Belgische Vereniging voor Cardio-Thoracale Heelkunde
Société Belge de Chirurgie Cardio-Thoracique
Belgian Association for Cardio-Thoracic Surgery

21th Congress
on Cardio-Thoracic Surgery

Programme

November 26th 2016
Cercel de Wallonie, Namur
Dear Colleagues and Friends,

We look forward to meeting you and your partner at this important event.

Paul Herijgers
President BACTS 2013-2016
All Information

http://www.meetings.be/BACTS
Program

08:00 – 08:30 Registration

08:30 – 09:15 General Assembly

09:15 – 09:30 Report of Database Committee

09:30 – 09:40 Coffee break

Adult Cardiac Session

Chair: A. Pasquet, S. Papadatos

09:40 – 09:55 Endoscopic single stage port access left ventricle outflow tract resection and mitral valve surgery.
J. Van der Merwe, F. Casselman, B. Stockman, A. Roubelakis, Y. Vermeulen, I. Degrieck, F. Van Praet (Aalst)

M. Pettinari, G. Tamagnini, R. Devotini, H. Gutermann, Ch. Van Kerrebroeck, R. Dion (Genk)

K. De Brabandere, C. Verburgh, W. Oosterlinck, P. Verbrugghe, H. De Praetere, Ch. Dubois, T. Adriaenssens, M-Ch. Herregods, F. Rega, B. Meuris (Leuven)

10.25 – 10.40 Frailty in elderly cardiac surgery patients: does it really matter?
T. Philipsen, J. Van Den Broucke, A. Velghe, Th. Bové (Gent)

10.40 – 11.10 Coffee Break
Thoracic Session

Chair: P. De Leyn, Y. Sokolow

11.10 – 11.25 eNOS uncoupling contributes to oxidative stress during lung ischemia-reperfusion injury dependent on ischemia time.
J. Gielis, J. Briedé¹, P. Cos, P. Van Schil (Antwerpen, Maastricht¹)

11.25 – 11.40 Understanding the prognosis of stage I non-small cell lung cancer: a prospective study on resection types and inflammatory parameters.
J. Govaerts, L. Haest, K. de Schaetzen, J. Gielis, P. Van Schil, J. Hendriks, P. Lauwers (Antwerpen)

11.40 – 12.20 Invited Lecture Thoracic Surgery
2017 TNM classification of lung cancer.
M. Dusmet (London, U.K.)

12.20 – 13.20 Lunch

Congenital Cardiac Surgery Session

Chair: J. Rubay, B. Meyns

13.20 – 13.35 Long term outcome after aortic arch hypoplasia treated with autologous pericardial patch in neonates.
L. Chebli, Ch. Waxweiller, H. Demanet, H. Dessy, Ph. Van Der Linden, P. Wauthy (Brussels)

13.35 – 13.50 Hepatic changes in the Fontan circulation: an attempt to streamline follow-up screening.
K. Francois, Th. Ackerman, J. De Backer, L. Demulier, A. Geerts, H. Van Vlierberghe, Th. Bové (Gent)

13.50 – 14.30 Invited Lecture Congenital Surgery:
Management of heart failure in children
M. Burch (London, U.K.)
Bullet presentations session

Chair: H. De Praetere, K. Cathepis, P. De Leyn

14.30 – 14.35 Survival and functional capacity after complex cardiac surgery: are the outcomes patient or procedure related. M. Pettinari, G. Tamagnini, R. Devotini, H. Gutermann, Ch. Van Kerrebroeck, R. Dion (Genk)

14.35 – 14.40 Endoscopic port access surgery for isolated atrioventricular valve endocarditis. J. Van der Merwe, F. Casselman, B. Stockman, Y. Vermeulen, I. Degrieck, F. Van Praet (Aalst)

14.40 – 14.45 Experience with robotic lobectomy with the 4-arm Da Vinci XI system. J. Hendriks, J. Goedemé, P. Lauwers, M. De Waele, P. Van Schil (Antwerpen)


15.00 – 15.05 HCV false positive immunoassays in patients with LVAD: a potential trap! A. Heinrichs, M. Antoine, D. Steensels, I. Montesinos, M-L. Delforge (Bruxelles)
15.05 – 15.30 Coffee Break

15.30 – 16.00 Presidential address
Th. Bové

**Adult Cardiac Session**

*Chair:* Th. Bové, H. Gutermann

16.00 – 16.40 Invited Lecture Cardiac Surgery
New developments in Mitral devices.
F. Volkmar (Berlin, Germany)

16.40 – 16.55 Best Abstract Award
Minimally invasive mitral valve annuloplasty confers a long-term survival benefit compared with state-of-the-art treatment in heart failure patients with functional mitral regurgitation.
F. Van Praet, M. Penicka, F. Casselman, M. Vanderheyden, G. Van Camp, B. Stockman, I. Degrieck, J. Bartunek (Aalst)

S. Jacobs, J. Geens, P. Claus, F. Rega, B. Meyns (Leuven)

17.10 – 17.25 Wound complications after OPCAB: Is skeletonized IMA grafting worth the effort?
D. Mulier, O. Da Costa Senior, V. Spalart, P. Verbrugghe, B. Meuris, W. Oosterlinck (Leuven)

17.25 – 17.40 Factors that contribute to conversions in minimally invasive cardiac surgery.
J. Van der Merwe, F. Casselman, B. Stockman, A. Roubelakis, Y. Vermeulen, I. Degrieck, F. Van Praet (Aalst)
Abstracts

ENDOSCOPIC SINGLE STAGE PORT ACCESS LEFT VENTRICLE OUTFLOW TRACT RESECTION AND MITRAL VALVE SURGERY

J. Van der Merwe, F. Casselman, B. Stockman, A. Roubelakis, Y. Vermeulen, I. Degrieck, F. Van Praet
O.L.V. Kliniek, Aalst, Belgium

This study is the first to report the outcomes of single stage Endoscopic Port Access left ventricular outflow tract septal myomectomy and mitral valve surgery (EPAS-LVOTSM-MVS) for significant hypertrophic obstructive cardiomyopathy (HOCM) and concomitant mitral valve (MV) disease. Our current surgical team performed single stage EPAS-LVOTSM-MVS in 13 consecutive HOCM patients (mean age 57.3±14.5 years, 38.5% female, 15.4% older than 70 years, mean logistical EuroSCORE II 4.2±5.3%) between March 1st 2010 and October 31st 2015. Presenting symptoms included angina (n = 6, 42.6%). The mean pre-operative peak left ventricle outflow tract (LVOT) gradient was 74.8±42.5 mmHg and intra-ventricular septal diameter (IVSD) 19.5±4.5 mm. MV-surgical indications included endocarditis (n = 1, 7.7%) and systolic anterior motion (SAM) (n = 12, 92.3%).

EPAS-LVOTSM-MVS procedures performed included MV-repair (n = 7, 53.8%) and TV-repair (n = 1, 7.7%). The mean cardiopulmonary bypass- and ischemic times were 202.2±65.5 and 140.2±49.3 minutes respectively. In-hospital morbidities included hospital acquired pneumonia (n = 1, 7.7%). The mean length of hospitalization was 17.7±18.1 days. More than 645.7 patient months (mean 49.7±30.0) were available for long term clinical- and echocardiographic analysis. There were no HOCM or MV re-interventions. All patients (n = 13, 100%) were classified as New York Heart Association clinical status grade II or less. No residual peak LVOT-gradients greater than 15.0 mmHg or MV-regurgitation more than grade I were present in any patients. The mean IVSD was 14.2±4.9 millimetres.

Single stage EPAS-LVOTSM-MVS is safe, feasible and offers favourable procedure related clinical- and echocardiographic outcomes.
COMPARISON OF HEMODYNAMIC PERFORMANCE AND EXERCISE CAPACITY OF 3 CONTEMPORARY BIOPROSTHETIC AORTIC VALVES: RESULTS FROM A PROSPECTIVE RANDOMIZED STUDY.

M. Pettinari, G. Tamagnini, R. Devotini, H. Gutermann, Ch. Van Kerrebroeck, R. Dion
A.Z. Oost Limburg, Genk, Belgium

We sought to determine whether there are differences in hemodynamic performance and exercise capacity among three new-generation biological aortic valve.

279 adults undergoing aortic valve replacement were randomized to receive the Edwards Magna (n=93), Sorin Mitroflow (n=93), or St. Jude Trifecta bioprostheses (n=93). Hemodynamic performance was evaluated by transthoracic echocardiography and ergospirometry was used to determine exercise capacity.

Mean age was 74±8 years and there were 144 men (51.6%). There were no significant differences in baseline characteristics among implant groups.

At 4 years follow up, survival (Trifecta=73.6±8.7%, Mitroflow=72.8±9.6% and Perimount=77.5±10.4%), freedom from stroke (Trifecta=94.7±5.1%, Mitroflow=96±3.9% and Perimount=95.2±4.6%) and patients in NYHA class I/II (Trifecta=74.2±0.3%, Mitroflow=75.3±0.2% and Perimount=85.8±0.1%) were similar. Mean transvalvular gradient did not differ among the groups (Trifecta=10.6±4.4 mmHg, Mitroflow=12.1±5.11 mmHg and Perimount=10.9±4.3 mmHg), while the Trifecta had a significant lower peak gradient compared to the Mitroflow (18±6.1 mmHg vs 22.8±8.5 mmHg). VO2max was also similar (Trifecta=20.8±3.5 mL/min/kg, Mitroflow=19.6±4.2 mL/min/kg and Perimount=19±2.9 mL/min/kg).

This prospective, randomized comparison reveals that the 3 valves studied performed nearly equally in term of hemodynamic performance and exercise capacity. Longitudinal follow-up of these randomized cohorts is essential to determine late clinical implications of these findings.

SINGLE-CENTER EXPERIENCE WITH PERCEVAL: 9 YEARS CLINICAL AND ECHOCARDIOGRAPHIC FOLLOW-UP IN 220 PATIENTS.

K. De Brabandere, C. Verburgh, W. Oosterlinck, P. Verbrugghe, H. De Praetere, Ch. Dubois, T. Adriaenssens, M-Ch. Herregods, F. Rega, B. Meuris
U.Z. Gasthuisberg, Leuven, Belgium

After the completion of the “first-in-man” trial, the Perceval bioprosthesis has been in use in a wide variation of primary and redo cases, both in single aortic valve replacement (mini-sternotomy and right thoracotomy) as in combined interventions. We collected the complete clinical and echocardiographic follow-up of all UZ Leuven
patients with a Perceval bioprosthesis since 2007. Single AVR was performed in 107 cases, while 113 cases (51%) were combined (CABG, mitral or tricuspid plasty, myectomy, ablation,...). Cross-clamp times were 39 ± 14min in single minimal-invasive AVR, and 74 ± 36min in combined cases. Despite the elevated risk profile (mean age 79 ± 5y, mean EuroSCORE II 5.4 ± 5.8, mean STS-score 6.3 ± 6), the 30-day mortality was only 3.7%. All-cause mortality at 2 years was 14.8%. Endocarditis needing reoperation was seen in 3 cases. One case of SVD was observed after 7 years in a patient with severe renal and vascular disease. For the whole cohort, peak and mean gradients were 23 ± 8mmHg and 13 ± 5mmHg at the latest echo follow-up. In 34 cases with more than 5 years of echocardiographic follow-up (range 5-8y), the peak and mean gradients were 22 ± 9mmHg and 12 ± 5mmHg, with an EOA of 1.7 ± 0.5cm². No explants for SVD have been performed yet. The use of the Perceval rapid-deployment valve results in short cross-clamp times in both minimal-invasive AVR as in combined cases. Even in a population with obvious elevated risk, the early mortality is 30% lower than what is predicted by EuroSCORE II. Also the 2-year all-cause mortality is lower than literature-reported data in similar patients. Intermediate-term echocardiographic follow-up still proves adequate hemodynamics of the sutureless valve.

FRAILTY IN ELDERLY CARDIAC SURGERY PATIENTS: DOES IT REALLY MATTER?

T. Philipsen, J. Van Den Broucke, A. Velghe, Th. Bové
U.Z. Gent, Gent, Belgium

To investigate the impact of preoperative bedside frailty testing on surgical outcome in elderly cardiac surgery patients. Frailty was assessed in patients >75 years, scheduled for elective cardiac surgery. Grip strength, 5-m-walking speed, comprehensive geriatric assessment and frailty-related biomarkers were determined. Frailty was also subjectively quantified by preoperative eyeball-scoring, depending on the bedside perception of the operating surgeon. Study endpoints were mortality and ICU/hospital stay duration. From October 2015 to May 2016, 141 patients (mean age 79.24 ± 3.5y) were included for respectively CABG (54%), valve surgery (24%) and combined CABG-valve surgery (18%), yielding a mean STS PROM score of 3.17±3.6. Frailty tests and outcome are summarized in table 1. Multivariate regression analysis showed that length of ICU stay was significantly longer in patients with low grip strength(p=0.01), poor renal function(p=0.02) and serum iron deficit(p<0.001). High eyeball-frailty scoring was associated with significant longer ICU and hospital stay, higher mortality risk, poor 5-m walking time, poor renal function and high geriatric risk scores. Grip strength and 5-m walking speed are easily performed bedside tests, that reliably help to identify frailty. In addition to the geriatric evaluation, the subjective ‘eyeball score’ by the surgeon appears to be most accurate in predicting hospital outcome, independent of associated organ-specific diseases. Preoperative assessment of
frailty should be included to improve a patient-tailored approach of elderly patients scheduled for cardiac surgery.

**ENOS UNCOUPLING CONTRIBUTES TO OXIDATIVE STRESS DURING LUNG ISCHEMIA-REPERFUSION INJURY DEPENDENT ON ISCHEMIA TIME**

J. Gielis, J. Briedé¹, P. Cos, P. Van Schil
U.Z.A., Antwerpen, Belgium, Maastricht Universitary¹

Ischemia-reperfusion injury is a necessary part of organ transplantation and a key determinant of both acute and chronic graft failure. We have assessed the contribution of endothelial nitric oxide synthase (eNOS) and eNOS uncoupling to oxidative and nitrosative stress formation during lung ischemia-reperfusion injury dependent on ischemia time.

40 eNOS wild type mice (eNOS +/+) and 40 eNOS knock-out mice (eNOS -/-) were divided into four groups: a sham control group, and three groups receiving either 60 minutes or 90 minutes of pulmonary ischemia followed by 0 hours, 1 hour or 24 hours of reperfusion. Lung tissue was analysed with electron spin resonance for NO production and ROS content. Western blotting was performed to detect protein nitrosation, eNOS and eNOS uncoupling. In peripheral blood, arterial blood gases were taken and ROS content was determined.

eNOS +/- mice had lower ROS production in their peripheral circulation but worse blood gas values after 1 hour of reperfusion. Lung tissue of eNOS -/- mice showed lower ROS and NO production and lower protein nitrosation compared to wild-type. Longer ischemia times result in more elaborate oxidative and nitrosative stress. Structural eNOS uncoupling was present already after 60 minutes of ischemia as shown by increased eNOS monomer-dimer ratios, but diminished after 90 minutes of ischemia.
We have shown that eNOS uncoupling, both structurally and functionally, contributes to lung ischemia-reperfusion injury and inflammation. This ultimately leads to worse clinical outcome. Stabilizing eNOS may therefore be a new approach to extend pulmonary graft survival.

**UNDERSTANDING THE PROGNOSIS OF STAGE I NON-SMALL CELL LUNG CANCER: A PROSPECTIVE STUDY ON RESECTION TYPES AND INFLAMMATORY PARAMETERS**

J. Govaerts, **L. Haest**, K. de Schaetzen, J. Gielis, P. Van Schil, J. Hendriks, P. Lauwers
U.Z.A., Antwerpen, Belgium

For patients with resectable stage I NSCLC, lobectomy is standard treatment. As extensive surgery may induce considerable morbidity, this study will reassess the results of sublobectomy in stage I NSCLC. With an overall recurrence rate of 30% in stage I NSCLC patients who undergo resection, identification of prognostic parameters is of vital interest. Inflammatory parameters such as neutrophil to lymphocyte ratio (NLR), platelet to leukocyte ratio (PLR) and advanced lung cancer inflammation index (ALI) may be associated with a worse outcome. This study assesses the survival results of resected stage I NSCLC in relation to these inflammatory parameters.

Retrospective analysis of a prospective database: 55 patients with stage I NSCLC were treated between May 2009 and July 2015 at UZA with lobectomy or sublobectomy. They did not receive (neo)adjuvant chemoradiotherapy. Overall survival (OS) and disease-free survival (DFS) rates were estimated using Kaplan Meier and log rank analysis. Cox’s hazard regression model was used to evaluate prognostic factors. If applicable hazard ratios (HR) were calculated.

The mean OS was 4.6 and 4.0 years for the lobectomy and sublobectomy group respectively. The mean DFS was 3.9 versus 3.6 years for lobectomy versus sublobar resections. The differences in OS and DFS were not significant (P=0.195 and P=0.410) between both groups. NLR > 3.44 and PLR > 194 turned out to be significant prognostic factors for OS (P=0.022 and P=0.006), with HR of respectively 4.2 and 4.9. Concerning DFS, only PLR showed to be a significant prognostic factor (P=0.047) with an insignificant HR of 2.79. For ALI there was no significant difference in OS or DFS. For patients with stage I NSCLC, lobectomy and sublobar resections can be considered valid options for surgical treatment in selected patients. NLR and PLR are significant prognostic factors for OS. Concerning DFS, only PLR was found to be a significant prognostic factor.
LONG TERM OUTCOME AFTER AORTIC ARCH HYPOPLASIA TREATED WITH AUTOLOGOUS PERICARDIAL PATCH IN NEONATES.

L. Chebli, Ch. Waxweiller, H. Demanet, H. Dessy, Ph. Van Der Linden, P. Wauthy
HUDERF, Bruxelles, Belgium

Aortic arch hypoplasia is a congenital heart defect that is more often than not associated with other cardiac malformations, making its treatment an important surgical challenge. Many techniques are described with good results. Here we report a 17 years’ experience at H.U.D.E.R.F, using our technique that consists of an aortoplasty using an autologous pericardial patch treated in a glutaraldehyde solution, associated to the complete removal of ductal tissue.

Retrospective analysis of surgical results and late follow-up of aortic arch reconstruction using pericardial patch in 58 new-borns. Neonates were divided in two groups: hypoplasia associated with simple heart defects (group 1) or hypoplasia associated with severe heart defects such as Taussig-Bing anomaly or transposition of the great vessels (group 2).

Postoperative mortality in group 1 and 2 are respectively 5.4% and 33.3%. Overall mortality is 15.5%. Morbidity was more significant in group 2. Major complications were pulmonary hypertension associated with hemodynamic instability. Follow-up: no aneurysmal dilatation was detected. Two early restenosis were treated with endoluminal percutaneous angioplasty.

The use of pericardial autologous patch treated with glutaraldehyde is an effective technique with promising results. There is no aneurysmal dilatation and a poor incidence of restenosis. Its growth potential and non-immunogenic characteristics make it an optimal patch for the new-born population.

HEPATIC CHANGES IN THE FONTAN CIRCULATION: AN ATTEMPT TO STREAMLINE FOLLOW-UP SCREENING.

K. Francois, Th. Ackerman, J. De Backer, L. Demulier, A. Geerts, H. Van Vlierberghen, Th. Bové
U.Z. Gent, Gent, Belgium

Fontan completion induces liver congestion, leading to liver fibrosis, cirrhosis and hepatocellular carcinoma. Timely detection of liver dysfunction is essential to identify patients at risk. In this study we sought to determine the laboratory and liver imaging screening tools most useful for follow-up.

In a prospective set-up, 25 Fontan patients, aged 24.8 ± 5 years, underwent laboratory analysis and liver imaging. Fibrosis indices (APRI, FIB-4 and Forns-index) were calculated. Liver morphology and Doppler imaging of hepatic vein(HV),portal vein (PV), hepatic (HA) and superior mesenteric artery (SMA) were performed, and
Resistance indices (RI) and pulsatility ratio calculated. Liver stiffness was measured with elastography. The results were correlated to time indices (age, interval) and their usefulness for screening.

Age at operation was 6.2 ± 3.8 years, the interval since operation was 18.6 ± 5.1 years. APRI (0.42 ± 0.18) and FIB-4 (0.63 ± 0.33) indices were non-indicative for liver fibrosis. Forns-index (3.08 ± 1.5) suggested fibrosis in 24% of patients. FIB-4 and Forns index correlated significantly with patient age (p=0.037 and 0.002 respectively). 25% and 15% of patients had lobulated liver contour and nodular hyperplasia. HV backward/forward flow ratio was 0.68 ± 0.51. PV pulsatility index (0.37 ± 0.19) was subnormal. HA RI (0.67 ± 0.12) was normal, the SMA RI was increased (0.87 ± 0.09), indicating higher mesenteric vascular resistance. Liver stiffness (9.8 ± 3.2 kPa) was slightly increased compared to normal. SMA RI only correlated with Fontan interval (p=0.05).

Adult Fontan patients show moderate signs of liver dysfunction. The usefulness of laboratory indices validated for classical liver fibrosis is still unclear. The morphologic changes in the liver, and the abnormal Doppler parameters in the hepatic vessels, sustain the use of non-invasive liver imaging during follow-up of Fontan patients, while liver stiffness screening leads to divergent results, and needs validation through sequential measurement.

**SURVIVAL AND FUNCTIONAL CAPACITY AFTER COMPLEX CARDIAC SURGERY: ARE THE OUTCOMES PATIENT OR PROCEDURE RELATED.**

M. Pettinari, G. Tamagnini, R. Devotini, H. Gutermann, Ch. Van Kerrebroeck, R. Dion
A.Z. Oost Limburg, Genk, Belgium

Confronted with an extensive multi-components procedure in a high-risk patient, many surgeons tend to decrease operative risk by skipping one or more of the operation’s components. However, we believe that the combined advantages of a complete procedure prevail over the negative impact of its extended duration and complexity. Aim of our study was to evaluate and compare the influence of patient vs surgery related risk on survival and postoperative exercise capacity.

Between 2008 and 2014, 334 patients underwent 3 or more cardiac procedures (CABG, valves repair or replacement, ablation, ventricular restoration, thoracic aorta interventions and redo’s) in the same operation. Mean aortic cross clamping time was 174±57 min. Cox hazard regression for survival and multivariate linear modelling for the VO2max were used to build two risk models: one (patient related model, PRM) based on patients specific characteristics and the second (surgery related model, SRM) based only on surgical related characteristics. Time related ROC curve, Negative and Positive Predictive Value (NPV, PPV), Negative and Positive Likelihood Ratio (-LR, +LR) were conducted to compare the models performance for the survival analysis while an Analysis of the Variance (ANOVA) was conducted for the VO2max.

1 and 5-year survival were 83.1±2.1% and 68.3±3.4%, and at 5 years there were no
difference if patient underwent 3, 4 and 5 procedures (71.8±3.9%, 64.1±6.3% and 71.4±13.3%). At follow up VO2max was 21.1±5.3 ml/kg/min. The PRM performed better than the SRM to predict survival in term of ROC (86.5±3.5% vs 73.6±3.9%, p=0.02), NPV (92.2±1.8% vs 87.3±2.2, p=0.02), PPV (52.1±4.6% vs 42.1±4.5%, p=0.04), -LR (0.5±0.2 vs 0.2±0.2, p=0.4), +LR (3.6±0.1 vs 2.3±0.1, p=0.02). PRM predicted better than SRM also in term of VO2max (p<0.01).

Patient’s complexity predicts survival and functional capacity VO2max better than the complexity of the operation in case of complex cardiac procedure. Therefore patient’s factors more than surgical factors should influence our benchmarking of outcomes in those complex procedures.

ENDOSCOPIC SINGLE STAGE PORT ACCESS LEFT VENTRICLE OUTFLOW TRACT RESECTION AND MITRAL VALVE SURGERY

J. Van der Merwe, F. Casselman, B. Stockman, Y. Vermeulen, I. Degrieck, F. Van Praet
O.L.V. Kliniek, Aalst, Belgium

This study is the first to report the outcomes of single stage Endoscopic Port Access left ventricular outflow tract septal myomectomy and mitral valve surgery (EPAS-LVOTSM-MVS) for significant hypertrophic obstructive cardiomyopathy (HOCM) and concomitant mitral valve (MV) disease.

Our current surgical team performed single stage EPAS-LVOTSM-MVS in 13 consecutive HOCM patients (mean age 57.3±14.5 years, 38.5% female, 15.4% older than 70 years, mean logistical EuroSCORE II 4.2±5.3%) between March 1st 2010 and October 31st 2015. Presenting symptoms included angina (n = 6, 42.6%). The mean pre-operative peak left ventricle outflow tract (LVOT) gradient was 74.8±42.5 mmHg and intra-ventricular septal diameter (IVSD) 19.5±4.5 mm. MV-surgical indications included endocarditis (n = 1, 7.7%) and systolic anterior motion (SAM) (n = 12, 92.3%).

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Single stage EPAS-LVOTSM-MVS is safe, feasible and offers favourable procedure related clinical- and echocardiographic outcomes.
EXPERIENCE WITH ROBOTIC LOBECTOMY WITH THE 4-ARM DA VINCI XI SYSTEM

J. Hendriks, J. Goedemé, P. Lauwers, M. De Waele, P. Van Schil
U.Z.A., Antwerpen, Belgium

Since 2011 complete VATS lobectomy is used for T1 and T2 NSCLC. Although used on a regular basis, some technical and ergonomic issues are still apparent. In 2003 we started using the first generation of the three-armed da Vinci robot to perform resection of mediastinal tumours. With the introduction of the four-armed Da Vinci Xi we also started a robotic lobectomy program in January 2016 and did our first case in February 2016. Until June, we operated on 20 patients including both lobectomies and segmentectomies, with operating times on the console up to 2 hours or less. So far, one patient needed conversion to a utility incision to control a bleeding. Overall, the da Vinci Xi scored far better for ergonomics, view and surgical handling compared to a VATS procedure. Installation time and total time of procedure was significantly longer compared to VATS. We show a video of a right upper lobe lobectomy, from port placement and installation of the robot, to extraction of the specimen, in order to share our early experience and to discuss the main advantages of the four-armed robot.

ANGIOTENSIN-CONVERTING-ENZYME INHIBITOR THERAPY RESTORES PRECONDITIONING-MEDIATED CARDIOPROTECTIVE TRANSCRIPTOME REPROGRAMMING IN A MODEL OF THE METABOLIC SYNDROME

A. Yakubova, D. Svelichnyy, W. Oosterlinck, L. Zwarts, G. Laenen, Y. Moreau, G. Van Der Mieren, B. De Moor, L. Thorrez, P. Callaerts, P. Herijgers
U.Z. Gasthuisberg, Leuven, Belgium

In subjects with the metabolic syndrome (MS), endogenous cardioprotection of second window preconditioning (SWOP) is dysfunctional. Chronic angiotensin-converting-enzyme inhibition (AceI) partially restored SWOP. We studied the possible gene expression footprint responsible for this restoration of cardioprotective properties. LDLR/-;ob/ob (DKO, model of MS) and C57Bl6/J (WT) mice were injected with captopril (10 mg/kg/day) between 12 and 24 weeks of age, or placebo as untreated controls. Preconditioning was induced by five intermittent 6-min cycles at 6% oxygen (HPC). Non-preconditioned mice underwent a sham procedure. 24 hours later, total cardiac RNA was isolated and sequenced by RNASeq (Illumina). Differential gene expression was analysed by Cufdiff. qRT-PCR was used to validate the results. In parallel groups, infarct size (IS) after 30 min LAD occlusion and 60 min reperfusion was determined as phenotypic outcome parameter. SWOP did not significantly reduce IS in untreated DKO mice (3±1%). In untreated
and treated WT mice SWOP significantly reduced IS by 49±6 and 56±7%. In DKO AceI mice, preconditioning potential was partially restored with significant IS reduction (20±4%). Preconditioning induced gene expression modification in the untreated DKO group (0.07% of all genes) was extremely low in comparison to both WT groups (4 and 6%), p<.05. In AceI treated DKO mice, the number of preconditioning-induced differentially expressed genes increased to 0.15%, p<0.05. Pathway and transcription factor analysis showed that preconditioning, in the three groups that could phenotypically be protected, triggered pathways of metabolism, immune system, cell development and proliferation, cell cycle, transcription and RNA processing, heart morphogenesis, histone modification, apoptosis, response to stress, and mitochondrial biogenesis.

In WT hearts SWOP generated a clear genetic cardioprotective footprint. In the model of MS, this genetic footprint was not induced by preconditioning, but was restored, although at a lower degree, after preventive AceI. These changes can explain the phenotypic findings of ischemia-reperfusion induced myocardial necrosis.

**THE COCOS INTERVENTIONAL TRIAL: CALORIC CONTROL IN CARDIAC SURGERY PATIENTS.**

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Malnutrition, often presenting as sarcopenic obesity, is widespread among cardiac surgery patients and is independently related to an adverse postoperative evolution or outcome. We aimed to assess whether nutrition therapy (NT) could alter caloric deficit, morbidity, and mortality in patients scheduled for non-emergency coronary artery bypass graft (CABG) or aortic valve surgery. 351 patients undergoing either elective CABG or aortic valve surgery were studied. Patients receiving NT were enrolled from January 2013 until December 2014. A historical control group consisted of 142 matched patients who underwent either type of surgery. In all patients, the NRS 2002 and MUST score were used for evaluating the preoperative nutritional status. Resting energy expenditure was measured using indirect calorimetry or calculated. A dietician assessed daily caloric intake during the entire hospitalization. Caloric deficits were calculated. According to a predefined protocol, nutritional interventions were launched on different time points. The primary endpoint was to evaluate whether NT could limit caloric deficit (Intake to Need Deviation). A secondary endpoint addressed the potential effect of NT on morbidity and mortality. Patients were followed for one year after surgery. There was no significant difference in patient, laboratory or mortality profile between the groups. Caloric deficit could be limited in the intervention group, essentially by providing oral feeding and oral supplements.
Caloric deficit increased after the second postoperative day because more patients were switched to oral feeding and intravenous infusions were omitted. Compared with controls, male CABG patients who received NT had less arrhythmia while female NT recipients had less sepsis and pneumonia. Male NT subjects undergoing aortic valve surgery had less arrhythmia, sepsis, and pneumonia. Women in this group presented less acute heart failure, sepsis, and pneumonia. Mortality after CABG and aortic valve surgery was lower in female NT patients. NT beneficially affects morbidity and mortality in elective cardiac surgery patients. The impact of NT is more pronounced in women than in men.

ROBOTIC MITRAL REPAIR : THE RING ISSUE.

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Robotic mitral valve repair is increasingly accepted as an effective treatment for degenerative mitral regurgitation. To respect the basic principles of mitral valve repair and the policy of our institution, we introduced the use of complete ring, instead of a posterior band for annuloplasty. Aim of this work is to evaluate the feasibility and the early results in robotic mitral valve repair with the use of complete annuloplasty ring. Between February 2012 and February 2016, 128 patients (mean age 56 14 years) underwent robotic mitral valve repair with the Da Vinci system. All patients received a ring annuloplasty (14 posterior band and 114 a complete ring). In most of the cases, the complete annuloplasty was performed using 9 to 12 separated U-stitches. In few cases the ring was inserted by using 3 Goretex running sutures. Posterior bands were implanted using two Goretex running sutures. The surgical techniques employed are summarised in table 1.

Mean aortic cross clamp time was 108 26 minutes for the entire population and 109 27 minutes in the complete ring group (p=0.77). In 9 patients (7%) the initial repair was not satisfactory and a second run of CPB, without conversion to sternotomy, was necessary to achieve a satisfactory result. There was no perioperative mortality. Discharge TT echocardiogram showed no or trivial MR in 127 patients and MR grade II in 1 patient. Median follow up was 16 months and was 100% complete. During the follow-up 1 patient with posterior band and 2 patients with complete ring needed to be reoperated for MR recurrence. In all cases the mitral valve was re-repaired with satisfactory echocardiographic result.

The use of complete annuloplasty ring is safe and reproducible in robotic mitral valve repair. Early results are promising and show that the complete annuloplasty is feasible as in conventional surgical approach.
HCV FALSE POSITIVE IMMUNOASSAYS IN PATIENTS WITH LVAD: A POTENTIAL TRAP!

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To determine the rate of false positive results with immunoassays for HCV antibodies in a LVAD population. Between June 2011 and January 2015, HCV antibody testing using CLIA (Liaison, Diasorin) was performed in 32 patients prior and post LVAD implantation. For patients with a positive HCV CLIA and ELFA (Vidas, Biomérieux) test, immunoblot and HCV RNA detection were performed. Prior to implantation, all patients showed a negative HCV serology. After LVAD implantation, 19 patients (59%) had a positive results for HCV antibody using CLIA and ELFA technologies. The HCV immunoblot was negative for 17 patients and indeterminate for two patients. For 15 patients, HCV RNA detection was performed and undetectable. Actually, no HCV infections were observed among those who were tested for HCV RNA. HCV serological tests routinely used in our laboratories are not reliable in patients with cardiac devices. A positive CLIA and/or ELFA reaction in patients with LVAD should be confirmed by HCV immunoblot and by HCV RNA PCR detection in order to rule out a HCV infection.
MINIMALLY INVASIVE MITRAL VALVE ANNULOPLASTY CONFERS A LONG-TERM SURVIVAL BENEFIT COMPARED WITH STATE-OF-THE-ART TREATMENT IN HEART FAILURE PATIENTS WITH FUNCTIONAL MITRAL REGURGITATION

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Minimally Invasive Mitral Valve Annuloplasty Confers a Long-Term Survival Benefit Compared with State-Of-The-Art Treatment I nHeart Failure Patients with Functional Mitral Regurgitation

Introduction: Data comparing the outcome of the minimally invasive surgical mitral valve annuloplasty (MVA) of isolated functional mitral regurgitation (FMR) with the state-of-the-art standards of care in systolic heart failure are not available. We tested the hypothesis that isolated MVA using the minimally invasive surgical approach will be independently associated with long-term survival benefit compared with the state-of-the-art conservative (CON) treatment in the propensity-matched high-risk patients with chronic systolic heart failure and symptomatic FMR.

The study population consisted of 312 consecutive patients (age 68.6± 10.8 years, 65.2% males) with stable LV systolic dysfunction, symptomatic FMR and previous heart failure hospitalization, who were followed in the heart failure clinic. A total of 158 patients underwent undersized MVA and 158 propensity-score matched patients were treated conservatively. A concomitant MAZE was performed in 53 (34%) patients. In the MVA group, the periprocedural and the 30-day mortality were 1.3% and 5.7%, respectively. During the median follow-up of 6.3 years (IQR 3.5-8.2 years) a total of 12 (23%), 51 (49%) and 94 (60%) died in the MVA with MAZE, MVA without MAZE and the CON group, respectively (p<0.001) (Figure 1). In Cox regression analysis, age, MVA both with and without MAZE emerged as independent predictors of all-cause mortality (all p < 0.05). MVA was associated with significantly greater symptomatic improvement and reduction of FMR than the conservative treatment (both p<0.001). Reverse LV remodelling was observed only in the MVA combined with MAZE group (p<0.01).

In high-risk heart failure patients with symptomatic FMR, minimally invasive MVA, in particular in combination with MAZE, confers an independent long-term survival benefit compared with the state-of-the-art conservative medical treatment.
COMPARING DIFFERENT UNLOADING STRATEGIES IN AN OVINE MODEL OF POST-INFARCTION HEART FAILURE.

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Previous research indicated that partial mechanical support in an model of post-infarction heart failure could induce structural reversed remodelling (i.e. decrease in ventricular end-diastolic volumes). With all commercial available assist devices today being full support devices we sought to analyse the structural reversed remodelling potential of full support assist devices.

Heart failure was induced by permanent ligation of the distal LAD and second diagonal branch and temporary occlusion of the proximal LAD. Six weeks later ventricular dimensions were measured using MRI. Then the sheep were randomized into 2 treatment groups; one group receiving no treatment (n=4) and the other group had a full support device implanted (n=7). After 6 weeks both groups underwent a new MRI analysis.

In the group without treatment left ventricular end-diastolic volumes increased from 119.3ml ±3.9ml to 135.3ml ±4.4ml after 6 weeks (p<0.01). In the group with a full support left ventricular assist device the left ventricular end-diastolic volumes did not change significantly (136ml ±33.4ml vs. 139.1ml ±32.9ml; p=0.32).

These results indicate that full support assist devices rather halt further structural remodelling rather than inducing reversed structural remodelling. This in contrast to previous research that showed that partial support devices in this model significantly reduced end-diastolic volumes. These findings highlight the importance of the type of unloading strategy in inducing reversed remodelling.
WOUND COMPLICATIONS AFTER OPCAB: IS SKELETONIZED IMA GRAFTING WORTH THE EFFORT?

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Wound complications are a potential life-threatening complication after CABG. Many interventions are aiming to reduce the incidence or severity of wound complications. The current guidelines favour a skeletonized approach for mammary artery grafting to avoid devascularisation of the sternum and midline incision. Although skeletonizing might be more time consuming it has the advantage to increase length and directly visualize the quality of the graft. We evaluated retrospectively after OPCAB, 100 patients with skeletonized grafts and compared them to 1487 patients with non-skeletonized grafts.

Patients underwent OPCAB between 2010-2015 at the University Hospital of Leuven. The first group (n=1487) received non-skeletonized uni- or bilateral IMA grafting while the second group (n=100) underwent the skeletonized technique. Demographical parameters were compared with a simple t-test while incidence of wound complications were evaluated by Chi-square. Survival analysis was performed by Kaplan-Maier curves. Wound complications were grade on a scale from 1 to 4 (see legend).

![Diagram showing wound complication grades]

**Legend wound grading**
1: minor: local redness or drainage with conservative approach and spontaneous healing
2: superficial: positive culture with need for antibiotic treatment
3: moderate: need for drainage, debridement or drainage
4: severe: mediastinitis with or without omentoplasty

**Figure 1. Pie chart of wound problem distribution in non-skeletonized and skeletonized OPCAB patients**

13% overall wound problems in non-skeletonized OPCAB patients
8% overall wound problems in skeletonized OPCAB patients
The 30 day mortality was similar for both groups with a survival of 98%. The non-skeletonized group had 12.8 % (191/1487) wound complications versus 8% (8/100) in the skeletonized group ( NS, p =0.19). There is a shift in severity of wound complications from a 47% of all wound problems being grade 3 to 4 complications in the non-skeletonized group to only 25% grade 3 to 4 in the skeletonized group. Although there is only a trend to less wound infections in our first cohort of 100 skeletonized patients versus 1487 non-skeletonized IMA grafting, the severity of these wound complications is clearly reduced. This may have a major impact on both recovery and quality of life after CABG.

**FACTORS THAT CONTRIBUTE TO CONVERSIONS IN MINIMALLY INVASIVE CARDIAC SURGERY**

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This study presents the first comprehensive report on factors that contributed to sternotomy conversions in patient scheduled for minimally invasive robotic enhanced coronary artery bypass- (RE-MIDCAB), aortic valve- (MI-AVS), endoscopic port access atrioventricular valve- (MI-PAAVVS) and left ventricular assist device (MI-LVAD) implantation surgery.

We analysed our institutional minimally invasive cardiac surgery (MICS) database for factors that contributed to sternotomy conversion. In total, 4471 consecutive patients underwent MICS between 1 February 1997 and 31 March 2016, of which 687-, 908-, 2872- and 4 patients underwent RE-MIDCAB (mean age 65.7±10.0 years, 24.9% female, 7.0% older than 80 years, 1.3% redo-cardiac surgery, 27.7% planned hybrid, 95.9% single internal mammary artery use, 13.4% multi-vessel anastomosis), MI-AVS (mean age 69.2±11.3 years, 45.2% female, 16.7% > 80 years, 19.1% body mass index > 30, 6.2% redo-cardiac surgery, 98.7% aortic valve replacement), MI-PAAVVS (mean age 64.1±13.3 years, 46.7% female, 7.7% older than 80 years, 12.2% redo-cardiac surgery, 11.0% body mass index > 30, 76.0% isolated mitral valve surgery, 28.5% cryo-ablation, 1.7% morrow myomectomy) and MI-LVAD implantation (mean age 51.3±16.5years, 25% female, 100% bridge to transplant) procedures respectively.

In total, sternotomy conversion was required in 26 (3.8%), 28 (3.1%) and 86 (3.0%) of RE-MIDCAB- (including lung adhesions 1.4%, inadequate exposure 0.2%, internal mammary artery dysfunction 1.2%, anastomosis dysfunction 0.5%, arrhythmia 0.2%), MI-AVS- (including porcelain ascending aorta 0.4%, inadequate visualization 0.3%, intra-operative complications 2.3%) and MI-PAAVVS- procedures (including lung adhesions 1.2%, inadequate visualization 0.1%, intra-operative complication 0.9% ) respectively. There were no MI-LVAD conversions.

MICS is evolving and increasingly becoming recognized as the future “gold-standard” approach. Surgeons need to be aware of factors (redo surgery, lung adhesions,
learning curve, ...) that contribute to sternotomy conversion to ensure that patients enjoy the maximum benefit of MICS and to encourage safer- and sustainable- MICS programs and prevention strategies.
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