39.4% in patients with hilar lymph-node metastasis, and 30.8% in patients with mediastinal lymph-node metastasis (Figure 1). The extent of lymph-node dissection was not related to survival (Figure 2). Univariate analysis revealed that tumour size, the presence of lymph-node metastasis, the presence of multiple lesions, a disease-free interval of 24 months or less and incomplete resection were significant predictors of poor prognosis. Multivariate analysis confirmed these prognostic factors.

Since tumour number and the presence of lymph-node metastasis were significant prognostic factors, we divided patients into four groups based on these factors. Overall survival was different between groups. The five-year survival of patients with solitary tumours and without lymph-node metastasis was significantly better than that seen in the other groups (58.5%). Patients with multiple pulmonary metastases and lymph-node metastasis demonstrated poor five-year survival (29.3%).

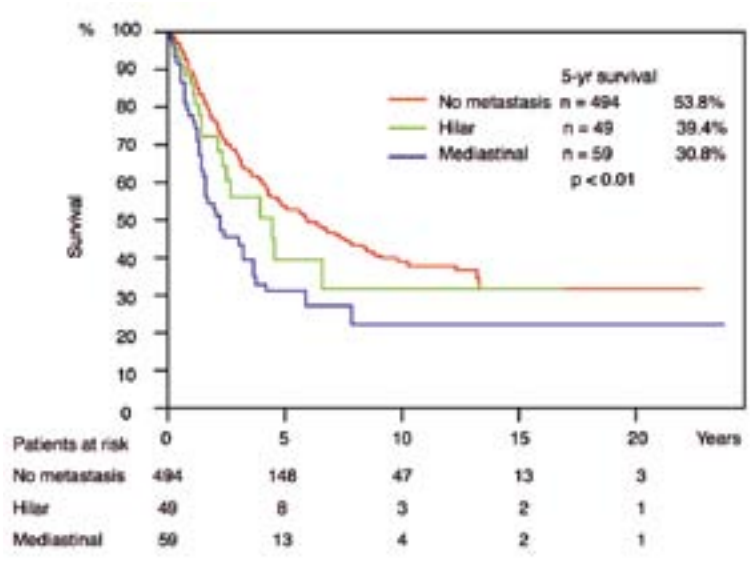


Figure 1

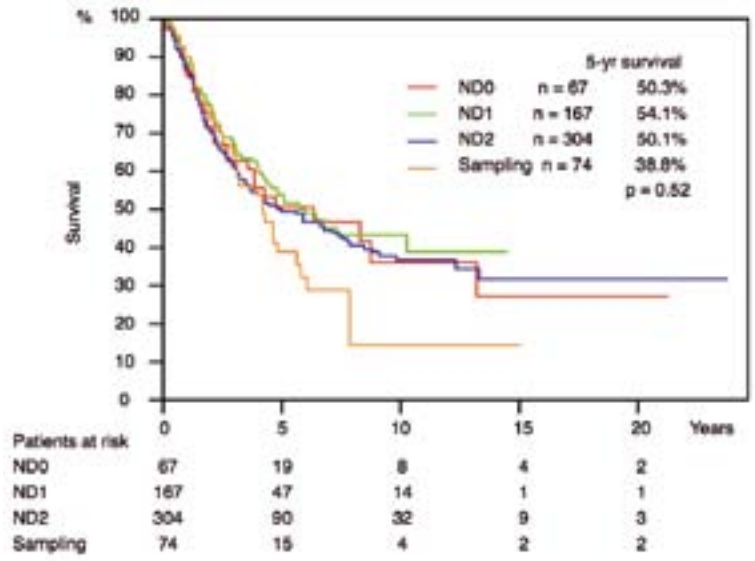


Figure 2

Conclusions

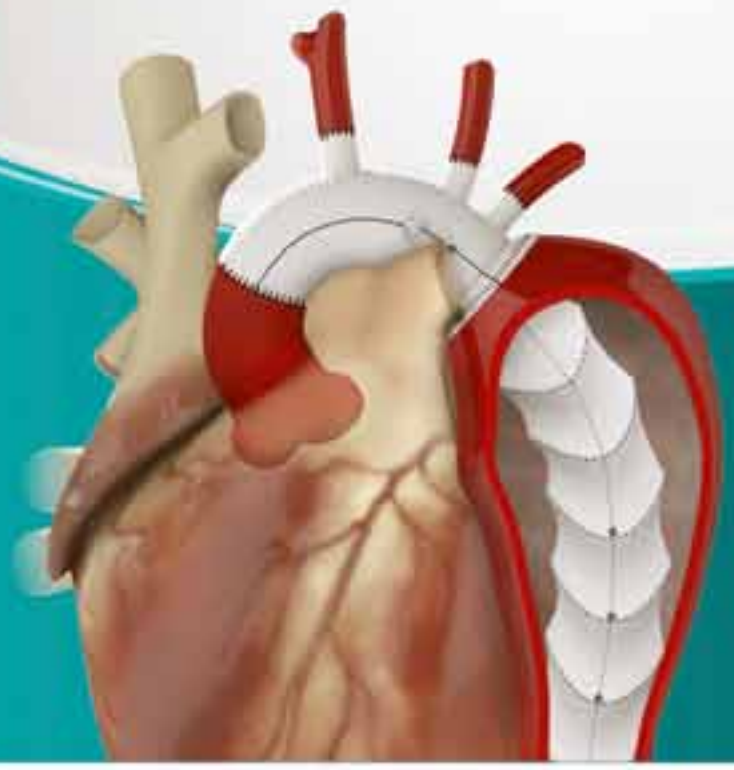
Retrospective analysis of lobectomy for pulmonary metastasis demonstrated that lymph-node metastasis is a significant prognostic factor predicting poor outcome. Lymph-node sampling or dissection is therefore warranted to predict patient prognosis.

thoraflex™ **hybrid**

Our unique design reduces operating times [1,2]

Thoraflex™ Hybrid combines the benefits of the "Frozen Elephant Trunk" procedure with the Gelweave™ Plexus graft to reduce myocardial ischaemia, re-warming and operating times. [1,2]

For more information visit:
www.vascutek.com/thoraflex-hybrid



Delivery system designed for **intuitive** and **accurate** deployment [3,4]

Aortic Arch Plexus – facilitates individual arch vessel reconstruction [2,5]

Reduced ischaemia, re-warming and operating time [1,2]

Product availability subject to local regulatory approval.

References:

1. Symposium October 2011. Innovative Product Designs & Emerging Implantation Techniques: First-in-Man Results with a Novel 4-Branched Elephant Trunk Graft for Total Aortic Arch Replacement. Shrestha M et al.
2. Di Marco L et al.. The Thoraflex Hybrid frozen elephant trunk device : the Bologna Experience. Ital Journal of Vascular & Endovascular Surgery. 2014; 1146.
3. Clinical Investigation Report.
4. Design history file 036.
5. Adachi et al., (1997) Usefulness of a new branched sealed graft for the replacement of aortic arch. Jap J Art Organs 26:624-628

VASCUTEK
TERUMO

VASCUTEK, a **TERUMO** Company, Newmains Avenue, Inchinnan, Renfrewshire PA4 9RR, Scotland | Tel: +44 (0) 141 812 5555

@vascutek
www.vascutek.com

Continued from page 10

	mini-thoracotomy: A 10-year experience in 1, 604 patients	*Mattia Glauber*
15:15	Surgical treatment of paravalvular leak: Long-term results in a single-centre experience (up to 14 years)	*Maurizio Taramasso*
15:30	Off-pump transapical mitral valve repair with neochordae	*Abdul-Hakim Dayeh*

Aortic valve sparing include me, remodel me but spare me

Titian

Moderators: L. de Kerchove, Brussels; R. Lange, Munich

14:15	Aortic valve sparing operations in aortic root aneurysms: remodeling, reimplanting: is the debate closed?	*Ruggero De Paulis*
14:25	LIB – to suture or not to suture: a simplified reimplantation technique	*Thomas Modine*
14:40	The role of annulus dimension and annuloplasty in tricuspid aortic valve repair	*Laurent de Kerchove*
14:55	Aortic valve repair in asymptomatic patients with severe aortic valve regurgitation: Long-term results	*Khalil Fattouch*
15:10	Aortic valvuloplasty for aortic insufficiency	*Masayuki Mukaida*
15:25	Long-term results of the David procedure in patients with acute type A aortic dissection	*Nadejda Monsefi*
15:40	Wrap up	*Laurent de Kerchove*

What is the benefit of a radial conduit?

Amber 5

Moderators: B. Buxton, Victoria; J. Dunning, Middlesbrough

14:15	Is the vein a bad conduit?	*Gianni Angelini*
14:30	Is the radial artery associated with improved survival in older patients undergoing coronary artery bypass grafting? A propensity-score analysis of a multicentre experience	*William Shi*
14:45	The second best arterial graft to the left coronary system in off-pump bypass surgery: A propensity analysis of the radial artery with a proximal anastomosis to the ascending aorta versus the right internal thoracic artery	*Hiroshi Tsuneyoshi*
15:00	Radial artery versus right internal thoracic artery as the best second conduit in multi-arterial CABG: A multi-institutional study	*Thomas A. Schwann*
15:15	The effects of using a radial artery in patients already receiving bilateral internal mammary arteries during coronary bypass grafting: 30-day outcomes and 14-year survival in a propensity-matched cohort	*Juan Grau*
15:30	Radial or right internal mammary artery?	*Michael Grimm*

Focus Session

New nuggets from late-breaking clinical trials

Raphael

Moderators: O. Alfieri, Milan; T.M. Sundt, Boston

14:15	Mitral-valve repair versus replacement for severe ischemic mitral regurgitation	*Michael Acker*
14:25	Critical review	*Robert Klautz*
14:30	Early surgery vs watchful waiting and outcomes for asymptomatic mitral regurgitation	*Rakesh Suri*
14:40	Critical review	*Alec Vahanian*
14:45	Mechanical valves – Reduced anticoagulation PROACT (Dabigatran)	*John Puskas*
14:55	Critical review	*A.Pieter Kappetein*
15:00	Transcatheter aortic valve implantation with self-expandable valve vs surgical AVR (Pivotal trial)	*Michael Reardon*
15:15	Still no clear CHOICE for transcatheter aortic valve implantation? Randomized trial Corevalve vs Sapien (Choice)	*Alec Vahanian*
15:30	Reducing blood transfusion following cardiac surgery (TiTRE)	*Gavin Murphy*
15:40	Critical review	*Anders Jeppsson*

Challenges and opportunities in modern atrial fibrillation surgery

Botticelli

Moderators: S. Benussi, Milan; J. Pepper, London

14:15	Present and future of atrial fibrillation surgery for lone atrial fibrillation: success and limitations of catheter ablation	*Paolo Della Bella*
14:30	Single stage hybrid close-chest stand-alone atrial fibrillation ablation	*Mark La Meir*
14:45	Multidisciplinary staged approach to lone atrial fibrillation. Is there still a role for maze surgery?	*Stefano Benussi*
15:00	Why concomitant atrial fibrillation ablation is offered to a minority of patients: Technical aspects and patient selection for a successful	

Continued on page 14

Thoracic – Abstract

EBUS-TBNA is a highly-sensitive method to evaluate patients who should not undergo pulmonary metastasectomy.

Jens Eckardt *Odense University Hospital, Denmark*

The surgical approach and preoperative workup varies from country to country and even hospital to hospital and the results from retrospective series are coming up with divergent conclusions. This abstract is one of the publications from a trial where patients with pulmonary metastasis were evaluated with PET-CT and endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) before surgery to exclude the patients with disseminated disease. In a previous publication from this trial we demonstrated that video-assisted thoracoscopic surgery is an inferior approach for detections of all pulmonary metastases but whether or not this has any impact on survival remains unknown.

Surgeons in general agree that pulmonary metastasectomy is an effective treatment in selected patients with primary extra-pulmonary cancer and oligometastatic disease in the lung. We know that the presence of mediastinal lymph node metastases reduce survival significantly in such patients but the mediastinum is rarely evaluated before metastasectomy. In this trial we prospectively evaluated if EBUS-TBNA could identify patients with mediastinal node metastases prior to pulmonary metastasectomy.

All patients with a primary extra-pulmonary cancer and oligometastatic disease confined to the lungs on positron emission tomography – computed tomography (PET-CT), who were considered eligible for pulmonary metastasectomy, routinely underwent EBUS-TBNA of the mediastinal lymph nodes. If no malignant cells were found by EBUS-TBNA, the patient later underwent open pulmonary metastasectomy with systematic sampling of mediastinal lymph nodes and histologic evaluation.

One hundred-three patients with oligometastatic pulmonary disease were referred for EBUS-TBNA during a four-year period. We sampled 248 lymph nodes and adequate cytology was obtained in 93 patients (90%).

We found lymph node metastases in 17 patients (16.5%) with EBUS-TBNA, and during subsequent pulmonary metastasectomy in the remaining 85 patients one (1.0%) had a lymph node metastasis. The sensitivity, specificity, NPV and PPV of EBUS-TBNA for diagnosis of mediastinal lymph node metastasis were 94.4%, 100%, 98.8%, and 100%, respectively.

In conclusion EBUS-TBNA is a highly sensitive minimal invasive modality for evaluation of mediastinal lymph node metastases in patients with oligometastatic pulmonary disease, which allows surgeons to select patients who will not benefit from pulmonary metastasectomy.

Thoracic – Abstract

Extended pulmonary metastasectomy: is it worthwhile?

M. Casiraghi[1], P. Maisonneuve[2], D. Brambilla[1], F. Petrella[1], PG Solli[1], J. Guarize[1], F. De Marinis[2], L. Spaggiari[1]

1. University of Milan, Milan, Italy; 2. European Institute of Oncology, Milan, Italy

In the past, pulmonary metastases (PM) were considered fatal in less than two years, and had no indication for surgical treatment. Since 1927, when Davis described the first intentional lung metastasectomy, many case reports have shown that surgical resection of lung metastases could improve survival in selected patients. Even if the recent surgical trend for lung metastasectomy is "lung sparing" surgical resection, major resections could still be reserved for highly selected patients. As already demonstrated in the literature, the completeness of surgery after pulmonary metastasectomy is the most important prognostic factor in terms of survival and because surgery should be offered with a prospect of cure, it seems obvious to consider extended resection a therapeutic option to achieve long-term survival.

In 1993, Putnam and colleagues were the first to establish that resections of multiple PM or PM involving more than lung parenchyma were technically similar to resections for locally advanced non-small cell lung cancer, and they were the first to define extended resection (ER) as pneumonectomy or pulmonary resection with en bloc resection of the chest wall or other major structures (diaphragm, pericardium, superior vena cava).

Unfortunately, the role of ER for lung metastases is still unclear, and little information is available in the literature. Our study was performed to analyse the outcomes and feasibility of extended resections for pulmonary metastases.

From 1998 to 2013, 1027 consecutive patients at the European Institute of Oncology (Milan, Italy) underwent lung metastasectomy procedures. Twenty-nine patients (2.8%) had ER defined as pneumonectomy or pulmonary resection with en bloc resection of the chest wall or other major structures (diaphragm, pericardium, superior vena cava).

The five-year survival rate was 42%, higher than that of other literature reports. All our 29 patients had a complete surgical resection, sufficient pulmonary reserve, controlled primary disease, and no evidence of other metastatic disease showing the importance of selection criteria to improve survival. Our survival rate was surprising considering both the type of surgery and previous literature data. We believe that this survival rate was the result of better patient selection because of a small but homogeneous database and the use of modern staging systems (CT scan and PET/CT), which allowed us to check all patients preoperatively and eventually exclude them from surgery if extrathoracic or other tumor localizations were found. Patients with non-epithelial primary tumours had a threefold risk of dying after metastasectomy both at univariate and multivariate analysis, whereas survival was not statistically related to the number of metastases, nodal status, DFI or extension of surgery. Our overall post-operative morbidity was 38% with only one major complication (3.4%), and there was no statistically difference between the extension of surgery (pneumonectomy versus lobectomy/sublobar resection) which was 43% in patients who underwent pneumonectomy compared to 33% morbidity in the other patients who underwent lobar or sublobar resections. Extended resection usually represents the only chance of cure for these patients, and selection becomes essential to obtain a complete surgical resection, offering them the best possible long-term survival rate with the lowest possible morbidity.

In conclusion, extended resection could be proposed as a treatment for pulmonary metastases in highly selected patients with a prospect of cure, and with low rates of operative morbidity and mortality.

Thoracic – Abstract

Postoperative air leak management with intrapleural instillation of fresh frozen plasma

Froso Konstantinou[2], Konstantinos Potaris[1], K. N. Syrigos[2], Pantelis Tsipas[1], Grigorios Karagkiouzis[1] and Marios Konstantinou[1]

3rd Internal Medicine Clinic of Athens University

Air leak following pulmonary resection is a common complication often leading to prolonged hospitalization. We aimed to evaluate the efficacy of intrapleurally infused fresh frozen plasma on postoperative air leak management.

Between June 2008 and June 2013, we retrospectively reviewed 81 patients who underwent lobectomy for lung cancer, and postoperatively developed prolonged air leak treated with intrapleural instillation of fresh frozen plasma.

The study identified 75 men and six women, with a median age of 66 years (range 48-76 years), with persistent postoperative air leak, presumed to originate in the interlobar fissure or in the raw lung surface following dissection of adhesions. Infusion of fresh frozen plasma, via the chest tube, was successful in stopping air leaks in 74 patients (91.3%), within 24 hours, and in 79 patients (97.5%), within 48 hours, following resumption of the procedure. In the remaining two patients air leak ceased 14 and 19 days later, respectively. There was neither morbidity or mortality associated with the procedure nor relapse of air leak after patients discharge or at follow up, one and three months later.

Intrapleural infusion of fresh frozen plasma for persistent postoperative air leak management proved to be a safe, inexpensive, and remarkably effective method in ceasing postoperative air leak, resulting in prompt patients relief and reduction of hospitalization.

EACTS Daily News

Publisher
Dendrite Clinical Systems

Editor in Chief
Pieter Kappetein

Managing Editor
Owen Haskins
owen.haskins@e-dendrite.com

Industry Liaison
Martin Twycross
martin.twycross@e-dendrite.com

Design and layout
Peter Williams
williams_peter@me.com

Managing Director
Peter K H Walton
peter.walton@e-dendrite.com

Head Office
The Hub
Station Road
Henley-on-Thames,
RG9 1AY, United Kingdom
Tel +44 (0) 1491 411 288
Fax +44 (0) 1491 411 399
Website www.e-dendrite.com

Vascutek Symposium at EACTS 2014

Monday 13 October 2014
12:45 - 14:00
Amber Rooms 1 & 2

Meeting the Challenges of Aortic Surgery

Chairman: Professor Duke Cameron, USA

12:50 - 12:55

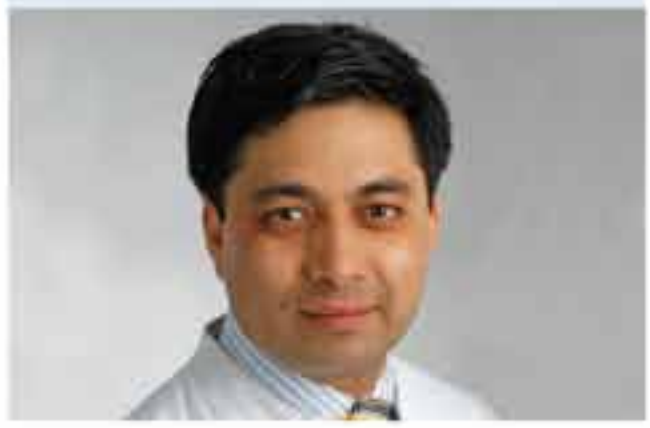
Introduction
by Professor
Duke Cameron, USA

12:55 - 13:05

Professor Joseph Coselli, USA
The Challenges of Aortic Surgery in the Coming Decade: Patient Expectations and Outcomes

13:25 – 13:35

Professor Malakh Shrestha, Germany
Thoraflex™ Hybrid:
From Concept to Reality



Panel Discussion: 13:05 - 13:25 and 13:35 - 13:55

Professor Joseph Bavaria,
USA

Professor Eric Roselli,
USA

Professor Ruggero De Paulis,
Italy

Professor Roberto Di Bartolomeo,
Italy

14:00 Close

@vascutek
www.vascutek.com

VASCUTEK, a **TERUMO** Company, Newmains Avenue, Inchinnan, Renfrewshire PA4 9RR, Scotland | Tel: +44 (0) 141 812 5555

VASCUTEK
TERUMO

Continued from page 12

	treatment	*Samer Nashef*
15:15	**Guidelines and real life in atrial fibrillation treatment: time for a change**	*Manuel Castella*

Challenges in cardiac surgery in emerging economies

Amber 7

Moderators: M.J. Antunes, Coimbra; C. Yankah, Berlin

14:15	**Management of end-stage heart failure in developing countries: Facing the realities and making the options**	*Fabio Jatene*
15:15	**Infective endocarditis. An increasing challenge in high HIV prevalence populations.**	*Carlos Mestres*

Abstract

Late Breakers I

Michelangelo

Moderators: H. Reichenspurner, Hamburg; T. Walther, Bad Nauheim

15:15	**Validation of a new method for trial analysis: applying the win ratio to analyze percutaneous coronary intervention versus coronary artery bypass grafting for complex coronary artery disease**	*Milan Milojevic*

Quick Fire

Congenital rapid response

Brown 3

Moderators: D. Barron, Birmingham; M. Hazekamp, Leiden; F. Lacour-Gayet, London; G. Stellin, Padua

14:15	**Durability of bicuspidalised homografts for the reconstruction of the right ventricular outflow tract**	*Julie Cleuziou*
14:24	**Pulmonary artery sling repair: Single-centre experience with analysis of risk factors**	*Nagarajan Muthialu*
14:33	**Surgical outcomes following repair of anomalous origin of coronary artery from the pulmonary artery: Results from a national audit**	*Serban Stoica*
14:42	**Dacron conduit is not suitable for extracardiac Fontan operation**	*Guido Oppido*
14:51	**The efficacy of the "intrapulmonary-artery septation" surgical approach for Fontan candidates with unilateral pulmonary arterial hypoplasia**	*Maiko Tachi*
15:00	**Closing the gap: First results of the new 15ml EXCOR pump for children**	*Fabrizio de Rita*
15:09	**Outcome of paediatric cardiac re-transplantation in the mechanical support era**	*Fabrizio de Rita*
15:18	**Early rise in troponin-I predicts left ventricular dysfunction in simple transposition: A study of 225 arterial switch operations**	*Pierre-Luc Bernier*
15:27	**Individual pulmonary veins outgrow somatic growth after the primary sutureless repair for total anomalous pulmonary venous drainage**	*Hyun-Jin Jung*
15:36	**Surgical debranching of aortopulmonary collaterals in patients with single ventricle physiology: Subclavian artery cleaning**	*Hiroki Ito*

Abstract

Chest wall

Brown 2

Moderators: J.R.M. De Campos, Sao Paulo; M.S. Kalkat, Birmingham; G. Massard, Place De l'Hopital

14:15	**Accuracy of transthoracic ultrasound for the prediction of chest wall infiltration by lung cancer and of lung infiltration by chest wall tumours**	*Guido Caroli*
14:30	**Ultrasound-assisted treatment of sternocutaneous fistula in poststernotomy cardiac surgery patients**	*Lachmandath Tewarie*
14:45	**Audit of trauma practice in a tertiary referral thoracic surgical centre in the UK**	*Nur Ismail*
15:00	**Predictors of complications after pectoralis major transposition for sternal dehiscence**	*Sanne Molenkamp*
15:15	**The morphology of the thorax and heart in patients with pectus excavatum, and the changes after surgical correction**	*Hiroshi Iida*

Complicated type A aortic dissection: Malperfusion and outcome

Brown 1

Moderators: R.M.S. Almeida, Cascavel; L. Di Marco, Bologna

14:15	**Total arch replacement versus more conservative management in type A acute aortic dissection**	*Marco Di Eusanio*
14:45	**Italian multi-centre study for type A acute aortic dissection: Thirty-three-year follow-up**	*Claudio Russo*

Continued on page 16

Cardiac – Professional challenges

Prosthesis-patient mismatch due to small ring annuloplasty in patients with degenerative mitral insufficiency

Naonoori Kawamoto and Tomoyuki Fujita *National Cerebral and Cardiovascular Centre, Osaka, Japan*

Prosthesis-patient mismatch (PPM) after aortic valve replacement is currently a hot topic. Several studies have investigated PPM after mitral valve replacement, but PPM after mitral valve repair still requires further discussion. Down-sized ring annuloplasty is recommended for ischemic mitral regurgitation, but is not suitable for ring annuloplasty concomitant with valve repair for degenerative mitral insufficiency. This study investigated ring annuloplasty using a small ring or band that caused postoperative functional mitral stenosis, which can prevent left atrial reverse remodeling. This may lead to adverse cardiac events such as new onset of atrial fibrillation.

This study retrospectively reviewed 227 patients with symptomatic severe mitral insufficiency (MI) who underwent mitral valve repair for degenerative MI (graded 0 to 4) using an Edwards ring or band (Cosgrove, n = 146; Physio, n = 49; Physio II, n = 32) between 2003 and 2012. Prostheses were selected by measuring the inter-trigon distance. The prosthesis sizes used were 26mm (n = 71), 28mm (n = 87), 30mm (n = 57), and 32mm (n = 12).

There were no operative deaths. Actuarial freedom from major adverse cardiac events was 91% at 10 years. The postoperative MI grade was not significantly different between different sizes of prosthesis (26mm, 0.67 ± 0.8; 28mm, 0.73 ± 0.9; 30mm, 0.85 ± 0.9; 32mm, 0.3 ± 0.6). Left atrial diameter (LAD) and tricuspid regurgitant pressure gradient (TRPG) were both significantly lower at follow-up for each size of prosthesis (all $P < 0.05$). Although patients with a smaller BSA received a significantly smaller prosthesis ($P < 0.05$), the trans-mitral pressure gradient was significantly higher in patients with a 26mm prosthesis than in patients with a larger size of prosthesis (Figure). Thirty-three patients had a follow-up trans-mitral pressure gradient ≥5mmHg. The follow-up LAD was higher in patients with a trans-mitral pressure gradient <5mmHg than ≥5mmHg (43.2 ± 9.4mm vs 47.1 ± 9.6mm, $P < 0.05$).

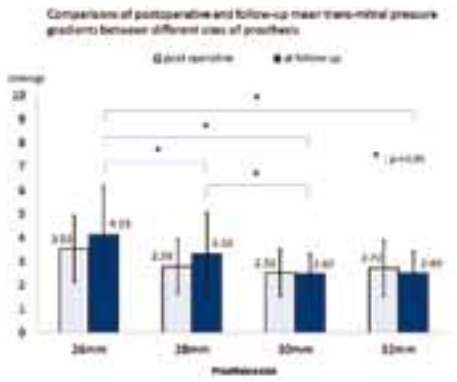


Figure 1

Naonoori Kawamoto and Tomoyuki Fujita

In conclusion, mitral valve repair resulted in excellent clinical outcomes with significant reductions in MI, LAD, and TRPG for all sizes of prosthesis. However, use of a smaller prosthesis may result in a higher mean trans-mitral pressure gradient, and may inhibit reverse remodeling of the left atrium. Our findings suggest that it is best to avoid using a small prosthesis for mitral annuloplasty for degenerative mitral insufficiency.

Thoracic – Abstract session

Juvenile catamenial pneumothorax: An institutional report and review

Takashi Inoue
Dokkyo Medical University, Mibu, Japan

Catamenial pneumothorax (CP) was an entity of thoracic endometriosis syndrome. Several theories have been proposed to explain development of thoracic endometriosis including coelomic metaplasia, lymphatic or hematogenous embolization of an endometrial cluster, and retrograde menstruation with subsequent transdiaphragmatic migration of endometrial tissue. However, none of those can adequately explain all of the clinical manifestations of CP, whereas CP is unilateral or right-sided in nearly all cases, with diaphragmatic abnormalities such as perforation or endometrial deposits of tendinous portions common findings, indicating that transdiaphragmatic migration occurs in most affected individuals.

CP occurs in women during the reproductive years, mostly between 30 and 40 years old, while occurrence in females younger than 20 is rare. Based on our experience with a case of CP in a teenager, who had left-side pneumothorax without diaphragmatic lesion, we speculated that the mechanism of CP in younger individuals is different from that in older CP cases in regards to transdiaphragmatic migration. Therefore, for the present study we defined CP occurring in patients younger than 20 years old as juvenile CP (JCP), and retrospectively analyzed case records and also conducted a search of relevant medical literature.

A total 465 CPs, 451 found in our literature search and 14 treated at our institution, were investigated. Among those, there were 40 cases of JCP (39 in literature search, one treated at our institution). Left-sided pneumothorax was more often observed in younger patients, therefore JCP cases showed significantly less laterality as compared to usual CP ($p<0.0001$). Fewer diaphragmatic lesions were observed in younger patients and JCP cases had a significantly lower incidence of diaphragmatic abnormalities as compared to usual CP ($p<0.0001$).

Since a similar tendency (less laterality and fewer diaphrgamtic lesions) was observed in patients in their 20s, the pathogenesis of CP in younger individuals may be mainly related to hematogenous embolization of endometrial tissue, while that in older individuals might be mostly related to transdiaphragmatic migration. Joseph and colleague reported that the peak incidence of pelvic endometriosis occurred between 24 and 29 years of age, whereas that of thoracic endometriosis occurred approximately five years later. This difference may explain the time necessary for migration of endometrial tissue through the right diaphragm.

Takashi Inoue

In conclusion, JCP cases showed characteristics different from those of usual CP. Hematogenous embolization is likely related to JCP, while usual CP might be explained by transdiaphragmatic migration.

Cardiac – Abstract session

Surgical treatment of posterior mitral valve prolapse: towards 100 percent repair

Pedro M Correia *University Hospital Coimbra, Coimbra, Portugal*

Posterior leaflet prolapse is the most common form of presentation in degenerative mitral valve regurgitation and the most amenable and easy to repair. So much so, that there is a current trend to operate on asymptomatic patients with severe regurgitation. Nonetheless, many such valves are still replaced by probably the majority of surgeons around the world. In our presentation entitled 'Surgical treatment of posterior mitral valve prolapse: Towards one hundred percent repair', we evaluated the immediate and long-term results of surgical treatment of isolated posterior mitral valve leaflet prolapse. From January 1998 to December 2012, 932 consecutive patients were submitted to first-time mitral surgery for degenerative regurgitation in our department. Among these, 492 (52.8%) had isolated posterior leaflet prolapse with a mean age 61.8±12.1 years (13–86). More than half of the patients (58.3%) were asymptomatic or mildly symptomatic.

Mitral valve repair was achieved in 484 patients (98.4%). Leaflet resection was performed in 419 (85.2%) and artificial chordae implantation (ePTFE) as the basic technique to correct areas of prolapse was used in 40 cases (8.1%). Additional techniques were also used, namely chordal shortening, chordal transfer, commissural closure, papillary muscle shortening, leaflet plication and decalcification. The repair was completed by an annuloplasty procedure in 99.2% of the repaired cases, the great majority with a prosthetic ring (90.1% of repairs). Concomitant procedures were done in 153 (31.1%), mainly tricuspid valve repair in 50 (10.2%), aortic valve surgery in 34 (6.9%) and CABG in 64 (13%). Only one patient died during the first 30 days (0.2%). The main causes of hospital morbidity were stroke (1.2%), acute renal failure (6.7%), mostly transient, and need for permanent pacemaker in 2.4%.

Overall survival at 5, 10 and 15 years was 91.7±1.3%, 81.9±2.3% and 64.7±6.1%, respectively. There was no significant difference in long-term survival compared with the age and gender-matched population (standardized mortality ratio: 0.84; P=0.146). Older age, LV dysfunction, atrial fibrillation and increased LV dimension were significant predictors of late mortality. There were 7 (1.4%) mitral valve reoperations. Freedom from mitral reoperation at 5, 10 and 15 years was 99.2±0.5%, 97.4±1.1% and 97.4±1.1%, respectively.

We concluded that mitral valve repair in isolated posterior leaflet prolapse can be done in virtually all cases with very low operative risk and excellent long-term survival, comparable to that of the general population, and with a high durability of repair. Surgery should address all lesions found intra-operatively (leaflets, chordae and annulus), using a vast armamentarium, hence these patients should preferentially be referred to centres with large and good experience in mitral valve repair.

Patients with atrial fibrillation or large left ventricles are associated with a poor prognosis, which emphasises the importance of early surgery. The results obtained in this series of patients undergoing mitral valve repair by conventional surgical approach, confirming most of other works published, should be viewed as the standard to which minimally invasive or robotic approaches, and, more recently, percutaneous techniques must be compared.

LUNCH SYMPOSIUM

Monday, October 13th, 2014
12:45 - 2:00 pm
Room Raphael

In occasion of the 28th EACTS Annual Meeting Sorin Group has the pleasure of inviting you to attend the Lunch Symposium:

INNOVATION TO IMPROVE PATIENT OUTCOMES

Chairmen: B. Gersak, *Slovenia* - **J. Dillon**, *Malaysia* - **M. Laskar**, *France*

PROGRAM

The impact of perfusion on outcomes in cardiac surgery
M. Ranucci, *Italy*

Advanced treatment in AVR: which are the key benefits of sutureless technology vs stented valves?
B. Meuris, *Belgium*

Is there space for innovation in MV repair?
S. F. Bolling, *USA*

"Valve in Valve" Interventions: which is the appropriate patient to select and how to tailor the treatment?
V. Bapat, *UK*

SORIN GROUP
AT THE HEART OF MEDICAL TECHNOLOGY

Continued from page 14

15:00	**Can antegrade and retrograde perfusion and early organ perfusion decrease mortality from acute type A aortic dissection associated with malperfusion?**	*Kiyotaka Imoto*
15:15	**Pattern analysis of carotid malperfusion with acute type A aortic dissection and its impact on neurological outcome**	*Takeshi Shimamoto*
15:30	**Should neurologic symptoms still preclude surgery in acute type A aortic dissection?**	*Henriette Most*

Focus Session

Nightmares in cardiothoracic surgery

Amber 6

Moderators: M. Scarci, Cambridge; P.E. Van Schil, Antwerp

14:15	**Cardiac**	*Peyman Sardari Nia*
14:35	**Cardiac**	*Friedrich-Wilhelm Mohr*
14:55	**Thoracic**	*Douglas Mathisen*
15:15	**Thoracic**	*Paul Van Schil*

Basic Science 1

Amber 8

Moderators: P. Dohmen, Berlin; M. Emmert, Zurich; A. Haverich, Hannover

14:15	**Tissue Engineering: where are we now?**	*Pascal Dohmen*
14:30	**How to increase scaffold sources?**	*Francis Smit*
14:45	**Bioreactors for tissue engineering**	*Bassil Akra*
15:15	**Results of tissue engineered vascular grafts**	*Toshiharu Shinoka*

Abstract

Left ventricular assist device 2

Gold Room

Moderators: M. Siepe, Freiburg

16:15	**Temporary extracorporeal membrane oxygenation support for right ventricular failure after left ventricular assist device implantation**	*Julia Riebandt*
16:30	**Euromacs: A growing EACTS data registry**	*Theo De By*
16:45	**Neuron-specific enolase correlates to laboratory markers of haemolysis in patients on long-term circulatory support**	*Claudia Heilmann*

Technical aspects of coronary bypass graft surgery

Titian

Moderators: D. Glineur, Bouge; M. Reardon, Houston

16:00	**The way we graft now**	*Brian Buxton*
16:25	**Coronary artery bypass surgery without cardioplegia: Early results in 8, 515 patients**	*Manuel Antunes*
16:40	**Impact of sequential bypass grafting with full skeletonised in-situ arterial grafts**	*Kazutoshi Tachibana*
16:55	**Novel suturing device for distal coronary anastomosis: Preclinical results from swine off-pump coronary bypass model**	*Yoshifumi Itoda*
17:10	**Robotic versus conventional coronary artery bypass graft: A propensity score-based comparison of perioperative and long-term results**	*Markus Kofler*

Re-evaluation of mitral valve repair and replacement

Michelangelo

Moderators: M.J. Antunes, Coimbra; M. Kirsch, Paris

16:00	**Left ventricular four-dimensional flow changes following undersized mitral annuloplasty**	*Jeremy McGarvey*
16:15	**Comparison between posterior leaflet and complete preservation versus complete resection of the subvalvular apparatus during mitral valve replacement in rheumatic patients with a 'stenosis-dominant' valve**	*Farideh Roshanali*
16:30	**Preservation of the sub-valvular apparatus during mitral valve replacement of rheumatic valves does not improve long-term survival**	*Gonçalo Freitas Coutinho*
16:45	**Mitraclip therapy and surgical edge-to-edge repair in patients with severe left ventricular dysfunction and secondary mitral regurgitation: Mid-term results of a single-centre experience**	*Michele De Bonis*
17:00	**Evaluation of risk factors for recurrence of ischaemic mitral regurgitation after undersized mitral ring annuloplasty using cardiovascular magnetic resonance imaging**	*Sachiko Yamazaki*
17:15	**Surgical treatment of posterior mitral valve prolapse: Towards one hundred percent repair**	

Continued on page 18

Cardiac – Abstract session

Size Matters

Obesity paradox or parallax for cardiac surgery patients?

Analysis of 3,977 patients and review of the literature

Mohamed Zeinah, Hamza El Nady, Dumbor Ngaage *Basildon, UK*

Obesity is a growing public health problem worldwide. Improvement of socioeconomic conditions has led to an expansion of the overweight population over recent decades. Obesity is well known to be a risk factor for the development of diabetes mellitus (DM), hypertension, and coronary artery disease.

The prevalence of obesity among cardiac patients will be expected to be high. Obesity is commonly thought to be a risk factor for morbidity and mortality after cardiac surgery however the relationship between obesity and cardiac surgery outcomes, including the reported 'obesity paradox', remains controversialv. A clear understanding of the impact of the varying severity of obesity on operative outcomes is still lacking. The enhanced survival of the obese patients is referred to as the obesity paradox, and this same phenomenon was observed in studies evaluating the effect of BMI on coronary artery revascularization outcomes. However, this is not a routine observation, and other studies have demonstrated increased or no association with poor outcomes in patients with elevated BMI. The objective of our study is to determine the influence of obesity defined by different BMI categories according to WHO on cardiac operative morbidity and mortality.

Mohamed Zeinah

We concluded that most cardiac patients are overweight or obese. Underweight and morbidly obese patiens experienced higher morbidity and mortality rates, while ideal BMI patients had the lowest mortality after adjusting for euroSCORE. Underweight and morbid obesity associated with excess mortality, were risk factors for operative mortality. The cardiac literature does not support th obesity paradox. Perhaps the different obesity definitions used in studies account for the parallax, not the paradox.

Cardiac – Abstract session

Short- and long-term outcomes (including quality of life) after cardiac surgery in patients with postoperative acute kidney injury (AKI)

From left to right: Dr Ramesh Giri, Dr Saif Kitchlu, Dr Heyman Luckraz, Dr Johann Nicholas, Dr Andrew Panayiotou, Mr Nick Denyer and (inset:) Dr Jayanta Nandi.

Jayanta Nandi[1], Pankaj Kumar Mishra[1], Heyman Luckraz[1], Alan Nevill[2], Saif Kitchlu[1], Andrew Panayiotou[1], Ramesh Giri[1], Nick Denyer[3] Johann Nicholas[3]
1 Heart & Lung Centre, Wolverhampton, UK,
2 University of Wolverhampton, UK,
3 New Cross Hospital, Wolverhampton, UK

The long-term quality of life in patients suffering new renal impairment following cardiac surgery has not been specifically reported earlier.

An abundance of data exists regarding short-term outcomes in this well-documented and relentlessly analysed specialty of cardiac surgery. Since the mid-nineties such analyses are made more convenient with the development and use of bespoke databases (e.g. the PATS database commonly used in the UK developed by Dendrite Clinical Systems). Prospective peri-operative data collection – now a pre-requisite for national audits – facilitates studies of short-term outcomes. Long-term data including accurate cause of death, derived survival data and specific quality of life (QOL) data is not as readily available and requires time, effort and resources to obtain and hence remains relatively under reported.

The Heart & Lung Centre – providing tertiary cardiac care to the Black country region of the Midlands in the UK – working closely with the renal unit of the trust provided an ideal platform for collaboration to address the relative lack of late QOL data. This led to the establishment of a database of patients developing new renal impairment and allowing study of their long-term outcomes.

This study provides a mean of eight years of follow-up data in survivors following cardiac surgery related new-onset acute kidney injury (AKI) – based on widely accepted Risk Injury Failure Loss-of-function End-stage-renal-dysfunction (RIFLE) criteria. The risk profile of patients and acceptable in-hospital mortality makes this study cohort representative of the real-world population.

This study finds new-onset renal problems complicating cardiac surgery in up to 9% patients. Hospital mortality (at 15%) is significantly higher in this group.

Cardiac surgery related AKI is often (up to 50%) treated with renal replacement therapy (RRT) in the form of continuous haemo-filtration. These patients seldom go on to require long-term haemodialysis, as the inherent cause is usually reversible. Despite starting with normal preoperative renal function, short-term attrition within the year following surgery remains a significant risk amongst those suffering AKI. Long-term survival after AKI was acceptable (50% at 8 years) albeit poorer than matched controls.

This study noted significantly worse patient reported physical quality of life indices in this subgroup of patients. Whether this reflects ongoing renal, cardiac or other health issues – necessitating more attention to long-term disease follow-up – remains the subject of future study.

In the era of ever improving results after cardiac surgery, despite a rising risk profile, the outcome measure goalposts are constantly moving. Hence, in addition to the existing benchmarking tools of hospital mortality, morbidity, length of stay and cost-efficiency, attention undoubtedly shifts to long-term survival and patient reported quality of life as a measure of the quality of health care provided. Whether this, in due course, promotes development of databases that will allow patient-reported late outcomes to be logged in real time, remains to be seen.

Thoracic – Abstract session

Preresectional and intraoperative PDT therapy in locally advanced central NSCLC

Andrey Akopov *Pavlov' First State Medical University*

It is over 30 years since Photodynamic therapy (PDT) was first used bronchoscopically to treat a patient with lung cancer. Few people are aware of the extent of the research and clinical work which is undertaken in Saint Petersburg on PDT. This may due, unfortunately, to lack of publications in any of the common languages of communication of research and clinical papers amongst some of scientists and clinicians in Russia. Group of surgeons, endoscopists and oncologists from Pavlov' First State Medical University, led by Professor Andrey Akopov, presents a study "Preressectional and intraoperative photodynamic therapy in locally advanced central non-small cell lung cancer".

There is limited information in literature that PDT represents an attractive additional modality to achieve preoperative downgrading of the locally advanced tumor with the aim to facilitate its respectability. In other words, marginally resectable patients with locally advanced lung cancer may be treated with PDT to enhance resectability or to reduce the required resection extent. In these cases intraoperative PDT of resection margins facilitating additional cancer cell death may be indicated.

This study is the first randomized one evaluating PDT effectiveness of neoadjuvant PDT and chemotherapy followed by resection and intraoperative PDT of resections margins for locally advanced NSCLC. The authors hope that this work will provide physicians with relevant evidence-based information and enhance their interest to PDT as a treatment modality for lung cancer and cancer disease in general.

Andrey Akopov

Vascular – Professional challenges

Subclavian artery cannulation without side graft

Diana Reser
UniversitätsSpital, Zürich, Switzerland

There is still ongoing debate about the "ideal" cannulation technique for the subclavian artery: with or without side graft.

At our institution we perform cannulation without a side graft in all cases except for very small or dissected vessels.

Surgical exposure is performed in the usual way through an infraclavicular muscle sparing incision. The subclavian artery is circumferentially dissected and secured with a vessel loop. Thereafter, a purse-string suture is placed on the anterior surface of the artery and secured with a tourniquet. It is important that the purse-string does not have too large a diameter and is not circular but rather longitudinal in order to reduce the risk of postoperative subclavian stenosis.

After heparin administration and proper exposition cannulation is carried out using the Seldinger technique. The punctured vessel is gradually dilated along the wire with increasing sized dilators. Depending onto the size of the subclavian artery we normally use a 16 or 18 French Fem-Flex femoral cannula which always provides adequate flow. It is safely secured with the purse-string suture and the tourniquet which prevents blood loss during the procedure. After connection to the arterial line of the heart-lung machine the cannula is sutured on the skin in order to avoid accidental dislodgement. An arterial line is placed in advance into the right radial artery in order to be able to react to any kind of hyperperfusion of the right upper extremity. In this case we would snare the vessel loop already in place.

At the end of the operation the Fem-Flex cannula

is removed and the purse-string suture is tied. Normally there is no need for an additional stitch. The longitudinal suture allows the preservation of the anatomy of the artery and reduces the risk of subclavian stenosis even in smaller vessels. The postoperative blood pressure of the right arm is consistent with the preoperative merit.

We are convinced that the subclavian cannulation without side graft using the Seldinger Technique is advantageous because it can be performed rapidly especially in an emergency setting, excessive blood loss during the operation is prevented, the anatomy of the vessel is preserved and there is no foreign material left behind that could potentially irritate the brachial plexus.

Continued from page 16

Pedro Correia

Transcatheter aortic valve implantation and its place in the contemporary treatment

Amber 5

Moderators: V. Falk, Zurich; M. Thielmann, Essen

16:00 **No difference in outcome at five years after transfemoral and transapical transcatheter aortic valve implantation in more than 1, 000 patients** *Sabine Bleiziffer*

16:15 **European real-world transcatheter aortic valve implantation: Systematic review and meta-analysis of European national registries** *Umberto Benedetto*

16:45 **One-year registry outcomes of the recently approved transapical ACURATE TAVI device** *Joerg Kempfert*

17:15 **Safety and effectiveness of transaortic approach for transcatheter aortic valve implantation: Procedural and mid-term outcomes of 232 consecutive patients at a single centre** *Mauro Romano*

Focus Session

Guidelines

Botticelli

Moderators: J.T. Cremer, Kiel; A. Vahanian, Paris

16:00 **The new EACTS/ESC Coronary guidelines: Surgeon perspective** *Philippe Kolh*

16:10 **The new EACTS/ESC Coronary guidelines: Cardiologist perspective** *Stephan Windecker*

16:20 **EACTS/ESC Coronary guidelines 2014: What are the unanswered questions – Cardiologist perspective** *Giulio Stefanini*

16:25 **EACTS/ESC Coronary guidelines 2014: What are the unanswered questions – Surgical perspective** *Stuart Head*

16:30 **New guidelines in US: European guidelines 2 years old – Valvular guidelines** *Thoralf Sundt*

16:40 **New guidelines in US: European guidelines 2 years old – Overview of both guidelines** *Jean-Louis Vanoverschelde*

16:50 **New risk stratification model in the US valvular guidelines** *Nicholas Van Mieghem*

17:05 **How to implement guidelines** *John Pepper*

Developing cardiac surgery in the Southern Hemisphere

Amber 7

Moderators: M.M. Cascudo, Natal; J.L. Pomar, Barcelona

16:00 **Impact of the social and economic evolution in the cardiac surgery of developing countries** *Francis Fynn-Thompson*

17:00 **Cardiac surgery training programmes in South America, Africa and Asia.** *Shengshou Hu*

Predictive and non-invasive evaluation of congenital heart disease

Amber 1&2

Moderators: K. Brockmeier, Cologne; B. Maruszewski, Warsaw

16:00 **Magnetic resonance imaging and new advances** *Andrew Taylor*

16:20 **Present and future possibilities of ultrasound** *Bart Bijnens*

16:40 **Virtual prediction of surgery** *Ajit Yoganathan*

17:00 **How to use new imaging modalities to plan and execute surgical procedures** *Pedro Del Nido*

Quick Fire

Thoracic rapid response

Brown 3

Moderators: K. Athanassiadi, Athens; C.K.C. Choong, Melbourne; P.B. Rajesh, Birmingham; E.A. Rendina, Rome

16:00 **Suction on chest drains following lung resection: Evidence and practice are not aligned** *Peter Lang*

16:09 **Patch replacement of left hemidiaphragm in dogs by cryopreserved heterograft** *Hamidreza Davari*

16:18 **The effect of diaphragmatic plication on chest wall dynamics** *Ghazi Elshafie*

16:36 **Plasmatic soluble epidermal growth factor receptor isoforms as biomarker in non-small-cell lung cancer patients** *Massimiliano Paci*

16:45 **A novel technique using preoperative lipiodol marking and fluoroscopy to identify an adequate resection margin in thoracoscopic segmentectomy for deep seated non-palpable ground-glass nodules** *Yoohwa Hwang*

16:54 **Salvage surgery after definitive chemoradiotherapy for non-small-cell**

Continued on page 20

Thoracic – Abstract session

Surgical results of lung cancer with synchronous multiple ground-glass opacities and the management of the residual and new lesions

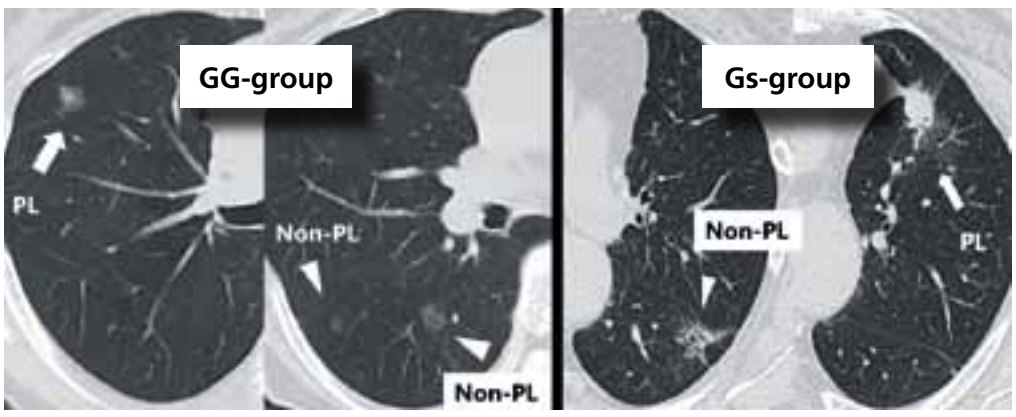
Yoshihisa Shimada

Yoshihisa Shimada *Tokyo Medical University, Japan*

Summary

Ground-glass opacity (GGO) lesions on chest CT are often detected as multiple lesions, and the incidence of multiple primary lung cancers with GGOs has recently increased. We reviewed the medical record of a series of patients with synchronous multiple lung cancers, in an attempt to identify the optimal treatment strategy for multiple GGOs. From January 2004 through December 2010, a total of 1, 223 patients underwent complete resection of non-small cell lung cancer at our hospital. Among these, 67 patients (5.5%) with multiple mixed or pure GGO lesions had a predominant lesion (PL) and at least one lesion proven or suspected of secondary cancer (non-PL), and were included in the study. These patients were classified into two groups; the GG-group (PL showing GGO-predominant lesion: consolidation/tumor ratio (CTR) on thin-section CT 0.5 or less) and the GS-group (PL showing solid-predominant lesion: CTR more than 0.5). In the patients who underwent resection for all lung tumors, they were classified with multiple lung cancer if they met the modified criteria of Martini and Melamed[1]. In patients with multiple lung lesions, the surgical procedure was determined according to site of lesion, CT findings, estimated postoperative respiratory function, and the presence or absence of preoperative comorbidities. Median follow-up time of this study was 53.4 months. There were 24 patients in the GG-group (36%) and 43 patients in the GS-group (64%), and the five-year OS proportions were 95.7% and 64.0%, respectively (p = 0.031). Surgical resections included 11 sublobar resections (SLs), 33 lobectomies, 19 lobectomy + SLs, and four bilobectomies. There were 39 patients with a total of 118 unresected GGOs after the initial surgery. Among them, the frequency of growth was 7.6% on a per-nodule basis (nine GGOs), and the median doubling time was 1373 days. New GGOs emerged in 15 patients (23%). Multivariate analysis demonstrated that possessing a PL > 25mm, 68 years old or younger, and the GS-group were significantly associated with poor prognosis, whereas number of lesions, growth of the residual GGOs, the development of new GGOs, or whether or not all GGOs were treated did not significantly affect OS. All seven patients with multifocal pure GGOs survived for five years without recurrence. In conclusion, there appears to be a difference in the biology between multifocal GGO-dominant tumors and solid-dominant tumors. We found that the survival of patients with synchronous multifocal GGOs is strongly affected by radiological CT findings of the PL. A clinical strategy of thorough local control of PLs and easily accessible non-PLs by limited resection or SBRT, and close monitoring of the residual GGOs during longer period could be most important.

Figure 1



Reference

1 Finley et al. J Thorac Oncol. 2010;5: 197-205

Congenital – Professional challenges

Long-term outcome with pericardial patch augmentation

for redo left atrioventricular valve repair in atrioventricular septal defect

Koichi Sughimoto, Yves D'Udekem, Igor E Konstantinov, Christian Brizard *The Royal Children's Hospital Melbourne, Australia*

Atrio-ventricular septal defect (AVSD) occurs in 5.3 per 10,000 births according to European research. All patients with AVSD need a surgical correction of the septal defect and some will also need a repair of the left atrio-ventricular valve (LAVV) regurgitation pre-existing the repair or iatrogenic [Figure 1]. Recurrence of the LAVV regurgitation is common; the severity of LAVV regurgitation may increase even after the AVSD repair. Reoperation rate for LAVV regurgitation has been reported to be as high as 6–18%. While various techniques have been reported, the surgical management of the recurrent LAVV regurgitation remains technically demanding, the mid-term to long-term result of any techniques has not been well clarified. In our institution, a new approach, cleft patch augmentation of the cleft area and the creation of a coaptation surface in front of the tip of the left lateral leaflet in normal papillary muscles [Figure 2], and restoration of coaptation in single papillary muscle anatomy were applied since 1998. The efficacy of these techniques and long-term result for the redo LAVV repair is evaluated.

From November 1991 to July 2008, 42 patients who underwent reoperation for LAVV regurgitation after AVSD repair, were included in the study. Age at the primary valve repair was 18.1+/-25 months and the duration to the reoperation was 84.8 months (5–148 months). Age at the first reoperation was 115.9 months. Median follow-up after the reoperation was 89 months. With regard to the AVSD morphology, there were partial AVSD in 12, complete AVSD in 30.

Figure 1: Regurgitation jet due to lack of coaptation after the primary cleft closure.

Three patients died in the follow-up period. Freedom from second reoperation at 10 years was 68.0% (51.5 – 84.5% of 95% confidence). Of 37 patients with normal papillary muscles, freedom from reoperation at 10 years was 58.6% in cleft closure group, while the cleft patch augmentation group was 88.2% (p=0.045). Comparison between the cleft patch augmentation and other techniques after the second redo LAVV repair showed insignificant difference. Among five patients with single papillary muscle after the first redo repair, three patients received the second redo surgery: one repair and two replacements (One and 12 years after the first redo), followed by one case of third redo surgery. Five patients required valve replacement eventually.

In conclusion, surgical results for the redo LAVV repair suggest excellent outcome. The cleft patch augmentation technique had better results than the direct cleft closure for the redo LAVV repair. Various techniques may have to be performed in combination according to the morphological features. The recurrent left AV valve regurgitation in the single papillary muscle anatomy remains a difficult challenge, but repair may delay replacement significantly.

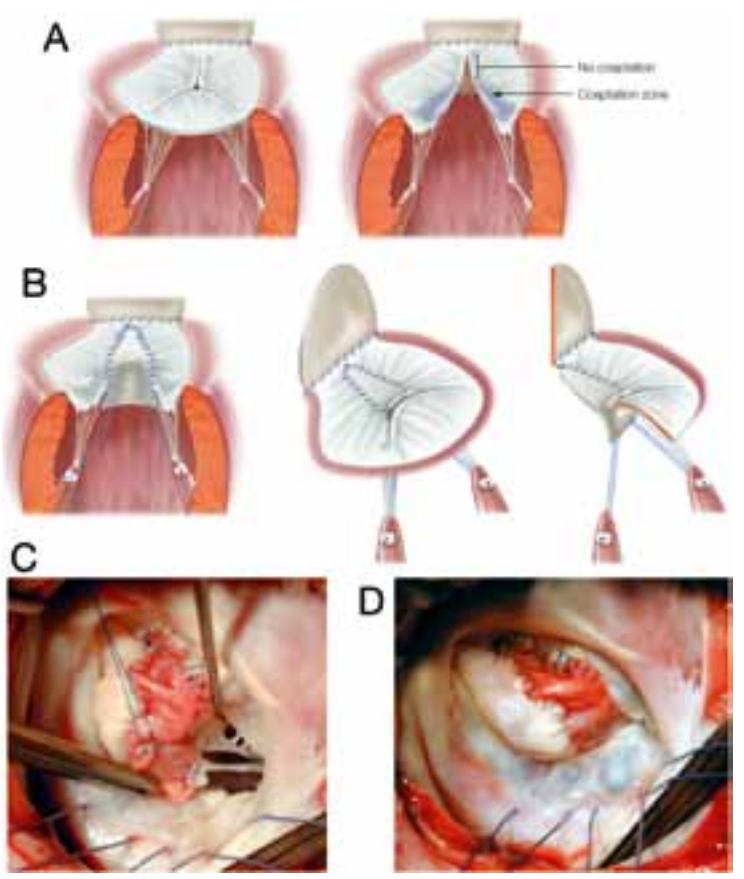


Figure 2: **A.** Cleft patch augmentation for adequate left lateral leaflet with normal papillary muscles. Thickened edges of the leaflet are resected carefully. **B.** Glutaraldehyde treated autologous pericardium was trimmed and sutured to the edge of the leaflet. Sutures are extended to adjacent marginal chordae. **C.** Intra-operative picture. Autologous pericardial patch is placed between the anterior and posterior bridging leaflets. **D.** Intra-operative picture after the repair. Good coaptation is gained.

Cardiac – Abstract session

Worth the effort?

Concomitant surgical ablation for atrial fibrillation (AF) in patients with significant atrial dilation >55mm

Simon Pecha
University Heart Center, Hamburg, Germany

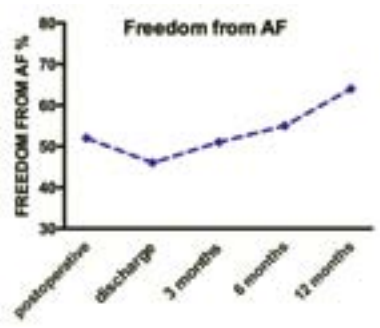
Background and methods:

Concomitant Surgical AF ablation is an established procedure, recommended in guidelines. However many surgeons are reluctant to perform AF ablation in patients with significantly enlarged left atrium. We therefore analyzed outcomes of patients with left-atrial diameter >55mm undergoing concomitant AF ablation.

Between 05/2003 and 12/2012 124 patients with significantly enlarged left-atrium >55mm underwent concomitant surgical AF ablation. Rhythm monitoring was accomplished by implantable loop recorder (ILR) interrogation (n=54), or 24-h Holter-ECG (n=70). Successful ablation was defined as AF Burden <0.5% in ILR interrogation or absence of AF episode >30sec in 24-h Holter-ECG. Primary endpoint of the study was sinus rhythm (SR) at 12-months follow-up.

Results:

Mean patient's age was 65.7+/-9.6 years, 69.4% were male. No major ablation or ILR related complications occurred. Mean LA diameter was 60.7+/-4.4mm. Survival rate at one-year follow up was 94.4%. 11 (8.8%) patients received additional catheter-based ablation, while 23 (18.5%) had an electrical cardioversion during follow-up period. Freedom from AF after one-year follow-up was 64.4% and 59.4% off antiarrhythmic drugs respectively. Logistic regression analysis identified preoperative paroxysmal AF, duration of AF and LA diameter > 70mm as predictors for rhythm outcome at 12 months follow-up.



Conclusion:

In this patient cohort with significantly enlarged LA diameter, concomitant surgical AF ablation provided freedom from AF rate of 64.4 % after one-year follow-up. However in this patient population, an accurate postoperative care with interventions like medical or- electrical cardioversion and additional catheter based ablation is necessary to achieve satisfactory results.

Thoracic – Abstract

Risk factors for postoperative recurrence of spontaneous pneumothorax treated by VATS

Andrea Imperatori, Nicola Rotolo, Marco Spagnoletti, Luigi Festi, Fabio Berizzi, Davide Di Natale, Elisa Nardecchia, Lorenzo Dominioni
University of Insurbia, Varese, Italy

Primary spontaneous pneumothorax (PSP), a relevant health problem, predominantly occurs in healthy, young, tall and thin males. After the first episode, the estimated recurrence rate is 20-50% and it increases up to 60% after further episodes. The optimal treatment of PSP, both at first episode and at recurrence, has been a matter of debate. Surgical treatment is needed in 25-50% of all patients. Nowadays video-assisted thoracoscopic (VATS) blebectomy and pleurodesis is widely accepted as a reliable option for treatment of recurrent PSP. Recurrence rate after VATS treatment has been reported from 0% to 11%. Identified risk factors of postoperative recurrence include active smoking habit, comorbidities, prolonged postoperative air leakage, missed or incomplete bullectomy.

In this retrospective study, carried out in patients <40 years of age, treated by VATS blebectomy and partial pleurectomy for PSP, we aimed to estimate the postoperative recurrence rate, and to identify related risk factors. As secondary objective we evaluated the long-term outcome of VATS treatment in terms of chest wall chronic pain and dysaesthesia.

We evaluated 134 young patients (110 men, 24 women; mean age, 25 years) undergoing VATS blebectomy and partial parietal pleurectomy for PSP, at the Center for Thoracic Surgery, University of Insubria, Varese, Italy between 1997 and 2010. Patients were followed-up for at least 36 months after discharge.


Andrea Imperatori

Overall, no relevant complications were recorded intraoperatively and there were no cases converted into thoracotomy. The postoperative course was uneventful in 102 patients (76.1%). The most frequent complication was air leakage lasting longer than 7 days (17.2%). In two patients a re-VATS procedure was necessary on postoperative day 1 to control bleeding. Moreover, one patient required re-operation for persistent air leaks. Mortality rate at 90 days was nil. Median hospital stay was 8 days.

The median follow-up was 79 months (range: 36–187). The postoperative recurrence rate of ipsilateral pneumothorax was 6.0% (8/134 cases), with a median interval of 43 months. In detail, two cases recurred early (on postoperative day 38 and 40). The other six recurrences occurred late (at 23, 32, 54, 58, 59 and 71 months). Of the eight patients with recurrent pneumothorax, three showed only a partial failure of pleurodesis and underwent conservative treatment. In the five patients (3.7%) with significant failure of pleurodesis a redo-VATS procedure was carried out with talc poudrage (four cases), and with extended parietal pleurectomy (one case). None of these 8 patients presented a further episode of ipsilateral pneumothorax with a 68 months median time of follow up.

Multivariate regression analysis showed that postoperative recurrence was correlated with prolonged postoperative air leaks (p=0.037) and with female gender (p=0.045). In our study 3 out of 4 women with postoperative recurrence presented pelvic endometriosis and in 2 of these we observed small diaphragmatic "fenestrations" during VATS inspection.

Chronic chest pain (analogic scale >4 points) was reported in three patients (2.2%), but only one used analgesics more than once a month. Moreover, in 13 patients (9.7%) chest wall dysaesthesia was recorded; only three reported an analogic score >6 and complained of a significantly compromised quality of life.

In conclusion, our findings confirm that VATS blebectomy with pleurectomy for pleurodesis is a safe and effective procedure for treatment of spontaneous pneumothorax in young patients. Postoperative recurrence significantly correlates with female gender and with prolonged air leakage after surgery. Further efforts should be made aiming to improve postoperative air leak control. Moreover, in young women catamenial pneumothorax should be always considered and a careful exploring of the pleural cavity and of the diaphragm should be performed.

Continued from page 18

	lung cancer	*Monica Casiraghi*
17:03	Discharge of thoracic patients with portable suction drainage devices: Are they cost effective?	*Diane Pullinger*
17:12	Extracorporeal membrane oxygenation in thoracic surgery	*Mehmet Erol*

Abstract

Proximal thoracic aortic pathology: Variations on a theme

Brown 1

Moderators: C.D. Etz, Leipzig; J. Dumfarth, New Haven; H.J. Schäfers, Homburg

16:00	Predicting the aortopathy in patients with bicuspid aortic valve stenosis: Focus on the functional analysis of aortic root	*Evaldas Girdauskas*
16:15	Four-dimensional magnetic resonance imaging-derived ascending aortic flow eccentricity and flow compression are linked to aneurysm morphology	*Fabian Kari*
16:30	Ascending thoracic aortic aneurysm wall stress analysis using patient-specific finite element modelling of in vivo magnetic resonance imaging	*Elaine Tseng*
16:45	Decision making in aortic root surgery in Marfan syndrome: Bleeding, thromboembolism and risk of reintervention after valve-sparing or mechanical aortic root replacement	*Florian Schoenhoff*
17:15	Root replacement in acute type A dissection: Does valve sparing operation increase surgical risk?	*Heemoon Lee*

Focus Session

Basic Science 2

Amber 8

Moderators: F. Da Costa, Curitiba; P. Dohmen, Berlin

16:00	Update on decellularized aortic allografts	*Francisco Da Costa*
16:15	Which stem cells do we need for tissue engineering?	*Gustav Steinhoff*
16:45	Whole heart tissue engineered	*Alexander Weymann*
17:00	Autologous marrow stromal cell-based tissue-engineered heart valves	*Maximilian Emmert*
17:15	Summary, conclusions	*Pascal Dohmen*

Vascular – Professional challenges

Complex reoperative aortic surgery after TEVAR

Eduard Quintana[1,2] and Alberto Pochettino[2] *1 University of Barcelona, Spain; 2 Mayo Clinic, Rochester, USA*

A neurysmal expansion of an aberrant right subclavian artery (ARSA) arising from the posterior aortic arch is a rare vascular condition. In most cases ARSA remains asymptomatic, but some individuals suffer compressive symptoms caused by vascular ring or sling effect typically affecting the esophagus. Although an asymptomatic aneurysmal Kommerell diverticulum (KD) carries risk of rupture or dissection, the literature has not clarified indications for surgery and best treatment.

Conventional open surgery for large KD[1] entails the use of cardiopulmonary bypass eventually with circulatory arrest. For a multitude of reasons new technologies are advancing and addressing several aortic conditions that have been approached traditionally with open techniques. Evolving endovascular technology has provided additional management options but long-term outcomes are not yet available. Alternative hybrid approaches have been introduced[2] and typically require extra-anatomic revascularization followed by endovascular exclusion of the subclavian origins by thoracic stent grafts.

The reasons to intervene young patients with the use of hybrid techniques that otherwise could tolerate open approaches should be scrutinized. Such decisions are usually taken by those not confortable with all existing approaches. Possibly a bias exists when caregivers are trained only using percutaneous and extra-cavitary techniques.

Despite the lack of evidence of effectiveness of these new therapies there is a growing perception by patients and referring physicians that less invasive is synonymous of best outcome. There is still a long trip to prove that this new repair options can parallel long term results already observed with traditional repairs. This journey will force us -cardiovascular surgeons- to face the most threatening and complex aortic scenarios reoperating on young populations that were promised a quick and painful recovery with hybrid approaches.

It is mandatory that the new generation of surgeons should undertake training in both open and closed techniques. If so, therapy offers can be tailored to the patient's needs and not to physician or team preferences. Fortunately, despite the perception of prohibitive surgical risks, rescue aortic repair taking down extremely complex endovascular and extra-anatomic repairs can still be achieved.

Figure 1. Illustration showing extra-anatomic bypasses and embolization of KD and left subclavian artery in preparation to arch stenting. Two years later this 29 year-old patient required dismantlement of failed previous hybrid repair by means of a two-staged conventional open repair under circulatory arrest.

References

1. Kouchoukos, N.T. and P. Masetti. Aberrant subclavian artery and Kommerell aneurysm: surgical treatment with a standard approach. J Thorac Cardiovasc Surg, 2007. 133:888-92.
2. Idrees, J., S. Keshavamurthy, S. Subramanian, Clair DG, Svensson LG, Roselli EE, Hybrid repair of Kommerell diverticulum. J Thorac Cardiovasc Surg, 2014. 147:973-6.

Vascular – Professional challenges

Arterial cannulation for aortic surgery: more confusion or more clarity?

Jean Bachet *Nogent-sur-Marne, France*

For several decades the question of arterial cannulation has been considered as totally resolved: Cannulation of the ascending aorta for the valvular, coronary and congenital procedures on the one hand and of the femoral artery for all other procedures, including aortic ones, on the other hand, was systematic.

Only less than two decades ago, it became obvious that this apparently secondary issue could be of some importance, in particular for aortic procedures and that other modes of arterial cannulation could significantly influence the surgical results. In particular the type and location of arterial cannulation appeared to be of major importance during surgery of the aortic arch and even most important during surgery of type A acute dissection.

In this matter many different approaches and techniques have been described. They consist in possible cannulation of:

- the femoral arteries (two sites)
- the right axillary artery (two techniques)
- the right brachial artery
- the left axillary artery
- the innominate artery
- the common carotid arteries (two sites)
- the ascending aorta (two techniques)
- the apex of the left ventricle,
- The left trans-atrial approach, for a total of 11 sites and six techniques of arterial access.

Most of those described sites and techniques have advantages and disadvantages. That's why each one has its strong supporters and, similarly, strong opponents.

However all those techniques are not equivalent and cannot be indifferently used in all patients and in whatever circumstances.

It seems, indeed, presently largely demonstrated that some advantages and some disadvantages are of paramount importance that might induce surgeons to use preferentially some techniques rather than others.

So, there is no doubt that, when discussing the mode of cannulation to be used, the surgical, anaesthesiology and perfusion team may first take into account the pathologic and clinical condition of the patient, the circumstances of surgery, the local as well as the general anatomical and physiological conditions and all other important determinants and risk-factors.

Indeed, no technique combines all advantages with no drawbacks. Therefore it seems important that the surgical teams be aware of the various technical methods and decide the most convenient and less harmful type of arterial access for each case according to the patient's condition as well as their experience, skill, and local possibilities.

Jean Bachet

No technique should be considered as the one and only.

During what we hope to be a complete survey of the various methods so far described, we shall try to assess their advantages and drawbacks and try to decide which is the most appropriate for each patient. Hopefully some clarity will be brought to this matter.

This is the real core of the debate.

Cardiac – Abstract

Off-pump transapical mitral valve repair with neochordae

Abdul-Halkim Dayeh
IHeart Center Duisburg, Dussledorf, Germany

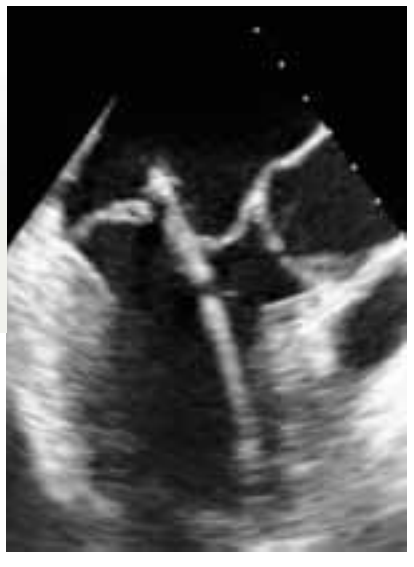
Open mitral valve repair, irrespective of access – minithoracotomy or sternotomy – is the gold standard in the treatment of mitral regurgitation caused by leaflet prolapse. However, extra-corporeal circulation is associated with the wide spectrum of well-known side effects. In the current era, surgery is becoming more and more 'gentle', i.e. minimally invasive with regard to access or less invasive with regard to the use of CPB and overall strain. Recently, technical improvements and on–site availability of 3D echocardiography have enabled detailed visualisation of pathology and of success of repair on the mitral valve without direct view. Based on this, transapical implantation of PTFE chordae on prolapsed leaflet segments on the beating heart has become feasible. The Neochord DS 1000 enables the insertion of PTFE chordae on prolapsed leaflet segments comparable to surgical reinforcement and the adjustment under online echo-control on the beating heart. Furthermore, an almost physiological repair is achieved by fixing the chordae on the ventricular wall. Due to access and applicability, P2 is the ideal segment for this technique, performed via left minithoracotomy. The reported results in a small entity of selected patients prove feasibility and efficacy of the technique intraoperatively as well as in mid-term follow-up. Major advantages are the short operative time, the avoidance of CPB and the fast recovery reflecting a reduced overall strain for the patient as well as the cosmetic aspect. Concerns were risen that the anchoring of the PTFE sutures on the leaflet edges may tear, as single double strings are inserted. The rationale to prevent from this, was to insert at least three neochordae to dispers the strain. The second concern for recurrent MR was expected in case of remodelling of a primarily dilated left ventricle with reduced ejection fraction. We observed this phenomen in one patient who went into surgery with reduced EF. Respective to recovery of the ventricle, there was recurrent MR, although the neochords were primarily "overpulled" to account for this development. The patient improved clinically and the increase of EF is proving the positive impact of the procedure on cardiac function. However, MR may have to be addressed at some point depending on further follow-up findings.

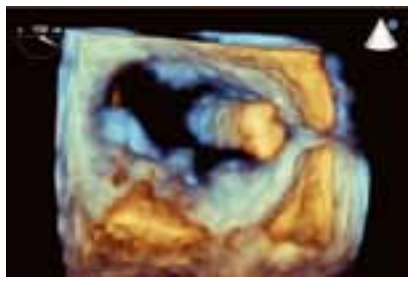
Neochord DS®1000

Despite these concerns, mitral valve repair with the Neochord DS1000 device showed convincing results even without annuloplasty in our study.

Ideal patients are those with isolated P2-prolapse and preserved left ventricular function without severe annulus dilatation. The technique can also be used in high risk patients to avoid the adverse effect of CPB and reduce operative risk. More experience and longer follow up are necessary to confirm the early results and to define criteria for patient selection.

In conclusion, off-pump transapical mitral valve repair with the Neochord technique is safe and feasible from the procedural point of view and is associated with excellent operative and short-to-mid-term results. Therefore, this technique can be considered an alternative to the classic on-pump mitral valve repair in selected patients.





Thoracic – Abstract session

Predictive factors of myasthenic crisis after extended thymectomy for patients with myasthenia gravis

Takeshi Ando *Department of Thoracic Surgery, Kyoto University Hospital, Japan*

Extended thymectomy is the standard therapeutic option for myasthenia gravis (MG) patients and has good results. Although postoperative myasthenic crisis (POMC) is a serious issue when considering surgery, to date only a few studies have assessed possible risk factors for POMC. The purpose of this study was to determine predictive factors for POMC occurrence and its impact on the surgical outcomes ofmg.

We reviewed the records of 55mg patients who underwent extended thymectomy at Kyoto University Hospital between January 2000 and December 2013. Preoperative and surgical records and postoperative neurological outcomes were retrospectively reviewed and analyzed on the basis of the occurrence of POMC.

POMC was defined as the requirement of prolonged ventilatory support of >24 hours after surgery or repeated ventilatory support (including noninvasive ventilation) after extubation before postoperative day 30.

The preoperative Myasthenia Gravis Foundation of America stage was I, II, III, and IV in 24, 22, 8, and 1 patients, respectively. Ten patients (18.2%) developed POMC; six required prolonged intubation over 24 h and four required re-ventilatory support. All patients were weaned after 5.6 (2–26) days of ventilator support and were discharged. Univariate analysis revealed a correlation with a high preoperative anti-acetylcholine receptor antibody titer ($p = 0.009$), history of MC ($p < 0.001$), and unstablemg after preoperative medical therapy ($p = 0.003$). Multivariate logistic regression analysis showed that history of MC (Odds Ratio, 10.49; 95% Confidential Interval, 1.09–264; $p = 0.041$) and unstablemg (Oddds ratio, 30.68; 95% Confidential Interval, 2.051–1104; $p = 0.012$) independently predicted POMC. The surgical response rate was not significantly different between the two groups (66.7% with POMC, 85.4% without POMC; $p = 0.334$).

Our multivariate analysis showed that a history of MC and unstablemg were predictive factors for POMC, whereas preoperativemg severity was not. In principle, after a diagnosis ofmg is made, an extended thymectomy is performed following preoperative medical therapy. Based on the results of this study, we suggest that the preoperative medical therapy outcome could affect the occurrence of POMC.

In addition, an improvement rate in the AchRAb titer (preoperative/pretreatment AchRAb titer) was not associated with POMC occurrence in spite of significant reduction of preoperative AchRAb titers compared to pretreatment titers. It is suggested from this result that patients with uncontrolled symptoms at the time of operation are still at substantial risk of POMC even if the AchRAb titers improve after preoperative medical therapies.

Unstablemg or a history of preoperative MC tends to cause POMC. Keeping preoperativemg under control with appropriate preoperative medical therapies can reduce POMC occurrence. Because postoperative neurological outcomes can be expected, even in patients with POMC, surgery is indicated even if POMC is assumed to occur at a high rate.

Cardiac – Abstract session

Validation of a new method for trial analysis: applying the win ratio to analyze PCI versus CABG for complex CAD

Milan Milojevic *Erasmus Medical Center, Rotterdam, The Netherlands*

For any randomized trial, the sample size calculation is a critical determinant of the overall success of the trial and the interpretation of the findings. Due to this fact, composite endpoints are widely used in cardiovascular disease trials, leading to higher event rates and more statistical power; thus requiring smaller sample sizes and shorter follow-up. Conventional analyses calculate composite in direction that each component of the composite as equally important. It provokes often criticism that results of the study may be driven primarily by the subcomponent with lesser clinical significance.

The win ratio methodology is a new approach for the analyses of composite endpoints. In contrast to the conventional analyses, this methodology takes hierarchical weighting of events and puts emphasis on events with greater clinical importance, which provides greater statistical power and gives insightful meanings of the results.

The objective of this re-analysis was to compare PCI with CABG, accounting for the severity of the individual components in the composite of MACCE and prioritizing these using the win ratio approach. Moreover, this study, for the first time, applies the win ratio and evaluates its impact on trial design in comparison with conventional analysis.

The win ratio methodology was applied across the SYNTAX trial. Win ratio analyses were performed for MACCE and all-cause death, and compared with conventional Cox proportional hazard analyses. For the primary outcome of MACCE, the win ratio favored CABG and was 1.61 (95% CI 1.34-1.96; P<0.0001) using the matched approach, 1.49 (95% CI 1.23-1.73) using the unmatched approach, and smallest using a conventional hazard ratio: 1.43 (95% CI 1.21-1.70). The win ratio for death was 1.39 (95% CI 1.04-1.86; P=0.021), in both cases in favor of CABG treatment. The results in other subgroups show similar trends of pronounced change in favor of the CABG treatment, especially in the subgroups of three vessel diseases, the intermediate SYNTAX Score and the low SYNTAX Score, where the win ratio for MACCE was 1.38 (95% CI 0.98-1.87; P=0.064), compared with conventional hazard ratio: 1.13 (95% CI 0.83-1.53 P=0.43). This results leads to the conclusion that the benefit of CABG over PCI is not driven primarily by repeat revascularization, but this re-analysis suggest that the most important benefit of CABG treatment is the reduction in hard clinical events, based on the win ratio approach to hierarchically prioritize events in the composite of MACCE. This approach is easily and effectively applicable to clinical trial data. It provides a larger treatment effect estimate than conventional analyses; based on these and additional advantages, future trials adopting this approach can expect to maintain similar statistical power with smaller sample sizes, and lower trial costs.

Congenital – Abstract rapid response session

Pulmonary artery sling repair

Single centre experience with analysis of risk factors

Nagarajan Muthialu
Great Ormond Street Hospital, London, UK

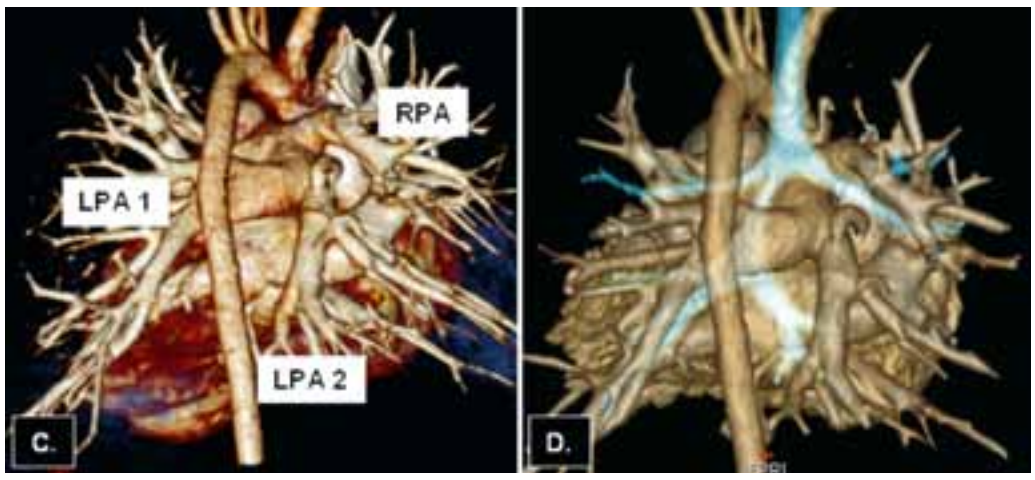
Pulmonary artery sling is a rare congenital vascular malformation, resulting often in airway obstruction. Associated intra-cardiac defects are common and co-existing airway stenosis due to presence of complete tracheal rings further complicate surgical outcomes. The worldwide experience is limited, with few published results on long-term outcomes, and risk stratification.

Embryologically, PA sling arises in relation to lack of space by competing vital structures during foregut malformation, and results in LPA securing its source origin behind airway. The author (Muthialu N) had previously reported isolation of right pulmonary artery sling in a setting of bronchial isomerism, and another report comprising of duplicate LPA wherein one segment is in sling position while the other segmental artery is normally placed.

Surgery for PA sling is often performed using cardiopulmonary bypass, and this gives opportunity to correct intra-cardiac defects at the same time. Tracheal stenosis, if present, is managed by slide tracheoplasty. The left pulmonary artery is disconnected from its origin at right pulmonary artery, and is brought anteriorly to the anatomical position. Ductal tissues are removed completely, and implantation of left pulmonary artery is carried out in its expected normal position.

The current article also highlights stratified risk in this population, and identified presence of abnormal lung (which is quite often hypoplastic or aplastic lung) as important risk factor on univariate analysis, and a complex surgical procedure, as evidenced by a long cardiopulmonary bypass time as a risk factor in multivariate analysis.

In spite of these, the long-term results are very satisfactory with a very low mortality and reintervention risk following surgical correction.



Cardiac – Abstract session

Aortic valve sparing operations in aortic root aneurysms: remodeling, reimplanting: is the debate closed?

Ruggero De Paulis
European hospital, Rome, Italy

In the late '80s and early '90s an intense debate was present among the two renowned surgeons, Magdi Yacoub and Tirone David who had conceived the two types of valve sparing operation better known as remodeling or reimplantation procedure. The former was considered easier to perform and more physiological because it allowed a proper reconstruction of the sinuses of Valsalva although with an intrinsic higher risk for bleeding. The latter, although apparently more complex from a technical point of view was considered safer while at the same time guaranteeing an optimal stabilization of the annulus. However, the lack of sinuses of Valsalva was seen as a serious drawback when considering the long-term durability of the valve. As the time passed and the patients data became available, it was evident that progressive annular dilatation was the Achille's hills of the remodeling procedure while an altered leaflet dynamics was invariably present in patients with reimplanted valve potentially at the base for an accelerated cusp deterioration.

How to transform a reimplantation procedure in a remodeling+annuloplasty procedure by simply tailoring the Dacron graft from outside.

In the following years a series of technical modification were introduced with the aim of improving both procedures. An annuloplasty ring or an annuloplasty sutures were added to the remodeling procedure to stabilize the annulus and preventing the progressive annular dilatation; on the other the reimplantation procedure was improved either by a series of surgical modification of the original technique or by the use of specifically modified vascular prostheses incorporating pseudo-sinuses of Valsalva.

We are now at the point where both procedures can offer at the same time a good root reconstruction and a proper stabilization of the annulus with increased chance of optimal durability of the spared valve. It goes without saying that in the case of remodeling the annuloplasty should be complete, robust and at the proper level along the whole annulus circumference; and in case of the reimplantation the root reconstruction should achieve sinuses of appropriate anatomical shape and dimension. However, in both cases similar attention should be paid not to alter the normal spatial geometry of the commissures and at the same time avoiding any distortion of the valve.

Nevertheless, from our personal experience we continue to favour the reimplantation procedure for its ability of being well reproducible, for offering an optimal support of the aortic wall especially useful in case of thin, fragile and dissected commissures, and for greatly reducing any chance of bleeding at the end of the procedure. Furthermore, follow-up data are showing that up to 15 years more than 90% of the valve reimplanted within a graft incorporating sinuses continue to function well. Failure can mostly be ascribed to improper indication, suboptimal technique and are usually already diagnosed in the first two–three years of follow-up.

Ruggero De Paulis

Cardiac – Abstract session

LIB – to suture or not to suture: a simplified reimplantation technique

Thomas Modine *CHRU de Lille, France*

Composite replacement has been the standard surgical procedure for the treatment of combined aortic dilatation and aortic regurgitation. Nevertheless this intervention exposes patients to long-term risks associated with the presence of biological or mechanical prostheses, including bleeding, thromboembolic and infective events. In this context, valve sparing and repair interventions, associated with low mortality, acceptable durability and low risk valve-related events, have received increasing interest.

Sarsam and Yacoub proposed the « remodeling of the aortic root » procedure, which preserves physiological motion of the leaflets with a better stress distribution as compared with the David's procedure. Because all three aortic sinuses are excised but leaving approximately 5mm of arterial wall attached to the aortic annulus, the remodeling technique may be inappropriate in patients with Marfan Syndrome or annuloaortic ectasia. In some patients it failed to stabilize the aortic annulus and led to progressive annular and remnant aortic wall dilatation and valve incompetence.

David and Feindel proposed a procedure (David I) described as « the reimplantation technique » which provided external support of the entire aortic root complex as well as better hemostasis. The original procedure consists in reimplanting the aortic valve within a Dacron tube graft.

The ideal sparing surgery aimed at building the more physiologic aortic root as possible by preserving the functionnal anatomy of the aortic root and valve complex. This includes the preservation of the geometry of the sinuses of valsalva and the ratio of different components of the aortic root. De Paulis introduced a modified Dacron conduit with preformed neosinuses. This conduit used in David I procedure, allows in theory to enhance leaflet closure at the end of the diastole and protects leaflets from the prosthetic wall trauma during systole.

Unfortunately in-conduit suturing of the aortic valve annulus and a small rim of remnant sinuses to the graft is time consuming, and may lead to bleeding, and distorsion of the native valve in the prosthetic root. In addition, crimping the valsalva graft may result in its theoretical advantage loss. We here describe a modification of the previous techniques to facilitate reimplantation, using a single commissure suspension of the aortic native valve in addition to a continuous in-flow suture line to facilitate in-conduit valve reimplantation. This technique showed to be effective and easy to realize.

Cardiac – Abstract session

Direct aortic implantation of CoreValve system leads to favorable outcomes
The ADVANCE Direct Aortic Study

Giuseppe Bruschi *Azienda Ospedaliera Niguarda Ca' Granda Milano, Milan, Italy*

Neil Moat *Cardiovascular BRU Royal Brompton & Harefield NHS Trust, London, United Kingdom*

Transcatheter aortic valve implantation (TAVI) is rapidly becoming the standard of care for aortic stenosis patients at increased risk for surgical aortic valve replacement. There are several options for access, the first choice being the transfemoral route when anatomical and clinical conditions are optimal. A number of aortic stenosis patients have limitations which make them ineligible for a transfemoral procedure, including calcification, narrowing, or tortuosity of the iliofemoral tree. For them, the direct aortic (DA) approach is an alternative.

Positive results from case studies have been described in the literature[1], as have key outcomes from a multicentre European DA registry[2]. However, no rigorous clinical study has been done to demonstrate the clinical efficacy of this approach and understand its impact on patient status and quality of life. The ADVANCE DA study was conducted specifically for this purpose. From September 2012 to February 2014, 100 patients were enrolled at nine centres in Europe in this prospective, single-arm study. Prior to the procedure, multislice computed tomography (MSCT) was used to evaluate the anatomy of the aortic annulus and select an appropriately sized CoreValve. TAVI was then performed with the patient under general anesthesia.

The patients were elderly with an average age of 82 ±6 years and a mean STS score of 6 ± 3%. Most had significant comorbidities including peripheral vascular disease (51%), diabetes (38%), and LVEF ≤50% (32%), as well as a history of PCI (33%) and CABG (15%). Ninety-two of the enrolled patients underwent implant. By post-TAVI day 30, four patients had died, and one patient had a stroke which was classified as non-disabling.

In the patients with echocardiograms available at hospital discharge, only one had moderate paravalvular leak (PVL), leaving the remaining 98.7% of patients free from moderate or severe PVL. This is the lowest rate of clinically-relevant PVL reported with the Medtronic CoreValve System (MCS). One possible reason for this outcome may be the greater control of device deployment and positioning afforded by the direct aortic approach. This precise positioning may also have impacted the permanent pacemaker implantation rate, which was 14.5%, again among the lowest reported with the MCS[3-5].

The invasiveness of the direct aortic approach elicits concern about its potential impact on patient health status and quality of life. The ADVANCE DA study implemented quality of life instruments to help understand this issue. The mean change in the Kansas City Cardiomyopathy Questionnaire overall summary score was 18 ± 28 points between baseline and 30-days, which was both statistically and clinically significant. In addition, 74% of patients derived substantial symptom relief as shown by improved NYHA class.

In summary, the results of the ADVANCE DA study show that TAVI through direct aortic access with the MCS is associated with low complication and mortality rates at 30 days, and provides substantial improvement in patient health status and quality of life. This procedure is an excellent alternative for patients with aortic stenosis and prohibitive iliofemoral anatomy.

Neil Moat and Giuseppe Bruschi

References

1. Bruschi G, De Marco F, Botta L, Cannata A, Oreglia J, Colombo P, et al. Direct aortic access for transcatheter self-expanding aortic bioprosthetic valves implantation. Ann Thorac Surg 2012 Aug;94:497-503.
2. Bruschi G, Chevalier B, Hafid A, Moat N, Branny M, Coletti G, et al. EURyDICE Registry: European Direct Aortic CoreValve Experience. Eurointervention 2014; Suppl (EuroPCR Abstracts and Posters 2014):14A-MA063.
3. Adams DH, Popma JJ, Reardon MJ, Yakubov SJ, Coselli JS, Deeb GM, et al. Transcatheter aortic-valve replacement with a self-expanding prosthesis. N Engl J Med 2014;370:1790-8.
4. Tchetche D, Modine T, Farah B, Vahat O, Sudre A, Koussa M, et al. Update on the need for a permanent pacemaker after transcatheter aortic valve implantation using the CoreValve Accutrak system. EuroIntervention 2012;8:556-62.
5. Linke A, Wenaweser P, Gerckens U, Tamburino C, Bosmans J, Bleiziffer S, et al. Treatment of aortic stenosis with a self-expanding transcatheter valve: the International Multi-centre ADVANCE Study. Eur Heart J 2014;doi:10.1093/eurheartj/ehu162.

Cardiac – Focus session

Transcatheter aortic valve implantation with self-expandable valve vs surgical AVR (CoreValve US Pivotal High Risk Study)

Michael J Reardon *Houston Methodist DeBakey Heart and Vascular Center, Houston, US*

Transcatheter aortic valve implantation (TAVI) has replaced surgical aortic valve replacement (SAVR) in patients with severe, symptomatic aortic valve stenosis considered inoperable for open heart surgery, and has now been shown to be superior to SAVR in patients considered to be at high surgical risk.

The randomized CoreValve US Pivotal High Risk Study examined 747 implanted patients (390 TAVI, 357 SAVR) enrolled at 45 centres[1]. All patients were selected for participation in the trial only after rigorous review of their medical profiles by a multidisciplinary Heart Team. We looked closely at patient factors, e.g. frailty, disabilities, and comorbidities not included in the STS assessment when determining patient risk. The primary endpoint was all-cause mortality at one year with prespecified non-inferiority and superiority testing.

Overall 52.7% of patients were men, most (86.2%) had New York Heart Association class III or IV symptoms at baseline and the mean age was 83.2 years. As expected, baseline characteristics were similar between treatment groups with the exception that more patients with diabetes (45.4% vs 34.9%, P = 0.003) were randomized to the SAVR group, although this difference was not present in patients requiring insulin.

All-cause mortality was 14.2% in the TAVI group and 19.1% in the SAVR group at one year (P<0.001 for noninferiority, P=0.04 for superiority) (Figure 1). We also reported no differences in mortality in nine different subgroups, including patients with an STS PROM < 7% vs. ≥ 7%1. Figure 2 shows better survival with TAVI compared with SAVR in both groups although these were not statistically different.

The occurrence of stroke at 30 days was lower in patients treated with TAVI compared with SAVR (4.9% vs. 6.2%, P=0.46); and at one year this difference significantly favored TAVI (8.8% vs. 12.6%, P=0.01). The rate of stroke in the CoreValve US Trial was higher than typically seen in SAVR patients and higher than previously reported in TAVI trials[2]. We believe this is because we looked very carefully for neurological events by having all patients undergo baseline and post-procedural neurological evaluations.

Moderate or severe paravalvular leak (PVL) following SAVR is an uncommon event, which is what we found in our study as well, yet a common topic of debate among implanters of TAVI devices. In our trial, all PVL data was centrally evaluated at the Mayo Echocardiographic Core Laboratory (Rochester, Minnesota, USA). The CoreValve device was associated with low rates of moderate to severe regurgitation, and a paired analysis showed 76% of patients with moderate or severe regurgitation improved by at least one grade by one year.

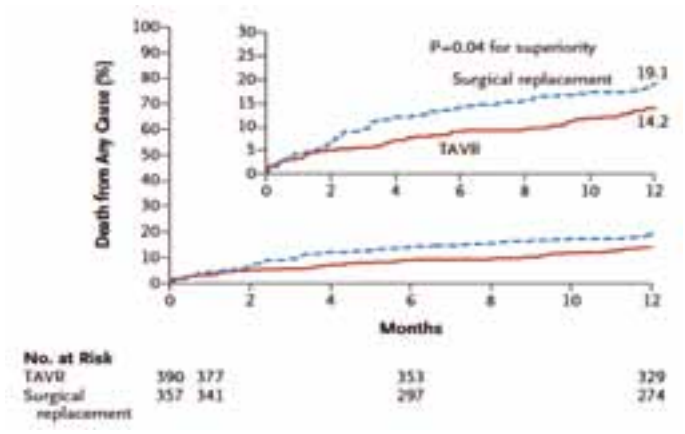


Figure 1. The High Risk Cohort Primary End Point of All-Cause Mortality. The Kaplan-Meier rate of all-cause mortality at 1 year for TAVR vs SAVR (p<0.001 for nonferiority, p=0.04 for superiority). From The New England Journal of Medicine, Adams DH, et al. Transcatheter aortic-valve replacement with a self-expanding prosthesis, Volume 370, Page 7.

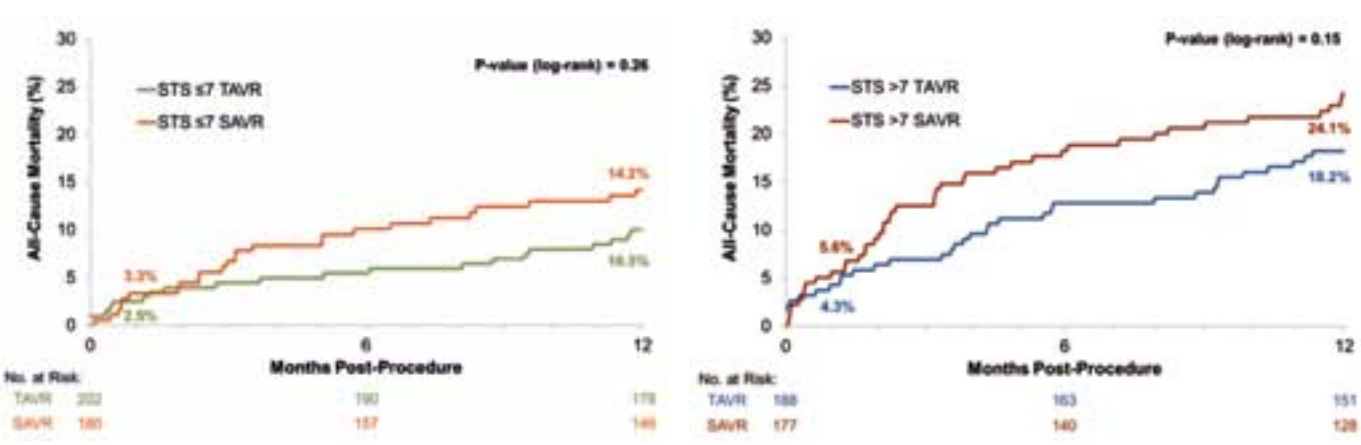


Figure 2. All-cause mortality at one year by STS Score for patients treated with TAVI vs. SAVR.

References

1. Adams DH, Popma JJ, Reardon MJ, et al. Transcatheter aortic-valve replacement with a self-expanding prosthesis. New Engl J Med 2014; 371: 967-8.
2. Smith CR, Leon MB, Mack MJ, et al. Transcatheter versus surgical aortic-valve replacement in high-risk patients. New Engl J Med 2011; 364: 2187-98.

Thoracic – Abstract session

Accuracy of transthoracic ultrasound
for the prediction of chest wall infiltration by lung cancer and of lung infiltration by chest wall tumors

Guido Caroli
Policlinico S.Orsola-Malpighi, Bologna, Italy

The purpose of this work starts from two common preoperative problems. Often thoracic surgeons face peripheral lung cancers with the doubt of chest wall infiltration and chest wall tumors abutting on the pleural cavity with the doubt of lung infiltration. This happens when preoperative CT scan or MRI lack of clear signs of infiltration.

In these suspect cases literature report low/moderate sensibility and sensitivity for both CT scan and MRI, varying from 42% to 80%.

In recent years the use of Transthoracic Ultrasound (TUS) has gained more and more spread. In 2011 at the 25th EACTS annual meeting in Lisbon, my colleague Dr. Cassanelli presented our work dealing with the value of TUS on the preoperative detection of pleural adhesions. We found a sensibility and sensitivity of 80.6 and 96%, respectively.

Starting from the same technical aspect, 'the sliding sign', we wanted to evaluate TUS accuracy in the detection of chest wall infiltration by lung cancer and of lung infiltration by chest wall tumors.

Assuming that sliding sign is the ecographic manifestation of the movement of the lung over the parietal costal pleura or, more precisely, of the pleural layers on each other, its absence corresponds to the presence of adhesions between these two layers. From an anatomical point of view this happens in case of pleural fibrous adhesions, but also in case of neoplastic infiltration coming from both side of the pleural space. Chest wall tumors can cross parietal pleura and infiltrate visceral pleura and the underlying lung. In a specular way, lung cancer can cross visceral pleura layer and infiltrate parietal costal pleura and the overlying chest wall.

We prospectively collected 23 patients from January 2012 to February 2014 affected by peripheral lung cancer suspect for chest wall infiltration (14) or chest wall tumor (nine) scheduled for surgical intervention with CT scans suspected for lung infiltration.

They underwent preoperative TUS. Prevision was checked during intervention.

Sensitivity and specificity of TUS in predicting infiltration were 88.89% and 100%, respectively. Positive and negative predictive values were 100% and 93.3%, respectively. Accuracy resulted 95.7%.

The maximum value of sensibility and specificity, 100% and 57% respectively, corresponded to a tumor size value of 4.5cm, found using the Youden-index.

This study demonstrated that transthoracic ultrasound is a very accurate instrument to predict chest wall infiltration by lung cancer or lung infiltration by chest wall tumors. In case of suspect infiltration at CT-scan, TUS should be a fundamental part of the preoperative management to plan the best surgical approach.

Guido Caroli

Vascular – Abstract session

Total arch replacement vs. more conservative management in type A acute aortic dissection

Marco Di Eusanio
Sant'Orsola Malpighi Hospital, Bologna, Italy

In type A acute aortic dissection (TA-AAD) how to manage the dissected aortic arch is controversial. While some surgeons advocate a conservative tear-oriented approach (most commonly involving hemiarch replacement) to minimize post-operative mortality and morbidity, others more aggressively propose a systematic total arch replacement (TAR) with liberal use of elephant trunk techniques (classic and frozen) to enhance distal aortic remodelling and improve patients' long-term prognosis. However, due to the technical challenges involved and the increased operative times from TAR over conservative management, TAR has not been widespread and remains an important object of debate.

Our study addressed this controversy by comparing short and long-term outcomes of TAR interventions vs. more conservative arch management (CAM) in TA-AAD surgery.

Between 1997 and 2012, 270 patients underwent TA-AAD surgery in our institution; 53 (19.6%) received TAR and 217 (80.1%) CAM. Compared to CAM patients, those undergoing TAR had more extensive aortic dissection (p=0.012), were younger (59.1 vs. 64.7, p=0.002) and were less likely to present with cardiogenic shock (15.7% vs. 3.8%, p=0.02). Distal site of intimal tear (arch or descending aorta) was predictive of TAR management (OR: 9.2; p<0.001). These data confirmed in our institution the decision to perform TAR in TA-AAD is based on patient (lower risk) and aortic (arch tear) characteristics.

Following these concepts, hospital outcomes were similar in the groups, and TAR management did not affect hospital mortality (23% vs. 22.6%; p=ns) (propensity score (PS) adjusted odds-ratio: 1.14, p=0.730). Independent predictors of hospital death were age (OR:1.045; p=0.009) and cardiopulmonary bypass time (OR:1.006; p=0.04) (C-statistic = 0.7). Based on these data, TAR appears as a reasonable option of treatment in TA-AAD patients with distal arch tears and a favourable pre-operative risk profile.

On Kaplan-Meier analyses, 7-years survival (TAR:52.1±0.9% vs. CA:57.2±0.4%, log-rank p=0.801) and freedom from aortic re-intervention (TAR:71.6±1.3% vs. CA:86.4±3.5%, log-rank p=0.221) were similar in the two groups. In addition, PS-adjusted Cox regression showed no relationship between type of arch management and follow-up survival (HR:1.1; p=0.808) or need for re-intervention (HR:1.3; p=0.542). Age at increments of one year (HR: 1.1; p=0.004), preoperative renal failure (HR: 3.5; p= 0.023) and diabetes (HR= 6.2; p= 0.018) emerged as independent predictors of late death. Cox regression failed to identify any independent predictors for aortic re-intervention during follow up. Our long-term data eventually confirm that the successful resection of the primary intimal tear and a thoughtful patient selection for different arch interventions may eventually equal long-term mortality and freedom from re-intervention after TAR and CAM.

In conclusion, our strategy in TA-AAD patients involves a tear-oriented aortic resection with extended TAR in patients with severe distal aortic arch compromise by the dissecting process and sufficient physical conditions to undergo major aortic arch surgery. Such approach, based on aortic and patients' characteristics, has shown to translate into satisfactory results and equivalent short and long-term outcomes after TAR and CAM operations.

Marco Di Eusanio

Figure 1. Kaplan-Meier estimate of survival (TAR: total arch replacement; CAM: conservative arch management).

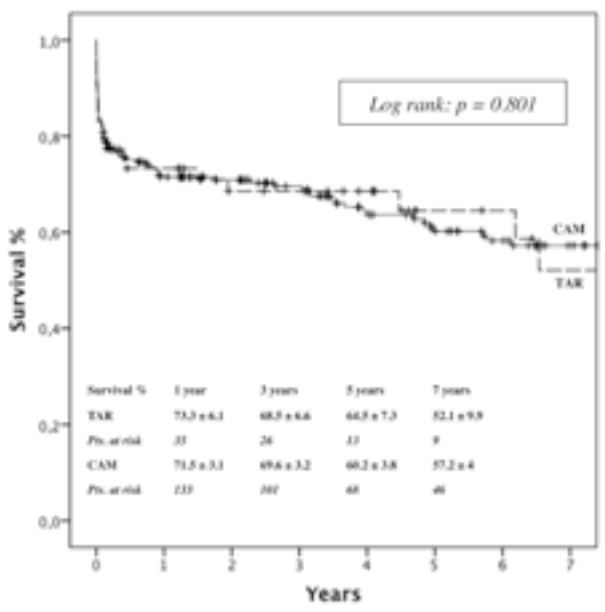
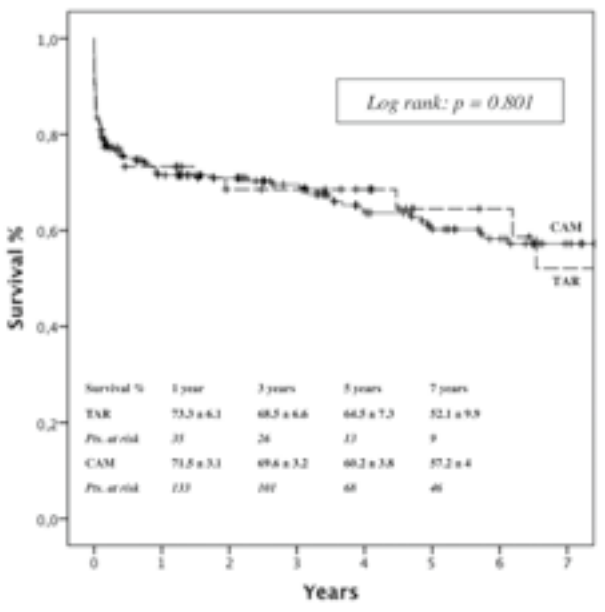


Figure 2. Kaplan-Meier estimate of freedom from aortic reoperation (TAR: total arch replacement; CAM: conservative arch management).



FEHLING INSTRUMENTS

Delayed sternal closure

Antonio Maria Calafiore *Department of Adult Cardiac Surgery, Prince Sultan Cardiac Center, Riyadh, Saudi Arabia*

Cardiopulmonary bypass is responsible of a complex series of events which lead to loss of vessel tone, capillary fluid leakage and leukocytes extravasation. All these complications can cause organ edema and dysfunction. When tissue edema involves the heart and the lungs, sometimes the chest cannot be enough to contain both organs without reciprocal interference. Closure of the sternum can cause, even in normal hearts, a reduction of cardiac output due to reduced diastolic filling[1]. After a long pump run, in presence of stiff lungs and/or myocardial edema, sternal closure can reduce critically diastolic filling in a patient with border-line cardiac output and can cause severe hemodynamic impairment. This can happen more frequently in patients with large heart and low ejection fraction, where diastolic filling has to be maintained adequate, and/or with pulmonary hypertension, when lungs are stiff even before surgery.

Furnary et al[2] demonstrated that opening the sternum in case of postoperative low output state could increase per se the cardiac index by around 60%, improving as well the systolic systemic pressure. This is the rationale at the basis of delayed sternal closure (DSC), which, in selected patients, can even be part of the surgical strategy.

In the past the fear of infections was predominant over the potential benefit of keeping the sternum open till 1975, when Rihai et al[3] reported the first case of DSC in a patient who could not tolerate sternal closure. Other reports progressively showed the safety and the benefit, in selected patients, of DSC. Its incidence, in the adult population, averaged 2%[4-6], reaching a peak of 5%[7]. The main indication has been hemodynamic instability (included the necessity of central ECMO), followed by bleeding. Mortality ranges widely, from 15% to 50%, as well as surgical site infection, from 0 to 20%, averaging around 5%.

DSC is by far more diffuse in the pediatric area, with an overall incidence which ranges, in the general surgical population, from 2.7%[8] to 11.3%[9], reaching 100% in selected pathologies[10]. Mortality averages 20%, with an incidence of infection non dissimilar from the adult site.

Many techniques have used to keep the sternum open. Some of them are aimed in avoiding its closure, as isolated skin closure with sutures or sterile zipper, coverage of the surgical incision with plastic material, rubber patch or synthetic material sutured to presternal and abdominal fascia or to the skin, vacuum assisted system. Other techniques maintain the sternum actively open, as use of conventional retractors, of semirigid chest tubes, syringes appropriately cut, compression plates from orthopedic surgery, spool-like stents, twisted wires. Some conventional instruments were described as well, but are not commercially available.

This variety of solutions reflects the lack of dedicated instruments to maintain open a pediatric or adult sternum. For this purpose, we propose a new device, useful to standardize an appropriate surgical technique to keep open a sternum when necessary. This device, manufactured by FEHLING INSTRUMENTS, is easy to apply and to retrieve and is designed both for pediatric and adult patients.

References

1 Gielchinsky I, Parsonnet V, Krishnan B, Silidker M, RM Abel. Delayed sternal closure following open-heart operation. Ann Thorac Surg 1981;32:273-7.
2 Furnary AP, Magovern JA, Simpson KA, Magovern GJ. Prolonged open sternotomy and delayed sternal closure after cardiac operations. Ann Thorac Surg 1992;54:233-9.
3 Riahi M, Tomatis LA, Schlosser RJ, Bertoloui E, Johnston DW. Cardiac compression due to closure of the median sternotomy in open heart surgery. Chest 1975;67:113-4.
4 Mubeen M, Dan S, Agarwal SK, Srivastava AK, Kanhere VM. Delayed sternal closure after cardiac operations. Asian Cardiovasc Thorac Ann 2001;9:82-5.
5 Anderson CA, Filsoufi F, Aklog L, Farivar RS, Byrne JB, Adams DH. Liberal use of delayed sternal closure for postcardiotomy hemodynamic instability. Ann Thorac Surg 2002;73:1484-8.
6 Shalabi RI, Amin M, Ayed AK, Shuhiber H. Delayed sternal closure is a life saving decision. Ann Thorac Cardiovasc Surg. 2002;8:220-3.
7 Hashemzadeh K, Hashemzadeh S. In-hospital outcomes of delayed sternal closure after open cardiac surgery. J Card Surg 2009;24:30-3.
8 Shin HJ, Jhang WK, Park J-J, Yun T-J. Impact of delayed sternal closure on postoperative infection or wound dehiscence in patients with congenital heart disease. Ann Thorac Surg 2011;92:705-9.
9 Riphagen S, McDougall M, Tibby SM, Alphonso N, Anderson D, Austin C et al. "Early" delayed sternal closure following pediatric cardiac surgery. Ann Thorac Surg 2005;80:678-85.
10 Johnson JN, Jaggers J, Li S, O'Brien SM, Li JS, Jacobs JP et al. Center variation and outcomes associated with delayed sternal closure after stage 1 palliation for hypoplastic left heart syndrome. J Thorac Cardiovasc Surg 2010;139:1205-10.

Cardiac – Professional challenges

Safety and feasibility of a novel, adjustable mitral annuloplasty ring:
A multicentre European experience

Martin Andreas, Nicolas Doll, Steve Livesey, Manuel Castella, Alfred Kocher, Filip Casselman, Vladimir Voth, Christina Bannister, Juan F. E. Palacios, Daniel Pereda, Guenther Laufer, Markus Czesla *Institute*

Recurrent mitral regurgitation is a significant problem after mitral valve repair in patients with functional valve disease. The optimal surgical treatment of mitral regurgitation in these patients is still a matter of debate.

A novel, adjustable mitral ring was developed by MiCardia (MiCardia Corp, Irvine, CA, USA) to allow minimally invasive correction of recurrent mitral regurgitation. Langer et al. published the encouraging results of the first generation, which could be activated during the initial surgery. The second generation, which is described in this paper, has a subcutaneous lead and can be adjusted at any time point after the initial surgery. The lead is accessed through a small incision and connected to the generator for adjustment (Figure 1A). A temperature increase induces a change in shape towards a decreased anterior-posterior diameter (Figure 1B). This is believed to improve leaflet coaptation and decrease mitral regurgitation.

We report the results of a multicentre, non-randomized, observational register with this device. Ninety-four patients (69±10years) undergoing surgical mitral valve repair with the MiCardia EnCorSQ™ Mitral Valve Repair system were evaluated in five centres. The EuroSCORE II was 6.85±6.35. The majority had a functional mitral valve disease (48% ischemic mitral regurgitation and 37% dilated cardiomyopathy).

Operative mortality was 1% and the one-year survival was 93%. Twelve patients required ring adjustment due to recurrent mitral regurgitation at a mean interval of 9±6 months after surgery (Figure 2). The adjustment failed for technical reasons in three of these patients due to a defect in the implanted wire connected to the temperature probe in the ring. This defect could later be solved with a new external connection wire and did not occur thereafter. In one patient, mitral regurgitation was reduced two grades, in two patients mitral regurgitation was reduced one grade, and in six patients, mitral regurgitation did not change significantly. The mean grade of mitral regurgitation changed from 2.9±0.9 to 2.1±0.7 (p=0.03). A follow-up of >6 months was available for only two patients after adjustment and their grade of mitral regurgitation remained stable. Five patients were reoperated after 11±9 months (ring dehiscence: 2; failed adjustment: 3).

We conclude that implantation of this device is safe and effective. Minimally invasive late adjustment is feasible, but clinical results in this complex disease were ambiguous. However, this method may reduce the risk of reoperation in patients with recurrent mitral regurgitation. Additional experience in a larger patient cohort is required to establish the clinical value of this technology.

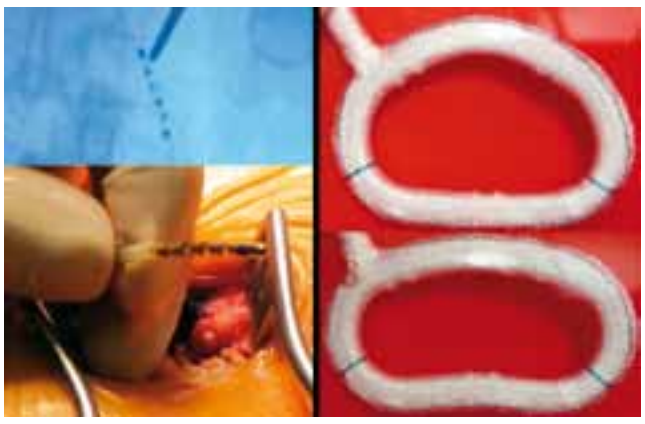


Figure 1: Adjustment procedure: A (left side): The subcutaneous lead is located by X-ray and accessed through a small incision; B (right side): The ring adjust to its preformed shape with a reduced anterior-posterior diameter during the activation.

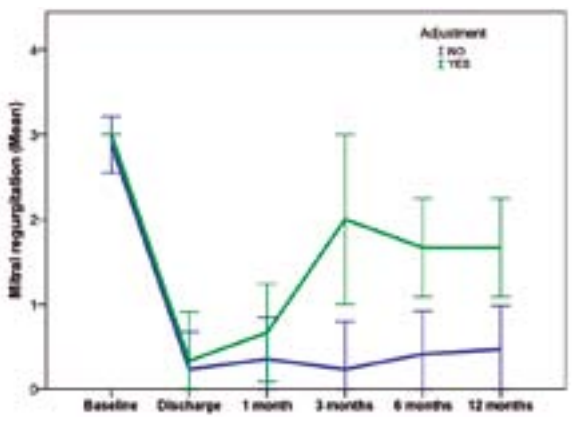


Figure 2: Postoperative progression of mitral regurgitation: Patients who later required adjustment (green) had early recurrent mitral regurgitation compared to patients without adjustment.

Cardiac – Abstract session

The way we graft now

Philip Hayward, Brian Buxton, James Tatoulis
Epworth Hospital, University of Melbourne, Australia

Coronary artery bypass surgery has undergone evolution in three phases, venous grafting, mixed arterial and venous grafting and total arterial bypass grafting.

The use of venous grafting has limited the success of coronary artery bypass grafting by way of early saphenous vein graft failure. Since the introduction of arterial grafting using internal thoracic artery grafts, there has been a marked improvement in survival. Our aim is to evaluate the role of total arterial revascularisation versus the standard operation of a single internal thoracic artery and saphenous vein grafts in patients who have three vessel or extensive coronary artery disease.

We embraced total arterial grafting using internal thoracic and radial artery grafts in Melbourne commencing in 1995 comparing it with conventional surgery. This observational study was completed in 2010.

This study revealed that the patients with total arterial patients were slightly younger, less likely to have diabetes, cerebrovascular disease and recent myocardial infarctions. The unadjusted patient's survival was 62% versus 35% when compared with the standard procedure of a SITA and vein grafts. After adjusting for the differences in preoperative morbidities, a propensity score was used to match 384 patient pairs. The total arterial graft group showed an improved survival at 15 years compared with the conventional CABG group (54% versus 41% with a significant statistical benefit).

This large multicentre study suggests that a strategy of total arterial revascularisation using internal thoracic and radial artery grafts is associated with a long-term improved survival. Total arterial revascularisation should be encouraged in patients with a reasonable life expectancy.

Brian Buxton James Tatoulis

Cardiac – Abstract session

Mid-term results of a single centre experience
Mitraclip therapy and surgical edge-to-edge repair in patients with severe left ventricular dysfunction and secondary mitral regurgitation

Michele De Bonis
IRCCS San Raffaele Scientific Institute, Milan, Italy

The Mitraclip system has emerged over the last years as an alternative approach to surgery in patients with functional mitral regurgitation (MR) who are contraindicated or at high surgical risk. The Mitraclip mimics the surgical edge-to-edge (EE) repair although, unlike surgery, it does not include a concomitant annuloplasty. In our Institution, at San Raffaele University Hospital (Milan, Italy), the EE technique has been used both surgically and percutaneously in patients with functional MR and this offered us the unique opportunity to compare hospital outcome and mid-term results of those two treatment options. In particular we compared patients undergoing Mitraclip implantation for secondary MR (55 pts) with patients submitted to surgical EE repair combined with annuloplasty (65 pts). As expected, age and logistic euroscore were higher in the Mitraclip group. However, the two groups were not significantly different in terms of severity of MR, LV size and function, pulmonary hypertension and prevalence of atrial fibrillation. Such a similarity can be explained by the fact that the surgical patients enrolled in this analysis were treated at a time when the Mitraclip was not yet available and, therefore, surgery was the only treatment option even for cases at high surgical risk due to severe LV remodelling and dysfunction.

Hospital mortality was similar in the two groups. No hospital deaths occurred in the Mitraclip group, confirming the safety of the percutaneous EE procedure even in high risk patients. Only two patients died before discharge in the surgical group. Mitraclip patients had a shorter hospital stay and most of them were discharged home, confirming that the overall impact on the patients of the trans-catheter procedure was substantially lower than surgery. In terms of efficacy, this was significantly higher with the surgical EE repair. Surgical patients had a lower rate of residual MR at discharge and recurrent MR at follow-up. In addition, MitraClip was the only independent predictor of residual or recurrent MR in this series. This difference persisted also when only patients with initial optimal result (MR≤1+) after surgery or Mitraclip were compared.

Michele De Bonis

Despite the higher rate of residual and recurrent MR in the Mitraclip patients, overall survival and freedom from cardiac death at four years was similar between surgery and trans-catheter treatment. No risk factors for cardiac mortality were found in the surgical group whereas LV end-diastolic diameter and SPAP were identified as predictors of cardiac deaths in the Mitraclip one. An important observation of this study was that in the Mitraclip, but not in the surgical group, the persistence of significant MR (either residual or recurrent) was associated with higher mid-term cardiac mortality compared to patients without residual or recurrent mitral insufficiency. This finding confirms that appropriate patient selection for Mitraclip therapy remains crucial in order to minimize residual or recurrent MR and improve the overall outcome of the trans-catheter MV repair. Surprisingly, the negative prognostic impact of persisting MR could not be demonstrated in the surgical group, possibly because of the lower rate of postoperative MV regurgitation in the surgical patients combined with the small number of cases analysed. In conclusion Mitraclip therapy is a safe therapeutic option in selected high-risk patients with secondary MR and relevant comorbidities. The surgical EE provides higher efficacy both postoperatively and at mid-term follow-up. A larger number of patients and a longer follow-up would be necessary to establish whether the higher efficacy of surgery will translate into a survival benefit compared to the percutaneous approach.

Cardiac – Focus session

Bioreactors for tissue engineering

Bassil Akra
TÜV SÜD Produkt Service, München, Germany

Due to the increasing interest in applying the concept of tissue engineering and the extremely varying conditions in the human body, various bioreactors were developed over the last few years.
These bioreactors are essential for controlled manufacturing and testing of tissue engineered products for either clinical application or clinical research. Today, there are no specifications supporting the design, manufacturing and testing of such bioreactors under standardized conditions. Therefore, it was important to establish a working group of scientific and industrial experts that can identify shared problems, identify risk factors and define fundamental common requirements. The technical committee CEN/TC 316 "Medical products utilizing cells, tissues and/or their derivatives" of the European Standardization Organization (CEN) works on a project towards standardization of bioreactors and test systems. The presentation will give an overview on the current state-of-the art technology, provide insight into the current activities for standardization on the European level and describe potential future challenges in the approval process.

Cardiac – Abstract session

Complete resection of the subvalvular apparatus during mitral valve replacement in patients with stenosis- dominant rheumatic valves

Mohammed Hossen Mandegar and Farideh Roshanali *Day General Hospital, Tehran, Iran*

Mitral valve replacement has been an option for the treatment of patients with rheumatic mitral valve for a long time. Many surgical approaches to MVR have been developed, each with its own advantages and disadvantages. Indeed, a general consensus has yet to emerge as to which of the complete or partial preservation versus complete resection constitutes the best technical approach to the subvalvular apparatus during MVR.

This study compared the early and midterm results of the preservation versus resection (partial/complete) of the subvalvular apparatus during MVR surgery regarding the left ventricular (LV) geometry and functional indices and changes in pulmonary arterial pressure in rheumatic mitral valve patients with a mixed stenosis and regurgitation pathology. Stenosis was the predominant determining factor of the structural and hemodynamic consequences on the LV.

Sixty stenosis-dominant rheumatic patients undergoing MVR surgery were prospectively randomized to three groups: in the first group all the leaflet and papillary muscles were removed, whereas in the second and third groups complete (anterior and posterior) or partial (posterior leaflet) chordal preservation was done. In each group, 20 patients were enrolled. Clinical and echocardiographic work-up was performed one day before surgery and then at two days and six months postoperatively and showed the left ventricular shape (as measured by left ventricular end-systolic and end-diastolic sizes, length, and sphericity index) was significantly better in Group one, who also had more acceptable systolic function (left ventricular ejection fraction) and diastolic function (as measured by lateral E') and lower pulmonary artery pressure than the other two groups.

Briefly our results showed that in case of rheumatic mitral valve with dominant stenosis in patients with small and restricted left ventricles, the total resection of the subvalvular apparatus confers better echocardiographic indices of shape, geometry, and function of the left ventricle as well as pulmonary vascular pressure compared to other approaches.

Mohammed Hossen Mandegar

Cardiac – Abstract session

Transaortic approach for TAVI confirms its safety and effectiveness over time

Mauro Romano
Institut Hospitalier Jacques Cartier, Massy, France

Three years after its systematic adoption as alternative access route for TAVI in patients with unsuitable peripheral vascular anatomy, significant respiratory disease and poor left ventricular function, the transaortic approach confirms its reliability with both the Edwards XT and Corevalve devices.

In our 232 patients series, the largest single centre experience in the world to the best of our knowledge, we obtained very satisafactory procedural and mid-term results according to the VARC 2 criteria.

In this high risk population receiving both the available TAVI devices with a reverse "T"manubriotomy (69.4% Edwards XT and 30.6% Medtronic Corevalve) the device success rate was 95% with a 30-day mortality of 7.4% and low complications rate.

Full sternotomy allowed, in 33 patients with severe coronary artery disease most often involving the left main stem and unsuitable for PCI, elective complete off pump coronary coronary bypass before the transcatheter transaortic device implantation.

Emergency conversion to conventional surgery was required in 3.9% of the patients, acute kidney injury occurred in 1.7% and new pacemakers were implanted in 9.9% of the patients, more frequently in the Corevalve recipients.

Cerebrovascular accidents (only one disabling and related to atrial fibrillation at one week) happened in 1.3% of the patients. One of the explanations could be the absence of "navigation" with guidewires and catheters in the aortic arch decreasing the risk of distal embolization in patients with aortic debris.

Paravalvular leaks grade ≥2/4 were found at discharge in 7.3% of the patients.

At follow-up (mean 18 months duration) mortality was 16.8% with 88% of the patients living without prosthetic dysfunction in NYHA class I and II.

As already published[1], the main advantage of the transaortic approach is the surgeon's familiarity with the access and the cannulation of the ascending aorta wich do not require a new specific training thus facilitating and shortening the learning curve.

Then, the easy and quick conversion to full sternotomy and conventional cardiopulmonary bypass allow a faster treatment of vascular or other complications. From this point of view we consider the transaortic approach potentially safer than the transapical access.

It must also be said that, after the advent of the new Edwards delivery device with nose cone, we did not see any more aortic dissections observed in the very early phase of our experience in three patients (only one died after supracoronary aortic replacement of respiratory failure) and in close relationship with inadequate material. Since then, the procedural success rate rose to 98%.

Finally, this is the only peripheral artery sparing procedure also avoiding the need for vessel closure devices.

In conclusion, in our experience the Transaortic approach for TAVI confirms its safety and effectiveness and, compared with other proposed access routes can be used in the vast majority of patients except, of course, those with a truly porcelain aorta wich is a rare entity indeed.

It maintains left ventricular integrity, spares the peripheral arteries, thereby decreasing the risk of access-related complications, has a low rate of cerebrovascular complications and, despite the need for general anesthesia, appears to be a simple, fast and reliable technique to deliver TAVI devices.

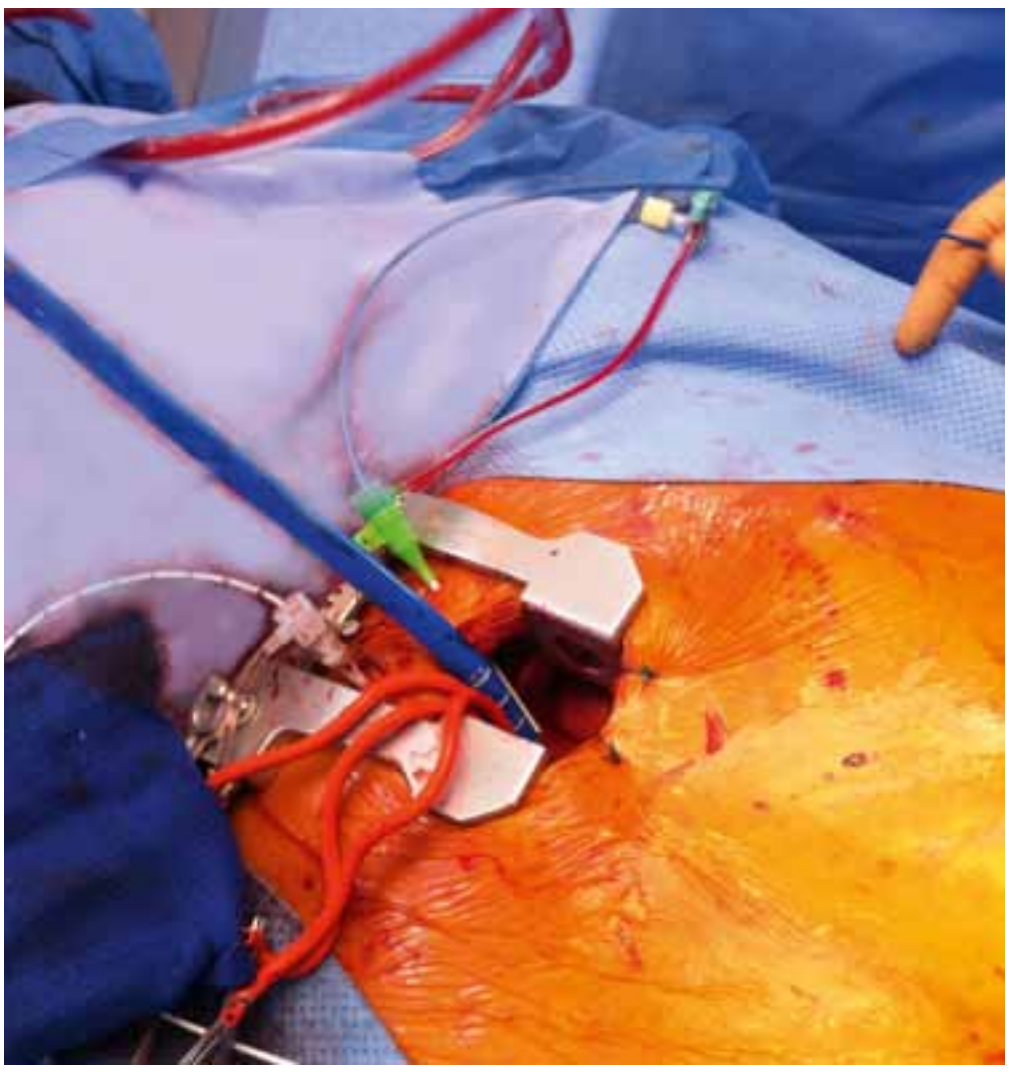
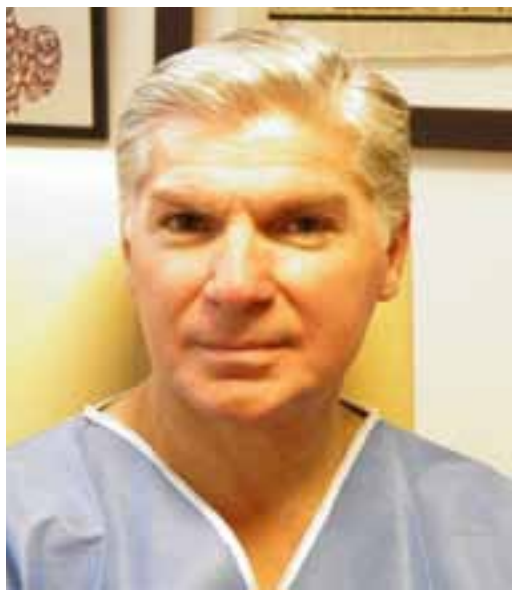


Figure 1: Transaortic approach with the the Ascendra delivery system; pig-tail catheter placed on its right side and PCI protection guidewire on the left side.



Mauro Romano

Figure 2. Follow-up NYHA class and late mortality rate

References

1 Hayashida K., Romano M., Lefèvre T.et al.: Eur.J.Cardiothorc.Surg.2013;44:692-700

Cardiac – Focus session

The effects of using a radial artery in patients already receiving BIMA during CABG

30-Day outcomes and 14-year survival in a propensity-matched cohort

Dr. Juan B. Grau, Cyrus E. Kuschner *The Valley Columbia Heart Center, Columbia University College of Physicians and Surgeons, New York, USA*

Previously we have demonstrated the long term benefits associated with choosing a BIMA (Bilateral Internal Mammary Artery) over the standard LIMA-SVG (Left Internal Mammary Artery – Sephanous Vein Graft) during CABG (Coronary Artery Bypass Grafting). While there have been previous studies on the benefits of incremental use of arteries during CABG, there has been limited research on the effects of adding a radial artery to a BIMA strategy. In our presentation entitled 'The Effects of Using a Radial Artery in Patients Already Receiving Bilateral Internal Mammary Arteries during Coronary Bypass Grafting: 30-Day Outcomes and 14-Year Survival in a Propensity-Matched Cohort' we evaluate whether the use of an additional radial artery provides superior long-term outcome in patients receiving BIMA at our institution.

To this end we compared two groups of 183 propensity-matched patients who received either BIMA-radial or BIMA-SVG during CABG between the years 2000-2013. Both patient groups had equivalent pre-operative patient characteristics after propensity matching. After comparing the 30-day outcomes we observed that the BIMA-Radial group had more post-operative atrial fibrillation (24.6% vs 12.0%; p=0.001) and a longer stay (seven vs. six days; p=0.007) than the BIMA-SVG. A Kaplan-Meier analysis was performed to compare the long-term survival between the groups (Figure 1). This showed that the three-year survival rates of the BIMA+SVG were slightly higher (99% vs 97.3%). At 10 years the survival curves cross, such that at the longest follow-up point, there is a trend favoring the BIMA-radial group (91% vs. 83% p =0.252). Further analysis after splitting the cohort at 10 years showed the BIMA-radial group has improved survival (99% vs 92%; p=.036) over BIMA-SVG patients between 10 and 14 years (Figure 2).

The results from this study corroborate previous literature on the benefits of arterialization during CABG, demonstrating how the incremental increase in arterial revascularization shows improved long-term survival. This study supports the positive long-term effects of the radial artery as an additional arterial conduit to the BIMA without any increase in significant short-term complications. The addition of the radial artery to the BIMAs does not radically increase the procedure's complexity and could be adopted by most practicing surgeons.

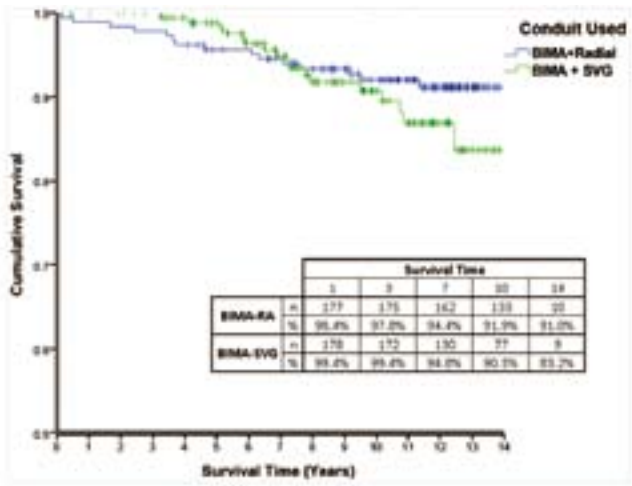


Figure 1. Kaplan Meier survival comparing conduit groups

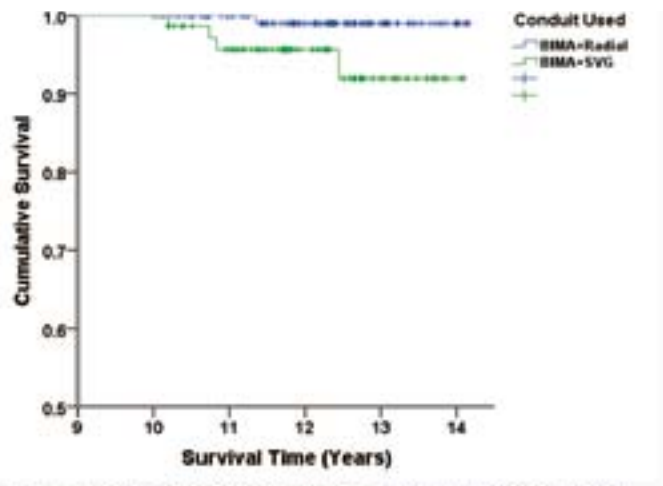


Figure 2. Kaplan Meier survival splitting groups at 10 years

Thoracic – Abstract rapid response session

Suction on chest drains following lung resection: evidence and practice are not aligned

Peter Lang[1], Menaka Manickavasagar[1], Clare Burdett[2], Tom Treasure[3], Francesca Fiorentino[4]
1. Royal Sussex County Hospital, Brighton, UK; 2. Addenbrooke's Hospital, Cambridge, UK; 3. University College London, London, UK; 4. Imperial College, London, UK

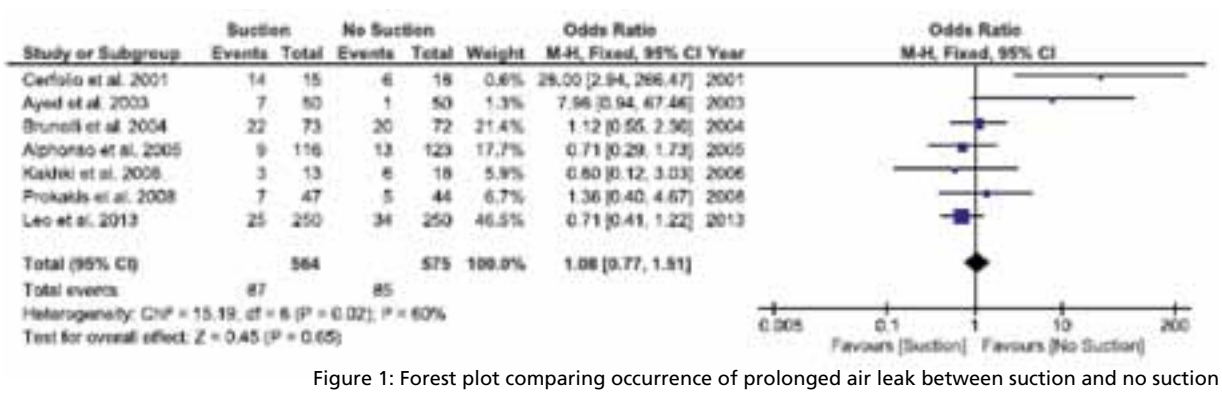


Figure 1: Forest plot comparing occurrence of prolonged air leak between suction and no suction

Much controversy exists regarding the application of low-pressure suction to chest drains following non-pneumonectomy lung resection[1]. A recent meta-analysis of randomised controlled trials comparing a policy of suction versus no suction found no evidence in favour of post-operative suction in terms of occurrence of prolonged air leak, air leak duration, chest tube duration or length of stay (LOS)[2]. We sought to determine whether clinical practice is consistent with published evidence by surveying thoracic units nationally.

We performed our own meta-analysis of the eight 'best evidence' papers, which included a more recent randomised controlled trials not analysed by previous studies, and generated forest plots using RevMan.

Members of the UK Cardiothoracic Trainees' Research Collaborative (CTRC) were emailed a survey concerning chest drain management following non-pneumonectomy lung resection. The UK CTRC is a nationwide network of trainee cardiothoracic surgeons working together to maximize data availability, resources and research output. A clinical representative from each unit was asked if there was a written unit protocol concerning suction on chest drains and whether suction was routinely applied.

Meta-analysis showed that use of suction made no difference to the occurrence of Prolonged air leak (see Figure 1). Indeed, suction had an adverse effect on air leak duration, Chest tube duration and Length of stay. However, it was associated with a decrease in the occurrence of post-operative pneumothorax.

Our national survey revealed that, of the 89 surgeons represented, 61 (69%) routinely use suction (see Table 1). Criteria for suction discontinuation and chest drain removal vary widely and are essentially surgeon-specific (see Figure 2). Electronic drains are used in 14 units.

Application of suction to chest drains following non-pneumonectomy lung resection is common practice nationally. Suction has an effect in hastening removal of air and fluid in clinical experience. This 'mechanistic efficacy' results in a reduced rate of post-operative pneumothorax, which is witnessed first-hand by clinicians caring for the patient. However, this does not translate into the benefits of earlier chest drain removal or shorter hospital stay, which would constitute the 'clinical effectiveness'[3] of a routine policy. Therefore, clinical practice is not aligned with Level 1a evidence.

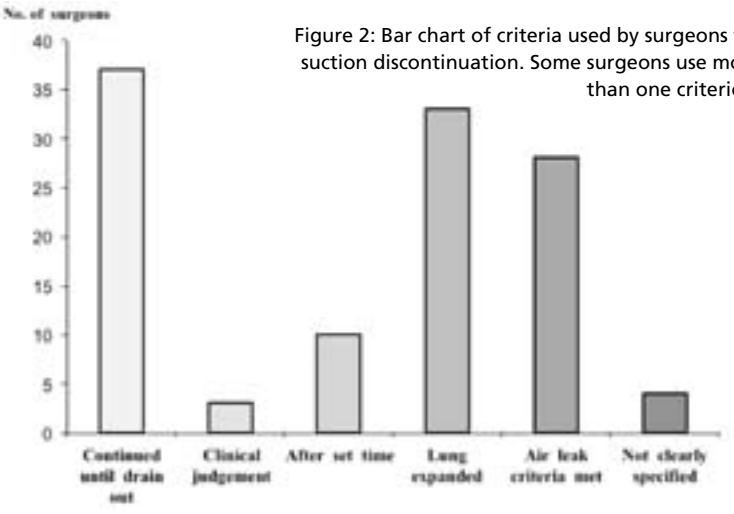


Figure 2: Bar chart of criteria used by surgeons for suction discontinuation. Some surgeons use more than one criterion.

Table 1: Summary of results of national thoracic survey

Units approached	39
Units that replied	24
Surgeons represented	89
No. of units where -	
Written protocol in use	5
Copy of written protocol provided	3
Suction used routinely by all surgeons	11
Suction routinely not used by any surgeon	5
Suction routinely used by some surgeons	8
Electronic drains in use	14

	Suction	No suction
Total no. of surgeons	61	28

This study was borne of a trainee-led, nationwide collaboration between thoracic units. Development of the UK CTRC drew inspiration from a similar initiative set up by general surgeons in the north of England[4]. The UK CTRC promotes trainee involvement in high-quality research and facilitates the pooling of resources and data from many cardiothoracic centres.

References:

1 Alphonso N, Tan C, Utley M, Cameron R, Dussek J, Lang-Lazdunski L et al. A prospective randomized controlled trial of suction versus non-suction to the under-water seal drains following lung resection. Eur J Cardiothorac Surg 2005;27:391-394.
2 Coughlin SM et al. Management of chest tubes after pulmonary resection: a systematic review and meta-analysis. Can J Surg 2012;55(4):264-270
3 Järvinen TLN, Sievänen H, Kannus P, Jokihaara J, Khan KM. The true cost of pharmacological disease prevention. Brit Med J 2011;342:1006-1008
4 Pinkney TD, Calvert M, Bartlett DC, Gheorghe A, Redman V, Dowswell G et al. Impact of wound edge protection devices on surgical site infection after laparotomy: multicentre randomised controlled trial (ROSSINI Trial). Brit Med J 2013;347:f4305 doi: 10.1136/bmj.f4305

Vascular – Abstract session

Root replacement in acute type A aortic dissection

Does valve preservation increase surgical risk?

Kiick Sung *Samsung Medical Center, Seoul, South Korea*

Despite several advantages of valve-sparing root replacement (VSR), there are still controversies in applying VSR in acute type A aortic dissection (AAD), mainly due to the technical complexity and the uncertainty of long-term outcomes. Dr. Sung and coworkers retrospectively reviewed 53 patients who underwent surgery for AAD and concomitant root replacement between 1998 and 2013 at Samsung Medical Center. Patients were divided into two groups: Bentall (Bentall group, n = 35) and VSR (sparing group, n = 18). The mean follow-up duration was 53.3 ± 45.3 months. Endpoints were all major adverse valve-related events (MAVRE) and all-cause death.

Patients in the Bentall group were older than those in the sparing group (Bentall, 48 ± 15 years; sparing, 37 ± 11 years, P = 0.007). Other preoperative characteristics were similar between the two groups. Aortic cross clamp time was significantly longer in the sparing group (Bentall, 181.31 ± 65.46; sparing, 246.86 ± 43.89 min, P < 0.001). There were no early deaths in the sparing group and two in Bentall group (P = 0.543). There were three reoperations for aortic valve replacement in the sparing group due to progression of aortic regurgitation. Two patients had operations in the early period of VSR (before 2005).

Despite freedom from reoperation for aortic valve was higher in the sparing group than the Bentall group (P < 0.001), MAVREs and all-cause mortality did not differ between the two groups (P =0.544 and 0.108, respectively). In multivariate analysis, the root replacement technique was not a risk factor for major valve-related events.

In this study, VSR seems to be equivalent to the Bentall procedure for AAD in terms of overall clinical outcomes. VSR can be considered a viable option, particularly for young patients treated in an experienced centre. The longer-term follow-up or randomised trials would be necessary for possible reoperation.

External chest supports: A lot to win and nothing to lose

Is it time for routine use?
Limited research has been done to demonstrate the best method to protect the sternum after a sternotomy. Current clinical practice is often based on anecdotal evidence and expert opinion. There is no consensus on prevention and postoperative care, although peer reviewed publications reach compelling conclusions about post-sternotomy complications. [16-17,26,46,75]

On infections:
- Sternal wound infections (SWI) range from 0.5-9%, and deep sternal wound infections (DSWI) from 0.3-7.3% (90 days follow-up) with a mortality rate of 9-47%.[25-28,32,59,61]
- The STS database shows major sternal infections in 3.51% and DSWI in 0.6% (includes only acute events).[42]

On late onset of infections:
- 50% of SWI and 80% of DSWI are diagnosed after discharge (90 days follow-up).[32-33,81]
- Early discharge to reduce costs could be counterproductive as it leaves patients to deal with wound issues, pain and inefficient breathing without professional assistance.[33,48,50]

On postoperative pain and pulmonary complications:
- Chronic pain affects 17-56% of patients, and pulmonary complications range from 8% to 79%. [2-9,13,16-17,19-20]
- Post-surgical atelectasis and less expansion of lower lung lobes are linked to pain, ineffective breathing, weak coughs, decreased mobility, and a prolonged recovery.[12,17-19]

On coughing:
- Lifting 40 lbs puts less force on the sternum than a cough, which unsupported is the main cause of sternal stress and can lead to sternum instability, wound dehiscence, and mediastinitis. [26,46,73]

On obesity:
- The greater degree of obesity, the higher incidence of sternal dehiscence. Obesity constantly puts pressure on the sternum similar to a cough (up to 300 Hg).[29,46,86]
- The sternal wound suture line is exposed to significant pulling forces from the weight of tissue in obese patients and women with large breasts. [26,46,64]

On sternotomy in women:
- Suture line skin breakage in women is directly proportional to breast size. Women with large breasts are 38.5 times more likely to develop DSWI, and 47% of women report incision or breast pain 12 months postoperatively.[44,46,76]

On costs:
- Sternal wound complications accumulate 18-20 additional hospital days and cost up to 3 times more than a complication-free case.[20,22-23,27,31,48]
- Prevention of complications is an important consideration in patient safety initiatives and the implementation of best practice guidelines, and results in substantial cost savings. [24]

On the cause of infections and dehiscence:
- Breakdown of skin sutures followed by seepage of bacteria into the deeper layers of the sternal wound cause sternal wound infections. [59,64]
- Sternal instability and friction between the sternal halves promotes inflammation and effusion resulting in infection. [75,82]
- Sternal wires are the only force holding the sternum together post-operatively, and must withstand the main force leading to sternal dehiscence, which is concurrent strain of the sternum in lateral direction. Higher forces are required in both anterior-posterior and rostro-caudal directions.[46,61]

On preventive methods:
- Opening the sternum strictly midline and using tension free wound care to prevent skin breakdown would prevent most post-sternotomy complications and should be basic principles.[26,64]
- Cough and respiratory movements of the thorax loosen the steel wires and require supplementary means, such as chest supports.[84,86]

On external chest supports:
- Sternal complications and pain are significantly lower with external support of the thorax. Compression provides resistance to the lateral forces from increased intra-thoracic pressures during cough and in obese patients.[75,78-84,86]
- An external chest support allows patients to breathe deeper with less pain when the parasternal muscles are complemented, and the torsional forces during mobilization and daily living activities counteracted. When patients have little time to brace themselves for a sneeze, cough or losing one's footing, the additional support is critical.[46,80,83]
- Sternal separation and pain is reduced in patients with chronic sternal instability, as are interruptions to sleep due to excessive sternal motion when patients move in bed.[75,80]

Literature makes a strong case for the routine use of external chest supports to decrease complications and reduce costs. The decision to use a specific device should be based on whether there is adecrease in pain and complications and a positive effect on patient function, comfort, ease of breathing, and ease of exercise activities, as well as whether patients will conform with usage for up to 8 weeks. [a,86]

When fulfilling requirements to improve the entire recovery process, there appears to be a lot to win for patients and health care providers and nothing to lose.

For a complete list of references see the white paper publication, "Evaluation of external chest supports bases on the entire recovery process in and out of the hospital to avoid offset costs of long term complications and medications", [a] on www.qualiteam.com

Congenital – Focus session

Virtual prediction of pediatric cardiac surgery

Ajit P. Yoganathan *Georgia Institute of Technology and Emory University, Atlanta, USA*

Virtual prediction of surgery provides a novel means to pre-operatively evaluate blood flow characteristics and tailor the surgery to the patient-specific anatomy. This framework has been successfully applied to assist the surgical planning for congenital single ventricle patients, who need a palliative surgical procedure, i.e. Fontan, involving the total cavopulmonary connection (TCPC) design[1]. Our goal is to provide the clinical team with a series of options that seek to improve the adverse hemodynamics in the connection.

A schematic of the virtual prediction of surgery is outlined in Figure 1. The flow starts from obtaining cardiac magnetic resonance (CMR) images. Such images, then are segmented to create patient-specific vascular models (i.e., bi-directional Glenn or existing TCPC connections, and ventricular volumes)[2,3] and reconstruct flow information[4], if available. Furthermore, a specially designed virtual surgery environment is used to mimic the procedure of interest: baffle placement in Fontan patients[5]. Blood flow simulations using cutting-edge computational fluid dynamics techniques6 are performed to characterize hemodynamic metrics (i.e., power loss and hepatic flow distribution) to compare theoretical connection performances and provide input to surgical decision-making.

In conclusion, virtual prediction of surgery is an exciting new paradigm for patients with congenital heart defects, and has the potential to deliver patient-specific benefit. Moreover, surgical planning can help in the evaluation of more complex surgical options in order to assess their benefits. Last but not least, the paradigm is now being extended to other congenital heart diseases such as double outlet right ventricle (DORV). With this state-of-the-art technology, we hope to assist the surgical planning efforts of pediatric cardiac surgeons and cardiologists around the world.

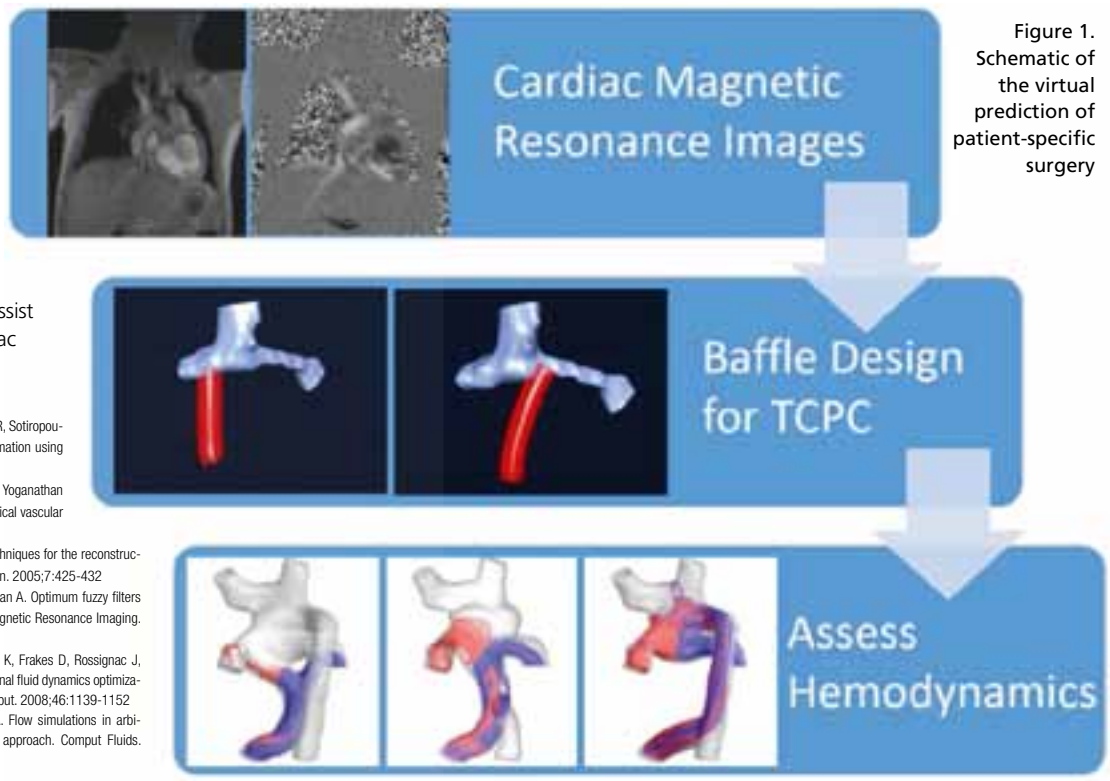


Figure 1. Schematic of the virtual prediction of patient-specific surgery

References

1. Sundareswaran K, de Zélicourt D, Sharma S, Kanter K, Spray T, Rossignac JR, Sotiropoulos F, Fogel M, Yoganathan AP. Correction of pulmonary arteriovenous malformation using image based surgical planning. JACC Imaging. 2009;2:1024-1030

2. Frakes DH, Conrad CP, Healy TM, Monaco JW, Fogel M, Sharma S, Smith MJ, Yoganathan AP. Application of an adaptive control grid interpolation technique to morphological vascular reconstruction. IEEE Trans Biomed Eng. 2003;50:197-206

3. Frakes DH, Smith MJ, Parks J, Sharma S, Fogel M, Yoganathan AP. New techniques for the reconstruction of complex vascular anatomies from mri images. J Cardiovasc Magn Reson. 2005;7:425-432

4. Sundareswaran K, Frakes D, Fogel M, Soerensen D, Oshinski JN, Yoganathan A. Optimum fuzzy filters for phase-contrast magnetic resonance imaging segmentation. Journal of Magnetic Resonance Imaging. 2009;29:155-165

5. Pekkan K, Whited B, Kanter K, Sharma S, de Zelicourt D, Sundareswaran K, Frakes D, Rossignac J, Yoganathan AP. Patient-specific surgical planning and hemodynamic computational fluid dynamics optimization through free-form haptic anatomy editing tool (surgem). Med Biol Eng Comput. 2008;46:1139-1152

6. de Zélicourt D, Ge L, Wang C, Sotiropoulos F, Gilmanov A, Yoganathan A. Flow simulations in arbitrarily complex cardiovascular anatomies – an unstructured cartesian grid approach. Comput Fluids. 2009;38:1749-1762

Cardiac – Focus session

2014 ESC/EACTS Joint Guidelines on Myocardial Revascularization:

What are the unanswered questions Cardiologist perspective

Giulio Stefanini *University Hospital Bern, Switzerland*

The recently published joint guidelines on Myocardial Revascularization of the EACTS and ESC represent an important update and are based on a constantly expanding body of evidence. Of note, however, 119 out of 314 recommendations (38%) provided by the guidelines have a level of evidence C – which indicates that these recommendations are based on experts opinion. Therefore, there certainly is a number of unanswered questions that will require to be investigated in future clinical studies. On a cardiologist perspective, a number of issues remain unanswered regarding strategies for myocardial revascularization in patients with stable coronary artery disease.

First, it remains to be determined whether revascularization by percutaneous coronary interventions not only improves symptoms and quality of life but also prognosis in patients with stable coronary artery disease coronary artery disease. The guidelines Task Force has conducted a systematic review and network meta-analysis of available randomized evidence comparing revascularization strategies and medical therapy in patients with stable coronary artery disease. The findings of this meta-analysis – recently published in the British Medical Journal – confirm a survival advantage of coronary artery bypass surgery over medical therapy. Similarly, it is noteworthy that percutaneous revascularization with new generation drug-eluting stents is also associated with improved survival as compared to medical therapy, which instead appears not to be the case for earlier percutaneous revascularization strategies (i.e., balloon angioplasty, bare metal stents, and early-generation drug-eluting stents). Certainly the ongoing ISCHEMIA trial will provide a basis for more definite conclusions on this matter. The trial is currently recruiting 8000 patients with stable coronary artery disease who – before coronary angiography and in the presence of objectively determined ischaemia – are randomized to medical therapy or an invasive strategy to detect differences in the composite of death or myocardial infarction.

Second, the role of percutaneous coronary interventions in the treatment of left main disease is increasingly appreciated. Primarily based on the results of the SYNTAX trial, the guidelines are clear in providing a class I recommendation to both surgical and percutaneous revascularization strategies in patients with left main disease and a SYNTAX score ≤22. Conversely, for patients with left main disease and a SYNTAX score >32 percutaneous revascularization is not recommended (class III). Uncertainties remain for patients with left main disease intermediate SYNTAX scores (ie, 23-32). A relevant piece of information will come from the ongoing EXCEL trial, which is recruiting 2,600 patients with unprotected left main disease and a SYNTAX Score <33 to determine the safety and efficacy of percutaneous revascularization with a new generation drug-eluting stent as compared to coronary artery bypass grafting for the primary endpoint of death, myocardial infarction, and stroke assessed at three years of follow-up.

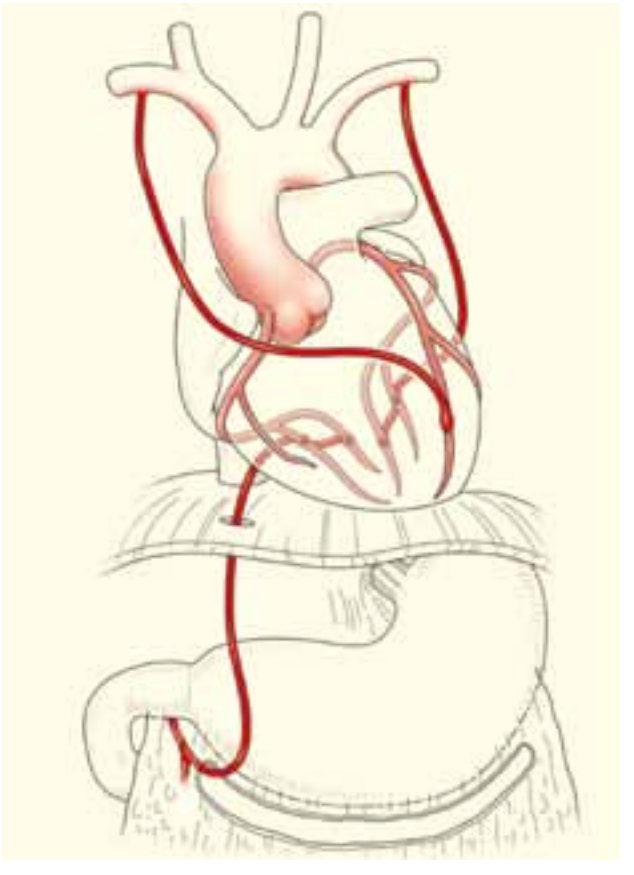
Finally, the selection of patients and lesions for revascularization may be refined. Current techniques rely on coronary angiography and detection of flow-limiting lesions determining ischemia. However, future adverse events are related, at least in part, to non-flow limiting vulnerable plaques. Identification of vulnerable plaques and appropriate treatment strategies require further development.

Cardiac – Abstract session

Impact of sequential bypass grafting with full skeletonised in-situ arterial grafts

Kazutoshi Tachibana *Sapporo Medical University, Japan*

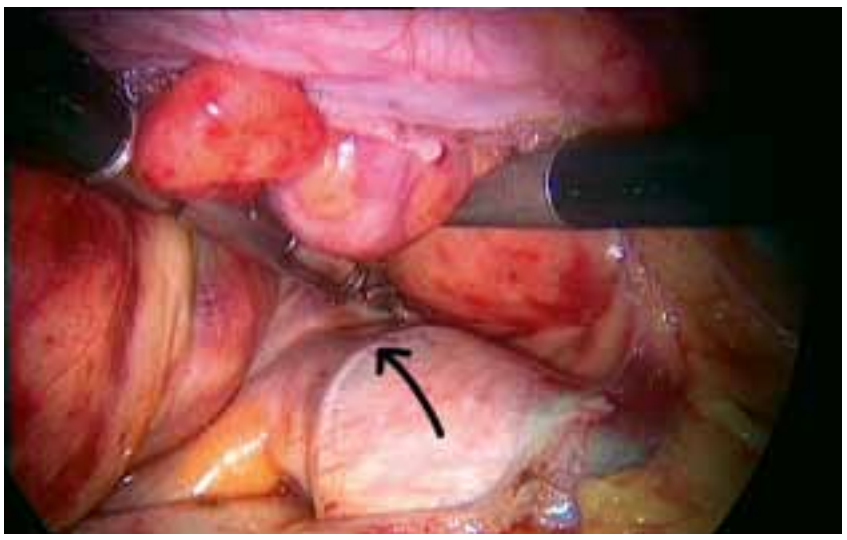
The sequential grafting techniques of in-situ arterial grafts can increase the number of anastomoses and enable "Aorta no-touch technique" with avoiding proximal aortic anastomoses. To utilize in-situ arterial grafts for as many coronary branches as possible, we attempted to perform sequential grafting and have grafted a maximum of six branches using only in-situ left internal thoracic artery (LITA), right internal thoracic artery (RITA), and right gastroepiploic artery (GEA) in our series. The harvesting in-situ ITA and GEA by full skeletonisation is our current principle. We have harvested routinely all arterial grafts as full skeletonized fashion with an ultrasonic scalpel. Using this technique, dissection of the entire length of in-situ arterial grafts takes a short time. Removal of the surrounding tissue makes the in-situ arterial grafts longer and wider. Furthermore, full skeletonization makes sequential anastomosis easier. The aim of this study was to clarify the efficacy of sequential grafting of the full skeletonized in-situ arterial grafts using the intra-operative transit time flow meter measurement (TTFM) and the post-operative angiograms. The 630 anastomoses after total arterial revascularization with an off-pump were reviewed. The Mean Flow of sequential bypass at 31.3ml/min was significantly higher than that of individual bypass at 26.1ml/min ($p < 0.005$). Whereas, the pulsatility index (PI) was significantly lower in sequential bypass (2.17) than in individual bypass (2.70) ($p<0.03$). These outcomes suggested that the flow characteristics of sequential graft were superior to individual grafts on the basis of observations that showed significantly lower vascular resistance and higher flow velocities in the sequential bypass grafts compared with the individual grafts. The 617 (97.9%) graft anastomoses were patent while 13 (2.1%) were occluded. In the sequential bypass, 259 (98.9%) graft anastomoses were patent, and in individual bypass, 358 (97.3%) anastomoses were patent. The difference in the overall graft patency between sequential bypass and individual bypass was not statistically significant. In the multivariate analysis of the 630 anastomoses, the predictor of occlusion was the use of the right gastroepiploic artery. In sequential bypass grafting, the stenosis range and diameter of the native coronary artery were not considered independent risk factors statistically. We revealed the sequential in-situ arterial grafts had significantly preferable hemodynamic characteristics compared with the individual in-situ arterial grafts without risk of graft occlusion. The sequential grafting technique enables the entire coronary system to be grafted using only in-situ arterial grafts with an excellent patency rate even in patients requiring multiple revascularization. The adequate effect could be expected in the sequential bypass grafting with full skeletonized in-situ arterial grafts.



Cardiac – Focus session

Single stage hybrid close chest stand-alone atrial fibrillation ablation

Mark Le Meir
University Hospital Brussels, Belgium



Lasso catheter in left superior pulmonary vein during thoracoscopic ablation

Historically, the Maze procedure, introduced by Dr. J. Cox, has been the surgical treatment of choice for symptomatic patients with medically refractory atrial fibrillation (AF). This surgical procedure is based upon the principles of critical mass. By subdividing large areas of contiguous tissue, the idea is to eliminate all potential re-entrant circuits that could rotate around the thoracic veins and valve annuli. Improved mapping studies and the knowledge that AF is often initiated from ectopic beats at foci in the pulmonary veins (PVs), radically changed the interventional options for patients with AF. As a consequence non-surgical catheter based endocardial techniques evolved rapidly and indications for interventional treatment include paroxysmal as well as chronic AF. Recently it was also introduced as a first-line treatment of paroxysmal AF in patients without heart disease. But, current literature shows that long-term results of endocardial catheter ablation in patient with non-paroxysmal AF are suboptimal, in particular with a single procedure. One of the challenges the electrophysiologists are confronted with are recovered PV conduction after complete acute circular isolation of the PVs, the dominant factor for recurrent atrial tachy-arrhythmias. This is most probably related to the limitations of energy delivery of the existing endovascular ablation tools. Minimally invasive surgical treatment of AF is not limited by the vascular access and therefore potentially has a better choice of ablation tools.

The challenge with AF surgery is the development of an off-pump thoracoscopic ablation procedure that can create a transmural lesion set in a reliable and safe manner. Therefore, intra-operative electrophysiological assessment of the triggers and substrates of AF in a step-by-step tailored approach, with verification of conduction block over the ablation lines (and maybe inducibility) could improve this success rate. A hybrid endocardial – epicardial approach, whether performed as a single-step or sequential procedure, combines the efficacy of surgical ablation with the knowledge of endocardial mapping and, if necessary, short and focused endocardial ablations. A literature overview of the hybrid treatment of AF showed acceptable complications rates of 4.1%. Only 0.8% of the patients required a conversion to sternotomy and none of the patients reported in the hybrid literature experienced a thromboembolic event. Freedom from AF off antiarrhythmic drugs (AAD) at one-year follow-up ranged from 85.7 % to 92 % in papers employing bipolar RF and from 36.8 % to 88.9% in those utilizing monopolar RF. With specific reference to AAD-free success rate by type of AF, it ranged from 60% to 91.6% in paroxysmal AF, from 50 % to 77.7 % in persistent AF and from 20% to 100% in LSP-AF. These figures compare favorably either with minimally invasive-beating heart surgery or percutaneous catheter ablation.

The hybrid single step or sequential approach for the treatment of AF has the potential to increase success rates and lower complication rates, but is still actively evolving. A multicenter randomized study comparing a hybrid approach to a percutaneous catheter approach is starting and will improve our understanding of this relatively new technique.

Cardiac – Focus session

Tissue engineering: Where are we now?

Pascal M Dohmen *Charité University Hospital Berlin, Germany*

Tissue engineering was introduced in the mid 1980s by Vacanti and Langer, exploring the potential of this new technology starting with the famous 'human ear on the mouse back'. The goal of this technology is to create a substitute, which supplies an individual therapy for patients including regeneration, remodeling and growth potential. The growth potential of these materials, especially in congenital cardiac surgery, repeated surgery or interventions could be avoided. To create a tissue engineered subject three components are needed namely autologous cells, a scaffold and a bioreactor. Initial cell were end-differentiated autologous cells, which have limited potential to grow.

New sources, such as stem and pluripotent cells, were explored to increase growth potential, however without losing their unique functionality and full control on growth. The three-dimensional scaffold, where cells will be seeded on, is another crucial component, providing biological and mechanical integrity, biochemical signals, supporting attachment and migration of cells, allowing dynamic changes of the scaffold's architecture. The scaffold origin can be of synthetic polymers or biological-based scaffolds. The final component is a bioreactor to unify cells and scaffold. This can be done in vitro by so-called bioreactors, which are currently standardized in a norm. Unseeded scaffolds, however are also implanted in which the organism itself will be the bioreactor and re-seeding starts *in vivo*. In the mid 1990s initial *in vivo* experimental studies showed that tissue engineered grafts and valves can be successfully implanted.

Tissue engineering is a dynamic technology and so the development of these products, which are continuously modified and improved. Today, initial clinical studies are started using tissue engineering tube graft, valves as well as patch material. Most of these studies are performed in the right ventricular outflow tract, however some studies are also performed under systemic circulation circumstances. Generally new technologies are unified and so this was also done with tissue engineering and new application forms of heart valves. First studies are initiated in valve intervention by using tissue engineered heart valves with the new transcatheter delivery system, allowing the implantation of valves less invasive. This era has recently started. Simultaneously studies have been started on tissue engineering of so-called whole organs. Also organ transplantation is very restricted due to donor shortage, tissue engineering could overcome this problem. Initial studies of Taylor on whole heart tissue engineering in the rat model are promising, however this size will not be sufficient and therefore these methods need to be optimize to be used in larger models. In the near future many studies will be performed on bio-artificial organs. In the postgraduate basic science session hold on October 13, there will be an overview on the current state of the art on this issue of tissue engineering in cardiovascular diseases.

Thoracic – Abstract rapid response session

Patch replacement of left hemidiaphragm in dog by cryopreserved heterograft

H. Davari,[1] M.B. rahim,[1] N. Tanide,[2] M. Sani,[2] H. Tavakoli,[1] A. Rasekhi,[2] S. Gholami,[2] A. Monabati,[2]
1 Tehran/IR, 2 Shiraz/IR

Objectives

Replacement of diaphragm by bioprosthesis is still a challenging issue. To evaluate the possibility of using diaphragm allograft in human being, we designed a study of patch cryoheterograft in phase one in canine.

Methods

At the end of organ harvesting from donor, left hemidiaphragm was taken and transported to laboratory in PSB solution. The graft was dried and repacked in sterile condition and was frozen at -70 centigrade for one month. Through left thoracotomy in eighth intercostal space in six dogs, patch of 10 in 7cm of native diaphragm were replaced with cryopreserved human diaphragm. They were followed by vital signs, CXR, sonography and three with CT scan. Three animals were euthanized after six months.

Results

There was no mortality. CT scan showed mild atelectasis and scattered infiltration in left lower lobe with some adhesion and minimal fluid collection under diaphragm (Figure 1). There was no evidence of gross disruption and complete healing of suture line in necroscopy (Figure 2). The transplanted patch has been completely replaced with fibrous tissue. Multiple three-micron thick H&E slides were taken from each formalin fixed specimen after paraffin embedding and tissue processing. The slides were reviewed by a pathologist under light microscope. The transitional zone between skeletal muscle of diaphragm and graft showed mild chronic inflammatory cell reaction. No skeletal muscle was seen in the graft. All

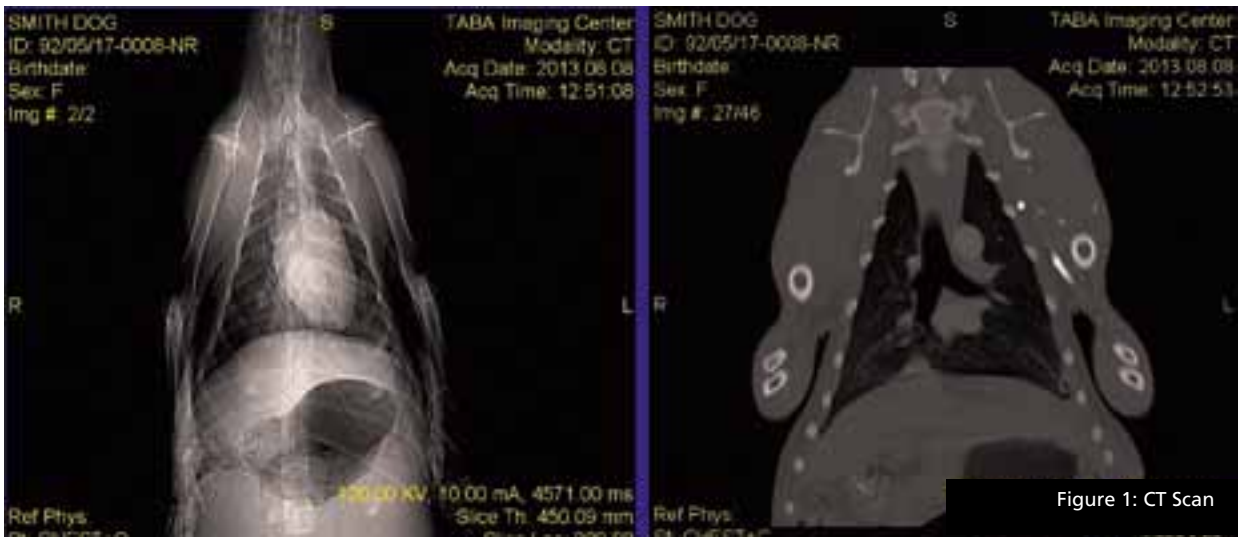


Figure 1: CT Scan

Cardiac – Abstract session

Evidence for neuroprotection

Decreased DNA disruption in the porcine neocortex with erythromycin preconditioning during prolonged hypothermic circulatory arrest

Charilaos-Panagiotis Koutsogiannidis (right), G E Drossos (middle) and E O Johnson (far right)
Cardiothoracic Surgery Department, General Hospital, Thessaloniki, Greece

Despite the apparent deleterious effects of prolonged exposure to cardiopulmonary bypass (CPB) and hypothermic circulatory arrest (HCA) on brain function and structure, neuroprotective strategies remain an issue of debate. We have previously reported that the neocortex is selectively vulnerable to injury in an acute porcine model of HCA at 18°C. The brain starts to exhibit neuronal injury shortly after reperfusion via activation of the apoptotic pathway. In regards to recent evidence showing that pharmacologic preconditioning with a single, clinically acceptable dose of Erythromycin lactobionate induces tolerance against transient global cerebral ischemia in rats, we hypothesized that erythromycin would reduce the number of apoptotic neurons in the neocortex in an acute porcine model of HCA at 18°C.

Fourteen piglets underwent 75 minutes of HCA at 18°C following pretreatment with erythromycin (25mg/kg, iv), Erythromycin pretreatment group (Ery) (n = 8), or vehicle (Normal Saline 0.9%), Vehicle pretreatment group (Veh) (n = 6), applied 12 hours before arrest. Three served as normal controls, Normal control group (Ctl). After gradual rewarming to a temperature of 36oC, treatment animals were sacrificed and brains were perfusion-fixed and cryopreserved. Neuronal apoptosis after HCA was observed morphologically with hematoxylin and eosin staining (H&E), and characterized by in situ DNA fragmentation using terminal deoxyneucleotidyl-transferase-mediated biotin-dUTP nick end-labeling (TUNEL) histochemistry.

The mean duration (±SD) of CPB cooling for animals in groups Ery and Veh was 43.3 ± 7.3 and 44.2 ± 5.3 minutes, respectively (t test; p = 0.57). There was also no difference in the mean duration of CPB rewarming (62.6 ± 9.4 and 55.3 ± 6.1 minutes, respectively). Pre-ischemic conditioning with a single dose of the antibiotic erythromycin reduced neuronal apoptosis in the neocortex of the porcine brain, previously recognized for its selective vulnerability. The neocortex from piglets pretreated with vehicle (Veh) showed diffuse edema after deep HCA with hematoxylin and eosin staining. A large percentage of the pyramidal neurons showed morphological features associated with apoptosis, including, a diffuse loss of Nissl substance, shrinkage of the perikaryon, blebbing and nuclear pyknosis. (Figure 1). Neuronal injury in the neocortex was significantly lower in animals pretreated with erythromycin (Ery group) compared to piglets pretreated with vehicle (Veh group) (H&E score: 2.53 ± 1.22 vs. 3.74 ± 1.47, respectively; p ≤ 0.01). (Figure 2). Pre-ischemic conditioning with a single dose of the antibiotic erythromycin 12 hours before deep HCA was also associated with significantly fewer TUNEL (+) cells compared to animals pretreated with vehicle (TUNEL score: 1.76 ± 0.91 vs. 2.55 ± 1.17; p ≤ 0.001) (Figure 3).

How to best protect the brain during the sensitive time of interruption of normal cerebral blood flow remains controversial. The results of the present study support our hypothesis that cerebral protection during HCA may be significantly achieved with erythromycin pharmacological preconditioning in the porcine model. Since erythromycin has been effectively used long-term in clinical practice with few side effects, these findings suggest that it is a highly promising candidate for clinical application for preemptive neuroprotection during HCA.

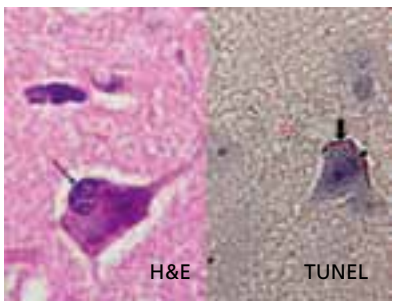


Figure 1. Photomicrographs showing morphological features of apoptotic cells following HCA after pretreatment with vehicle.

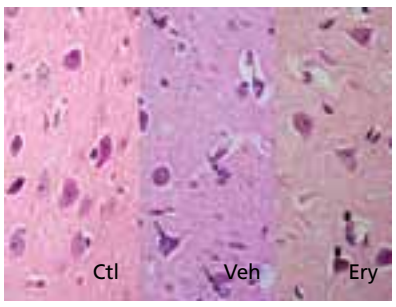


Figure 2. Photomicrographs showing morphologic features with H&E staining of neurons in all three experimental groups.

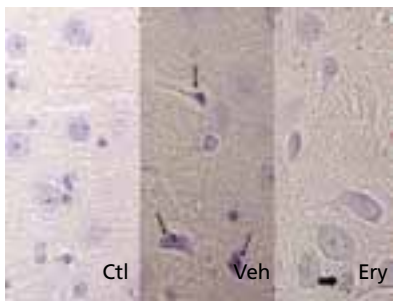


Figure 3. Photomicrographs of neocortex using TUNEL histochemistry in all three experimental groups.

Cardiac – Abstract session

A 25-year Study of Chordal Replacement with Expanded Polytetrafluoroethylene in Mitral Valve Repair

Hiroki Hata *National Cerebral and Cardiovascular Center, Osaka, Japan*

Chordal replacement with expanded polytetrafluoroethylene (ePTFE) sutures has been widely adopted as it is considered to increase the probability of successful mitral valve repair We evaluated the long-term outcomes of mitral valve repair with chordal replacement using ePTFE sutures over the past 25 years, including histopathological analysis.

From July 1988 to February 2013, 224 consecutive patients (mean age 56.5 years, 33.9% women) underwent mitral valve repair with chordal replacement using ePTFE sutures at our institution. Isolated anterior leaflet prolapse was observed in 134 patients (59.8%), while isolated posterior leaflet prolapse was observed in 13 patients (5.8%), and bileaflet prolapse was observed in 77 patients (34.4%). Our operative technique was as follows: 4-0 double-armed ePTFE suture with a small Teflon pledget was passed through the fibrous portion of the papillary muscle head without tying, and the ends of the suture were passed twice through the free margin of the prolapsing leaflet separately from the left ventricle to the left atrium. After additional procedures for the mitral leaflet and mitral annuloplasty, which was done mostly with a ring, the length of the artificial chordae was determined by comparing with the adjacent normal leaflet or opposing leaflet during distention of the left ventricle with saline solution. The ends of the ePTFE suture were then gently tied on the left atrial side. The number of replaced artificial chordae ranged from 2 to 12 (mean 3.7) per patient. Transthoracic echocardiography was performed pre- and postoperatively and in the follow-up period. The follow-up period ranged from 0.3 to 25.3 years (mean 7.4).

There was one early death and 15 late deaths, of which seven were cardiac related. The actuarial survivals at 10 and 20 years were 92.4% and 81.0%, respectively. Thirty-three patients (14.7%) developed recurrent moderate or severe mitral regurgitation during the follow-up period and 30 patients (13.4%) required reoperation on the mitral valve. Freedom from reoperation and freedom from recurrent moderate or severe mitral regurgitation were 83.7% and 81.6% at 10 years, and 73.7% and 59.1% at 20 years, respectively. Multivariate analysis revealed that the independent predictors of recurrent mitral regurgitation were mitral valve repair without annuloplasty ring and greater than mild postoperative mitral regurgitation; and the independent predictors for mitral reoperation were previous cardiac surgery and greater than mild postoperative mitral regurgitation. Histopathological analysis of the ePTFE sutures removed during reoperation revealed complete endothelialization without calcification or microthrombi.

In conclusion, our 25-year follow-up demonstrated reliable long term outcomes of chordal replacement with ePTFE sutures. Implanted ePTFE chordae could keep flexibility and durability without calcification for a very long-term.

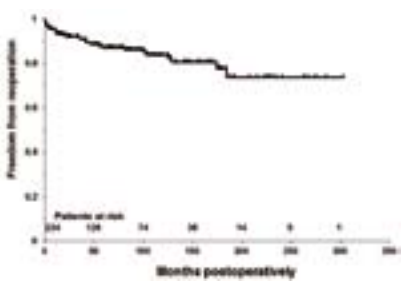


Figure 1: Freedom from reoperation was 83.7% at 10 years and 73.7% at 20 years, respectively.

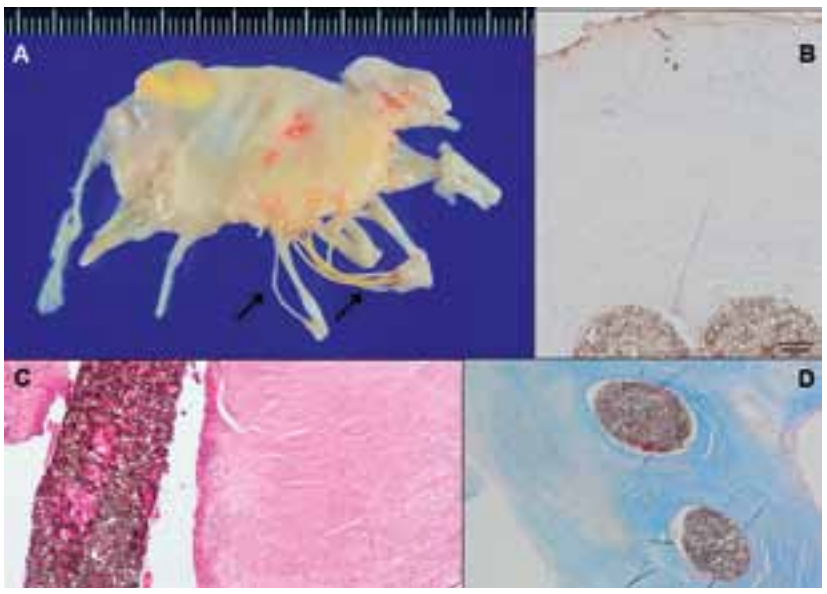


Figure 2: Pathological analysis of the expanded polytetrafluoroethylene sutures removed during reoperation revealed complete endothelialization without calcification or microthrombi.

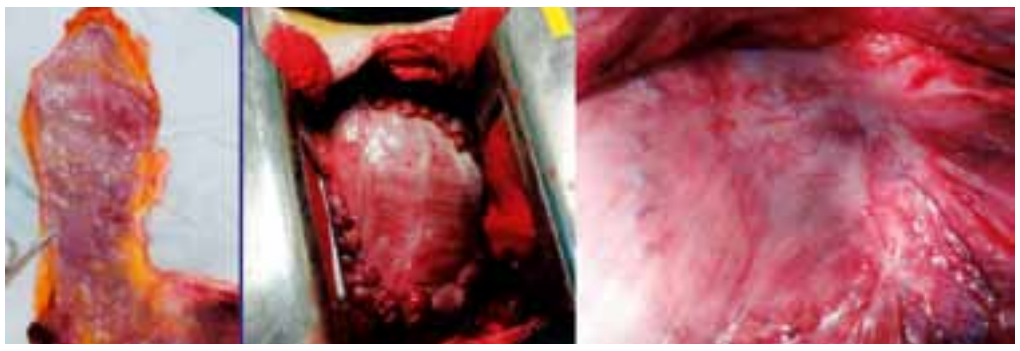


Figure 2: Patch before and after replacement

the graft parenchyma had been replaced with dense fibrous tissue. No perforation, significant edema or congestion were seen. Focal calcification was noticed in every case. Foreign body type of granulomas were clearly seen in all over the grafted tissue. Vascular changes were nil and vasculitis or fibrinoid necrosis of vessel wall was not seen. Inflammatory cells were mainly composed of lymphocytes and macrophages with a few neutrophils (Figure 3).

Discussion. Synthetic material has traditionally been used for tissue reconstruction in thoracic surgery. Diaphragm resection necessitates complete reconstruction. The use of bioprosthetic is an evolving strategy in reconstructing soft tissue. There are good results with bioprosthesis in partial replacement of diaphragm. Engineered bioprosthesis or acellular type are more expensive and require advance technology to prepare. Cryopreservation is a simple technique to prepare a kind of bioprosthesiis without allogenic reaction.

Conclusion

Cryopreserved diaphragm is an option for partial replacement of diaphragm. However, further study including total diaphragm replacement, and compared with other bioprosthesis including decellurarized diaphragm should be considered. We plan to implant decellurarized heterograft diaphragm in phase 2.

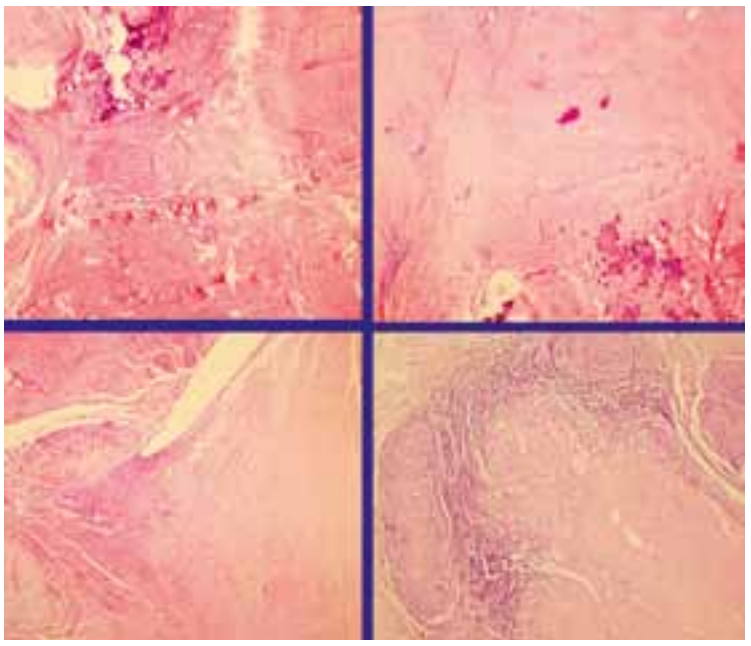
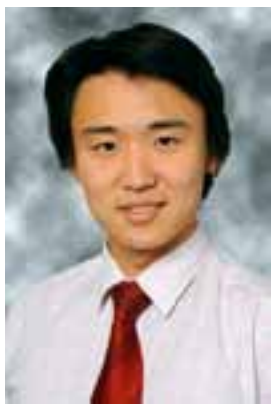


Figure 3: Histology

Cardiac – Abstract session

Is the radial artery associated with improved survival in older patients undergoing coronary surgery

William Shi, Philip Hayward, Brian Buxton *University of Melbourne, Australia*



During this years' EACTS Meeting in Milan, the group from the University in Melbourne in Australia, led by Professor Brian Buxton will present data on the prognostic survival benefit of using the radial artery as a conduit during coronary artery bypass surgery.

The radial artery was introduced in Melbourne in the mid 1990's. Its good long-term patency, coupled with minimal harvest site complications has made it an attractive option in multi-vessel revascularisation. Despite this, there remains contention as to whether the radial confers a survival benefit in older patients.[1]

In this retrospective study, the authors examined 4,006 patients and 4,638 radial artery conduits over a 15-year period across eight centres affiliated with the University of Melbourne. A single radial artery was used in 1802 patients while 1,418 patients had bilateral radial arteries harvested. Patients receiving at least one radial artery to supplement a single internal thoracic artery (ITA+RA) were compared to those who received only saphenous veins to supplement a single ITA (ITA+SV). Radial arteries were used to revascularise the circumflex and right coronary territories and in most cases, were anastomosed proximally to the aorta. In general, radial arteries are used when the target vessel stenosis exceeds 70%.

Even after risk adjustment, patients receiving at least one radial artery experienced improved survival at the 15-year mark. This association was present even for patients over 70 years of age. The authors postulate that this is secondary to the radial artery's previously reported improved patency[2], as well as its protective effect on the native circulation[3]. As such, the Melbourne group encourages the use of the radial in all patients where clinical factors permit.

In Melbourne, the radial artery forms an important component of an all-arterial revascularisation strategy together with the left and right internal thoracic arteries. Indeed, at this year's Annual Meeting of the American Association of Thoracic Surgery (AATS) in Toronto, Canada, Professor Brian Buxton presented data showing that after risk adjustment, patients undergoing total arterial revascularisation experienced improved survival compared to those receiving only a single ITA supplemented by saphenous veins[4].

The Austin Hospital in Melbourne is also the site of the randomised Radial Artery Patency and Clinical Outcomes Trial, which compares the patency and clinical outcomes of the right internal thoracic artery, radial artery and saphenous vein. The mid-term analyses suggested no statistically significant different between the radial artery and saphenous veins[5]. However, the final 10-year angiographic and clinical outcomes data are expected to be presented and published in the next 12 months.

References:

1. Benedetto U Codispoti M. Age cutoff for the loss of survival benefit from use of radial artery in coronary artery bypass grafting. J Thorac Cardiovasc Surg. 2013;146:1078-84.

2. Deb S, Cohen EA, Singh SK, Une D, Laupacis A, Fremes SE;, RAPS Investigators. Radial artery and saphenous vein patency more than 5 years after coronary artery bypass surgery: results from RAPS (Radial Artery Patency Study). J Am Coll Cardiol 2012;60:28-35.

3. Dimitrova KR, Hoffman DM, Gellercm, Dincheva G, Ko W, Tranbaugh RF. Arterial grafts protect the native coronary vessels from atherosclerotic disease progression. Ann Thorac Surg. 2012;94:475-81.

4. Buxton BF, Shi WY, Newcomb AE, Rosalion A, Fuller JA, Tatoulis J, Hayward PA, Total arterial grafting in triple vessel coronary artery disease is associated with improved long-term survival. The Journal of Thoracic and Cardiovascular Surgery, 2014, doi: 10.1016/j.jtcvs.2014.06.056.

5. Hayward PA, Gordon IR, Hare DL, Matalanis G, Horrigan ML, Rosalion A, Buxton BF. Comparable patencies of the radial artery and right internal thoracic artery or saphenous vein beyond 5 years: results from the Radial Artery Patency and Clinical Outcomes trial. J Thorac Cardiovasc Surg. 2010;139:60-5.

Brian Buxton

Cardiac – Clinical anataomy session

Anatomy of the mitral valve

Horia Muresian
University Hospital of Bucharest, Romania

As Horia Muresian states… "precise knowledge of anatomical details is of utmost importance in complex procedures such as the Ross operation." (RH Anderson: Further anatomical insights regarding the Ross procedure. *Ann Thorac Surg* 2006;81:411-2)

Introduction

The periodical re-evaluation of anatomical details in the clinical and surgical context, the continuous feed-back and comparisons with the newly-developing diagnostic and therapeutic procedures, represents a "*sine qua non*" for the modern surgeon. This appears even more imperious for the cardiac surgeon. The clinical anatomy of the heart and of some of its principal elements is presented in the setting of three courses and a lecture, during the EACTS 28th Annual Meeting in Milan by Dr. Horia Muresian MD, PhD, cardiovascular surgeon and head of the Cardiovascular Department of the University Hospital of Bucharest Romania. Dr Muresian is an equally well-known anatomist and specialist in medical photography: he presents unparalleled images of human heart specimens specially prepared in order to reveal the hidden and less known details of such cardiac structures as the mitral valve, the aortic root and valve, the right ventricle, the coronary arteries and veins. All the particulars envisage clinical and surgical applications, and not least, are correspondingly-relevant and important for any specialist involved in the diagnosis of cardiac conditions, including: echographists, CT and MRI specialists. The images presented by Dr. Muresian are particularly relevant being produced and recorded by a cardiovascular surgeon, anatomist and photographer, who provides new data and particulars consistent with the requests of the most complex cardiac surgical procedures nowadays.

Monday 13 October

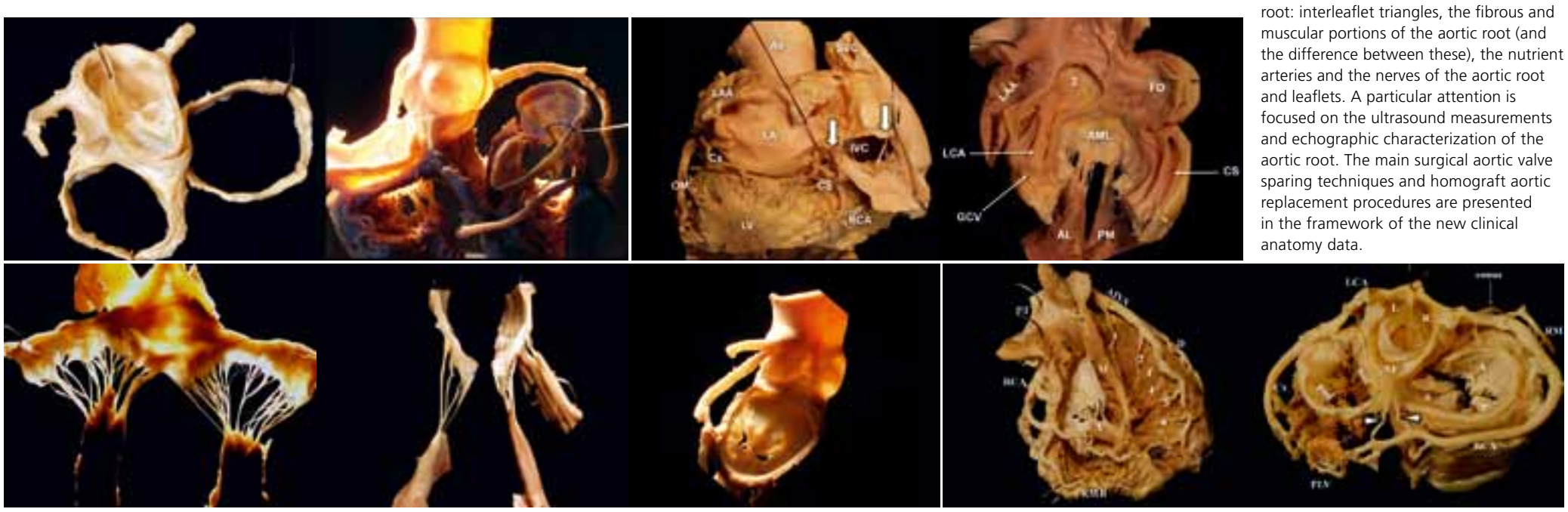
The mitral valve is presented in the session "Understanding the mitral valve" (Monday 13 October, in Gold Room). The presentation is part of a complex session which associates pathophysiology, diagnostic interrogation and surgical solutions addressing specifically the mitral regurgitation, and particularly the ischemic mitral regurgitation. The mitral valve is described in the larger context of the mitral valvar complex, which includes the subvalvar apparatus, the ventricular myocardium, the coronary circulation (with particular typology and dominance) – all these particulars being mirrored in various patterns of mitral regurgitation and different responses to disease also.

"The clinical anatomy of the right ventricle" (Monday 13 October Amber Room). There is a growing body of evidence supporting the fact the right ventricle (RV) depicts a different behavior both under normal circumstances as well as in disease, when compared to its left counterpart. Right ventricular dysfunction is directly related to survival, and predicts adverse outcomes in patients with left ventricular (LV) failure, coronary artery disease (with or without RV or atrial involvement). The response of the RV to disease is different from that of the LV. The diagnostic approaches and the emergent therapeutic measures are not identical or automatically and equally applicable to the RV and LV. The differences between the RV and LV can be traced at various levels: embryological, gross anatomical, mechanical, microscopical and biochemical. The thorough clinical anatomical re-evaluation and reanalysis of all the elements characterizing the RV is of utmost importance for understanding this particular component of the heart, and its function under various physiologic circumstances, as well as in disease while trying to offer the most suited diagnostic and therapeutic measures.

Tuesday 14 October

"The clinical anatomy of the cardiac veins, with special emphasis on electrophysiologic and percutaneous procedures" (Tuesday 14 October Amber Room). Recent developments in cardiac pacing and trans-coronary vein ablations have demonstrated the increasing value of imaging of the cardiac venous system (CVS), especially computed tomographic (CT) mapping of the coronary veins. In contrast to that for coronary arteries, the literature for coronary veins is scarce. Moreover, a complete, highly efficient, and clinically useful classification of the CVS is not as straightforward as for the coronary arteries. The CVS comprises polymorphous types of venous conduits with notable anatomic variations. Recent anatomic classification divides the cardiac veins into two main groups: tributaries of the greater CVS and tributaries of the lesser CVS, consisting of the Thebesian vessels. The greater CVS is subdivided into two groups: coronary sinus and non–coronary sinus tributaries. The author describes the clinical implications of the different imaging techniques for assessment of the coronary veins, where cardiac CT venous mapping has major advantages. The role of CT in anatomic classification, assessment of anatomic variants, and diagnosis of pathologic changes of the CVS is discussed. The author also underscores the particular role of CT venous mapping for cardiac interventions, especially for left ventricular pacing in cardiac resynchronization therapy and in percutaneous mitral annuloplasty.

"The surgical anatomy of the aortic root" (Tuesday 14 October Amber Room). The aortic root, is the centrally-located cardiac structure, establishing anatomical relations with practically all the remainder cardiac elements. Its particular make up renders its description and characterization apparently simple, in spite of the fat that its function is complex and still poorly understood. Beside the well known anatomical elements such as the valve leaflets, annulus, sinutubular junction, commissures, etc., the author underscores the particular structure and role in normal physiology as well as in disease, of the following components of the aortic root: interleaflet triangles, the fibrous and muscular portions of the aortic root (and the difference between these), the nutrient arteries and the nerves of the aortic root and leaflets. A particular attention is focused on the ultrasound measurements and echographic characterization of the aortic root. The main surgical aortic valve sparing techniques and homograft aortic replacement procedures are presented in the framework of the new clinical anatomy data.



EACTS Course preview 10–14 November

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 Gerosa (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 LVADs, tissue engineering and the total artificial heart," said Gerosa. "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 Feltrin (Padua) will then examine the role of biomarkers in heart failure and Dr Osswald (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 Gerosa. "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."

Gino Gerosa

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 Gerosa. "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 as fewer people with healthy hearts are dying early, as a result there is a real concern regarding the shortage of donor hearts, explained Gerosa. 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 Gerosa. "Now, almost 40 years on from the first heart transplant, we are close to realising a similar dream – the bioengineered heart."

Wetlab

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

"The wetlab 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," concluded Gerosa. "I would strongly advocate that colleagues who are part of a heart failure programme attend this course."

For further information, please visit the EACTS website: www.eacts.org.

Cardiac – Work in progress abstract session

A smartphone/tablet app to assist thoracic endovascular aortic repair

Bartosz Rylski *Heart Centre Freiburg University, Freiburg, Germany*

There is a growing number of new stent grafts dedicated for thoracic endovascular aortic repair (TEVAR). Stent grafts and especially its delivery systems design differ enormously. Furthermore, growing number of TEVARs are reinterventions in patients with already implanted one or more stent graft prostheses. The success of TEVAR is based on proper use of stent graft delivery systems, identification and understanding of radiopaque markers and accurate placement of the new stent graft. Therefore, we decided to design an app for smartphones and tablets, which should assist the user in TEVAR procedures.

This app contains information about all TEVAR devices available between 1990 and today. The following information about TEVAR prostheses and delivery systems will be provided:

- instruction of use inclusive flowchart, animation, short film clip with stent graft implantation and troubleshooting information
- size tables: diameters, lengths, catheter outer diameter
- images of delivery systems and stent grafts inclusive chest x-ray, fluoroscopy and direct view
- radiopaques localisation, shape and technical relevance and
- information on MR safety and compatibility.

We think that with a growing number of thoracic aortic stent grafts there is a need to provide TEVAR users with robust, worldwide available information to achieve higher success rate. The app will provide quick and easy information on currently available stent grafts as well as those, which were implanted earlier, but are now not more available. It will be free and ease to use. Once downloaded on the smartphone/tablet, it will not require internet connection. It will help to plan and prepare for TEVAR without searching for information at different sources. We will present the app design on Monday, October 13, during the Work-in-progress session. We strongly believe, that cooperation with centers having long TEVAR experience will enable us to collect x-ray images of first-generation and currently available devices in a short time.

EACTS
European Association For Cardio-Thoracic Surgery

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

Floor plan

Exhibition opening times

Saturday: Closed. **Sunday: 15:00–19:00**. Monday: 09:00–17:00. **Tuesday: 09:00–17:00**. Wenesday: Closed.

47 A&E Medical
15 AATS American Association for Thoracic Surgery
6 Abbott Vascular
123 Admedus
5 Advancis Surgical
95 Andocor
3 AngioDynamics
10 Argentum Medical
92, 93 Asanus Medizintechnik
77 ATMOS MedizinTechnik
105 AtriCure
108 B Braun Surgical
106 Bard
127–8 Baxter Healthcare
109 Berlin Heart
71 BioCer Entwicklungs
62 Biointegral Surgical
7 Cardia Innovation
88, 89 CardiaMed
21 Cardio Medical & Sengewald Klinikprodukte
23, 24 CareFusion International
75, 76 Carmat
80 Cook Medical
42 CorMatrix Cardiovascular
33, 34 Covidien
104 Cryolife Europa
12 CTSNet
61 CytoSorbents Europe
64 De Soutter Medical
90, 91 Delacroix-Chevalier
73 Dendrite Clinical Systems
18 DGM/Global Intercepts
124 EACTS The European Association for Cardio-Thoracic Surgery
101 Edwards Lifesciences
113 Eurosets
85, 86 Fehling Instruments
57 G+N MEDICAL
126 gebemed medical systems
81, 82 Gebrueder Martin & KLS Martin Group
117 Geister Medizintechnik
35 Genesee BioMedical
48 GEOMED Medizin-Technik
52 GUNZE
125 Hamamatsu Photonics Deutschland
26 Heart and Health Foundation
39 Heart Hugger / General Cardiac Technology
103 HeartWare
84 HMT Medizintechnik
53 ImaCor
78 Integra
16 ISMICS International Society for Minimally Invasive Cardiothoracic Surgery
116 Jena Valve Technology
36–8 Johnson & Johnson Medical
96, 97 JOTEC
30, 31 Karl Storz
43, 44 Lepu Medical Technology (Beijing) & Comed
28 Linde AG-Linde Healthcare
65, 66 LSI Solutions
118 MAQUET
45 Master Surgery Systems & Xenosys
69, 70 Medela
110 Medistim
111 Medos Medizintechnik
102 Medtronic
27 Moeller Medical
17 NeoChord
107 On-X Life Technologies
11 Oxford University Press
63 PEMCO Medical
40, 41 Peters Surgical
29 Posthorax
8 Praesidia
72 Qualiteam
99, 100 Redax
25 RTI Surgical
83 Rumex International
58–60 Scanlan International
121 Siemens
98 Smartcanula
22 Somahlution
112 Sorin Group
122 Spectrum Medical
119 St Jude Medical
32 Starch Medical
2 stroke2prevent
13 STS The Society of Thoracic Surgeons
115 Symetis
46 SynCardia Systems
120 Terumo Europe Cardiovascular Systems
14 The Heart Valve Society
4 The Medicines Company
114 Thoratec
49 Tianjin Plastics Research Institute
94 Tianjin Welcome
74 Transonic Europe
87 Vascular Graft Solutions
9 VYGON
54 Wetlabs
67, 68 Wexler Surgical
19, 20 Wisepress
79 WL Gore

Prescriptive Oxygenation™

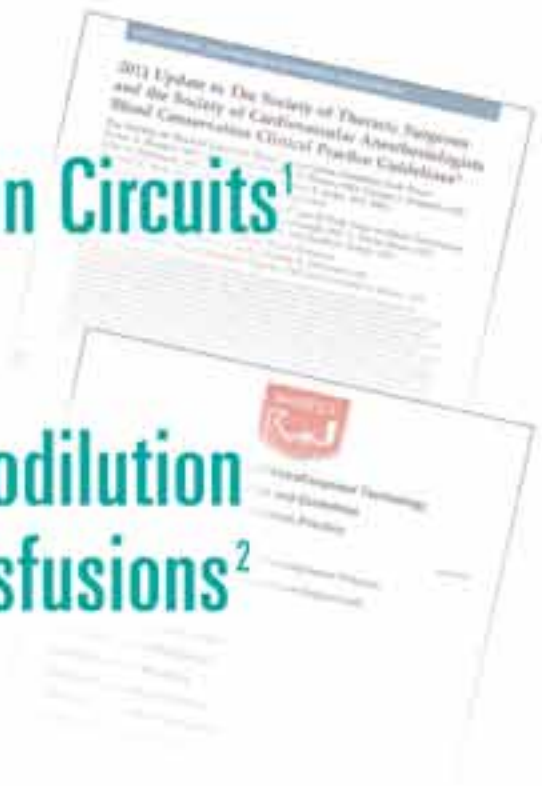
When Your Perfusion Team is Focused on

IMPROVING PATIENT OUTCOMES

DECREASING HOSPITAL COSTS

...Use the Evidence to Point the Way

Right Size Your Perfusion Circuits[1]



Improve Patient Outcomes[3]

Reduce Hemodilution & Blood Transfusions[2]

Decrease Hospital Costs[4]

References

1. Ferraris, V., et al. (2011). 2011 Update to The Society of Thoracic Surgeons and the Society of Cardiovascular Anesthesiologists Blood Conservation Clinical Practice Guidelines.
2. Baker, R., et al. (2013). American Society of ExtraCorporeal Technology Standards and Guidelines For Perfusion Practice.
3. Lahanas, T., et al. (2013). A retrospective comparison of blood transfusion requirements during cardiopulmonary bypass with two different small adult oxygenators. Perfusion. July 2013; 28 (4).
4. Bronson, S., et al. Prescriptive Patient Extracorporeal Circuit and Oxygenator Sizing Reduces Hemodilution and Allogeneic Blood Product Transfusion during Adult Cardiac Surgery. JECT. 2013;45:167-72.

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

Terumo Cardiovascular Group *Ann Arbor, Michigan USA 734.663.4145 800.521.2818*
Terumo Corporation *Tokyo, Japan 81.3.3374.8111* | ***Terumo Europe N.V. Cardiovascular Division*** *Eschborn, Germany 49.61.96.9023.0*

TERUMO®

Medtronic

NEW

CoreValve® Evolut™ R

TRANSCATHETER AORTIC VALVE

Confidence. Delivered.

Lowest Delivery Profile

14 Fr-Equivalent System with InLine™ Sheath improves access and reduces risk of major vascular complications

Designed for 1st Time Positioning Accuracy

with 1:1 response and self-centering and option to recapture and reposition*

Exceptional Valve Performance and Reduced PVL

with optimized cover index and consistent radial force

* up to approximately 80% valve deployment

Attend one of our **CoreValve® Evolut™ R workshops** in the **Medtronic Experience Center**