EACTS Daily News
European Association For Cardio-Thoracic Surgery
The official newspaper of the 26th EACTS Annual Meeting 2012
Sunday 28 October

In this issue

EACTS Techno College Innovation Award 2012

***EACTS Daily News* is pleased to announce the 2012 EACTS Techno College Innovation Award has been awarded to Per Steiner Halvorsen and Erik Fosse from Oslo University Hospital, Oslo, Norway.**

Erik Fosse (left) and Per Steinar Halvorsen

They won the award for demonstrating in experimental and clinical studies, that measures from accelerometers can be used to assess global and regional left ventricular function accurately, even during regional myocardial ischemia induced by coronary artery occlusion.

"Our invention has important implications in diagnosing and monitoring of cardiac surgery patients," said Halvorsen. "We envision permanent wireless accelerometers may be implanted during surgery, which after hospital discharge can give continuous clinical information – heart rate, arrhythmias, ventricular performance and occurrence of ischemic events – during daily activities."

They believe that the information obtained from cardiac accelerometers could be used to predict and avoid adverse clinical outcomes earlier than changes in clinical parameters would otherwise indicate. This latest innovation is a combined temporary pacemaker lead and a miniaturized 3-axes accelerometer, which is attached to epicardium like ordinary temporary pacemaker leads during surgery and withdrawn postoperatively, when there is no need for further monitoring of the patient. Signals from the sensor are processed and displayed in real time on an external monitor and give an alarm when deviations from normal activity are detected.

Studies have revealed that the accelerometer measures provided similar information as echocardiography and can be used as markers of myocardial contractility by correlating to LVSW (R=0.81), LV ejection fraction (R=0.80) and LV dP/dt (R=0.73). The method enables differentiating ischemia from global changes in contractility with excellent sensitivity (94%) and specificity (92%). The technique also allowed much earlier diagnosis of myocardial ischemia than ECG and hemodynamic monitoring, and thus has an advantage compared with other emerging device technologies.

"This offers promise for better and earlier diagnosis and treatment," said Fosse. "Our findings are also highly relevant for the increasing number of patients treated for cardiac arrhythmias and heart failure with ICD and biventricular pacemakers. Treatment with such devices has recently shown to reduce mortality by 50% in severe heart failure patients."

Vascular: Contoversies of open and endo controveries 13:00-16:20 **Room 114**

Position paper on TEVAR from the EACTS and the ESC in collaboration with the EAPCI

Martin Grabenwöger *Vienna, Austria*

Martin Grabenwöger

During the last decade thoracic endovascular repair (TEVAR) experienced a dramatic expansion for different indications and was adopted by many specialties including cardiologists, cardiovascular surgeons, radiologists and vascular surgeons. This fact prompted a requirement to systematically consider the indications, appropriateness, limitations and delivery of this treatment modality. For this purpose an evenly distributed group of cardiologists and cardiovascular surgeons as well as interventional radiologists, who are experts in the field of open surgical and endovascular treatment of thoracic aortic disease was constituted in order to create a code of best practice for TEVAR therapy. In the following I would like to focus on some important messages out of the Position Statement Paper:

Preoperative issues

Patient selection should be performed by a multidisciplinary approach, ideally in an aortic centre. The involvement of different specialties allows combining the best expertise in medical, interventional and surgical therapy for tailoring an optimal treatment strategy for the individual patient. High-quality imaging and appropriate facilities for open surgery are of utmost importance, while CT angiography is the method of choice for diagnosis and planning of the procedure. MRI

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Cardiac: Session 2 Update on Valves 12:45-14:50 **Rooms 115-117**

GARY: German Aortic valve RegistrY

Friedrich Mohr *Herzzentrum Universitate, Leipzig, Germany*

Friedrich Mohr

The German Aortic Valve Registry (GARY) was inaugurated by the German Societies of Cardiology and Thoracic and Cardiovascular Surgery because of a remarkable growing numbers of TAVI over the past few years. It was started in July 2010 and is the only registry so far to include both transcatheter aortic valve implantation (TAVI) and conventional aortic valve replacements and repair. The register is supported by the German Heart Foundation and receives unrestricted grants from the heart valve manufacturing industry.

Participation in the registry is voluntary, with 92 German centres (from a possible 99) actively taking part at present. The registry is planned to include patients until 2015 and gather a one, three and five-year follow up. It is expected that a total of more than 80,000 patients will eventually be enrolled.

Inclusion of the patients is done preoperatively by written informed consent. A comprehensive case report form including patient details, information on decision making and actual treatment as well as detailed data on the postoperative course is provided by the treating institution and is submitted to an independent research institute for patient safety and quality. Follow-up will be performed at one, three and five years after initial treatment which is done by standardized telephone interviews with every patient.

By July 2012 more than 26,000 patients were included of whom 23% were TAVI patients. Current data from the run in phase include 15,252 patients treated in 2011 from 53 centres

The first results show that the participating centers in general abided by the current guidelines for patient selection. 85% of all TAVI patients were older than 75 years and had a higher calculated perioperative risk of mortality. The mean age of patients who received isolated elective and urgent conventional aortic valve replacement was 68.3 (±11.3) years, with a logistic EuroSCORE (log. ES) of 8.8% (±9.7%).

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Sunday 28 October

Postgraduate Courses

07:00–17:00 **Registration**

Please Note

- Clocks go back one hour in line with the end of Daylight Savings Time

08:30 **Plenary Session: Quality Improvement Programmes**

Rooms 115/117

Moderators: L. K. Von Segesser, Lausanne; D. Pagano, Birmingham

08:30	**Quality: an elusive and moving target**	*B. E. Keogh (London)*
08:50	**Cost-effectiveness analysis: what is it and how can we use it to improve care?**	*D. J. Cohen (Kansas City)*
09:10	**Measuring data and creating evidence: shortcomings of trials/Registry/observational studies; mortality is not the only endpoint**	*M. Utley (London)*
09:30	**ProvenCare in lung cancer**	*D. Wood (Seattle)*

Acquired Cardiac Disease

Rooms 115/117

Organisers: Acquired Cardiac Disease Domain

10:30 **Session 1: Coronary Surgery**

Moderators: P. Sergeant, Leuven; D. Taggart, Oxford

10:30	**Triple-vessel disease: SYNTAX at five years**	**N. M. D. A. van Mieghem (Rotterdam)**
10:40	**Discussion**	
10:45	**Left main disease: SYNTAX at five years**	*A.P. Kappetein (Rotterdam)*
10:55	**Discussion**	
11:00	**Coronary trial: off-pump or on-pump coronary artery bypass grafting at 30 days**	*D. Taggart (Oxford)*
11:10	**Discussion**	
11:15	**ASCERT study: Comparative effectiveness of revascularization strategies**	*F. Grover (Aurora)*
11:20	**Discussion**	
11:25	**Bilateral internal thoracic artery grafting**	*F. Moraes (Recife)*
	Discussant: S. Kendall, Middlesbrough	
11:45	**Hybrid coronary surgery**	*I. S. Modrau (Aarhus)*
	Discussant: N. M. D. A. van Mieghem, Rotterdam	
12:00	**General discussion**	
12:15	**Break**	

12:45 **Session 2: Update on valves**

Moderators: L. K. Von Segesser, Lausanne; J. R. Pepper, London

12:45	**Long-term results from transcatheter aortic valve implantation**	*T. Walther (Bad Nauheim)*
	Discussant: J. Rich, Norfolk	
13:10	**GARY: real world Aortic Valve registry in Germany**	*F Mohr (Leipzig)*
	Discussant: V. Thourani, Atlanta	
13:35	**Port-access for mitral surgery**	*S. Hunter (Middlesbrough)*
	Discussant: R. Dion, Genk	
14:00	**MitraClip**	*F. Maisano (Milan)*
	Discussant: H. Treede, Hamburg	
14:25	**Evidence for repair vs. replacement for functional mitral regurgitation**	
	Discussant: S. Nashef, Cambridge	
14:50	**General discussion**	

15:00 **Session 3: Left heart failure**

Moderators: A. Haverich, Hannover; R. Lorusso, Brescia

15:00	**The growing epidemic**	*J. L. Pomar (Barcelona)*
15:10	**Surgical restoration**	*L. Menicanti (Milan)*
	Discussant: G. Dreyfus, Monte-Carlo	
15:35	**Hardware**	*G. Wieselthaler (Vienna)*
	Discussant: A Simon, Harefield	
16:00	**Extracorporeal membrane oxygenation**	*F. Beyersdorf (Freiburg)*
	Discussant: G. J. Peek, Leicester	
16:20	**General discussion**	
16:25	**Adjourn**	

- This course is supported by an unrestricted educational grant from St Jude Medical

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Quality Improvement Programmes 08:30-10:00 Room 115-117

Cost-effectiveness analysis: what is it and how can we use it to improve care?

David J Cohen *Director of Cardiovascular Research, Saint Luke's Mid America Heart Institute, Kansas City, Missouri USA*

David Cohen

In recent years, the economic impact of healthcare has assumed increasing importance in care patterns. These pressures have been particularly acute in the area of cardiovascular disease – driven both by the rapidity of technological advances in our field but also by the large number of patients who are potential candidates for these therapies. As a result, it is important for clinicians to understand the methods that underly these studies and their implications. Otherwise, it is likely that healthcare delivery will increasingly be determined by administrators who are unaware of the value of these major advances or nuances in their delivery.

The primary method used to understand "value" in healthcare is known as cost-effectiveness analysis. This is a formal technique for comparing the cost of a therapy with its expected benefits for a population of patients. One of the most important principles of this approach is that treatments need not be cost-saving in order to be cost-effective. Rather, treatments may still be considered cost-effective if the benefit they provide is worth the cost. Typically, cost-effectiveness is evaluated in terms of an incremental cost-effectiveness ratio, which represents the ratio of the cost of a treatment to its benefit – generally assessed in terms of life-years or quality-adjusted life years (QALY) gained. In many Western societies, treatments with cost-effectiveness ratios <$50,000 (or EUR30,000) per QALY gained are considered to represent good value for money. However, the specific threshold may vary according to a number of characteristics – most notably, the overall healthcare budget.

In my lecture, I will be discussing some recent studies that we have performed to evaluate the cost-effectiveness of a new treatment for patients with severe aortic stenosis – transcatheter aortic valve implantation (TAVI). The information that I will be presenting is based on our in-depth economic analyses of the PARTNER trial – the pivotal randomized trial that has led to the approval of TAVI in the United States. The PARTNER trial involved three main cohorts:

1. Cohort B – patients with truly 'inoperable' AS, who were randomized to TAVI vs. continued medical therapy
2. Cohort A, Transfemoral – patients with severe AS at high risk for mortality with surgical AVR (but still operable) and who were amenable to a transfemoral approach to TAVI, who were randomized to TAVI via the transfemoral approach vs. surgical AVR
3. Cohort A, Transapical – patients with severe AS at high risk for mortality with surgical AVR (but still operable) and who were NOT amenable to a transfemoral approach to TAVI, who were randomized to TAVI via the transapical approach vs. surgical AVR

For the Cohort B (inoperable cohort), our economic analysis found that TAVR was substantially more costly than medical therapy both over the first year and over the patient's lifetime. However, TAVI was also associated with a substantial improvement in both survival and quality of life for these patients with a gain in life expectancy of approximately two years. Thus, when we compare the lifetime cost with the benefit in this population, it appears that TAVI represents a "reasonable" value for the cost. Specifically, TAVI was associated with an incremental cost-effectiveness ratio of ~$50,000 per year of life gained – comparable to the cost-effectiveness of many other treatments that are commonly performed in the US and other health care systems. Moreover, in order for TAVR to provide reasonable value for this inoperable cohort, our analysis suggests that patients must have a life expectancy of at least three years after TAVI – an important benchmark for the technology.

For patients in Cohort A, the results of our analysis were different – mainly because the comparison strategy is surgical AVR for such patients, and to date we have no evidence that TAVI improves survival compared with surgical AVR. For patients who were eligible for a transfemoral procedure, we found that one-year costs were slightly less than with surgical AVR (difference of ~$2000) and quality of life was improved in the short term due to the more rapid recovery after transfemoral TAVI vs. surgery. The cost reductions seen with TAVI in these patients were due to a marked reduction in hospital length of stay compared with surgical AVR. These findings suggest that TAVR may be preferred over AVR in appropriately selected high-risk patients – at least when it can be performed transfemorally. On the other hand, for patients who were treated via the transapical route, the results of our economic analysis were not so favorable. For these patients, TAVR only slightly reduced length of stay compared with surgery and there was no difference in quality of life or survival at any time-point. These results would seem to suggest that surgical AVR is actually preferred over transapical TAVI at the present time. However, it is important to point out that these results are based on the very earliest case experience with TA-TAVI in the US as most of the sites had done fewer than five TA procedures prior to participating in PARTNER. Recent data suggest that with greater experience, the results of TA-TAVI have improved substantially. Whether these better outcomes translate into a more cost-effective procedure is currently unknown but will be the subject of future investigation within the PARTNER trial.

I believe that these examples from the PARTNER trial demonstrate both the strengths and limitations of cost-effectiveness analysis. This technique allows us to develop rigorous, quantitative insights into the value of any healthcare technology. Nonetheless, the results of any analysis are necessarily dependent on the quality of the underlying data. Although randomized clinical trials are clearly the gold standard for evaluating any medical treatment, it is important that these analyses be adaptable to rapidly evolving technology both to reflect the most up to date results and also so as not to inhibit technological evolution which is essential to the future of healthcare.

GARY

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In the TAVI group the patients were on average significantly older (transfemoral 81.0 [±6.1] years, transapical 80.3 [±6.1] years and with a higher operative risk – log. EuroSCORE transfemoral 25.9% [±18.1%], transapical 24.6% [±17.3%].

The reported in-hospital mortality for elective patients was 2.1% for conventional surgery, 5.1% for the transfemoral (TF) and 7.7% for the transapical (TA) approach. These numbers confirm the good results of recent studies and reflect the growing experience in treatment and perioperative management of aortic valve disease. The high procedural success of more than 97% and the low rate of valve related reinterventions of less than 0.5% are also indicators of the latest improvements.

Further stratification of the patients into risk groups revealed a particular benefit for people with high (log. ES > 20%) and very high (log. ES>30%) risk

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Perfusion

Room 112

Moderators: G. J. Peek, Leicester; A. Wahba, Trondheim

10:30	**Session 1: Extracorporeal life support**	
10:30	**Extracorporeal membrance oxygenation and extracorporeal support registries: What's in it for us?**	*G. Peek (Leicester)*
10:50	**The present and future of sudden death and brain ischaemia: Could we have saved Michael Jackson?**	*G. Trummer (Freiburg)*
11:25	**The role of the perfusionist in resuscitation**	*A. Philipp (Regensburg)*
11:45	**Session 2: Extracorporeal circulation**	
	Moderators: F. Merkle, Berlin; A. Liebold, Ulm	
11:45	**The scientific evidence for selective cerebral perfusion in complex aortic surgery**	*F. Emrich (Leipzig)*
12:05	**How to start a mini-bypass programme: Tips and tricks**	*L. Harling (London)*
12:25	**RFVIIa in cardiothoracic surgery: an update**	*M. Herbertson (Southampton)*
12:45	**Lunch**	
13:45	**Session 3: Cardiac assist**	
	Moderators: G. Gerosa, Padua; C. Hamilton, Vogtareuth	
13:45	**Treatment of end-stage heart failure in the future: from transplant to ventricular assist device?**	*A. Zuckermann (Vienna)*
14:05	**Predictors of left ventricular assist device-induced sustained myocardial recovery**	*M. Dandel (Berlin)*
14:25	**Assist in acute right ventricular failure: right ventricular assist device or extracorporeal support?**	*G. Gerosa (Padua)*
14:45	**Going home: hospital discharge on ventricular assist device**	*N. Wrightson (Newcastle upon Tyne)*
15:05	**Session 4: Case reports – worst case scenarios**	
	Moderators: J. Horisberger, Lausanne; A. Wahba, Trondheim	
15:05	**Challenging perfusion in a case of vein graft dissection**	*C. Nielsen (Aalborg)*
15:25	**Prolonged cerebral protection in a case of aortic dissection**	*R. Mrkonjic (Zagreb)*
16:25	**Adjourn**	

Thoracic Disease

10:30	**Session 1: Thoracic trauma**	
	Room 113	
	Moderators: P. B. Rajesh, Birmingham; C. K. C. Choong, Melbourne	
10:30	**Pre-hospital care**	*R. Steyn (Birmingham)*
10:50	**Civilian trauma Central Europe**	*T. Molnar (Pecs)*
11:10	**Road traffic accidents, Greece**	*K. Athanassiadi (Athens)*
11:30	**Military trauma**	*T. Graham (Birmingham)*
13:30	**Session 2: Oncology: complex cases**	
	Moderators: P. G. Dartevelle, Le Plessis Robinson; E. A. Rendina, Rome; G. Friedel; D. Wood, Seattle	

- Illustrative cases will be presented by each speaker and discussed in an interactive way.

15:00	**Session 3: Empyema difficult cases**	
	Moderators: D. Subotic, Belgrade; C. K. C. Choong, Melbourne; P. B. Licht, Odense	

- Illustrative cases will be presented by each speaker and discussed in an interactive way.

16:30	**Session ends**	

Congenital Heart Disease

10:30	**Session 1: Truncus arteriosus**	
	Room 111	
	Moderators: P. R. Vouhé, Paris; W. Brawn, Birmingham	
10:30	**Morphology**	*A. Cook (London)*
10:50	**Echo diagnosis**	*M. Vogt (Munich)*
11:10	**Surgical repair**	*M. Hazekamp (Leiden)*
11:30	**Management of the truncal valve**	*C. Caldarone (Toronto)*
11:50	**Reconstruction of the right ventricular outflow tract and pulmonary arteries**	*O. Raisky (Paris)*
12:10	**Long-term outcomes and reinterventions**	*C. Schreiber (Munich)*
12:30	**Lunch**	
13:30	**Session 2: Aortic valve repair in childhood**	
	Moderators: R. Prêtre, Zürich; S. Qureshi, London	

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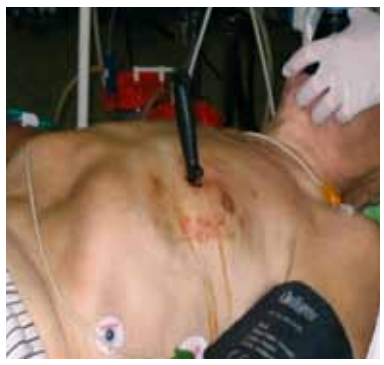
Session 1: Thoracic trauma 08:30-10:00 **Room 113**

Civilian chest trauma Central Europe

Tamas F Molnar (with contribution from Szilard Rendeki) *Department of Surgery, Medical School, University of Pécs, Hungary*



Thoracic injury care in Central Europe (Poland, Czech Republic, Slovakia, Hungary, Croatia, Slovenia) is defined by the exisiting overall emergency(trauma) medical systems of the region. They are copycats of their Western-European counterparts. Outcome data (survivals, costs) of health care efficacy in these countries are proverbially better than what one could expect by GDP-based calculations. Similarities in structures allow extrapolation of Hungarian model. In this country (10 million inhabitants/93,000km^2) chest trauma care is conventionally embedded into trauma surgical departments, with contributions from the 12 general thoracic surgery centers. Cardiac surgery is a different entity (six centers) Old style allround trauma surgeons are to be extinct on this part of the Continent, also. Major thoracic trauma (non-transportable) is looked after by locally available general surgeons. Thoracic trauma comprises 10-15% of all traumas and 30-60% percent of polytrauma are involving the upper torso. A 2012 review of the nationwide practice on chest trauma reveled, that one out of five to six chest drains are inserted by thoracic surgeons: the majority is performed by trauma/emergency specialists. No anatomical resections (lobectomy/pneumonectomy) were required in the past five years with the exception of one undertrained center (three pneumonectomies). The thoracotomy/drainage ratio is less than 1:5 nationwide for penetrating injuries with the exception of one center (1:2). With regard to the prehospital care, 'stay and play' policy of the ambulance service (stable the patient on spot) means preference for on site drainage (at least in protocols). Air ambulance popularizes emergency thoracostomy. Triage is applied up to three to five major patients/center/same time where reverse-triage is to be implemented above it.

Chest wall and injured lung parenchyma management are not serious thoracic surgical challenges. The decision making trees required in chest trauma are short and clear cut. The main issues, are timing of intervention and thoracotomy/drainage dichotomy. Is a (cardio)thoracic consultant really needed to attend the chest trauma case or is it a maximalist's shopping list? Considering the limited number of specialists (<40/10 million) and a task to be fulfilled an available round the clock thoracic surgeon is overtrained and overused for acute chest trauma surgery. With a hypothetic permanent availability of thoracic surgeons a one or two open thoracotomy cases/surgeon/year and a four to ten cases/center/year are expectable. onable. The numbers raise the question of manpower and budget abuse. The sole acute situation which calls for surgeon immediately is uncontrollable bleeding in the chest cavity as arteficial ventilation makes physiological pleural pressure-difference irrelevant. Chest wall and lung injuries are usually secondary to more devastating injuries. Major trauma profiles are undergoing a significant change of face. Thoracic torso affliction of terror attacks on civilians and novel explosive techniques in modern assymetric warfare are to be coped with. Damage control concept entered the chest cavity, also. A definitive optimization of surgical agressivity aims at the restoration and securing of vital functions instead of an immediate and complete regaining of all functions and anatomical coherence.

Properly trained general surgeon must be able to cope with penetrating thoracic injuries applying damage control concept. Consultant level definitive treatment in a semielective or elective fashion in general thoracic surgery means reconstruction (chest wall) and sequel management. A thoracic surgeon led postoperative (complication) management is mandatory.

GARY

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when treated transfemorally with mortality rates of 4.7% and 7.7%, respectively.

For better preoperative risk adjustment the new AKL was introduced and compared extremely well with predicted and observed outcome data.

In congruence with former observations the overall number of cerebrovascular events during hospital stay was low in the conventionally treated group (2.2%) and somewhat higher for TAVI patients (TF: 3.7%, TA 3.5%). The rate of vascular complications was reported with 11.9% for the transfemoral, 2.5% for the transapical and 1.0% for the conventional group.

The number of new pacemaker implants was 23.7% in the transfemoral group and therefore significantly higher than in the transapical (9.9%) and in the conventional surgical group (4.6%).

Another interesting fact is the amount of residual aortic regurgitation which was also reported to be different with the transfemoral (grade 0: 37.3%, grade I or II: 62.5%, more than grade II: 0.3%) and the transapical implants (grade 0: 57.2%, grade I or II: 42.0%, more than grade II: 0.6%).

From the GARY registry we will depict a real world all-comers picture of the existing practice with a special focus is on the performance and durability of the new valve types, and on long-term outcome and quality of life in patients following invasive aortic valve therapy.

Position paper on TEVAR from the EACTS and the ESC in collaboration with the EAPCI

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may be useful during follow-up, because radiation is avoided.

Indications and contraindications for TEVAR

In thoracic aortic aneurysms (TAA) TEVAR is indicated, when the maximum diameter exceeds 5.5cm or if rapid expansion occurs. There should be a proximal and distal landing zone of at least 2cm. TEVAR is the treatment modality of choice in complicated acute type B aortic dissections (TAD). In uncomplicated type B dissections, a primary conservative approach with close surveillance seems to be justified. The progressive/complicated intramural hematoma, the penetrating atherosclerotic ulcer as well as the traumatic aortic injury are proper indications for TEVAR therapy. TEVAR is not recommended in patients with connective tissue disorders except as a bridge to definite surgical therapy.

Endoleaks

Type I (proximal or distal reperfusion of the aneurysmal sac) and type III endoleaks (endograft/endograft disconnection leaks) are regarded as treatment failures. In type II endoleaks (retrograde perfusion via branch vessels) a primarily conservative management by "wait and watch" is justified.

Specifics of TEVAR for TAA and for TAD

In TAA patients the diameter of the endograft should exceed the diameter of the landing zone by at least 10-15%, whereas in TAD patients the stent graft diameter should be based on the diameter of the aorta proximal to the dissected segment, applying no oversizing. Ballooning of the endograft is not recommended.

Finally, the manuscript deals with procedure related complications and comes to the conclusion that TEVAR is a valid treatment option for elderly patients deemed at high risk for open surgery, but also for fit patients with suitable anatomies. The procedure should be ideally performed in specialized aortic centres, providing the full range of diagnostic tools and treatment options.

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SORIN GROUP

AT THE HEART OF MEDICAL TECHNOLOGY

Continued from page 4

13:30	**Morphology**	*A. Cook (London)*
13:40	**Aortic valve repair in Melbourne**	*C. Brizard (Melbourne)*
13:50	**Aortic valve repair in St Augustin**	*B. Asfour (Sankt Augustin)*
14:10	**Intraoperative evaluation of the repaired aortic valve**	*M. Vogt (Munich)*
14:30	**Panel discussion**	
15:30	**Session 3: Minimally invasive repairs**	
	Moderators: S. Sano, Okayama; B. Kreitmann, Marseille	
15:30	**Illustrative cases will be presented by each speaker and discussed in an interactive way**	*B. Asfour, Sankt Augustin; V. Vida, Padua; Z. Zhuang,Shanghai*
16:00	**The future of minimally invasive surgery**	*M, Reddy (Standord)*
16:20	**Panel discussion**	

■ This course is supported with an unrestricted educational grant from St Jude Medical

Vascular

10:15	**Session 1: Infections of the cardiovascular system**	
	Room 114	
	Moderators: M. Czerny, Berne; J. R. Pepper, London	
10:15	**Microbiology and guidelines on prophylaxis in native and prosthetic cardiovascular infection**	*P. Tornos (Barcelona)*
10:35	**Diagnostics of cardiovascular infections**	*L. Lonn (Copenhagen)*
10:55	**Surgery in native and prosthetic active infective endocarditis**	*M. Jahangiri (London)*
11:15	**Surgery in native and prosthetic active infective aortitis**	*T. Carrel (Berne)*
11:35	**Collateral damage of cardiovascular infection: bronchus, oesophagus and intestine**	*M. Grimm (Innsbruck)*
12:00	**Lunch**	
13:00	**Session 2: Controversies of open and endovascular approaches**	
	Moderators: M. Grimm, Innsbruck; J. Bavaria, Philadelphia	
13:00	**ESC-EACTS Position paper**	*M. Grabenwöger (Vienna)*
13:20	**Why we do need a European Registry of Aortic Disease**	*E. Weigang (Mainz)*
13:40	**Experimental and clinical pharmacology in aortic disease**	*K. Kallenbach (Heidelberg)*
14:00	**Why open surgery will remain the mainstay of thoracoabdominal aortic aneurysm treatment**	*M. A. A. M. Schepens (Brugge)*
14:20	**Why thoracic endovascular aortic repair will be the future treatment of thoracoabdominal aortic aneurysm treatment**	*M. Funovics (Vienna)*
15:00	**Session 3: Thoracic vascular trauma**	
	Moderators: R. Haaverstad, Bergen; D. Pacini, Bologna	
15:00	**Secondary surgical interventions after thoracic endovascular aortic repair**	*R. Haaverstad (Bergen)*
15:20	**Patterns and locations for acute traumatic vascular injury**	*H. Jakob (Essen)*
15:40	**Diagnostic tools in predicting acute traumatic vascular injury**	*V. Mosquera Rodriguez (A Coruña)*
16:00	**Timing and type of treatment in acute thoracic vascular injury**	*R. Di Bartolomeo (Bologna)*
16:20	**Adjourn**	

General Interest

Rooms 118/119

Basic Science

10:00	**Session 1**	
	Moderators: P. Dohmen, Leipzig; G. Gerosa, Padua	
10:00	**Overview of tissue engineering: what do we need?**	*P. Dohmen (Berlin)*
10:15	**Stem cells**	*G. Steinhoff (Rostock)*
10:30	**Pluripotent stem cells**	*G. Gerosa (Padua)*
10:45	**Are allografts suitable scaffolds for tissue engineering?**	*F. Smit (Bloemfontein)*
11:00	**Synthetic scaffolds vs. decellularized scaffolds including bioreactors**	*S. Cebotari (Hannover)*

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Session 1: Thoracic trauma 08:30-10:00 **Room 113**

Road traffic accidents in southern Europe

Kalliopi Athanassiadi *Senior Consultant Thoracic Surgeon "EVANGELISMOS" General Hospital, Athens, Greece*

The current generation has far greater opportunities for motorized travel than their forefathers. But their advantages have been achieved at a large cost – the human and economic costs. Road safety is considered to be a high priority issue in all European countries, but is not equally distributed across Europe. The real costs of deaths, injuries and social and economic consequences far exceed the estimates for the following reasons: incomplete and inaccurate accident statistics, long-term impacts of traffic injury and socio-economic dimensions of traffic injury.

The most important cause of significant blunt chest trauma are road traffic accidents accounting for 70-80% of such injuries. Pedestrians struck by vehicles is another causative mechanism.

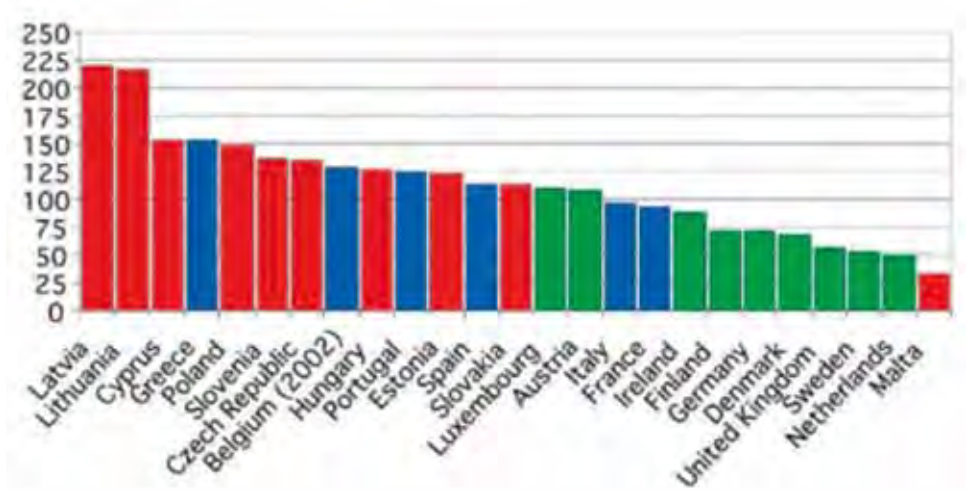


Fig. 1.: Road Accident Deaths per million Inhabitants for 2004, Road accident data in the enlarged European Union, European Transport Safety Council, Brussels 2006

Pathophysiology of Chest Trauma

In order to deal with chest trauma one has to realize the major pathophysiologies encountered in blunt chest trauma which involve derangements in the flow of air, blood, or both in combination. Sepsis due to leakage of alimentary tract contents, as in esophageal perforations, also must be considered.

Blunt trauma commonly results in chest wall injuries (eg, rib fractures). The pain associated with these injuries can make breathing difficult, and this may compromise ventilation.

Direct lung injuries, such as pulmonary contusions, are frequently associated with major chest trauma and may impair ventilation by a similar mechanism.

Shunting and dead space ventilation produced by these injuries can also impair oxygenation. Space-occupying lesions, such as pneumothoraces, hemothoraces, and hemopneumothoraces, interfere with oxygenation and ventilation by compressing otherwise healthy lung parenchyma.

At the molecular level, animal experimentation supports a mediator-driven inflammatory process further leading to respiratory insult after chest trauma. Following blunt chest trauma, several blood-borne mediators are released, including interleukin-6, tumor necrosis factor, and prostanoids. These mediators are thought to induce secondary cardiopulmonary changes. Blunt trauma that causes significant cardiac injuries (eg, chamber rupture) or severe great vessel injuries (eg, thoracic aortic disruption) frequently results in death before adequate treatment can be instituted. This is due to immediate and devastating exsanguination or loss of cardiac pump function. This causes hypovolemic or cardiogenic shock and death.

Mechanisms and patterns of blunt thoracic trauma			
Mechanism of injury	**Chest wall injury**	**Possible Thoracic-Visceral injuries**	**Common associated injuries**
High velocity (deceleration)	Chest wall often intact sternum fracture bilateral rib fractures with anterior flail	Ruptured aorta; cardiac contusion; tracheo-bronchial disruption; ruptured diaphragm	Head and Max-Fax injuries; C-spine fracture; lacerated liver/spleen; long bone fractures
Low velocity (direct blow)	Lateral: unilateral rib fractures; anterior: fractured sternum	Pulmonary contusion; cardiac contusion	Lacerated liver/spleen if lower ribs involved Max-Fax injuries
Crush injury	Anteroposterior: bilateral rib Fractures; anterior flail; lateral: ipsilateral fractures; flail; possible contralateral fractures	Ruptured bronchus; cardiac contusion; pulmonary contusion	Fractured thoracic spine Lacerated liver/spleen; Lacerated liver/spleen

In traffic accidents it is also essential to understand the mechanisms of blunt thoracic trauma as very well Westaby pointed out in his book entitled "Cardiothoracic Trauma"in the following table, since it influences the patterns of injury.

Two cases are reported:

1. A complete left main bronchus rupture in a 23-year-old man after blunt chest trauma without any vascular injury (Figure 1).
2. An aortic rupture in a 46-year-old man after blunt chest trauma (Figure 2).

Figure 1

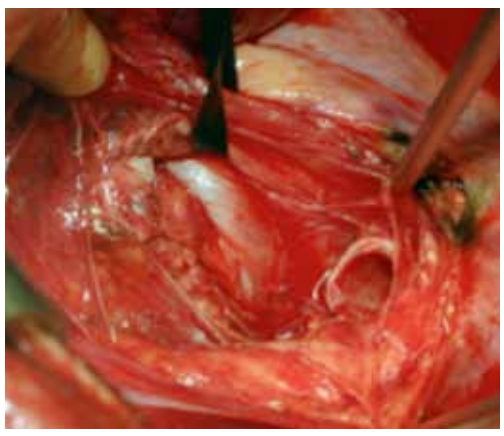
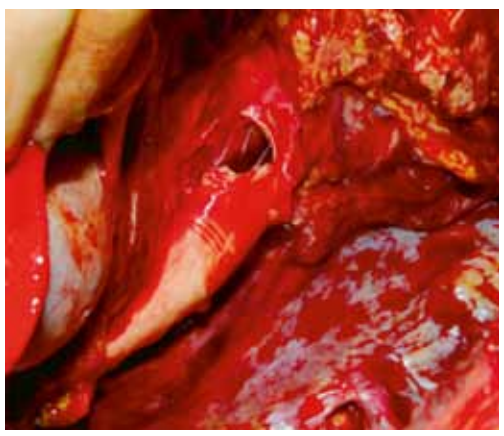


Figure 2



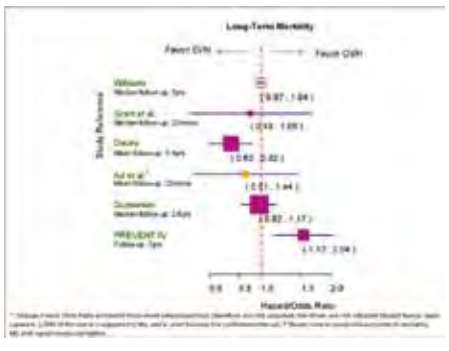
Endoscopic vein harvesting is safe and should be embraced by surgeons

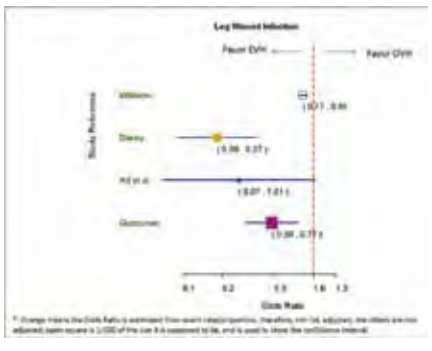
Michael J. Mack, MD
The Heart Hospital, Baylor Plano, Plano TX

EVH was standard of care in the United States and was becoming increasingly utilized in other countries when the PREVENT IV endoscopic vein harvesting (EVH) subset analysis[1] was published in 2009. These results received a great deal of attention and raised safety concerns about the procedure. In the aftermath of the publication of this retrospective study, there was a decrease in the routine use of EVH in some established centers and hesitation in incorporating the procedure in some newly-adopting centers. In addition, some recommendations raised the concern about a need for patient consent about the potential for worse outcomes with EVH.

As a result, a number of authorities were prompted to re-examine EVH outcomes, including the United States Food & Drug Administration (FDA). The recently reported FDA-mandated study documented that EVH did not increase mortality, cardiac events or need for repeat revascularization at 3 years in a sample size approaching a quarter of a million patients.[2] Fifty two percent of patients received EVH. After propensity score adjustment for clinical characteristics, there were no significant differences between long-term mortality rates (13.2% vs. 13.4%) and the composite of death, myocardial infarction, and revascularization (19.5% vs. 19.7%). In addition, EVH was associated with lower harvest site wound complications relative to open vein-graft harvesting (3.0% vs. 3.6% adjusted HR, 0.83; 95% CI, 0.77-0.89; P < .001) Investigators concluded that EVH is, in fact, safe and not associated with increased mortality. This finding reinforces the results of 4 additional studies (also conducted in response to PREVENT IV) that document no adverse impact of EVH on survival approximately 2 to 4 years following revascularization. 3-6 Further, EVH was uniformly associated with significantly lower rates of wound complications/infections compared with open harvest. [2,3,5,6]

Taken together, these studies provide strong reassurance that EVH is not only safe but also provides significant patient benefit. In order to continue to provide patients with the benefits of surgical revascularization, surgeons should adopt a mindset in which we aim to improve new technology based on experience and lessons learned, rather than abandon it prematurely. The increased focus on EVH has reinforced the importance of proper technique, procedural best practices and optimal training. EVH no doubt will continue to evolve and improve. In the meantime, currently available data should assure physicians to feel not only secure that EVH is safe but also feel good about providing this important advancement to their patients.





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"THE RULING? THE ENDOSCOPIC APPROACH WAS **EQUALLY SAFE** BUT HAD LOWER RATES OF WOUND COMPLICATIONS"

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—Mortgage Today

"THE USE OF EVH COMPARED WITH OVH WAS **NOT ASSOCIATED WITH INCREASED MORTALITY**"

—Dacey LJ. *JAMA*. 2012 Aug 1;308(5):512-3.

"ENDOSCOPIC VEIN-GRAFT HARVEST IS **SAFE** FOR CABG SURGERY"

—Williams JB et al. *JAMA*. 2012 Aug 1;308(5):475-84.

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- The studies that examined post-saphenectomy wound complications show significant superiority for EVH[1–3,5]

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Continued from page 6

Abstracts

11:20	**Improved myocardial engraftment of induced pluripotent cell-derived cardiomyocytes by co-transplantation with mesenchymal stem cells**	*Y. Choi, K. Neef, V. Lenerz, T. Saric, O. Liakopoulos, C. Stamm, T. Wittwer, T. Wahlers (Germany)*
11:30	**A novel native-derived coronary artery model**	*H. Aubin, A. Kranz, J. Huelsmann, A. Lichtenberg, P. Akhyari (Germany)*
	12:00 Lunch	
13:00	**Session 2**	
	Moderators: F. E. Smit, Bloemfontein; G. Lutter, Kiel	
13:00	**Experimental data on tissue engineered aortic valves**	*J. Honge (Aarhus)*
13:15	**Clinical results with in vitro unseeded tissue engineered heart valves**	*A. Haverich (Hannover)*
13:30	**Clinical experience with tissue engineered valves based on decellularized scaffolds**	*J. Kluin (Utrecht)*
13:45	**Transcatheter tissue engineered heart valves**	*G. Lutter (Kiel)*
14:05	**Summary, conclusions**	*P. Dohmen (Berlin)*
14:20	**Session 3**	
	Moderators: M. Kaljusto, Oslo; B. H. Walpoth, Geneva	
14:20	**Annular dilatation and loss of sinotubular junction in aneurysmal aorta: implications for leaflet quality at the time of surgery. A combined static stress and fluid interaction finite element study**	*L. Weltert, M. De Tullio, A. Salica, S. Nardella, R. Scaffa, D. Maselli, R. Verzicco, R. De Paulis (Italy)*
14:30	**Haemodynamic, cinematic and morphological effects of aortic interleaflet triangle annuloplasty in aortic valve repair**	*A. Mangini, C. Romagnoni, M. Contino, R. Vismara, A. Leopaldi, M. Lemma, G. Gelpi, C. Antona (Italy)*
14:40	**Straight versus valsalva graft: importance of pulsatility and eddy currents during systole. An in vitro study**	*A. Salica, G. Pisani, O. Ieropoli, R. Scaffa, E. M. Dell'Amico, D. Maselli, U. Morbiducci, R. De Paulis (Italy)*
14:50	**External aortic root support: A histological and mechanical study in sheep**	*P. Verbrugghe[1], E. Verbeken[1], J. Pepper[2], T. Treasure[2], B. Meyns[1], B. Meuris[1], P. Herijgers[1], F. Rega[1] ([1]Belgium, [2]United Kingdom)*
15:00	**Direct percutaneous transapical left ventricular puncture: feasibility and prediction study using computed tomography coronary angiography**	*T. Modine, M. Kilani, G. Fayad, J. M. Elarid, M. Koussa, J. P. Beregi (France)*
15:10	**The influence of acute matrix metalloproteinase activity on myocardial dysfunction associated with urgent cardiac surgery: cardioprotective effects of inhibition**	*E. Teh, D. Chambers (United Kingdom)*
15:20	**The anti-atherogenic potential of aspirin and clopidogrel in hypercholesterolaemic male rabbits**	*F. Al-Amran, N. Hadi, B. Mohammad, H. Tahir, H. Hamza (Iraq)*
15:30	**Prevention of arterial graft spasm using vasodilator-eluting biodegradable nano-scaled fibre in rats**	*K. Yagami, A. Ogata, M. Satake, H. Kaneko, H. Oshima, A. Usui, Y. Narita (Japan)*
15:40	**Shockwave therapy differentially activates endothelial cells: implications for the control of inflammation**	*J. Holfeld[1], C. Tepeköylü[1], A. Urbschat[2], K. Zacharowski[2], M. Grimm[1], P. Paulus[2] ([1]Austria, [2]Germany)*

Nurses

Nurses, Nurse Practitioners and Physician Assistants

Rooms 120/121

08:30	**Welcome**	*L. Hamilton (Newcastle upon Tyne)*
08:35	**Session 1: Optimizing preoperative care**	
	Moderators: M. Brunott, Rotterdam; T. Bartley, Birmingham	
08.35	**Nurse-driven outpatient clinics, preoperative assessment**	*S. Laidler (Newcastle upon Tyne)*
08.55	**EuroSCORE II: importance and rationale**	*S. Nashef (Cambridge)*
09.15	**Options for improving physical fitness: is there evidence?**	*P. Agostini (Birmingham)*
09:40	**Session 2: Theatre: making for a better tomorrow**	
	Moderators: R. van Valen, Rotterdam; D. Bordinggaard, Odense C	
09.40	**NOTTS/teamwork in operating room**	*tba*
10.00	**Surgical site infections**	*J. Tanner (Leicester)*
10.20	**Radial artery harvesting: what can go wrong?**	*C. Ruiz*
10:40	**Working in a hybrid room: vision and reality**	*M. Steen and B. E. Mikkelsen (Odense C)*

Continued on page 10

Quality Improvement Programmes 08:30-10:00 **Room 115-117**

ACS Commission on Cancer National Pilot Study for ProvenCare Lung Cancer

Douglas E Wood, *Professor and Chief, Division of Cardiothoracic Surgery, Vice-Chair, Department of Surgery, Endowed Chair in Lung Cancer Research, University of Washington, Seattle, USA*

In 2006 Geisinger Heath System developed the ProvenCare™ model to improve the reliable delivery of high quality care. The focus of the model is on high reliability and sustainable processes with a strict reliance on evidence-based care. When initiated for coronary artery bypass surgery, the ProvenCare™ model showed improvements in surgical complications, hospital length of stay, readmission rates, and hospital margin, and was expanded to bariatric, cataract, and hip replacement surgery, and subsequently to diabetes and adult preventive care. Geisinger has partnered with the American College of Surgeons Commission on Cancer (ACS CoC) and the Society of Thoracic Surgeons to develop the first multi-institutional ProvenCare project focused on lung cancer surgery. The ACS CoC sponsored ProvenCare™ initiative is focused on the surgical lung cancer patient from preadmission, through admission and surgery, and to outpatient clinic followup. Lung cancer is the most common cause of cancer death in the U.S. for both men and women, with higher mortality than breast, colon, and prostate cancer combined. Surgery provides the predominant opportunity for cure, yet there remain large variations in care across the United States that undermine quality and outcomes for lung cancer patients. The Lung Cancer ProvenCare™ Collaborative has identified 38 evidence and consensus-based process measures to improve the reliable delivery of high quality lung cancer surgery.

Several diverse institutions were invited to join a national collaborative engaged in reliably delivering the highest quality care and significantly improving patient outcomes, organizational efficiency and reducing costs for the surgical lung cancer patient. Six medical centers participated in Phase I of the Collaborative which was initiated in July 2010. (see map)

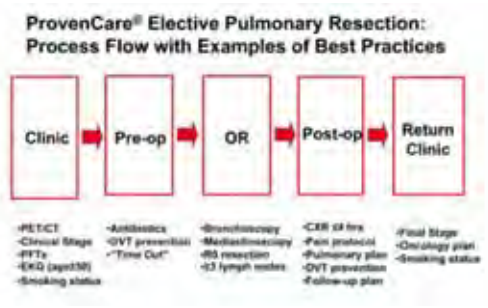
In Phase II, 6 additional hospitals have joined the Collaborative in August 2012.

Two categories of outcomes will be studied:

1 compliance with the elements of care, and
2 clinical outcomes. All-or-none compliance will be the chief metric. The secondary outcome will be whether the ProvenCare process result in decreased morbidity and mortality in patients undergoing resection for lung cancer. The STS General Thoracic Surgery Database will serve as the control cohort.

ProvenCare™ principles focusing on systems approaches and hardwiring reliability into evidenced-based practice has been effective in improving outcomes and decreasing cost within the Geisinger Health System. The ACS CoC Collaborative is a test of whether these principals can extend to cancer care, and can be more broadly generalized in a multi-institutional setting. If successful, the ProvenCare™ model may be appropriate to extend to more medical centers, as well as to a wider spectrum of care.

Douglas Wood



Vascular: Session 1 - Infections in the cardiovascular system 10:15-11:55 **Room114**

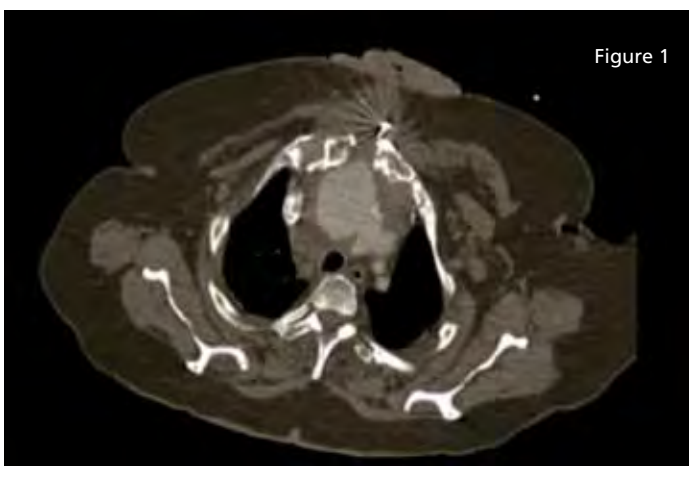
Surgery in native and prosthetic active infective aortitis

Thierry Carrel *Berne, Switzerland*

Infection of a vascular prosthesis or endovascular stent-graft is probably the most serious complication that may occur after implantation and dramatically affects the patient's outcome.

A 77 year old female patient underwent aortic valve replacement and coronary bypass grafting in 2007 in another hospital. Evolution was uneventful until December 2011. After repeated episodes of pulmonary infection, a CT-scan showed a large pseudo-aneurysm of the distal ascending aorta. The site of aortic rupture was closed with a Gore-Tex patch and a Staphylococcus aureus infection treated appropriately. Two months later, a small cutaneous lesion on the cranial part of the sternotomy started bleeding. CT-scan demonstrated recurrence of a false aneurysm with arrosion of the sternum and a large subcutaneous hematoma caused by a perfused fistula to the aorta (Figure 1). The patient was transferred to our institution.The challenges of this case include safe surgical approach (sternotomy, canulation, perfusion, cerebral protection) as well as complete removal and extensive debridement of the infected material and reconstruction of the ascending aorta and aortic arch using biological material only (Figure 2).

Thierry Carrel



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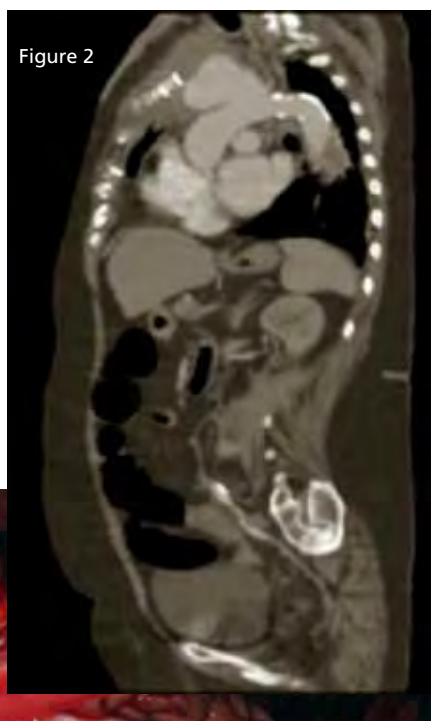

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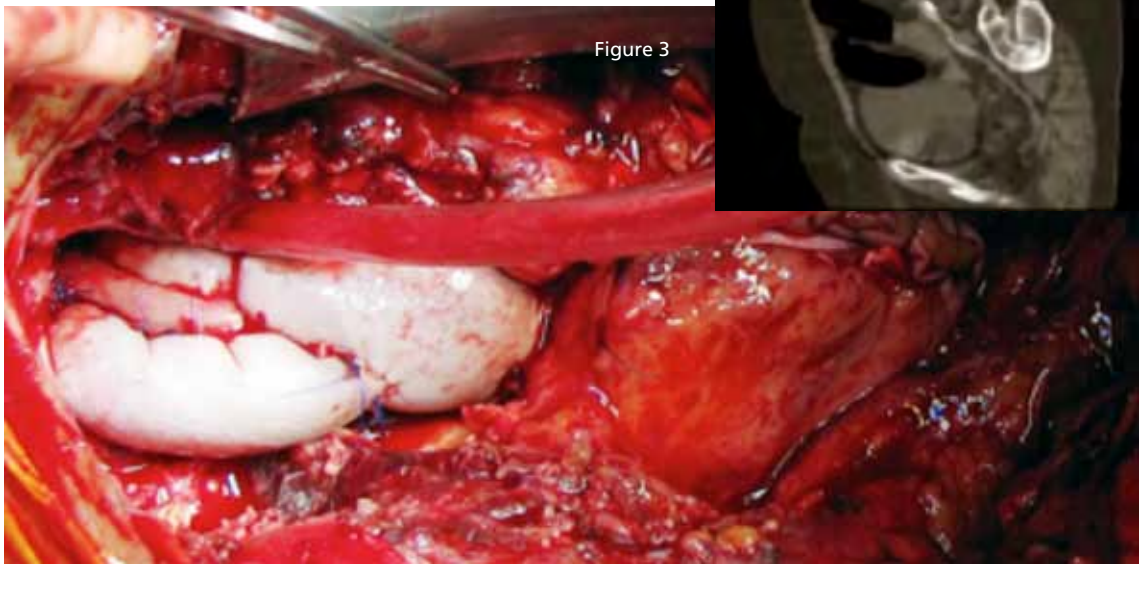


Figure 3

This case and some similar patients will be presented. The most common etiology of graft and/or prosthetic valve infection is usually wound-related infection, followed by seeding from distant infection sites (lung, urinary tract). Surgical treatment is almost always required but even after surgery, morbidity can be significant. Operative procedure must be tailored according to the individual patient and to the experience of the surgical team. Complete resection of the infected foreign material with débridement of the surrounding tissue gives most probably the best results. Orthotopic reconstruction is the best option for all thoracic and thoracoabdominal pathologies and the use of coated prostheses, homografts or self-made vascular tubes from xenopericardial tissue has to be discussed from case to case. In some exceptional situations, endovascular stent-graft can be performed as bridging to a more complete treatment if general condition of the patient has to be stabilized.

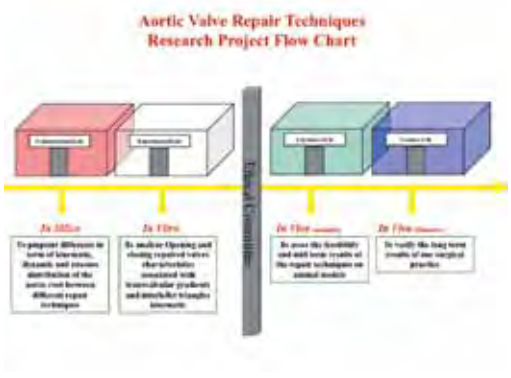
Basic science: Session 3 14:20-16:00 **Room 118/119**

Haemodynamic, cinematic and morphological effects of aortic interleaflet triangle annuloplasty in aortic valve repair

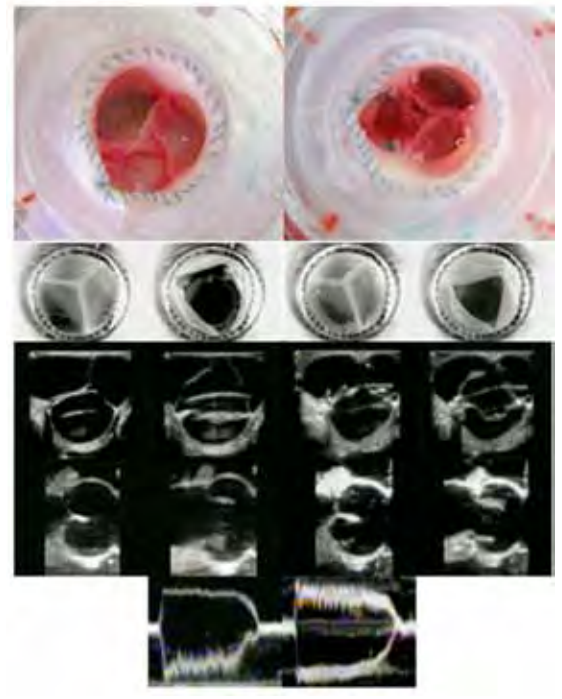
Andrea Mangini[abc], Claudia Romagnoni[ac], Riccardo Vismara[abc], Alberto Maria Leopaldi[bc], Monica Contino[ac], Massimo Giovanni Lemma[ac], Gianfranco Beniamino Fiore[bc], Carlo Antona[acd] *[a] Cardiovascular Surgery Department, "Luigi Sacco" University General Hospital, Milano, Italy; [b] Bioengineering Department, Politecnico di Milano, Milano, Italy: [c] ForCardio.Lab, Università di Milano – Politecnico di Milano, Milano, Italy; [d] Università degli Studi di Milano*

Aortic interleaflets triangles anuloplasty (AITA) is a simple reparative technique used to achieve aortic root functional unit (ARFU) stabilization, improving leaflet coaptation and functional valve reserve. Previous studies carried out by our research group using both finite element modelling and anatomical observations on formol-fixed human hearts demonstrated that AITA performed at 50% of the interleaflets triangles height (ITH) optimized valvular regurgitant area, coaptation area and virtual basal ring (VBR) diameter size restoration. Purpose of the present study was an experimental validation of these findings by means of an in vitro study performed in controlled and well-repeatable conditions. In particular, the effects of AITA performed at 50% of the ITH on valve hydrodynamic behaviour, leaflets opening and closing characteristics and ARFU morphology were evaluated. The study was carried on in the FoRCardioLAB, a joint venture between cardiac surgeons and bioengineers in the "L.SACCO"University Hospital, in collaboration with the Bioengineering Department of the Politecnico di Milano. The FoRCardioLAB is open to everyone who wants to research in the field of aortic valve or root repair or replacement with innovative prosthesis.

Andrea Mangini



21 porcine aortic roots were tested on a pulsatile mock loop. Each sample was firstly tested in basal condition and after surgery. During each test hydrodynamic data, high-speed digital videos and echographic images, both in B.mode and M-mode, were recorded. The comparison between pre- and post-surgery data showed a statistically but not clinically significant increase in pressure drop across the valve (from 2.70 (2.23-4.04) to 5.30 (4.23-8.44)mmHg) and an effective orifice area (EOA) significant reduction (from 3.83 ± 0.86 to 2.76 ± 0.67cm^2). We observed an opened valve time reduction ($p < 0.01$), due to an opening time reduction ($p < 0.01$), offset by a closed valve time increase ($p < 0.01$), a slow closing period increase ($p < 0.05$) and a rapid closing phase reduction ($p < 0.01$) without influence on the total closure time. We verified a significant reduction of VBR (from 2.58 ± 0.36 to 2.32 ± 0.35cm in systole, from 2.12 ± 0.31 to 1.91 ± 0.34cm in diastole), Valsalva sinuses diameter (from 3.68 ± 0.21cm to 3.5 0 ± 0.33cm in systole, from 3.52 ± 0.25 to 3.26 ± 0.32cm in diastole), maximum leaflets opening ($p < 0.01$), maximum leaflet distance ($p < 0.05$), leaflets opening before the rapid valve closing time ($p < 0.01$) and maximum opening area (from 3.99 ± 0.51 to 2.78 ± 0.48cm2) and an increase in coaptation height (from 1.51 ± 0.28 to 1.66 ± 0.26cm) and length (from 1.17 ± 0.25 to 1.35 ± 0.22cm). This experimental study demonstrated that AITA performed at 50 % of the ITH determines a reduction of the FAA and an increase in leaflets coaptation, thus improving the valve functional reserve, coherently with the rationale of this surgical technique. Some of the measured changes found in the shape and functioning of the ARFU were statistically significant, still limited to non-clinically relevant extents. Our findings suggest that no clinically threatening alterations of the hydrodynamic, kinematic or morphological valve behavior should be expected in the immediate post-operative scenario.



Perfusion: Extracorporeal circulation 11:45-12:45 **Room 112**

Activated Recombinant Factor VII in cardiac surgery – An update

Mike Herbertson *Consultant Cardiac Anaesthetist, Southampton UK*

Activated Recombinant Factor VII [F7A, NovoSeven] was first introduced by NovoNordisk for patients with congenital haemophilia and with inhibitors to normally factor replacements. In the 1990's its use widened to a range of off label settings including severe haemorrhage in patients peri-operatively and after severe trauma. F7a has been used off label in the setting of severe bleeding in cardiac surgery for well over a decade now.

In cardiac surgery it has been used for many thousands of patients worldwide and from clinical observation has contributed to saving the lives of many cardiac surgical patients. As professionals in cardiac surgery and cardiac anaesthesiology we have gone from the first tentative steps of using it in the face of catastrophic bleeding to using it with much greater certainty and enthusiasm.

In the cardiac surgical center in Southampton, England, our use of F7a has probably mirrored what has happened across much of the world. We used F7a from 2000 onwards and had used it for 42 patients by 2004. These were all patients with life threatening haemorrhage after cardiopulmonary bypass [CPB]. We do not have a comparable non-treatment group, but clinical experience would suggest that only 10-20% these patients would have survived without F7a. We had a survival rate of 63% in this patient group[1]. This mirrors the broader findings of much early off label experience with F7a[2].

Demonstrating benefit in controlled trials has been a less fruitful experience with F7a. We undertook a pilot randomised controlled trial in patients having complex cardiac surgery, who were considered at very high risk of serious haemorrhage after CPB[3]. Patients in the treatment group received F7a after protamine. Of the 10 patients in each group, eight controls required a tranfusion of red blood cells or coagulation products, compared to two patients receiving F7a. The placebo group overall received 105 units of blood and coagulation products compared to 13 units for the two patients transfused in the treatment group.

The main randomised control trial investigating the utility versus risk of F7a given after CPB in routine cardiac surgery[4] consented 2619 patients from 2004-2007. 172 patients were randomised and dosed with placebo or F7a in a 2:3 ratio for receiving placebo or F7a at 40 or 80mcg/Kg. Patients in the treatment arms showed a significant reduction in blood transfusions and in rate of re-sternotomy for haemorrhage. However there was also a clear trend towards excess thrombotic events in the treatment arms.

The role of F7a is in reality, for most cardiac surgical centers, not so different now to where we were 10 years ago! F7a does not seem to have a well-defined role for routine use to decrease blood loss in cardiac surgery. It does have a very significant role for helping control severe haemorrhage after CPB. We are probably more attuned to which patients will benefit from use of F7a compared to 10 years ago and we should not lose enthusiasm for a drug which has a very positive role, even if not a routine one.

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Perfusion: Extracorporeal circulation 11:45-12:45 **Room 112**

How to start a mini-bypass programme: tips and tricks

Leanne Harling, Hutan Ashrafian and Thanos Athanasiou *Department of Cardiothoracic Surgery, Imperial College London, UK*

The evolution of cardiopulmonary bypass (CPB) in the early 1950's revolutionized cardiac surgery, providing a platform on which surgeons could treat an increasingly complex set of both congenital and acquired cardiac diseases. Despite high early mortality rates, the subsequent introduction of commercialized systems, technical innovations in oxygenator design, use of hypothermia and advances in myocardial protection have resulted in the development of safe and reliable systems now used in operating theatres worldwide. In recent years, advances in perfusion have led to the introduction of the miniaturized extra-corporeal circuit, a closed system that removes the blood-air interface and reduces both prime volume and circuit tubing length. These modifications aim to reduce platelet activation, minimize haemodilution and cellular damage thus beneficially affecting clinical outcomes; reducing blood loss, transfusion, post-operative atrial fibrillation and renal impairment.[1] Nevertheless, it has taken some time for miniaturized systems to gain acceptance and although increasing in popularity, many surgical teams remain skeptical. This may be in part explained by early safety concerns such as air entrainment and embolization.[2] However, the lack of clearly defined guidelines and poor perfusion training amongst surgeons, nursing and anaesthetic staff undoubtedly contributes to the reluctance to adopt this technique. In order to ensure the successful introduction of a miniaturized CPB programme, we propose it should be afforded the same planning and attention as with any novel surgical procedure. Key aspects must be addressed from initial cost analysis and business planning to the integration of miniaturized CPB into the continuing medical education of surgical, nursing and anaesthetic teams. MECC is not just a job for the perfusionist and requires multidisciplinary changes.[3] The anaesthetist must be aware of the fluid management implications of both the mECC circuit and retrograde prime, the surgeon must accommodate for the use of cell salvage rather than cardiotomy suction and intra-cardiac vents, and communication between the perfusionist, anaesthetist and surgeon is paramount. In summary, the early days of MECC undoubtedly involve a steep learning curve for any institution. However, by sharing our experience of simple planning and a dedicated programme we hope that we may help alleviate many of these problems.

References:

1 Harling L, Warren OJ, Rogers PL, et al. How minimalized extracorporeal circulation compares with the off-pump technique in coronary artery bypass grafting. ASAIO J 2010;56:446-56.
2 Nollert G, Schwabenland I, Maktav D, et al. Miniaturized cardiopulmonary bypass in coronary artery bypass surgery: marginal impact on inflammation and coagulation but loss of safety margins. Ann Thorac Surg 2005;80:2326-32.
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Cogenital 10:30-16:00 **Room 111**

Echocardiography meets cardiac surgery

Manfred Vogt
Paediatric Cardiologist as a guest speaker in Barcelona

Manfred Vogt

Echocardiography is the leading diagnostic feature in congenital cardiology at any ages. Many of the congenital lesions are operated based on echocardiographic data only. This is why EACTS has decided to invite a dedicated speaker to join the 26th annual meeting in Barcelona for a Post Graduate Course – Congenital Domain. Professor Dr. Manfred Vogt, Head of the Echocardiography department at German Heart Centre Munich will join the surgical community to focus on two different topics within four talks: First will be morphology of common arterial trunk and of complex transposition of the great arteries based on Echocardiography second are two talks on intraoperative evaluation of quality of repair in Tetralogy of Fallot and after repair of aortic valve.

The two morphological talks are co joint together with two talks of Dr. Andrew Cook, Senior Lecturer on cardiac morphology, Institute of Child Health, London. The latter one will show principal pathologies in the two clinical entities, based on video based post mortem specimen – Vogt will show the corresponding clinical features based on in vivo ultrasound examinations. This entity of morphology and clinical picture has shown to be very educative especially for young doctors in training.

But beside the clinical preoperative evaluation echocardiography plays a major role in the operation theatre. By means of transesophageal or epicardial echocardiography experienced cardiologists have to evaluate the surgical result immediately after leaving bypass as a standard procedure. According to literature in about 10–15 per cent they will detect findings that can be ameliorated on going back to bypass in the same operation thus avoiding reoperations later on.

Professor Dr. Vogt will show examples of intraoperative decision making after aortic repair and after repair of Tetralogy of Fallot thus showing the close interaction of congenital cardiac surgery and congenital cardiology in a team approach in the operation room.

Continued from page 8

11.00	**The role of the anaesthesia nurse, a vital one**	*J. W. Nieland and T. Haverkam (Zwolle)*
11:20	**Session 3: Postoperative quality improvement**	
	Moderators: D. Bordinggaard, Odense C; J. Tanner (Leicester)	
11.20	**Interventions by nurses: proven safe and effective?**	*D. Danitsch (North Staffordshire)*
11.40	**MRSA management**	*M. Stenger (Odense C)*
12:00	**The impact of the cardiothoracic ward Nurse Practitioner**	*D. Southey (Wolverhampton)*
12:20	**Lunch**	
13:15	**Session 4: Innovations in patient care**	
	Moderator: R. van Valen (Rotterdam)	
13:15	**Nurse perfusionists in Spain**	*M. Mata (Barcelona)*
13:35	**Chest tubes and thoracic surgery: have things changed?**	*A. Maat (Rotterdam)*
13:55	**Extracorporeal life support in Intensive Care Unit of Emergency Room**	*J. Lipton (Rotterdam)*
14:15	**3D ultrasound: preoperative and perioperative benefits**	*A. Nierich (Zwolle)*
14:35	**Session 5: Hands-on sessions with industry and surgeons**	
	Introduction	
	R. van Valen (Rotterdam); D. Bordinggaard (Odense C)	
	Sternal closure devices	*Synthes*
	Extra corporal life support	*Maquet*
	Drainage systems	*Atrium*
16:15	**Adjourn**	

Leadership

Rooms 122/123

13:30 Working within multi-disciplinary teams

Ian Smith: Maguire Healthcare / Maguire Business Solutionss

Programme Introduction:

The aims of this programme are to give an overview of the stages through which teams develop and the role of the leader at each stage. It also heightens the delegates appreciation of their own supporting role to help their team achieve its' goals.

As most healthcare situations require a number of disciplines to work together, it is important that delegates also understand that there will be conflicting priorities, agendas and personal interests within the confines of the team.

Learning Objectives:

By the end of this programme, delegates can:

- List the components which enable a team to perform effectively
- Understand the importance to the team focus of values, culture and goals
- Apply the knowledge of different types of teams to plan and prepare for successful outcomes
- Discover leadership skills needed to work within multi disciplines, and know when to use which style and in which situation
- Understand the different team roles (including their own) and how to ensure there is balance within the team.

The programme agenda:

Introduction, agenda, outline expectations and aims:

- What makes a high performing team?
- Setting goals, values, standards and objectives
- Primary and secondary teams
- Leading and Managing different disciplines: Agendas; Priorities; Politics; Power
- Leadership skills required for multi – disciplinary projects
- Your team roles
- Reflection, feedback and action plans.

Cardiac: Session 1 - coronary surgery 10:30-12:10 **Room 115-117**

The Coronary Trial

David Taggart *Radcliffe Hospital, Oxford, UK. Disclosure: A participant of the trial and an author in the* NEJM *publication*

David Taggart

Since its initial description almost three decades ago there has been continuing controversy over the role of off pump CABG in comparison to on pump CABG. The debate is largely focused around whether off pump CABG reduces the common adverse sequelae of CABG but also whether it may lead to a reduced number and quality of grafts. Overall in the UK the number of off pump CABG remains at around 20% of all CABG.

In an effort to answer these questions the Coronary Trial, organised by Professor Lamy and Yusuf and many other colleagues, recruited 4,752 patients in 79 centres in 19 countries. The Trial was funded by the Canadian Institutes of Health Research (Clinical Trials. Gov No NCT00463294) and published in the New England Journal of Medicine on 19th April 2012. At 30 days there was no significant difference in the primary composite outcome of death (2.5%), non-fatal stroke (1%), non-fatal myocardial infarction (7%) or renal failure requiring dialysis (1%). being around 10% in both groups.

There were reductions in other aspects of morbidity with off pump CABG, in particular bleeding and renal and respiratory injury but at an increased rate of early repeat of vascularisation (0.7% versus 0.2%). Although there were statistically fewer grafts performed in the off-pump group (3.0 vs 3.2, p<0.001) this is unlikely to be of clinical relevance.

The findings in the CORONARY trial also differ from the ROOBY trial, the previously largest trial of off-pump and on-pump CABG (also published in NEJM), that actually reported less favourable outcomes with off-pump surgery. CORONARY is therefore reassuring in showing no significant adverse clinical outcomes with off-pump CABG and the differences in conclusions between the two trials is probably due to the fact that CORONARY enrolled almost double the number of patients, included a higher risk population (30 day mortality of 2.5% vs 1.4% in ROOBY) and was far more stringent in only recruiting surgeons with a high level of expertise in off-pump surgery

What can we learn from these trials ? The first message is that CABG whether performed on or off-pump is a remarkably safe procedure given the increasingly elderly and sick population on whom we operate. Second, we can conclude that there are few differences in major clinical outcomes at 30 days with on and off pump CABG in most patients and in particular off-pump CABG does not lead to poorer outcomes (and indeed appears to reduce bleeding and renal and lung injury). There is still a question mark as to why off-pump CABG increases the need for earlier repeat revascularization albeit in <1% patients and what are the predisposing factors: in particular is it related to surgical expertise and technical skills ?

Finally, what do these trials not tell us ? What is still unresolved is whether off pump CABG may have a greater beneficial clinical impact in those patients who are highest risk for CABG as several registries continue to show significant reductions in mortality and all aspects of major morbidity in such patients (a situation not dissimilar to the conflicting evidence between trial and registry findings between surgery and stents). This is also particularly true of stroke when a true no-touch aortic technique (avoiding bypass and any aortic manipulation) has been repeatedly reported to almost eliminate the risk of stroke.

Cardiac: Session 1 - coronary surgery 10:30-12:10 **Room 115-117**

Bilateral internal thoracic artery grafting

Fernando Moraes *Heart Institute of Pernambuco, Recife, Brazil*

The use of internal thoracic artery (ITA) began more than 30 years ago, but the first relevant report about its use in coronary artery surgery was made by Loop et al showing better patency rate than the saphenous vein, the most used graft at that moment.The same group reported also better survival, less myocardial infarction and need for repeat revascularization.

Because of the excellent results and biological similarities it is rational that there will be an additional benefit whether we use both arteries in the operation. It was also demonstrated that the right internal thoracic artery could have very high patency rate mainly if it is used to revascularize coronary arteries from the left side of the heart with obstruction greater than 70%.

Regarding which coronary artery we should place the right internal thoracic artery, Tatoulis et al. recently showed that it can be anastomosed to the LAD or CX territories with similar patency rates.

Several studies have shown that when both ITA (BITA) were used there was an important impact in long-term survival comparing with the use of only one ITA. Although this evidence was demonstrated in a metanalyses, the use of BITA is still low (5% in USA, 10% in Europe and 30% in Japan). The low rate of BITA has been justified, by some surgeons, due to prolongation of operating time, there is a higher risk of infection in diabetic patients and there is no difference related to survival in the first years after the operation. Recently, Puskas et al. published the influence in survival after 10 years with the use of BITA, even in diabetic patients.

Contemporary data have demonstrated, not only benefit in survival, but similar and very low deep sternum wound infection if you harvest the ITA skeletonised. This technique preserves sternum perfusion, compared to pedicled. Another important issue is establish a rigorous glicemic control in the first three pos-operative days (<150mg/dl).

Having said that these are no longer justifications to non use of this technique in myocardial revascularisation.

The ART Trial randomized 3,102 patients to do BITA or SITA with supplemental radial artery or veins. Although the primary outcome is 10-year survival, the 30 day and one year results were similar. BITA had an increased need for sternal wound reconstruction(1.3%) a finding not significant. We expect this study will result in grade IA recommendation for the use of BIMA in myocardial revascularization patients.

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Nurses, Nurse Practitioners and Physician Assistants: Session 2 - Making for a better tomorrow 09:40-11:20 **Room 122/123**

Radial artery harvesting – What can go wrong?

Cristina Ruiz *South Tees Hospitals, Middlesborough, UK*

In-surgery errors have been traditionally associated with secrecy and embarrassment, often reaching an unsatisfactory endpoint with no resultant education. Application of the Human Factors Approach to error management in surgery can identify factors impacting in human performance and patient safety. Surgeon inexperience, excessive workload, fatigue, insufficient supervision of trainees, poor communication, lack of leadership and complex surgical procedures, make operating theatres a high risk environment. A number of studies around the world estimate that a degree of error occurs in 5–15% of all hospital admissions, with 45% of errors occurring in the operating theatre. Valuable lessons may be learned from the aviation experience with error management. Human Factors Approach to error recognises the potential for errors occurring due to human limitations, and it encourages error reporting in a non-punitive environment, in order to prevent future errors.

The utilization of the radial artery as a conduit has increased significantly over the past years, however it is still only accounting for less than 15% of the total arterial grafts. Compare to others conduits, the radial artery harvesting technique is more complex. Several important anatomical structures lie very close to the radial artery, which can lead to potentially serious complications including nerve injury and impaired hand circulation.

Several anatomical variations of the radial artery have been reported, the superficial dorsal branch of the radial artery is present in about 3% of cases, and persistent median artery as an embryonic remnant of the axial artery of the upper limb, occurring in 8% of cases. Although these variations are rare it is important for practitioners to be aware of them to enable them to perform radial artery harvest successfully.

This presentation will review the normal and abnormal anatomy of the radial artery including documented cases of anatomical variation of the radial artery on the forearm and discuss the possible risks associated with this procedure. We will also include our own experience of inadvertent removal of the median nerve by two experienced medical colleagues. With the concept of Human Factors we retrospectively analyzed and identified the contributing factors involved in this adverse event which greatly enhanced our understanding of the key determinants for high performance in surgery and good clinical outcomes in high-risk environments like operating theatres.

Vascular: Contoversies of open and endo controveries 13:00-16:20 **Room 114**

Experimental and clinical pharmacology in aortic disease

Klaus Kallenbach *Department of Cardiac Surgery, University Hospital Heidelberg, Germany*

Klaus Kallenbach

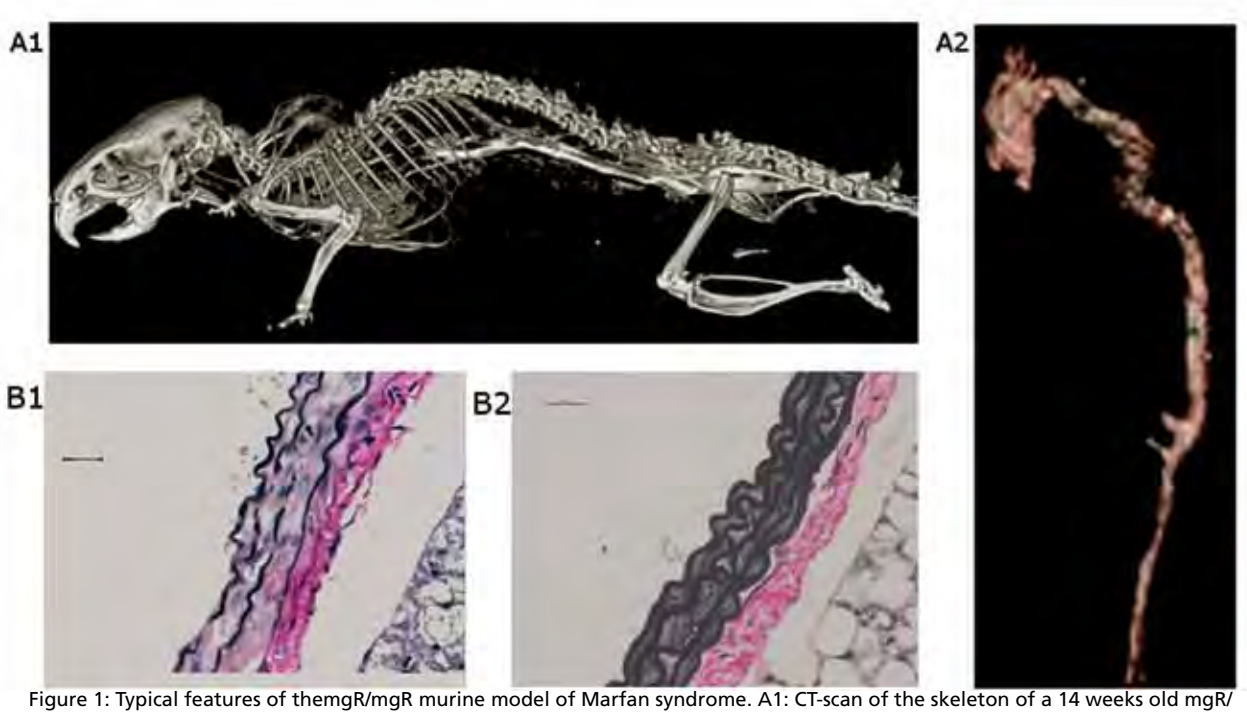


Figure 1: Typical features of themgR/mgR murine model of Marfan syndrome. A1: CT-scan of the skeleton of a 14 weeks old mgR/mgR mouse. A2: CT-scan of the Aorta. Note the aneurysm in the ascending aorta and the aortic kinking. B1: Aortic elastolysis of mgR/mgR mouse (note the disruption and rarefication of the elastic fibres in the media). B2: Healthy aorta of a wild-type mouse (elastic fibres are thick and intact).

The development of aortic aneurysm and acute aortic dissection remains not fully understood. Research on Marfan syndrome (MFS) helped to understand the molecular mechanisms of aortic disease in general. In 1991, for the first time a pathogenic mutation in the Fibrillin-1-Gen (FBN1) on chromosome 15 was found to cause a marfanoid phenotype. Since then, the role of TGF-ß and its co-factors as well as the role of matrix-metalloproteinases (MMPs) in the development of aortic aneurysm has been investigated thoroughly, resulting in important findings. For example, the Loeys-Dietz-Syndrom, associated with aneurysm formation in early childhood and high rates of aortic dissection at small diameters, is genetically defined by a mutation of the TGFß-Receptors (TGFBR1/2). These findings allowed a rationale for drug therapy aimed to reduce aneurysm growth. Indeed, Habashi et al. demonstrated that Angiotensin-1 receptor antagonists (AT1RA), such as Lorsartan, are capable of reducing aneurysm growth and achievement of normal vascular phenotype by blockade of TGF-ß-signalling in a mouse model of MFS. Further research from the group in Baltimore and others demonstrated that Pravastatin, ACE-Inhibitors and ERK-Antagonists reduce aneurysm growths in Marfan mice, too, utilizing the understanding of the TGF-ß-signalling cascades for new treatment options.

All important developments in the understanding and treatment of MFS on the molecular level were obtained by use of genetically modified mouse models of MFS. Several models are available today, aimed to mimic the phenotype of MFS. We use the mgR/mgR mouse model, where an insertion of a neo-cassette into fibrillin-1 gene leads to a 5-fold reduction of elastin. mgR/mgR-mice present with typical phenotypic features of human MFS such as skeletal deformations and aortic root aneurysm formation (figure 1A), resulting in aortic dissection in 49 out of 50 animals. We were able to show that aortic elastolysis affects all parts of the aorta (figure 1b), but significant aortic dilatation is only observed in the ascending aorta. To clarify the role of matrix-metalloproteinases (MMPs) in the process of elastolysis of marfanoid aorta, we experimentally blocked elevated MMP-activity in mgR/mgR-mice by adenoviral overexpression of TIMP-1 in a heterotopic transplant model of the diseased aorta. We reduced the activity of aortic MMPs with this approach; however, it remains open if elastolysis in the aortic media can be treated with this strategy, and we learned that the endothelial dysfunction in MFS may play a key role in development of medial elastolysis. Furthermore, it has been shown by other groups that Doxycycline, already clinically applied for treatment of AAA, has the potential to experimentally prevent thoracic aortic aneurysm in MFS by Inhibition of MMP-2 and 9.

The translation of experimental results into clinical application became true for several drugs. Since the therapeutic benefit of ß-blockade both in murine and human MFS for prevention of aortic root aneurysm is rather weak, AT1RA (Losartan) and ACE-Inhibitors (Enalapril) were introduced into clinical practise in prospective randomized trials. Both drugs showed highly significant reduction of aneurysm formation in murine models. In humans, first results are promising: Yetman et al. were able to show that ACE-Inhibitors increased aortic elasticity and reduced aortic stiffness, resulting in significantly reduced size of the ascending aorta compared to ß-blocker therapy in Marfan patients. Brooks et al. demonstrated that treatment with Losartan results in significant reduction of yearly increase of the diameters of aortic root diameter and sinotubular junction in children, compared to the time before initiation of Losartan therapy. However, both trails were not randomized and lack of adequate patient numbers. Several prospective, randomized single or multi centre trails are under way to investigate the potential of medical therapy. Currently, due to the lack of results, the basis of medical treatment of Marfan patients remains ß-blockade. Further research on the molecular pathology with use of genomics is mandatory to differentiate the various hereditary diseases connected to aortic dilatation and to develop a rationale for prophylactic drug therapy. Until then, high vigilance for early detection of aortic disease and proper prophylactic surgical treatment of the aorta remains crucial.

The New Kid on the Block One Year Later

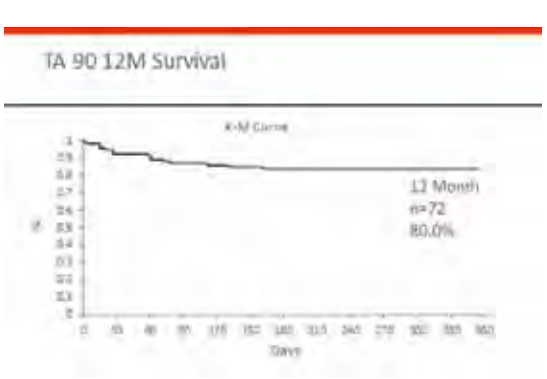
Hendrik Treede
University Heart Center Hamburg, Department of Cardiovascular Surgery, Hamburg, Germany

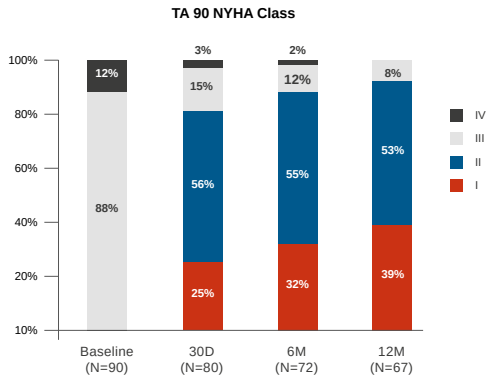
It has been one year since Symetis S.A. received a CE Mark for its ACURATE TA™ Aortic Bioprosthesis and Delivery System. The ACURATE TA™ is designed specifically for transapical access and is available in 3 sizes to treat annuli diameters of 21mm to 27mm. The bioprosthesis is composed of a self-expanding nitinol stent housing a regular porcine tissue valve. Two pre-market clinical trials were performed (n=90) and all patients have reached the 12 month follow-up.

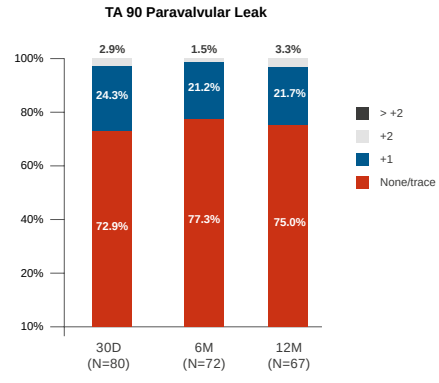
A procedure success rate of 94.4% was shown in the combined study cohort with a 30 days mortality rate of less than 8.0%. Additionally, no further reintervention on the implanted ACURATE TA™ was required once the patient was discharged from the OR. No aortic dissections were reported and most deaths were non-cardiovascular in origin. At 12 months follow-up, pooled data from the pre-approval studies show survival of 80.0%. (Figure 1)

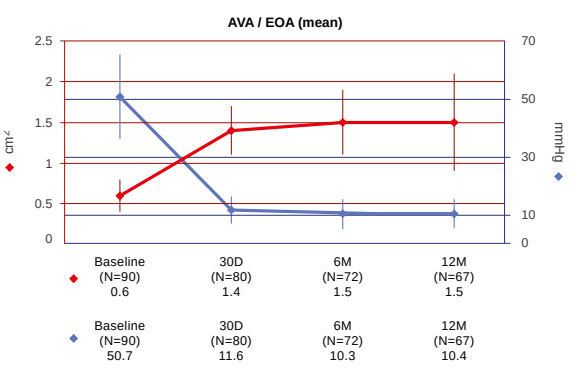
Hemodynamic results at 12 months were good showcasing negligible paravalvular leak rates (leak above +1 in only 2 patients) and stable transvalvular gradient and EOA, a mean of 10.4 ± 4.9mmHg and 1.5 ± 0.6cm2, respectively. Functional improvement was reported in over 90% of patients.

Today, the ACURATE TA™ has taken its place amongst well-established 1st Generation TAVR systems with its comparable safety and efficacy profile established early on in clinical trials. Additionally, the device boasts an unparalleled ease of use that translates into shorter procedure times and virtually no learning curve as compared to competitive products. The full 12 months trial data will be presented at this meeting during the Symetis lunch symposium on Monday, October 29 at 12:45 to 14:00 in rooms 129/130.









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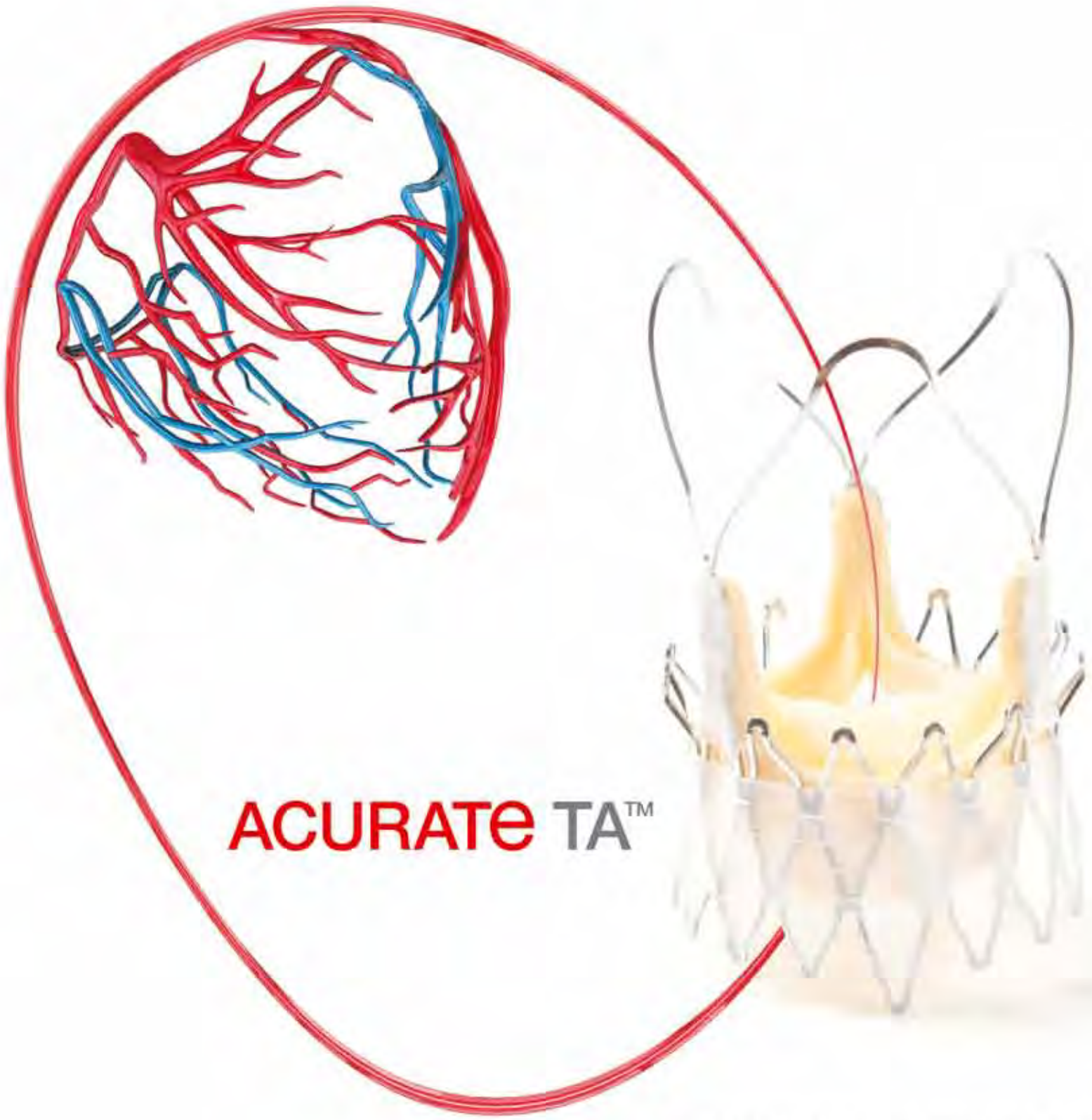

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Perfusion: Session 4 - Case report - worst case scenarios 15:05-16:25 **Room 112**

Prolonged cerebral protection in a case of aortic dissection

R. Mrkonjic, N. Marusic, M. Solaric, N. Lukacevic, M. Sentic *Department of Cardiac Surgery, Clinical Hospital Dubrava, Zagreb, Croatia*

Cardiopulmonary bypass is a nonphysiological situation that can result in a number of organ damages. The situation is getting worse by extending the duration of a bypass. In an aortic arch surgery, a circulatory arrest is inevitability linked to a significant postoperative neurological deficit, whose appearance and breadth are also associated with the duration of thr arrest. In a situation when we have both a prolonged cardiopulmonary bypass time and a prolonged circulatory arrest time, we can certainly expect many complications.

We present a case of a 59-year old female patient, with a chronic aortic dissection, type Stanford B , with a physiologic variation of the right subclavian arthery (a. luzoria), dissection after branching of the brachiocephalic trunk with celiac trunk and superior mesenteric artery branch from the true lumen, renal arteries from false lumen . The patient underwent aortic arch replacement surgery with E-VITA stent graft placement and reimplantation of the supraaortic branches, and ligation of the right subclavian artery.

Surgery duration was 685 min, CPB time was 537 min, and aortic cross-clamping time 244 min.

Cerebral protection was pharmacological (20% mannitol, methylprednisolone, and sodium pentobarbital) and MHCA (24 * C) + SACP 224 min. NIRS monitoring was used. During the entire procedure rSO2 values were over 50%. In the postoperative course the patient had prolonged "waking up" period. In early postoperative course was agitated, later somnolent with left hemiparesis. Brain CT scan showed right occipital ischaemic supratentorial lesion.

After 55 days of ICU stay in our hospital patient was transfered to Clinic for Infectious Diseases because there was a need for intermittent mechanical ventilation and a suspected graft infection. After a while the patient was discharged from Clinic for Infectious Diseases with complete recovery of hemiparesis.

Cardiac: Session 3 - Left Heart Failure 15:00-16:20 **Rooms 115/117**

Surgical Restoration

Lorenzo Menicanti *Dept. Cardiac Surgery, I.R.C.C.S Policlinico San Donato, Milan, Italy*

Surgical Ventricular Restoration (SVR) has been introduced as an optional therapeutic strategy aimed to reduce LV volumes through the exclusion of the scar tissue, thereby restoring the physiological volume and shape and improving LV function and clinical status. Until recently, several studies have shown that surgical SVR is effective and relatively safe with a favourable 5-year outcome. However, in spite of the large amount of reports drawn on various data sets, the results from the STICH trial, which showed no difference in the occurrence of the primary endpoint between patients treated with CABG alone or CABG plus SVR, have called into question the additional benefit of the LV surgical reconstruction. The management of patients with ischemic HF without angina has been a challenge in the past because of the lack of randomized data with patients who predominantly had HF symptoms. Nevertheless, only 49% of the STICH patients were in NYHA class III/IV and the same percentage were in CCS III/IV indicating a population more representative of the real world of ischemic patients independently by the HF. Furthermore, the lack of additional improvement in terms of survival in the SVR group observed in the STICH trial might be due to the inadequate volume reduction, which left the LV end-systolic volume still large (> 60ml/m2), in both arms. To this regard, our group reported the impact on survival of a residual LVESVI of > or < 60ml/m2. We showed that LVESVI following SVR impacts on the probability of death, being significantly higher in patients who remain with a post-operative LVESVI of > 60ml/m2. Moreover, nowadays LGE-CMR (Late gadolinium enhancement – Cardiac magnetic resonance) is gaining widespread use because of the information provided on the amount of myocardial scarring (figure.1) and its relationship with the outcome. Consequently, LGE-CMR should be considered an important diagnostic tool to identify a subset of ischemic HF patients likely to benefit from surgical therapies (figure.2).

Lorenzo Menicanti

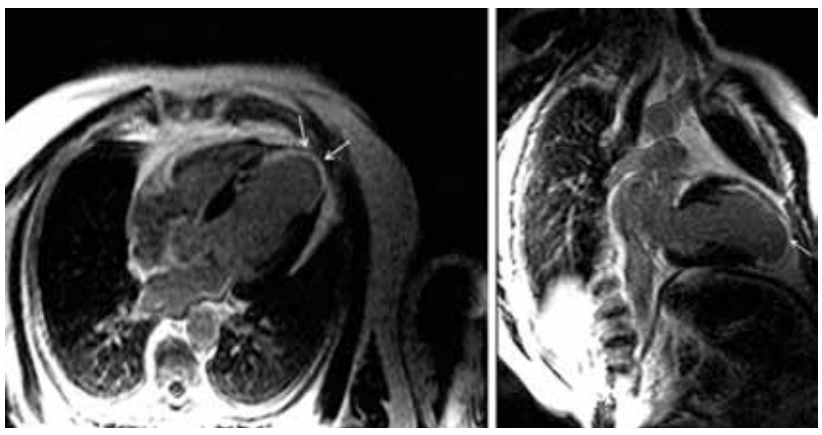

Figure.1 (left): Images have been acquired in a patient after a large myocardial infarction in the left anterior descending artery territory. After gadolinium administration, late gadolinium enhancement indicates a scar in the anterior wall and in the apex.

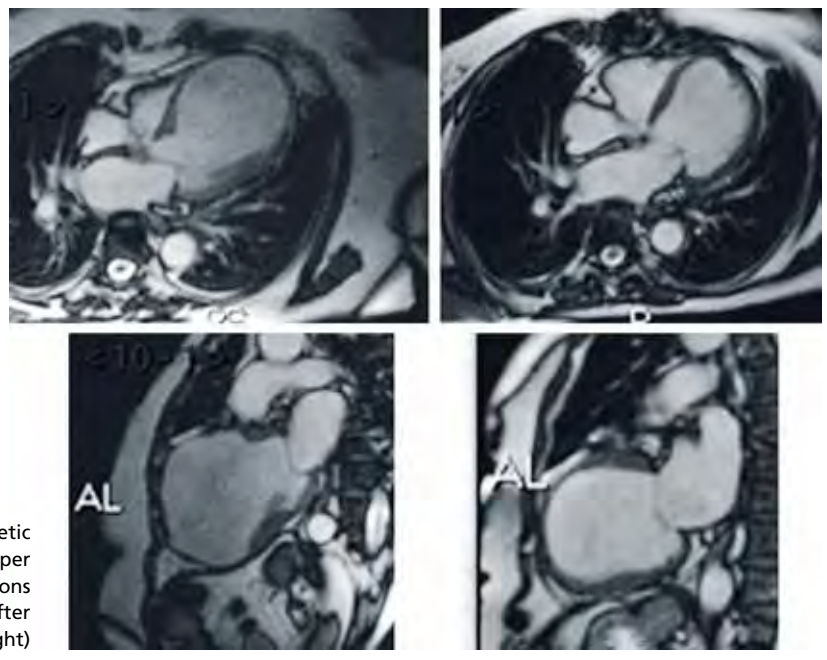

Figure. 2 (right): Cardiac Magnetic Resonance showing four-chamber (upper panel) and two-chamber projections before (on the left) and six months after the operation (on the right)

The choice to add SVR to CABG should be based on a careful evaluation of patients, including symptoms (HF symptoms should be predominant over angina), measurements of the LV volumes, careful assessment of mitral valve, including geometry and MR severity, assessment of the transmural extent of myocardial scar tissue and viability of regions remote from the scar, and should be performed only in centres with a high level of surgical expertise. While it is desiderable that a more detailed analysis of the STICH data, if any, will solve longstanding unanswered question, the Task Force on Myocardial Revascularization of the European Society of Cardiology (ESC) and the European Association for Cardio-Thoracic Surgery (EACTS), recognized the merit of SVR which has been included as a surgical option combined with CABG in selected HF patients with a scar in the LAD territory and a baseline LVESVI ≥ 60ml/ m2 (Class of Recommendation IIb; level of evidence B).

Vascular: Session 3 - Thoracic vascular trauma 15:00-16:20 **Room 114**

Secondary surgical interventions after thoracic endovascular aortic repair

Rune Haaverstad *Professor and Chief, Department of Cardiothoracic Surgery, Haukeland University Hospital, Bergen, Norway*

Rune Haaverstad

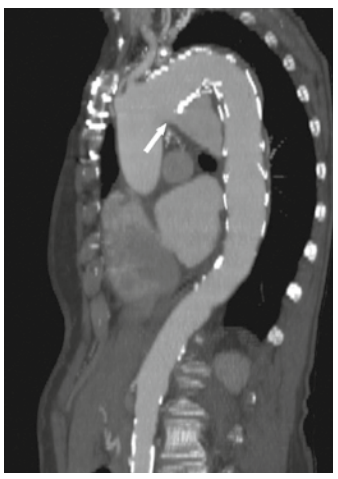

Figure 1: Proximal endoleak (arrow) with aneurysm of the aortic arch and the descending aorta treated with open surgery (including left thoracotomy, ECC and DHCA)

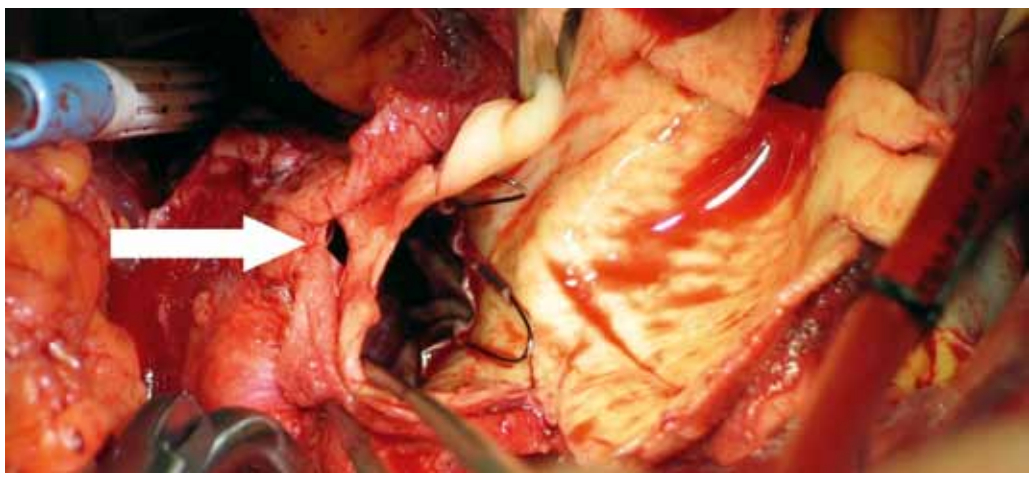

Figure 2: A dissection rift (arrow) in the aortic arch adjacent to a stentgraft strut

Evolving stentgraft technology is expanding the range of clinical indications that are amendable for endovascular solutions. The pace of progress is relatively slow due to the complexity of thoracic aortic pathology and risk of failure. Serious complications include paraplegia, different types of endoleak, stent collapse, retrograde type A dissection and rupture with subsequent morbidity or mortality. Most complications following thoracic aortic stentgrafting can be treated with endovascular repair. However, in 3-5 % open surgery is required to avoid serious events and restore vascular continuity.

Retrograde type A dissection is a feared and not so uncommon complication after thoracic endovascular aortic repair of type B dissections. This can be treated with urgent open surgery with replacement of the ascending aorta and hemiarch using ECC, DHCA and antegrade cerebral perfusion (Figure 1). In endovascular treatment of acute type B dissections stentgraft placement and proximal balloon-dilatation should be done with great care. Both oversizing and stentgraft with bare springs may harm the fragile dissected aortic tissue and cause retrograde type A dissection.

Endograft collaps after TEVAR is most commonly seen following repair of traumatic thoracic aortic injuries and occasionally seen after stentgrafting of acute type B dissections. The risk of endograft collaps is highest during the first weeks after repair and open surgery may be a solution. However, continuous improvements in stentgraft technology seem to have reduced the risk of endograft collapse.

Late stentgraft complications due to proximal or distal type 1 endoleaks can usually be treated with endovascular reinterventions. Some patients develop complications that are beyond the possibility of endovascular treatment and require extensive open surgery through a lateral thoracotomy or thoracolaparotomy with the use of ECC and eventually DHCA (Figure 2).

To avoid further complications due to aneurysm growth and repeated endovascular interventions, open surgery should be considered as the first treatment alternative in thoracic aortic aneurysm with chronic dissection. In patients with aneurysm growth of the arch and descending aorta following previous ascending aorta and hemiarch repair, endovascular treatment is less likely to succeed with the current stentgraft technology. In such cases, open surgical correction should be recommended, particularly in a patient with a short aortic arch.

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Cardiac: Session 3 - Left Heart Failure 15:00-16:20 **Rooms 115/117**

Extracorporeal membrane oxygenation and extracorporeal circulatory support

Friedhelm Beyersdorf
University Heart Center Freiburg, Germany

Acute cardiopulmonary failure is associated with a very high mortality rate. It may occur in an otherwise healthy individual (primary acute cardiopulmonary failure, e.g. acute cardiac failure in patients with acute myocardial infarctions, myocarditis, etc.), in a patient with a known, long-standing, chronic heart disease (secondary acute cardiopulmonary failure), after cardiac surgical procedures or after heart transplantations (primary graft failure).

For immediate and emergency treatment, modern cannulas and devices are available to either support only lung function or both heart and lung function. Extracorporeal membrane oxygenation (ECMO) and extracorporeal circulatory support systems (ECLSs) may be used for isolated pulmonary failure and for both heart and lung failure, respectively.

ECLSs can either be installed via the femoral vessels (femoral artery and vein) or via a sternotomy (for post-cardiotomy patients). Although cannulation for and operation of ECLS are often without complications, the following problems may occur at any time and immediate correction of these defects must be made, in most cases by both cardiac surgeons and perfusionists.

1. Cannulation problems causing inadequate flow
2. Pump and oxygenator problems
3. Left ventricular distention
4. Inadequate coronary and cerebral oxygenation
5. Increased afterload
6. Coagulation and thrombosis of the system
7. Bleeding complications at the cannulation sites

Successful ECLS support can be maintained for a short period of time, i.e. one–two weeks. The goals of these short-term support systems are either a bridge-to-decision or a bridge-to-recovery. Alternatively, they can be used as a bridge-to-bridge, i.e. if another mechanical assist system has to be implanted to facilitate long-term support. These systems include ventricular assist devices (VADs) and total artificial hearts (TAHs). The short-term results (ranging from months to a few years) have improved tremendously during the last years and more knowledge has been acquired concerning the proper indications and timing for implantation.

Friedhelm Beyersdorf

Cardiac: Session 3 - Left Heart Failure 15:00-16:20 **Rooms 115/117**

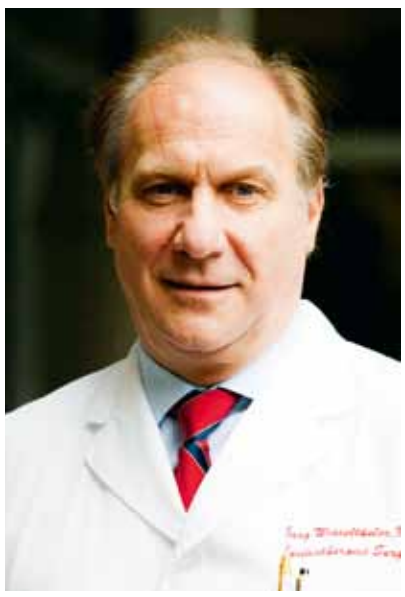
HeartWare HVAD

A novel concept for a third generation blood pump with a hybrid magnetic-hydrodynamic rotor suspension

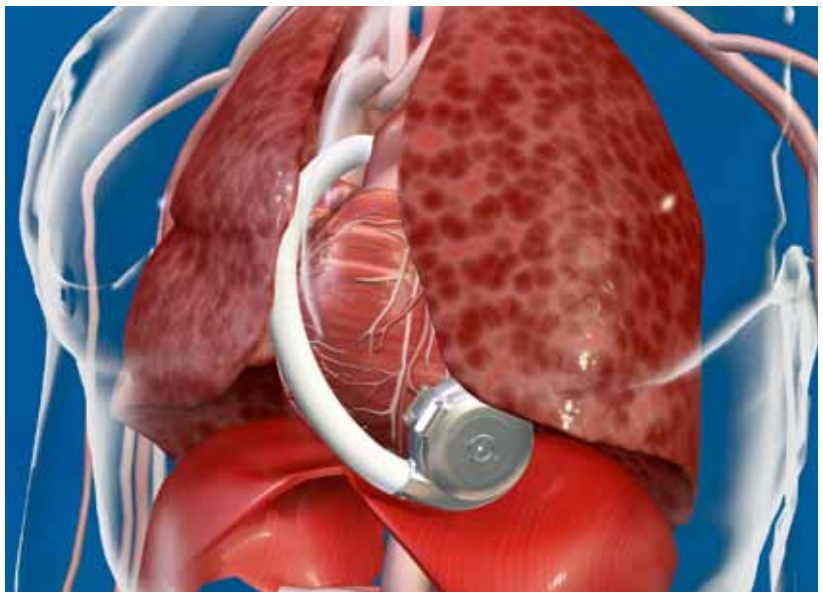
Georg Wieselthaler *Division of Cardiothoracic Surgery, San Francisco, USA*

Rotary blood pumps are the predominant pump concepts used nowadays in mechanical circulatory support. With their option for miniaturization, still providing full support for the failing heart, they can reduce the surgical trauma during implant. Miniaturized control/driving units with long lasting small batteries guarantee great quality of life while on support. Third generation rotary blood pumps with their magnetically levitated rotor suspension systems, overcome the mechanical outwear of ballpoint bearings used in second generation rotary pumps.

The HeartWare HVAD holds a unique concept of a hybrid passive-magnetic/hydrodynamic rotor suspension system which is in clear contrast to the otherwise used active-magnetic rotor suspension systems. The difference between the two results in a dramatic reduction in the size of the driveline. Unique to this next generation ventricular assist device is its miniaturized size and integrated inflow cannula, enabling placement of the 160g pump in the pericardial space without the need for a pump pocket. The patented sewing ring facilitates the surgical implantation and supports the option of a minimal invasive approach. Despite the small size, the pump's advanced design supports the following features:



Georg Wieselthaler



HVAD pump in pericardial space

- Provides up to 10 litres/min of flow allowing a wide range of patients to be treated
- Hydraulically designed to optimize blood flow and enhance hemocompatibility
- Hybrid magnetic / hydrodynamic impeller suspension; no contact system (no mechanical bearings) designed to last as long as a patient needs
- Thin (4.2mm), flexible driveline with fatigue resistant cables; no fractures seen in trials

CE and FDA data have shown survival rates with the HVAD Pump in excess of 91% out to 180 days. The first clinical implantation of the HeartWare HVAD pump was performed in March 2006 in two patients at the Medical University of Vienna by Professor Georg Wieselthaler. HeartWare received CE mark for the HVAD Pump in 2009 and now has both BTT and DT indications in Europe. In April 2012, the HeartWare Ventricular Assist System received a positive recommendation from the FDA advisory panel, and US approval is expected soon.

The impressive results in Europe combined with the high standard of service HeartWare provides, have resulted in HeartWare capturing much of the European market. Up to now, more than 2,600 pumps have been implanted in 26 countries and 100 international sites. The company is on track to bring its next generation device, the HeartWare MVAD System, to human trials, promising a further miniaturized pump and patient peripherals.

EACTS Quality Improvement Programmes

EACTS Quality Improvement Programme: an update

Domenico Pagano
Chair of the EACTS QUIP Task Force

The Sunday Plenary session at this year annual meeting in Barcelona, is dedicated to Quality Improvement Programmes. High profile International speakers will discuss the various aspects of setting up, running and the impacts of these programmes.

The European Association for Cardio-Thoracic Surgery's Quality Improvement Programme (QUIP) members will meet for the first time. Since its launch several areas of work have been identified.

The Network for Outcomes Research has enrolled 12 Units across Europe. This group will collaborate in several research areas including the design of a risk stratification score in Cardiac surgery. The database and Outcome Data Publishing group will present the programme of work for the next year. The education group will share initiatives for trainees and allied professionals.

We aim to enrol several other working groups and constitute networks to develop work streams in other quality improvement areas.

We will soon implement a self-nomination leadership programme to invite members to join the QUIP and contribute to its development. I look forward to meeting you in Barcelona.

"Express Yourself!"

Express yourself through completion of the sentence: "patients with severe MR feel like …!"

That is the call to action at the Abbott Vascular booth throughout the EACTS congress this year. In an effort to raise awareness of the debilitating burden of Mitral Regurgitation, physicians have the opportunity to write on a dedicated wall of Abbott's booth about how their patients feel.

Mitral Regurgitation is a deadly and pervasive disease that often goes unchecked until it is too late. Nearly half of patients referred for surgery are declined surgical repair or replacement because of multiple co-morbidities and advanced age. Visually representing the severe clinical impact of the disease is a powerful reminder of how much more we can do for these patients. The more – and sooner - the medical community screens for MR and refers patients, the better the outcome. After the congress, a summary of your notes will be made available and shared with other specialties across Europe. Take the opportunity for your opinions to be seen and your patient's feelings to be heard.

Express yourself through completion of the sentence: "patients with severe MR feel like …!"

CTSNet stand at EACTS – An ideal opportunity to update your individual profile page

CTSNet (www.ctsnet.org), the leading source of online resources dedicated to cardiothoracic surgery and the major hub of the international online community of cardiothoracic surgeons and allied health care professionals, is very pleased to be exhibiting at the 26th EACTS Annual Meeting in Barcelona.

In addition to being the main access point to the specialty's key journals and a huge repository of outstanding text-based and multimedia clinical resource, CTSNet houses individual profile pages or "homepages," as they are popularly known, for over 45,000 cardiothoracic surgery professionals, 34,000 of whom are surgeons. CTSNet's participants are located all over the world, but, interestingly, European-based surgeons and allied health professionals make up a staggering 38 percent of the CTSNet community!

As you might expect, CTSNet's individual profile pages are very heavily trafficked, making it essential that you keep your contact information and profile photograph fully up to date. To keep yourself accessible to your colleagues and patients alike, and to sustain CTSNet as the vital community of cardiothoracic surgery professionals, specialty-dedicated associations, and industry groups that it is, it is critical that you regularly update your CTSNet profile. Please visit the CTSNet Stand (number 37) in the Exhibit Hall to create or update your profile – CTSNet staff and volunteers will be very happy to assist you!

When you stop by the CTSNet Stand, it will also be a good opportunity for you to learn about CTSNet's new initiatives, including its recent move to Chicago, Illinois, USA, where The Society of Thoracic Surgeons is now providing management services to the organization, the migration of ctsnet.org to a new software platform, and the recent expansion of CTSNet Journal and News Scan activities. We would also love to hear your feedback on what you most enjoy about CTSNet, and new directions that the CTSNet Board of Directors should consider taking the organization and the website in the coming years.

The mission of CTSNet is "to advance education and collaboration in the global cardiothoracic surgical community through Internet resources." With your ongoing participation, we can help ensure that CTSNet remains the principal venue on the web where cardiothoracic surgeons go to learn about new techniques, connect with their colleagues, and stay apprised of the latest research on devices and procedures. We look forward to seeing you at Stand 37!

Nurses, Nurse Practitioners and Physician Assistants: Postoperative quality improvement 09:40-11:20 **Room 122/123**

MRSA management – the Danish experience

New and old strategies to fight antimicrobial resistance

Michael Stenger *Department of Cardio-Thoracic Surgery, Odense University Hospital, Denmark*

Management of infections caused by methicillin-resistant Staphylococcus aureus (MRSA) is a major challenge in health care settings in EU and worldwide.

Denmark has previously had a low prevalence and incidence of MRSA (<1%). Even so, over past decade we have in line with many other European countries observed an increase in the number of new cases (Figure 1). To maintain a low incidence the Danish National Board of Health prepared in 2006 national guidelines on the prevention of MRSA spreading in hospitals as well as non-hospital settings.

The two main principles of prevention are: 1) to identify, isolate and eradicate the bacterium in the patients concerned, and 2) to ensure that health care workers adhere strictly to stipulated hygiene measures.

Since 2006 a surveillance program (DANMAP) has reported an increase of new cases of MRSA infections classified as health care associated community onset (HACO) and community-acquired (CA) (Figure 2). This is mainly due to import from abroad, which spread in to the community and finally end up in the hospitals. In addition, over the last few years we have recorded an increasing numbers of cases due to transmission from livestock (predominantly pigs). Nonetheless, a stabile low rate of hospital acquired (HA) infection has been recorded, which indicates that the Danish guidelines for prevention of MRSA serves its purpose of minimizing HA-MRSA infections. Hence, isolation of patients with MRSA infections is a key factor in the prevention of spread in hospitals. However, it is associated with considerable costs, logistic, and nursing challenges as well as enhanced psychological stress and reduced quality of life for patients.

Michael Stenger

To identify and isolate are demanding procedures but to eradicate MRSA is also increasingly difficult with only a few effective antibiotics remaining, and so far the inert process of developing new antibiotics cannot keep up with the increasing resistance.

Consequently, the major objective of my research plan is to develop, validate and test alternative ways to fight MRSA and antimicrobial resistance in general. At first, we must reduce the use of broad-spectrum antibiotics through development of faster determination methods of antibiotic sensitivity, thus treatment can be more targeted and more specific with better recovery. Moreover, we focus on already existing drugs originally developed and approved for other purposes, but also possesses antibacterial activity and the ability to convert resistant bacteria to become sensitive to existing antibiotics. Laboratory screening and testing of well-known drugs have already identified a number of drugs with additive antibacterial capacities and synergistic effects in combination with traditional antibiotics against multi-resistant bacteria, such as MRSA. Furthermore, these drugs are validated through pharmaco-epidemiological studies and experimental trials in infectious animal models. Those passing the tests will be ready for clinical trials in humans.

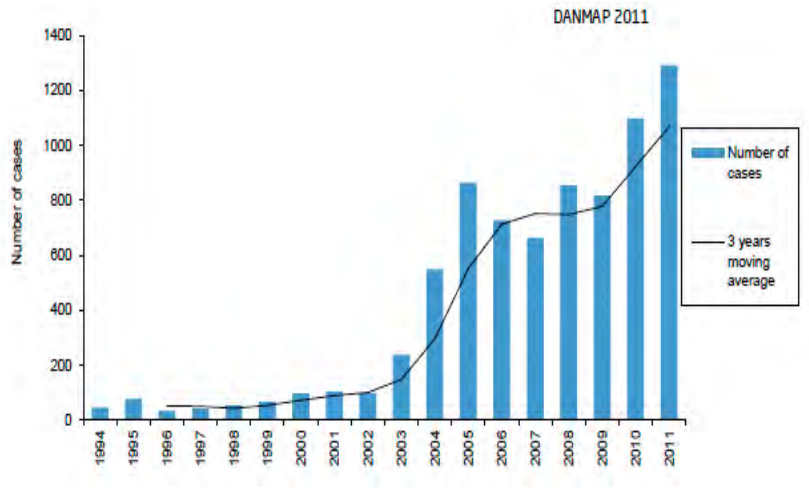


Figure 1. Number of MRSA cases with a three year moving average, Denmark (copyright DANMAP 2010)

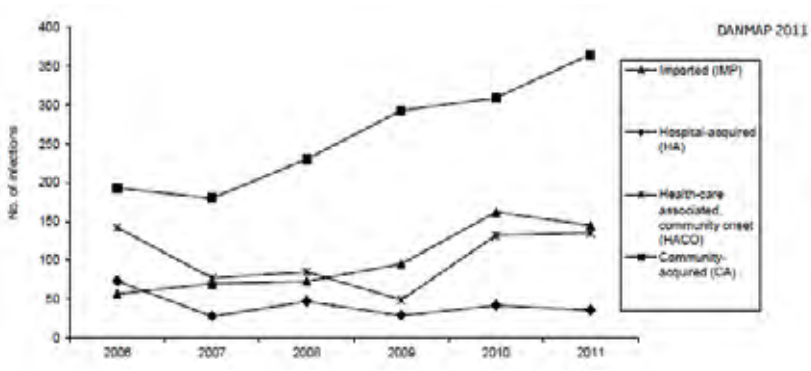


Figure 2. Number of MRSA cases presenting with infection according to epidemiological classification, Denmark (copyright DANMAP 2010)

Basic science: Session 3 14:20-16:00 **Room 188/119**

Percutaneous transapical puncture of the left ventricle

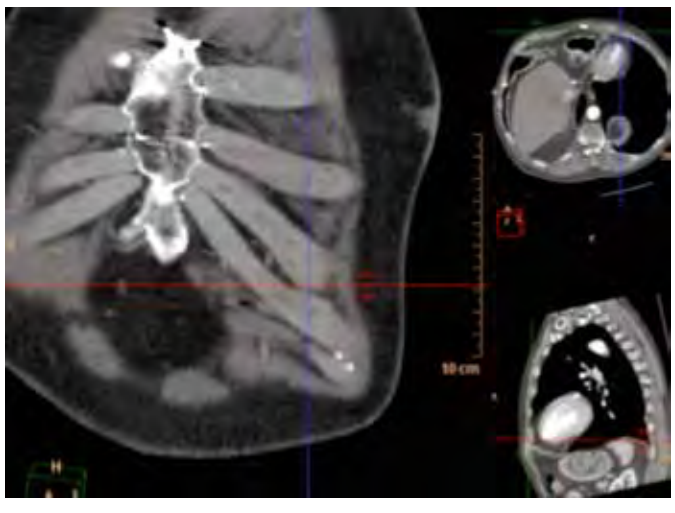
Thomas Modine *Lille, France*

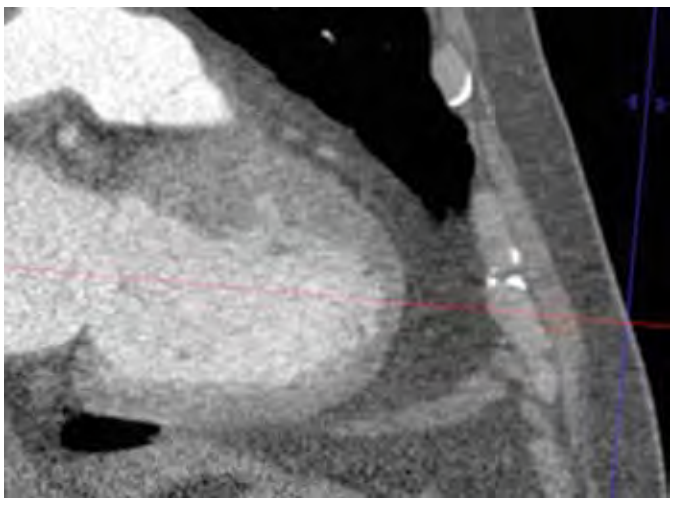
Cardiac pathologies are a major cause of morbidity and mortality. Although the principles of cardiovascular surgery and interventional cardiology have remained unchanged for years, important technical developments have emerged and new treatment options have developed. The management of patients has improved by the application of new technologies. Patients presenting for surgical indications are more challenging. As a consequence, the demand for less traumatic strategies increases dramatically. Transapical aortic valve implantation is a therapeutic advance for aortic valvular disease. However, the adoption of new technology can be extremely challenging, and patient selection is key. The transapical approach, is safe and effective; it provides an alternative solution for TAVI in patients in whom arterial access was denied. Midterm mortality and morbidity rates compares favourably with other altenatives. Transapical access was also successfully used to in mitral and pulmonary valves treatment. It could also provide a better access to treat pathologies as type A aortic dissection by stenting the ascending aorta using covered stents. Interestingly, percutaneous transthoracic ventricular puncture has been used since the 1930s for aortic valve pressure gradient assessment and left ventriculography with complications described as coronary artery laceration and pericardial tamponade. Direct puncture of the right ventricle was also used to diagnose

Thomas Modine

tricuspid insufficiency. Surgical trauma and reliable closure of the access remain a major issue. Some authors have reported significant peri-operative apical bleeding in upto 3% of patients. The solution would come from the rapid progress in the domain of sutureless closure devices, and make us believe that it would be possible to achieve aortic and mitral valve implantation by direct transthoracic percutaneous ventricular puncture in the coming years. For this purpose, it was suggested to use muscular closure devices designed for percutaneous VSD closure with promising results in animal model. This less invasive approach, may provide advantages; indeed, it could has a better hemostatic effect thanks to the pericardial and medistinal surrounding tissue and could help avoiding general anesthesia. But, even if technology is helping, could a percutaneous transapical procedure be predictible and feasible?. The wide anatomical variations between individuals in cardiac axis orientation, coronary arteries branches and the cardio-phrenic angle anatomy are the obstacles. CT coronary angiography (CTCA) is the most appropriate imaging technique to evaluate such a potential approach showing the anatomical structures at risk with high resolution, in particular the coronary arteries.

We assessed the feasibility and theoritical risk of percutaneous approach of the left ventricle using prospectively-gated CTCA in order to define dierct percutaneous transapical puncture line. We described the landmarks and orientations of this puncture line and analyzed its relations with surrounding structures. Risk was classified according to potential complications based on the distance between the puncture axis and limiting structures as well as structures to pass, the width of the puncture window and security margin. Interestingly, we found that a virtual puncture line from the skin to the LV was possible in 95% of patients. Those clinical findings, are a step from bench to bedside, and of great importance, corroborating the recent research studies results in animals.





Basic science: Session 2
13:00-14:20 **Room 188/119**

Clinical experience with tissue engineered based on decellularized scaffolds

Jolanda Kluin
UMC Utrecht, Netherlands

The first successful replacement of a single pulmonary valve leaflet with a tissue engineered (TE) equivalent was demonstrated in 1995 in lambs. In patients, the first TE heart valve was implanted in Europe in 2001. In this study a decellularized porcine HV substitute, introduced in Europe with CE-mark was implanted for reconstruction of the right ventricular outflow tract in four male patients (age 2.5-11 years). In-vitro hydrodynamic testing and in-vivo hemodynamic evaluation in sheep by echocardiography and explants histology showed promising results. However, implantation in these pediatric patients resulted in early failure of the xenograft tissue due to degeneration caused by inflammation by a foreign body type reaction. The pre-clinical in-vivo testing in the most common used sheep model has failed to predict failure of this living TE product in humans, possibly due to the species non-specific in-vivo testing.

The decellularization process was assumed to significantly reduce the antigenicity and ideally allow for repopulation of the graft with recipient autologous cells and create a living tissue. However, decellularization of xenogenic heart valve tissue does not result in a biologically 'silent' inert matrix; it is suggested that a number of inflammatory stimuli are still active within decellularized xenogenic tissue. A decellularized matrix induces platelet adhesion and activation. Seeding with autologous endothelial cells may effectively abolish platelet adhesion and activation. In addition, decellularization protocols vary in their efficiency of cell removal as well as preservation of the matrix integrity. Cell remnant removal is necessary, as the presence of dead cells potentially lead to inflammation (e.g. incomplete decellularization is associated with the presence of alpha-gal epitope) and/or calcification in-vivo. Finally, the use of unfixed xenografts carries the risk of disease transmission, such as Creutzfeldt-Jakob disease.

The decellularized allograft is therefore a safer option compared to the xenograft.

On February, 7th 2008, the FDA clears the market for the first decellularized allograft based on clinical data comparing 342 decellularized valves (implanted between the years 2000 and 2004) to 1,246 traditional allograft heart valves. The data included information on mortality, device-related re-operations, structural valve deterioration, endocarditis and blood clots. The FDA found that the decellularized valve performed at least as well as traditional allograft valves. Prior to the first clinical implantation, four implantations in sheep were described; the results were excellent.

Nowadays, only sparse cell infiltration in leaflets of decellularized homografts has been observed when implanted in patients. Long-term results of current running clinical studies using decellularized xeno- and homografts will provide more insight in the repopulating capacity of humans and of graft durability.

Basic science: Session 3 14:20-16:00 **Room 188/119**

The influence of acute matrix metalloproteinase activity on myocardial dysfunction associated with urgent cardiac surgery: cardioprotective effects of inhibition

Elaine Teh *Cardiac Research Fellow, Cardiac Surgical Research, The Rayne Institute (King's College London)*

Currently there is ongoing debate about the role of surgery in the revascularisation of patients presenting with acute coronary syndrome (ACS), especially patients in the non-ST elevation myocardial infarction (NSTEMI) category. These patients are often rather heterogenous in terms of the extent of myocardial injury. Some studies reported higher mortality and morbidity whereas other studies showed contradictory results, stating no difference in risks of surgery compared to elective cardiac patients.

At the same time, there has been considerable progress in the field of matrix metalloproteinases (MMPs) and its role in acute cardiovascular pathophysiology. MMPs are zinc-containing endopeptidases involved in tissue breakdown and synthesis. Over the years, rather than a primary role in the extracellular matrix, MMPs have been shown to be important signaling molecules, involved in almost every aspects of biology. MMPs, especially MMP2, have been shown to play a significant role in acute ischaemia-reperfusion injury of the heart. The roles of MMP have been investigated using various animal models simulating different clinical setting; global ischaemia-reperfusion and regional infarction followed by regional ischaemia-reperfusion.

Combining these two observations, we hypothesized that MMP2 is involved in exacerbating heart dysfunction when previously infarcted hearts are subjected to an additional elective global ischaemia. This scenario is manifested by patients presenting with ACS requiring urgent cardiac surgery.

We therefore use a well-established in-vivo model of surgical ligation of the left anterior descending coronary artery in rats. The rats were allowed to recover for seven days before subsequently harvesting the infarcted hearts for isolated Langendorff heart perfusion. During isolated heart perfusion, we could then study the temporal trend of recovery of the hearts during reperfusion after a further period of global ischaemia by measuring indices of contractility such as left ventricular developed pressure and end-diastolic pressure. At the end of the perfusion protocol, we also carried out biochemical assays in the myocardium.

Our results showed that previously infarcted hearts do indeed have less capacity to recover following a further period of global ischaemia. At the same time, there was an associated increased in MMP2 activity in the ischaemic myocardium; thia may correlate the role of MMP2 with the myocardial dysfunction. Inhibition of MMP2 activity led to improved recovery of the infarcted hearts. Further research in this area may allow translation into clinical practice to improve the outcome for patients undergoing cardiac surgery soon after a myocardial infarction.

Basic science: Session 3 14:20-16:00 **Room 188/119**

Annular dilatation and loss of sinotubular junction in aneurismatic aorta: implications on leaflet quality at the time of surgery. A Finite Element study

L. Weltert[1], M. De Tullio[3], L. Afferrante[3], A. Salica[1], S. Nardella[1], R. Scaffa[1], D. Maselli[1], A. Bellisario[1], R. Verzicco[2], R. De Paulis[1] *1 Cardiac Surgery Department, European Hospital, Rome,Italy; 2 Engineering Department, Università Tor Vergata, Rome,Italy; 3 Engineering Department, Politecnico, Bari ,Italy*

Luca Weltert

Aortic aneurisms present to the surgeon in a wide variety of anatomical configurations: those involving the aortic root may or may not be associated with aortic regurgitation and aortic valve leaflet deterioration. As poor quality of leaflets practically prevents the patient to benefit the advantages of a conservative surgical procedure (such as the reimplantation or the remodeling) it is a stringent question to ascertain what aneurism do early deteriorate the aortic valve and thus must be operated on earlier to preserve valve quality.

The fludodynamic science as applied in the racing sailing suggests that the angle a sail withstand into the wind dramatically impacts on the sail duration itself: sails used to go upwind, therefore in laminar fluid conditions, last even ten years, but sails used to go downwind as the Spinnaker, receiving a turbulent flow, only last a couple of season.

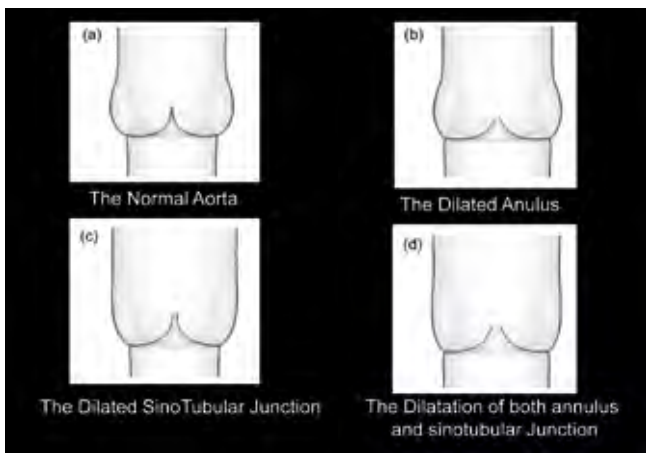
To ascertain if analogue conditions occur to aortic leaflets we used a computational simulation technique known as Finite Element Analysis. This technique heavily relies on computational power to divide a complex solid object in small segments of simple shape, which movements under stress can be mathematically defined. It has been used widely in aeronautical and sport-car modeling as well as, in medicine, for simulation of stress on mitral valve and aortic root.

The stress analysis of Finite Elements Technique is always very understandable because is represented as a color coded "wrapping" of the stressed objects (the Von Mises stress Pattern): colors range from blue (lowest stress) to red (highest stress) via pink, violet, green, yellow and orange.

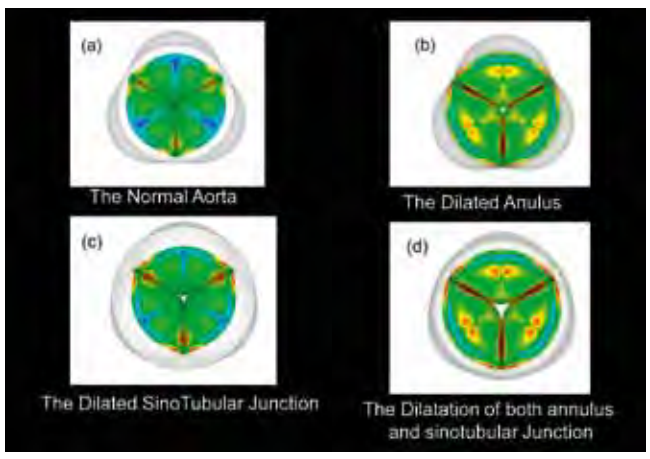
We modeled a normal aorta, an aneurism with loss of sinotubular junction but preserved annular diameter, an aneurism with preserved sinotubular junction but with enlarged annular diameter and finally an aneurism where both the sinotubular junction and the aortic annulus were enlarged.

Virtually pressurizing the four aortic roots we obtained comparable stress patterns showing that the normal aorta has the lowest stress, the loss of sinotubular junction produces a slightly enhanced stress (+14%) more evident on the free margin, the enlargement of the aortic annulus produces a dramatic increase (+64%) of stress both on the free margin and on the belly of the leaflet; the enlargement of both annulus and sinotubular junction produces a stress pattern largely overlapping the enlarged aortic annulus model.

Therefore we conclude that the aortic annuloectasia is by far the single most important determinant of stress on aortic valve leaflets; this may suggest earlier surgery for patients presenting this configuration to enhance probabilities of a successful conservative treatment.

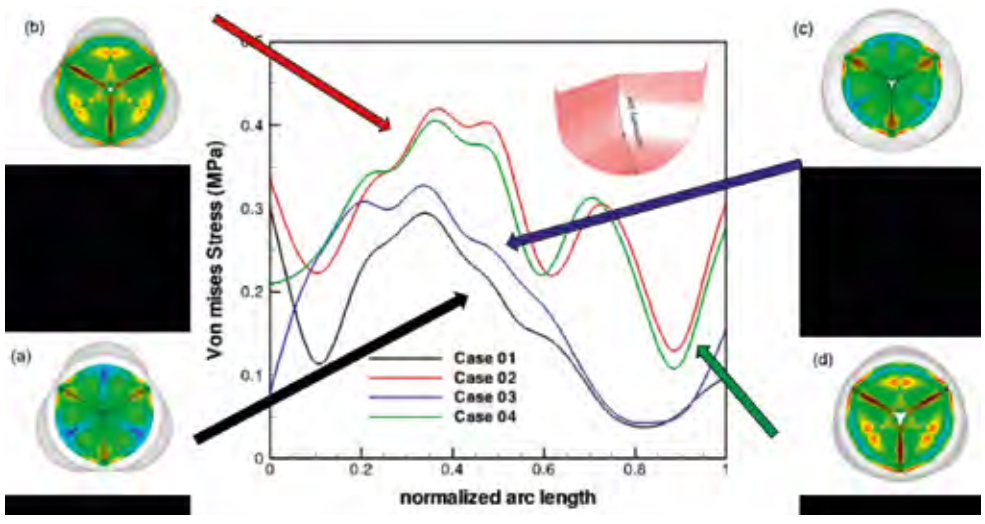


The four Models



Stress Patterns visual comparison

Below: Stress patterns comparison on graph



Basic science: Session 3 14:20-16:00 **Room 188/119**

The anti-atherogenic potential of aspirin and clopidogrel in hypercholesterolaemic male rabbits

Fadhil G. Al-Amran *Chief of surgical deptartment, College of medicine, Kufa University, Najaf, Iraq*

Fadhil G Al-Amran

Background

Atherosclerosis and its thrombotic complications are responsible for remarkably high numbers of deaths. Despite the important role of cholesterol in atherosclerosis, many individuals who experience myocardial infarction have cholesterol concentrations at or below the National Cholesterol Education Program thresholds.

Objectives

The objective of present study was to evaluate the effect of aspirin and clopidogrel and their combination on the progression of atherosclerosis.

Materials and Methods

A total of 42 male New Zealand White Rabbits were used in this study. These animals randomized into six groups (of seven rabbits each). Rabbits in first group were maintained on normal rabbit chow diet, and used as normal diet control group (NC). While the rabbits in other five groups were fed on atherogenic diet (2% cholesterol) for eight weeks and treated as following: Atherogenic control group (AC) rabbits received no treatment, Vehicle group(positive control) rabbits received ethanol, Aspirin treated group rabbits received aspirin 10mg per kg daily and Clopidogrel-treated group rabbits received clopidogrel 20mg per kg daily, Combination treated group rabbits received aspirin 5mg per kg and clopidogrel 10mg per kg.

At the end of eight weeks, animals were sacrificed, blood sample was collected to measure the following parameters: lipid profile, plasma GSH, MDA, and hsCRP. Immunohistochemical analysis (VCAM-1, MCP-1, TNF-a, and IL17) and histopathologic assessment of aortic atherosclerotic changes were also performed.

Results

Compared to NC, levels of lipid profile, atherogenic index, hsCRP, and MDA are increased while GSH were decreased in animals on atherogenic diet ($p< 0.001$).There was no important or statistically significant difference in the study parameters between positive controlgroupwhen compared with those on atherogenic diet.Immunohistochemical analysis showed that expression of aortic VCAM-1, MCP-1, TNF-a and IL17 were significantly increased in AC group compared to NC group ($p<0.001$). histopathologic finding showed that animals on atherogenic diet have significant atherosclerotic lesion compared to NC group. Compared to AC group both aspirin and clopidogrel andtheir combination don't have significant effect on lipid profile.

Aspirin and clopidogrel and their combination cause statistically significant reduction in hsCRP and MDA, ($p<0.001$). Aspirin and clopidogrel and their combination treatment cause statistically significant increase in plasma level of GSH ($p<0.001$). Both aspirin and clopidogrel and their combination treatment significantly reduced the expression of aortic VCAM-1, MCP-1, TNF-αand IL17 ($p<0.001$). Histopathologic examination of aortic arch showed that both aspirin and clopidogrel and their combination significantly reduced atherosclerotic lesion ($p<0.001$).

Conclusions

The results of the present study reveal that both aspirin and clopidogrel and their combination reduce lipid peroxidation, systemic inflammation and aortic expression of inflammatory markers used in this study and hence reduce the progression of atherosclerosis.

NeoChord completes enrollment for 'TACT' clinical trial

Acute and chronic results using NeoChord's sternal-sparing, beating-heart, mitral valve repair system to implant artificial chordae tendinae are encouraging.

John Seaberg

NeoChord, a medical device company focused on minimally invasive mitral valve repair, has completed enrollment for its ongoing 'TACT' (Transapical Artificial Chordae Tendinae) clinical trial in Europe.

"The 30-patient TACT trial now has numerous patients showing one- and even two-year durability of repair with clinically significant reductions in mitral regurgitation. Acute procedure success rates in the second half of the trial were 94% with excellent early durability results. These combined results suggest that NeoChord will make a strong contribution in the evolving field of mitral repair," said John Seaberg, Chairman and CEO, NeoChord.

"We are very pleased that we have successfully concluded enrollment into our TACT trial, as these patients suffering from mitral regurgitation are potentially avoiding the complications and trauma associated with traditional open-chest surgery performed on a stopped heart," added John Zentgraf, VP of R&D (vice president of research and development) at NeoChord. He added that "We look forward to conducting additional studies via the TACT Registry in Europe commencing in early 2013."

"Follow-up visits at 12 and 24 months post-op confirm that the vast majority of patients operated on using the NeoChord technology continue to show resolution or significant reduction of mitral regurgitation up to two years after the procedure," said Giovanni Speziali, M.D., a cardiac surgeon who is the primary inventor of the NeoChord device. "These results compare favorably to those obtained with traditional surgical repair of severe mitral regurgitation," said Dr. Speziali. He added that "I am very pleased with the progress we have made in both patient selection and procedure methodology."

The NeoChord procedure was developed to treat mitral prolapse caused by ruptured or elongated chordae tendinae — the primary cause of degenerative mitral regurgitation —— via minimally invasive implantation of artificial chordae tendinae. The technology was developed by Dr. Speziali, University of Pittsburgh Medical Center, along with Richard Daly, M.D., a cardiac surgeon from Mayo Clinic, and Charles Bruce, M.D., cardiologist, also of Mayo Clinic. The technology is licensed exclusively to NeoChord Inc.

Based in Eden Prairie, Minn., NeoChord is a privately held medical technology company focused on advancing the treatment of mitral regurgitation. The Company expects to commercialize a surgical device for minimally invasive mitral valve repair via surgical implantation of artificial chordae tendinae. Degenerative mitral regurgitation occurs when the leaflets of the heart's mitral valve do not close properly, usually due to rupture or elongation of the chordae tendinae (chords) that control the leaflets' motion. During pumping, the "leak" in the mitral valve causes blood to flow backwards (mitral regurgitation) into the left atrium, thereby decreasing blood flow to the body. Mitral regurgitation is a progressive disease that left untreated can result in atrial fibrillation, congestive heart failure, and death. For more information, visit: www.NeoChord.com. The NeoChord device is an investigational device and is not available for commercial use.

Basic science: Session 1 10:00-12:00 **Room 188/119**

A novel native derived coronary artery model

Hug Aubin*, Alexander Kranz, Jörn Huelsmann, Artur Lichtenberg, Payam Akhyari
Department of Cardiovascular Surgery, Heinrich-Heine-University Düsseldorf, Düsseldorf, Germany

**** Corresponding author***

Hug Aubin

Rising epidemiologic numbers of cardiovascular disease and the current demographic trend turn heart disease into an increasing health-economic problem worldwide, with coronary artery disease being one of the leading causes of mortality in the western world. Despite the great progress in the pharmacological and surgical treatment of heart disease of the last decades, the current treatment options still remain mostly symptomatic, slowing the progression of the disease but without being able to prevent the degeneration and pathologic remodeling of the diseased heart tissue. As today, heart transplantation is currently still the only curative treatment of end-stage heart failure caused by an irreversibly damaged heart tissue. However, the worldwide shortage of donor organs in addition to the high risks of such a transplantation procedure oblige us to seek for alternative therapies that will benefit all patients.

In the past years our research group – under the direction of Professor A. Lichtenberg – has focused on exploring and analyzing the cardiac extracellular matrix (ECM). Through in toto heart decellularization it has become possible to generate acellular, native derived 3D scaffolds that preserve the basic ECM-characteristics of the native heart, in addition to its micro- and macroscopic anatomy. However, using a whole-heart scaffold to create a one-to-one substitute for a diseased heart in the near future still poses an insuperable challenge because of the tremendous complexity of cardiac biology. Therefore, - for now - we must seek for alternatives trying to support the injured myocardium instead of striving for a complete replacement. Hence, our current efforts lie in exploring novel in vitro and in vivo ECM-models that allow us to study and better understand cardiac biology and in developing new experimental strategies that might help to regenerate, restore or replace the injured myocardium in order to overcome current therapy limitations.

At this year's EACTS meeting we present a novel native derived coronary artery tissue-flap model (Figure 1), which is a vascularized tissue model originating from native cardiac tissue and therefore mimicking nature's input to the highest possible degree. The advantage of such a native derived model to purely cell based or synthetic scaffold models lies in the biologically predefined vessel tree geometry including an optimal 3D spatial distribution of main and capillary vessels that is critically relevant for functional oxygen and nutrient supply as wells as carbon dioxide and waste removal. The production out of in toto decellularized hearts, which can be generated in high volume through standardized automated software-controlled coronary perfusion with well-studied and reproducible ECM characteristics further guarantees a high degree of standardization and reproducibility despite being a biologically derived model. The possibility to study re-endothelialization and endothelial function of different donor cell types and interaction with non-endothelial cells in a standardized in vitro model might help to address one of the key limitations in all tissue engineering approaches, the vascularization of engineered functional tissues. Further, the presented coronary artery tissue-flap model could serve as a platform for in vitro drug testing and stem cell differentiation studies.

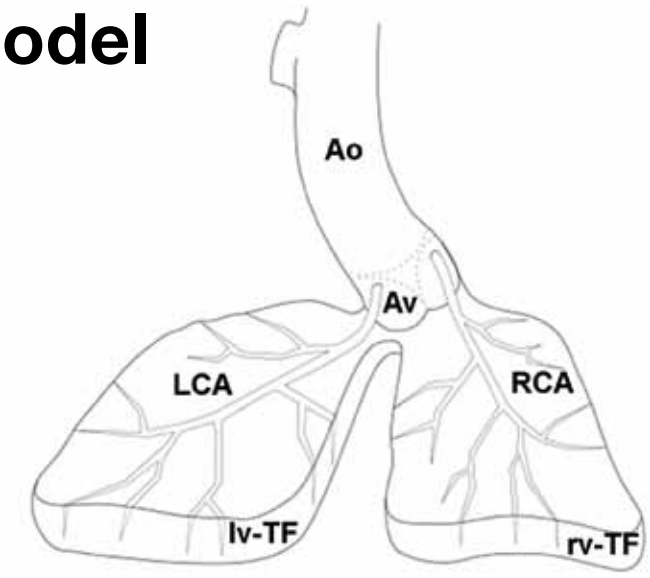
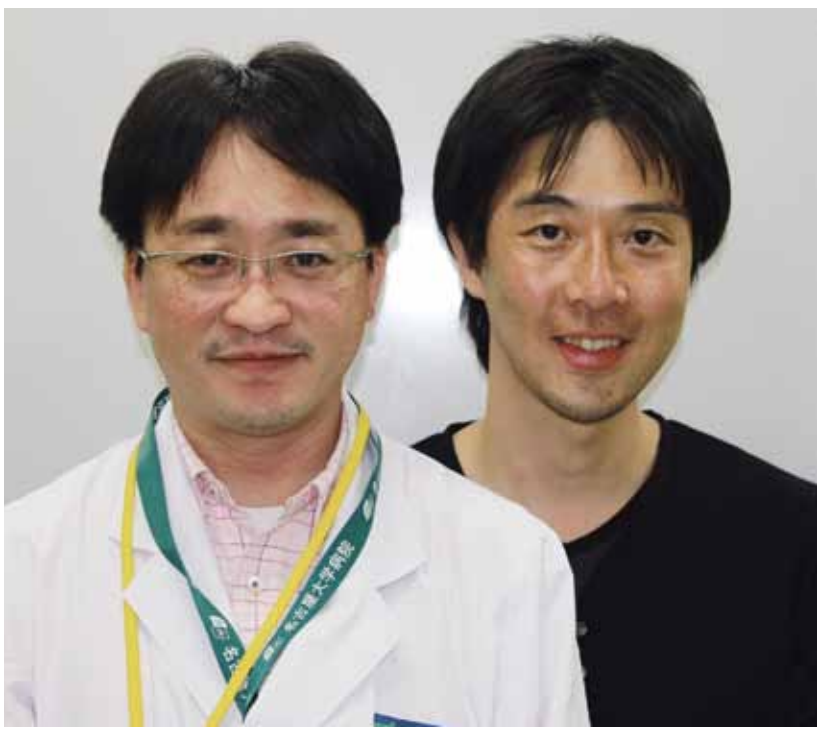


Figure 1: Native derived coronary artery tissue-flap model. Ao, aorta; Av, aortic valve; LCA, left coronary artery; RCA, right coronary artery; lv-TF, left ventricular tissue flap; rv-TV, right ventricular tissue flap.

Basic science: Session 3 14:20-16:00 **Room 188/119**

Prevention of Arterial Graft Spasm in rats using Vasodilator-Eluting Biodegradable Nano-Scaled Fiber

Kei Yagami[a], Aika Yamawaki-Ogata[a], Makoto Sateke[b], Hiroaki Kaneko[b], Yoshimori Araki[a], Hideki Oshima[a], Akihiko Usui[a], Yuichi Ueda[a] and Yuji Narita[a] *a Department of Cardiac Surgery, Nagoya University Graduate School of Medicine, Nagoya, Japan; b Technology Innovation Center, Teijin Limited, Hino, Japan*



Yuji Narita and Kei Yagami

Objective
Arterial graft spasm occasionally causes circulatory collapse immediately following postoperative coronary artery bypass grafting (CABG). We have developed a novel implantable drug (vasodilator) delivery system to prevent arterial spasm. The aim of this study is to evaluate the efficacy of our materials, which were composed of milrinone (phosphodiesterase III inhibitor) or diltiazem (calcium channel blocker), with nano-scaled fiber made of biodegradable polymer.

Materials and methods
Milrinone or diltiazem-releasing biodegradable nano-scaled fibers (MRBNF or DRBNF) were fabricated by electrospinning procedure. Poly lactic/glycolic acid co-polymer (50:50) was applied to the biodegradable polymer, and the content of milrinon or diltiazem were 1.0 wt%. The configuration of MRBNF and DRBNF was similar to "cotton-wool." In vivo milrinone or diltiazem-releasing tests were performed to confirm sustained release of the drugs. An in vivo arterial spasm model was established by making a subcutaneous injection of noradrenalin (NA) to the area around the rat femoral artery (RFA). Rats were randomly divided into four groups as follows: those who received 5mg of MRBNF (group M, n=14); 5mg of DRBNF (group D, n=12); or who received fiber without drugs (as a control; group C, n=14) implanted into the RFA. In the fourth group, sham operation was performed (group S, n=10). One day after the implantation, 0.1mg/0.1ml of NA was injected in all groups. Femoral arterial blood flow was measured before and after NA injection by Doppler flow meter.

Results
MRBNF or DRBNF released approximately 80% or 50% of drugs (milrinone or diltiazem) on the first day, and 95% or 60% on the second day, respectively. RFA blood flow was decreased after NA injection in all groups. However, the ratios of RFA blood flow after NA injection (RFA blood flow after NA injection/RFA blood flow before NA injection) in groups M and D were significantly higher than those of group C and S (group M, D vs. C, S; 0.74 ± 0.16, 0.72 ± 0.05 vs. 0.54 ± 0.09, 0.55 ± 0.16, P<0.05) (Fig 1).

Conclusion
NA-induced RFA spasm was inhibited by the implantation of MRBNF or DRBNF. These results suggested that our materials might be effective as a prevention of arterial graft spasm after CABG.

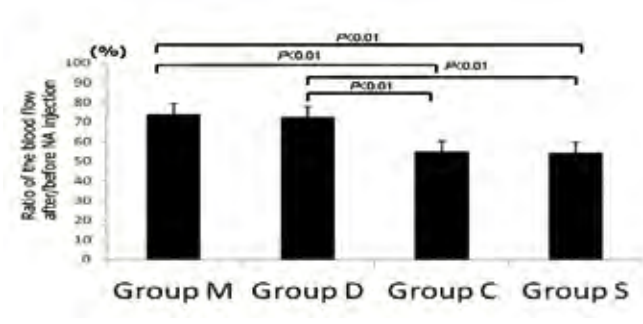


Figure 1

Innovation, Technologies and Techniques in Cardiothoracic and Cardiovascular/Vascular Surgery

ISMICS

International Society for Minimally Invasive Cardiothoracic Surgery

www.ISMICS.ORG

Have you ever thought that each time you attend a scientific meeting, it doesn't matter where the meeting is being held or which society or institution is the organizer, that it just feels "the same?" That the meeting could be anywhere in the world, but the same people are talking about the same thing? If you have, then you haven't yet participated in an ISMICS Meeting. For ISMICS *is a society like no other*.

ISMICS celebrates innovation, embraces new ideas, and welcomes surgeons from around the world. First time attendees always comment on the fact that ISMICS is an open, collegial, and warm society where cardiac, thoracic, and cardiovascular surgeons come together to share their ideas and their latest challenges and successes in the ever-changing cardiothoracic and cardiovascular specialty.

ISMICS members are innovators – whether they are pursuing less invasive surgical techniques, embracing the newest technologies, or pushing the boundaries of medical science. They all share a passion for their work and a common desire to improve the lives of their patients.

Scientific sessions at ISMICS are lively, with spirited discussion periods and varied formats designed to allow presentation of work in many ways, including an interactive poster competition. And each ISMICS meeting is designed to provide attendees large amounts of time to meet with our industry partners, to test drive their latest technologies and learn more about their products. ISMICS members are early adopters – they want to know what is the latest, the best, and what is coming next. They have never lost their sense of curiosity, and they never, ever represent the status quo.

Are you an ISMICS member? Or better yet – should you be?

From 12 to 15 June 2013, ISMICS is meeting in the elegant old-world city of Prague, in the Prague Hilton, in the Czech Republic. We invite you to join us for 4 days of cutting-edge science, lively interaction with colleagues from all over the world, extended time to visit industry partners, and opportunities for social interaction in one of the world's most stunning venues.

Visit our booth - #38 in the Exhibit Hall, and learn more about ISMICS!

BioVentrix

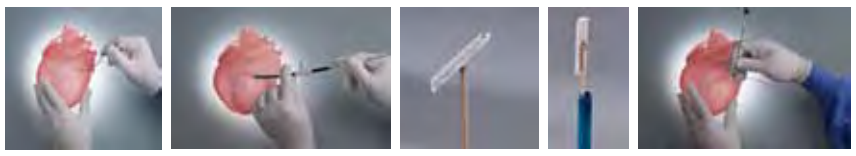
Less Invasive Ventricular Enhancement (LIVE) – A New Frontier of Minimally Invasive Cardiac Surgery

Prof. Louis Labrousse, MD *Hopital Haut-Leveque, Bordeaux Pessac, France*

Many cardiac operations have evolved towards minimally invasive approaches. However, Surgical Ventricular Reconstruction for ischemic cardiomyopathy has remained unchanged. We initiated participation in the clinical study of a unique technology for LV volume reduction. The Revivent™ Myocardial Anchoring System (Bioventrix Inc., San Ramon, CA) was developed for Less Invasive Ventricular Enhancement™. This innovative procedure provides the benefits of standard surgical approaches, without the need for ventriculotomy or cardiopulmonary bypass.

The Revivent system utilizes micro-anchors that pull the LV free wall into apposition with the septum. This maneuver excludes the akinetic/dyskinetic segment of the myocardium from the ventricle. The reduced volume renders more efficient performance than in the previously dilated heart.

Our first case: male (58), NYHA class III, BSA=1.97, post AMI anteroseptal scar identified on MRI. The pre-operative imaging studies revealed EDV = 256 ml, ESV = 196 ml, and EF = 26%. A standard sternotomy exposed the epicardium. Under fluoroscopy, a specially designed curved needle (photo 1) was inserted through the LV adjacent to the LAD. The needle was advanced through the LV and septum until it reached the RV. A .038" flexible guidewire was passed through the needle and into the RVOT. Using dilators and a Seldinger exchange, an 18 F catheter was placed into the RV (photo 2). The internal pivoting anchor (photos 3a-b) was advanced through this catheter and deployed in the RV. Manipulations of the protruding tether seated the anchor on the RV septum. An external anchor was advanced over the tether and firmly placed against the epicardium without tightening (photo 4). The needle sequence/catheter exchange was repeated until three anchor pairs were implanted across the RV septum to LV free wall. A final anchor was deployed near the apex of the LV, crossing the LV chamber only. Once the anchor pairs were in place, a force gauge tightened the anchors and apposed the LV free wall to the septum (photo 5). The procedure was completed with minimal bleeding (no ventriculotomy), and in spite of a previous implanted ICD. The restored cardiac morphology is shown (CT reconstruction).



1 2 3a 3b 4

Post Op CT

Postoperative results:

EDV =147 ml (80 ml indexed) - 45% EDV reduction

ESV = 93 ml (51 ml indexed) - 52% ESV reduction

Ejection Fraction = 36% (increased from 26%)

These results compare favorably with those achieved by common SVR techniques. The one-year durability of the initial implants will be reported by Dr. Andrew Wechsler on Monday, October 29 at 9:15 AM, Room 115.

The Revivent system offers a renaissance for Surgical Ventricular Reconstruction. Performing procedures off pump without ventriculotomy allows for treatment of very ill patients. With increasing economic and clinical challenges presented by the growing heart failure population, this device will have tremendous impact on future treatment strategies.

EACTS events

Advanced Module: Heart Failure – State of the Art and Future Perspectives

12–17 November 2012 – 2 days of wetlabs

EACTS House, Windsor, UK

Course Directors: G Gerosa, Padua; M Morshuis, Bad Oeynhausen

The course will be organised in 10 modules:

1 Epidemiology/Pathology;
2 Diagnostic/Imaging;
3 and 4 Optimal Medical Therapy/IC ; Resynchronization;
5 Cardiac Surgery (Indications, Techniques, Results);
6 Heart Transplant (Indications, Techniques, Results)
7 VADs/TAH (Indications, Techniques, Results);
8 HTx/VADs in Paediatric Population;
9 Stem Cells Regenerative Medicine;
10 Wet Labs/Live in a Box/Group Projects

Course Objectives:

To update knowledge of theoretical and technical issues of surgery for heart failure.

Leadership and Management Development for Cardiovascular and Thoracic Surgeons

20– 23 November 2012

EACTS House, Windsor, UK

Course Directors – J L Pomar, Barcelona

The Leadership and Management Development Course is an intensive five-day programme in two parts with a three day initial training session followed by a further two days of training scheduled six months later. The course will utilise a mix of pre and post programme activities and each delegate will be tasked with exploring leadership best practise during the break between the two parts of the programme.

Course Objectives:

Improve, enhance and maximise your leadership attributes

Thoracic Surgery Part II

3rd – 7th December 2012

EACTS House, Windsor, UK

Course Directors – P Rajesh, Birmingham

- The course programme includes:
- Tracheal Surgery
- Tracheobronchial injuries
- Tracheal-main bronchus obstruction;
- Esophagus Cancer – Staging, preoperative;
- Oesophageal cancer;
- Thoracoscopic technique;
- Mesothelioma treatments;
- Metastatic disease;
- Chest wall reconstruction;
- Case presentations.

Course Objectives:

To gain more insight and up-to-date knowledge on different aspects of thoracic surgery related to tracheal, pleural, mediastinal and oesophageal disease.

Chest Wall Diseases 28–30 November 2012

M Yuksel *Course Director, Istanbul; EACTS House, Windsor, UK*

Chest Wall Interest Group (CWIG) is a group belonging to the EACTS Thoracic Domain. It was founded during The Second International Nuss Procedure Workshop held in Istanbul in June 2009.

We have set out to establish a channel of communication across different continents with a view to allow the exchange of knowledge among those experienced practitioners who are studying, developing and innovating methods to treat chest wall diseases. In June 2010, we got together again in Izmir, for The Third International Workshop on the Minimally Invasive Repair of Pectus Deformities under the custody of EACTS. The Workshop was a great success and we had the chance to discuss the future projections of the CWIG.

Our next important meeting in the calendar was The Fourth International Chest Wall Interest Group Workshop on Chest Wall Diseases which was held in Istanbul on June 22 – 23, 2012, under the custody of EACTS, with the participation of 35 invited faculty from around the world.

Now we want to reach a broader spectrum of residents, specialists and academicians, thus we are organizing a workshop on "Chest Wall Diseases" in Windsor, UK, at EACTS House, 28-30 November 2012.

The main subjects are Congenital Chest Wall Deformities, Chest Wall Resection and Reconstruction, Thoracic Outlet Syndrome and Sternal Dehiscence.

The Learning Objectives are; Learning the indications, techniques and follow up of minimally invasive and open surgery in pectus deformities; Learning the alternative treatments –surgical and nonsurgcal- for pectus deformities; Learning chest wall resection and reconstruction techniques in chest wall diseases; Learning the surgical techniques in thoracic outlet syndrome and Learning the treatment options –surgical and nonsurgical- in sternal dehiscence.

The Target Audience is; Thoracic Surgery Residents, Specialists and the Academicians working in the field of Thoracic Surgery.

We very much look forward to welcoming you to Windsor.

To register for this course please visit:
www.eacts.org/academy/specialist-courses/
chest-wall-diseases.aspx

Regards,
Prof. Mustafa Yuksel, MD

EACTS
European Association For Cardio-Thoracic Surgery

27th EACTS
Annual Meeting
Vienna, Austria
5 - 9 October 2013

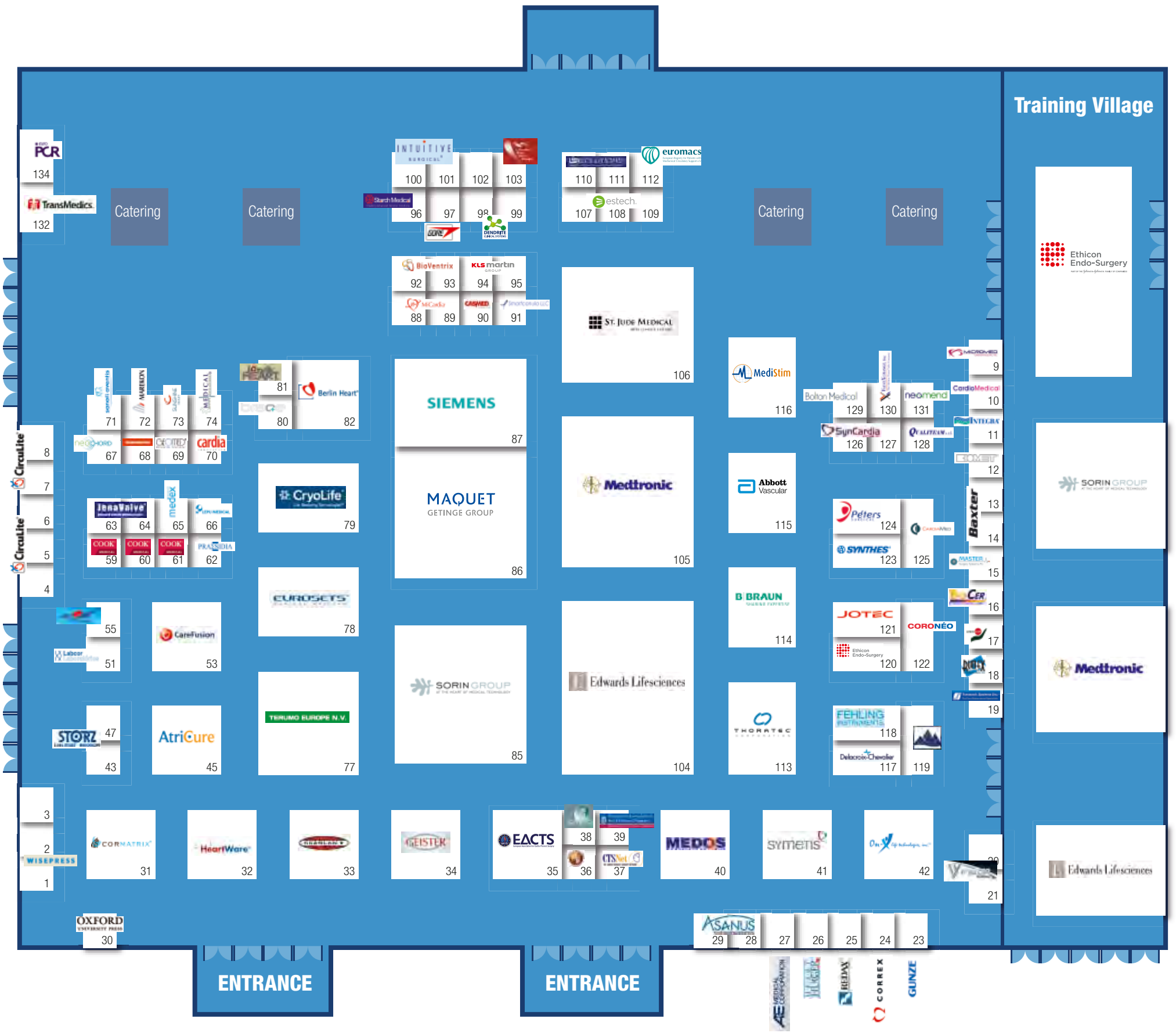
Deadline for Abstracts - 1st April 2013

To find out more or to register for the event visit:

www.eacts.org

Raising Standards through Education and Training

Floor plan



27	A&E Medical Corporation	**117**	Delacroix-Chevalier	**51**	Labcor Laboratorios Ltda	**87**	Siemens AG
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45	AtriCure Inc	**107–109**	Estech Inc	**15**	Master Surgery Systems AS	**36**	STS
114	B Braun Surgical S.A.	**120**	Ethicon – Johnson & Johnson	**74**	MDD Medical Device Development GmbH	**73**	Sunshine Heart
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16	BioCer Entwicklungs-GmbH	**118**	Fehling Instruments GmbH & Co KG	**116**	Medistim ASA	**77**	Terumo Europe Cardiovascular Systems (TECVS)
12	Biomet Microfixation	**34**	Geister Medizintechnik GmbH	**40**	Medos Medizintechnik AG	**103**	The Society for Heart Valve Disease
92–93	BioVentrix Inc	**119**	Genesee BioMedical Inc	**105**	Medtronic International Trading SÁRL	**113**	Thoratec Corporation
129	Bolton Medical	**69**	Geomed®Medizin-Technik GmbH & Co. KG	**88–89**	MiCardia Corporation	**55**	Tianjin Plastics Research Institute
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70	Cardia Innovation AB	**68**	Hamamatsu Photonics	**67**	NeoChord Inc	**19**	Transonic Systems Europe
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10	Cardio Medical GmbH	**26**	Heart Hugger / General Cardiac Technology	**42**	On-X Life Technologies INC™	**20–21**	Wexler Surgical Inc
53	CareFusion	**32**	HeartWare Inc	**30**	Oxford University Press	**1–2**	Wisepress Online Bookshop
90	CASMED	**11**	Integra	**134**	PCR	**97**	WL Gore & Associates GmbH
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31	CorMatrix Cardiovascular Inc	**81**	Jarvik Heart Inc	**128**	Qualiteam SRL		
122	Coroneo Inc	**63–64**	Jena Valve Technology GmbH	**25**	Redax SRL		
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79	Cryolife Europa Ltd	**43–47**	Karl Storz GmbH & Co KG	**71**	Sanofi Biosurgery		
37	CTSNET	**94–95**	KLS Martin Group	**33**	Scanlan International Inc		

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