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The investigators of these abstracts have stated in their submission letter that prospective studies where patients are involved have Ethics Committee approval and informed patient consent, and that the studies using experimental animal have institutional approval.

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**Author Index**

S81
Dynamic measurements of diastolic dysfunction in cardiac surgery and cardiac post operative morbidity scoring

Hafsah Hussain, Andrew Rogers, Hilary Shanahan, Vivek Sivaraman, Andrew Smith, Bonnie Kyle

Heart Hospital, UCL Hospitals NHS Foundation Trust

Background & Aim. Diastolic dysfunction (DD) has been reported in 50-80% of patients in the cardiac surgical setting and is associated with adverse post-operative outcomes (1). We aimed to determine if peroperative change in DD influences 30-day composite outcome after cardiac surgery. Outcome parameters included Cardiac Post Operative Morbidity Scoring (CPOMS), endotracheal intubation (ETT) duration, intensive care length of stay (ICU LOS), 30 day Major Adverse Cardiovascular and Cerebrovascular Events (MACCE) and 30 day all-cause mortality.

Methods. After ethical approval, clinicaltrials.gov registration NCT02285309, and written informed consent, data for this observational study was obtained using transoesophageal echocardiography pre-sternotomy and post-sternal closure in patients undergoing coronary artery bypass grafting +/- valvular surgery. DD was assessed with transmitral flow, annular tissue velocities, pulmonary venous flow and flow propagation velocity. Multivariate analysis of variance (MANOVA) was used to construct a linear composite for comparing outcome variables between groups, considering composite outcomes as dependent variables. DD status post-sternal closure (improved, unchanged, worse) informed the independent variable.

Results. Data from 28 patients was analysed. DD was identified in 23 (82%) patients pre-sternotomy (Grade I 28%, Grade II 39%, Grade III 14%) and 27 (96%) patients post-sternal closure (Grade I 50%, Grade II 47%). Where DD was unchanged post-sternal closure, mean CPOMS scores were higher (16.1 unchanged, 7.8 improved, 11 worse) but this was not statistically significant.

Conclusion. This initial dataset identifies a high incidence of DD in the cardiac surgical setting. There was a significant increase in CPOMS when DD was unresponsive to enoximone. Mean CPOMS scores were higher where DD was unchanged post-sternal closure but this was not statistically significant.

REFERENCE

Agreement of tricuspid annular systolic excursion (TAPSE) measurement in m-mode between transthoracic (TTE) and transoesophageal (TOE) echocardiography

Anna Flo, Elham Hasheminejad, Monica Dobrovie, Jaqueline Da Rocha e Silva, Jörg Ender

Heart Center Leipzig University

Agreement of tricuspid annular systolic excursion (TAPSE) measurement in m-mode between transthoracic (TTE) and transoesophageal (TOE) echocardiography
Objective. The aim of this study is to assess the agreement of TAPSE measurement in M-mode (Mm) between TTE and TOE.

Material and Methods. Patients scheduled for elective cardiac surgery underwent TTE and TOE examination shortly after induction of anaesthesia before the operation. TAPSE was measured by TTE using Mm in apical 4Chamber view (4CH) and by TOE using Mm in deep transgastric view at 0° (dTG0°) and dTG longaxis view (LAX) as well as using anatomic Mm (AmM) by aligning the cursor to the free wall of the tricuspid annulus in midoesophageal (ME) 4CH, dTG 0° (AMm) by aligning the cursor to the free wall of the tricuspid and dTG longaxis view (LAX) as well as using anatomic Mm.

There was statistically significant difference between TAPSE measurements in TTE and TOE in Mm in dTG0° views the angle between Mm cursor and the free wall of the tricuspid annulus was measured. One-way ANOVA for repeated measures was performed for TAPSE values between TTE and TOE measurements in each patient. Results are expressed as mean and 95% confidence interval (p < 0.05).

Results. 22 patients (12 men/10 women) were included. It was possible to obtain 6 TAPSE values in all patients. Angle of Mm measurement in TTE and TOE in Mm in dTG0° agreed with TAPSE measurement by TTE. Difference between TTE and TOE using Mm in apical 4chamber view (4CH)

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<th>Mean (mm)</th>
<th>IC 95%</th>
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<td>TTE 4CH Mm</td>
<td>19.3</td>
<td>17.1-21.5</td>
<td>0.759</td>
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<tr>
<td>TOE 4CH Am</td>
<td>19.1</td>
<td>16.8-21.5</td>
<td>0.003</td>
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<td>dTG0° Mm</td>
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<td>0.000</td>
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<td>dTG 0° AmM</td>
<td>19.2</td>
<td>16.9-21.4</td>
<td>0.612</td>
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<td>dTG LAX Mm</td>
<td>16.0°</td>
<td>14.1-18.0</td>
<td>0.000</td>
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<tr>
<td>dTG LAX AmM</td>
<td>16.7</td>
<td>16.5-20.8</td>
<td>0.139</td>
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Conclusion. TAPSE evaluation by TOE using AmM in any view agreed with TAPSE measurement by TTE. Difference between TAPSE values in TTE and TOE dTG0° Mm, though statistically significant seemed to be of no clinical importance.

REFERENCE

Oral Abstract Presentations 202
Wednesday, June 24, 2015
10:00 a.m.–10:30 a.m., Room F2/F3

OP-007
New anti pollution filter for volatile agents during cardiopulmonary bypass: preliminary tests

Caetano Nigro Neto
Dante Pazzanese Institute of Cardiology

Introduction. In most countries around the world the concern regarding pollution of the operating room atmosphere by volatile anaesthetics and its hazards related to the medical and paramedical team have already been well established. Recently, evidence of reduction in mortality due to the use of volatile agents during cardiac surgery led to an increase in their use even during cardiopulmonary bypass (CPB), mainly because the cardioprotective properties might be related to the modalities of its administration.1) Despite all the newest CPB machines having appropriate connections for volatile anaesthetic vaporizers, clinicians still need to adopt anaesthetic vaporizers to the bypass circuit as well as the scavenging gas systems to not pollute the room. The aim of this study was to create a prototype filter for volatile anaesthetic agents to be connected to the CPB machine.

FIGURE 1

Methods. After initial analysis and choice of suitable components, we built a prototype of volatile anaesthetic agents filter to be tested during CPB. For the test we used an in vitro oxygenator in a single-pass circuit. A pool of bovine fresh blood was used to fulfill the system and the circuit had a flow path to move the conditioned blood into the tested oxygenator. The prototype filter was connected to the membrane oxygenator at the outlet portion of the exhaled gases ensuring there was no leakage between them. The O2(%) and CO2(%) were measured with a gas analyzer just after the prototype filter in the outlet gas portion (Figure 1). The inlet (Pe) and outlet (Ps) pressures of the oxygenator were monitored with appropriately calibrated transducers connected to a pressure monitor to calculate the pressure drop (Pe – Ps = ΔP). The blood was maintained at 37°C throughout the test. The conditioned blood was pumped through the membrane oxygenator, with the predetermined combinations of test variables (blood flow rate=6 L/min; gas flow rate=6L/min with a FiO2=100% mixed with vaporized Sevoflurane 3% concentration) for 3 hours.

Results. No sevoflurane was detected on gas analyser and no statistical difference was observed on pressure drop during the test.

Conclusion. This prototype filter was considered suitable to adsorb completely the sevoflurane and it didn’t cause an over-pressure to the membrane oxygenator during the test.

REFERENCES

OP-008
Inhaled nitric oxide in lung transplantation in a large volume centre: evidence or tradition?

Maria Benedetto1,2, Rosalba Romano1,3, Georgiana Baca1, Andreas Fischer3, Andre Simon1, Nandor Marczin1,3

1Royal Brompton and Harefield NHS Foundation Trust, Harefield, United Kingdom, 2Campus Bio-Medico University, Rome, Italy, 3Anaesthetics, Imperial College London, London, United Kingdom, 4Royal Brompton and Harefield NHS Foundation Trust, London, United Kingdom
Background. The use of inhaled Nitric Oxide (iNO) in Lung Transplantation (LTx) remains controversial. This study describes our large single centre experience on the use of iNO. We hypothesized that the use of iNO improved hemodynamics and gas exchange at early periods following LTx and produced benefit in ICU and hospital outcomes.

Methods. We reviewed 179 patients who underwent LTx in our centre from 2010 to 2013. Data were collected from prospective databases as Electronic Patient Record and IntelligSpace Critical Care and Anaesthesia, including usage and duration of iNO therapy, mean Pulmonary Artery Pressure (mPAP) and PaO2/FiO2 (PF) ratio hourly in the first 6 hours and daily for 72 hours, previous history of Pulmonary Artery Hypertension (PAH), incidence of severe ischemia reperfusion injury (IRI) at the arrival in ICU (PF ratio <20), length of mechanical ventilation (MV), Intensive Care Unit (ICU) and hospital stay. Data were missing for 13 patients and this group was excluded by further analyses. Statistical analyses were performed using IBM SPSS Statistics 20.

Results. 98 patients out of 179 (54%) had iNO therapy after LTx. In this group, the starting dose was 19 (15, 20) ppm and the duration of the therapy was 19 (11, 43) hours. 68 patients did not receive iNO therapy. iNO was instituted in 17 out of the 37 patients (45.9%) who had previous history of PAH. The incidence of severe IRI at the arrival in ICU was higher in the group receiving iNO (22 (22.4%) vs 4 (5.9%), p= 0.004). The iNO group had lower mPAP at the arrival in ICU and at 24 and 72 hours (21.8±9.1 vs. 26.8±8.7 mmHg, p=0.003, 22.9±6.7 vs. 19.8±6.4 mmHg, p=0.012, and 27.1±6.5 vs. 22.7±5.8 mmHg, p=0.039, respectively), and lower PF ratio at 3 hours (37.1±21.3 vs. 46.6±23.4, p=0.043), and then at 24, 48, and 72 hours (29.0±13.6 vs. 33.6±11.9, p=0.027, 36.8±17.9 vs. 51.3±56.8, p=0.025, 35.8±16.0 vs. 45.4±17.2, p=0.001). Duration of VM, length of ICU stay and hospital stay were longer in the iNO group (77.5 (24, 504) vs. 32 (16, 99) hours, p=0.008; 11 (4, 29) vs. 5 (4, 11) days, p= 0.013; 34 (22, 50) vs. 27 (20, 47), p=0.310). 1-year survival was 81.6% in the iNO group and 89.7% in the other group (Log Rank 0.399).

Conclusion. iNO is frequently used at Harefield hospital to support LTx recipients but only half of the PAH are treated with iNO. The treatment group appears at higher risk with nearly a quarter suffering from severe graft dysfunction. While iNO influences PA pressures, the group exhibit poorer ICU outcomes but early survival is not compromised. Further large scale retrospective analysis is required to map European experience with iNO and ultimately prospective multicentre controlled trials to decide on justification of this expensive and off licence treatment.

Methods. Sixty patients scheduled for elective coronary artery bypass grafting ± aortic valve replacement randomised to two different types of opioid based anaesthesia. Cognitive function was evaluated preoperatively and on day 1, 4 and 30 after surgery. A change in cognitive function of more than 10 % was considered clinical relevant. A mean arterial pressure (MAP) < 60 mmHg, cardiac index (CI) < 1.8 L/min/m2 and mixed venous saturation (SvO2) < 60 % were considered indication of impaired haemodynamics. Other selected factors in this analysis were among others age > 70 years, female, residual EuroSCORE (EuroSCORE minus age and sex), valve surgery, extra corporal circulation time (ECC) and postoperative ventilation time.

Results. Higher age was correlated to lower preoperative cognitive score, which again was correlated to decreased cognitive function on 1st postoperative day. Compared to preoperative values 48% of the patients suffered cognitive dysfunction on day 1, 29 % on day 4 and 7% on day 30. Both crude and adjusted regression analysis of selected factors demonstrates (table) that low SvO2 for more than 15 minutes was associated with increased cognitive dysfunction on 1st postoperative day.

Conclusion. The study shows an association between perioperative low SvO2 and a decline in POCD on 1st postoperative day. A causal relation is yet to be analysed, but the result indicate that interventions improving the postoperative cognitive function might be possible.

OP-099

Low perioperative mixed venous saturation is associated with postoperative cognitive dysfunction on 1st postoperative day

Anne-Grethe Lorentzen, Linda Aagaard Rasmussen, Carl-Johan Jakobsen

Aarhus University Hospital, Aarhus, Denmark

Background & Aim. Postoperative cognitive dysfunction (POCD) is a well-known complication after cardiac surgery and may cause permanent disabilities with consequences for quality of life. Even though POCD is well known after major surgery the major factors with impact on POCD is less described. The objective was to estimate the frequency of POCD after on-pump cardiac surgery and to evaluate the associations between POCD and possible perioperative impact factors including depressed haemodynamic function.

OP-011

Low preoperative endotoxin core and anti-staphylococcal antibody levels are associated with prolonged hospital stay following aortic valve surgery

Sarka Moravcová1, Bonnie Kyle2, Thomas Treibel2, Andrew Smith2, Patricia Colques-Navarro3, Roland Molby2, Colin Hamilton-Davies2

1Royal Brompton & Harefield NHS Trust, London, UK, 2UCL Hospitals, London, UK, 3Karolinska Institute, Stockholm, Sweden

Background & Aim. It has previously been shown that preoperative endotoxin core antibody (EndoCab) level is predictive of post-cardiac surgery complications (1). This study aimed to determine if this relationship is due to a low level of this antibody or whether it relates to a general hypo-responsive immune system.

Method. Following institutional informed consent, 62 patients due to undergo surgery for severe aortic stenosis had blood (7ml) taken and the serum was stored at -80°C for later analysis. This was analysed by a series of ELISA assays IgG class of antibody for EndoCab and a range of anti-staphylococcal antibodies to alpha toxin, teichoic acid.
Discussion. It can be seen that both the pre-operative IgG antibo-
dies are inversely related to the post-operative length of stay, independent of
euroanesthesia predictions. This raises the question as to whether the antibodies are independently predictive of complications, form part of a battery of predictive antibodies or reflect a global immune hyporesponsiveness associated with a poor recovery profile. This warrants further investigation.

REFERENCE

OP-012
Minimally invasive mitral valve surgery through right thor-
ocotomy is a safe and effective procedure in short and long
term. A propensity score analysis
Paula Carmona1, Alejandro Vazquez2, Eva Mateo1, Carlos
Errando1, Sergio Cánovas3
1Consorcio Hospital General Valencia, 2Hospital Politecnico La
Fe, 3Hospital Universitario Virgen de la Arrixaca
Background. Minimally invasive (MI) mitral valve surgery has
grown in popularity. Starting a minimal access mitral valve
program is challenging. We sought to compare short term
outcomes and long term quality of surgical technique of mitral
valve surgery. The diameter of the Cx as well as the horizontal
and vertical (y) distance of the Cx from the mitral valve annulus
were measured in prede-

Material and Method. From 2009 to 2013, 212 consecutive
patients underwent mitral valve surgery. 44 by MI approach and
168 by MS. Patients receiving other concomitant procedures,
emergent surgery and reoperations were excluded. A propensity
score matching was performed to identify appropriate matched
pair of patients between groups by building a binary logistic
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pair of patients between groups by building a binary logistic

Results. Forty four patients were included in each group. Mean
follow-up was 26.6 ± 14.6 months for MI group and
28.4 ± 1.1 months for MS group, p = 0.63. There was no in
hospital mortality. Mitral valve repair was performed in 70.5%
patients in MI group vs 68.2% in the MS group and mitral
replacement in 29.5% and 31.8% respectively. No statistically
significant differences were found in major complications: Cardio-
vascular 0% vs 2.3%, neurological 0% vs 2.3%, renal 0% vs 2.3%
in MI vs MS group respectively. Reoperation for bleeding was more
frequent in MI group 6.8% vs 0% (p=0.08). The incidence of
pneumothorax and pleural effusion that required drainage occurred
in 11.4% in the MI group vs 0% (p=0.05) in the MS group.

Conclusion. MI approach through thoracotomy is not inferior to MS
in terms of in hospital morbidity and long term quality of surgical tech-
nique compared to conventional surgery in an initiating programme.

OP-013
Feasibility of analyzing circumflex artery anatomy by real
time 3D transesophageal echocardiography compared to 3D
reconstructed cardiac computed tomography
Carmine Bevilacqua1, Sarah Eibel1, Borek Foldyna2, Lukas
Lehmkuhl2, Matthias Gutterlet2, Chirojit Mukherjee1, Joerg
Seeburger3, Joerg Ender1
1Department of Anesthesiology, Heart Center Leipzig, Germany,
2Department of Radiology, Heart Center Leipzig, Germany, 3Department
of Cardiothoracic Surgery, Heart Center Leipzig, Germany
Background & Aim. Iatrogenic injury of the circumflex artery (Cx)
due to the close proximity to the mitral annulus might be a severe
complication during mitral valve surgery. The aim of our study was
to investigate the feasibility of measurement of the Cx in Real
Time three dimensional transesophageal echocardiography (RT3D
TEE) and to compare these measurements with data acquired
from three dimensional reconstructions of the coronary arteries
based on 128-row multidetector computed tomography (MDCT).
Methods. After approval from the Ethics Committee we retro-
spectively analyzed RT3D TEE datasets as well as MDCT datasets
of 50 patients that had previously undergone minimally invasive
mitral valve surgery. The diameter of the Cx as well as the horizontal
(x) and vertical (y) distance of the Cx from the mitral valve annulus
were measured in predefined positions. The measurements from
RT3D were then compared to the data derived from the MDCT.

Results. The measurements for diameter of the Cx in RT3D
varied from 1.1 to 3.4 mm and from 1 to 4 mm in MDCT
respectively. The horizontal distance of the Cx from the annulus in
RT3D varied between 2.5 and 8.8 mm and in MDCT between 5
and 11 mm respectively. The vertical distance of the Cx from the
annulus varied between 0 and 8.1 mm (cranially to the annulus) in
RT3D and between 0 and 11 mm in MDCT respectively. The Bland-Altman
analysis of the data showed good correlation.

Conclusion. The results of our study show a good agreement
between the measurements of the circumflex artery distances as
acquired by RT3D TEE and MDCT imaging and encourage the the
daily use in the intraoperative setting. This is an important landmark
for the surgeon to avoid complications during mitral valve surgery.

ORAL ABSTRACT PRESENTATIONS

Oral Abstract Presentations 302
Wednesday, June 24, 2015
12:00 p.m.–12:30 p.m., Room F2/F3

OP-020
Cerebral oxygen saturation in thoracic aortic surgery: a
single centre prospective observational study in 215 patients
Reto Basciani
University Hospital Bern

Background & Aim. Near-infrared spectroscopy (NIRS) moni-
toring of cerebral oxygen saturation has been shown to be useful during
hypothermic circulatory arrest (HCA) and cerebral perfusion (SACP) in small cohorts. Aim of the study was to describe cerebral oxygen saturation during HCA and SACP in a large cohort of patients.

Methods. With IRB approval, 215 patients (age 62±12) undergoing thoracic aortic surgery with HCA (24±18 min) and SACP (16±17 min) at 10 ml kg−1 min−1 were monitored with bifrontal NIRS (NIRO 200NX, Hamamatsu Photonics, Japan). Tissue oxygenation index (TOI) was measured continuously.

Results. TOI dropped by 16% (95% CI, 17.6 to 15.1) during HCA and increased again up to 10.1% (95% CI, 8.9 to 11.3) during SACP. TOI at start of HCA correlated with TOI at SACP-start and HCA-stop. Absolute TOI values and correlations are shown in Figures

Conclusion. NIRS detects changes in cerebral perfusion accurately and timely. HCA leads consistently to marked cerebral deoxygenation. SACP effectively restores cerebral oxygenation, however not to pre-HCA baseline levels. TOI levels at HCA-start are predictive for TOI-values during SACP and at HCA-end.

OP-021

Serum protein S100β for the prediction of postoperative delirium after off-pump coronary artery bypass surgery: a prospective observational trial

Layth Al Tmimil, Koen Poesen, Jan Van Hemelrijck, Marc Van de Velde, Paul Sergeant, Bart Meyns, Steffen Rex

Introduction. Patients undergoing cardiac surgery are vulnerable for the development of postoperative neuropsychiatric complications. Early recognition of these complications is of great clinical importance. Serum protein S100β is a biomarker that reflects blood brain barrier dysfunction. Serum S100β-levels are significantly increased after cardiac surgery with the use of cardiopulmonary bypass (1). We hypothesized that S100β-levels are also released during off-pump coronary artery bypass (OPCAB)-surgery and that S100β is an accurate neurobiochemical marker for the prediction of postoperative delirium (POD).

Methods. From January 2012 to June 2013, 91 patients older than 18 years, scheduled for elective OPCAB-surgery were included in this prospective observational trial. All patients underwent baseline neuropsychiatric examination with the confusion assessment score (CAM). Anaesthesia was titrated to achieve bispectral index values between 40-60. Serum S100β-levels were determined in arterial blood at baseline, the end of surgery and at postoperative day (PD) one using batch analysis with the Elecsys® S100-assay (Roche Diagnostics, Mannheim, Germany). Patients were daily evaluated, until discharge, for the presence of POD, using the CAM or the intensive care unit version of the CAM (CAM-ICU).

Results. Serum levels of S100β showed a significant increase at end of surgery and on PD1 (Fig.1). The occurrence of POD was 21% (95% confidence interval (CI): 13%-31%). In the receiver-operating-characteristic plot, S100β predicted the development of POD with an area under the curve of 0.719. The cut-off level of S100β measured at PD1 to predict POD was 160.5pg·mL⁻¹, with a sensitivity of 68% and a specificity of 58%. The positive predictive value of S100β was 30%, while the negative predictive value was 88%. Positive likelihood ratios for different test result intervals were 0.0 (95%-CI: 0.000-3.942) when the serum value of S100β at admission to the ICU was <180pg·mL⁻¹, 0.271 (95%-CI: 0.0379-1.931) for values between 180-240pg·mL⁻¹ and 1.364 (95%-CI: 1.132-1.644) for values >240pg·mL⁻¹.

Conclusion. S100β is significantly increased after OPCAB-surgery and predictive for the occurrence of POD. Postoperative S100β-values of <180pg·mL⁻¹ measured at admission to the ICU exclude the development of POD. This finding warrants testing whether postoperative levels of S100β could be used for risk stratification of cardiac surgical patients and for the initiation of preventive measures against POD.

REFERENCE


OP-022

Intraoperative decrease of regional cerebral oxygen saturation is not associated with the occurrence of delirium after elective cardiac surgery

Francisca Santos, Clara Luís, Marisa Gonçalo, Fernando Abelha, João Viterbo

1Centro Hospitalar de São João, 2Centro Hospitalar de Trás-os-Montes e Alto Douro

Introduction. Delirium after cardiac surgery is associated with increased morbidity and long-term mortality [1]. Aging and low baseline cerebral oxygen saturation measured by near infrared spectroscopy (rSO₂) have been associated with the occurrence of postoperative delirium [2]. In this prospective, observational study, our goal was to assess the association between duration and severity of intraoperative rSO₂ decrease and the occurrence of delirium after cardiac surgery.

Methods. In patients over 65 years of age, without previous psychiatric, neurological, cerebrovascular or renal disease, rSO₂ was continuously monitored and recorded (INVOS 5100i), during
elective cardiac surgery, after ethical committee approval. Medical information was obtained. "Intensive care delirium screening checklist" (ICDCS) was used to evaluate delirium in the ICU. Mann-Whitney, Student’s T-test, chi-square, Fisher’s test and binary logistic regression were used for statistical analysis. Quantitative results are presented as mean ± SD and median [IQR], as appropriate.

**Results.** Of 42 patients (74.3±5.8 years old, 50% female, 2% ASA II, 93% ASA III, 5% ASA IV, EuroSCORE II = 7±3.8%), 69% underwent open heart surgery; 31% underwent valve replacement, 31% aortocoronary bypass, 35.7% both, and 2.3% left atrial myxoma exeresis. Six patients (14.3%) presented delirium during ICU stay. They had less severe absolute (AUCabs 3 vs 158 min.%, p=0.04) and relative (AUCcorr 1 vs 72 min.%, p=0.01) rSO2 decrease. They were not different regarding age (P=0.32), BMI (P=0.78), sex (P=1.00), ASA physical status (0 vs 2.7% ASA IV, P=1.00), EuroSCORE II (P=0.20), baseline rSO2 (p=0.55), frequency of open-heart surgery (P=0.65) or duration of surgery (P=0.35), but had higher preoperative C-reactive protein (5.9 [IQR 4.6, 7.2] vs 3.2 [IQR 1.1, 5.0] mg/l, P=0.04) and creatinine (1.1 [IQR 0.9, 1.2] vs 0.8 [IQR 0.6, 0.9] mg/dl, p=0.03) plasma levels. Preoperative creatinine level predicted ICU delirium occurrence (OR 1.34x103 [95% CI 5.46-331x103], P=0.01) in stepwise multivariate analysis.

**Discussion.** Intraoperative cerebral oxygen saturation decrease was not associated with postoperative delirium occurrence. Preoperative creatinine plasma level was an independent predictor for delirium occurrence after elective cardiac surgery, although our results need to be confirmed in a properly sized sample of patients.

**REFERENCES**


**Oral Abstract Presentations 303**

**Wednesday, June 24, 2015**

**12:00 p.m.-12:30 p.m., Room G3**

**OP-026**

Myocardial blood flow reflects myocardial oxygenation in healthy swine

Dominik P. Guensch

*Bern University Hospital, Department Anaesthesiology and Pain Therapy*

**Background & Aim.** Myocardial auto-regulation secures a near constant myocardial blood flow through a wide range of systemic blood pressures. However, it is not clear if coronary auto-regulation can maintain myocardial oxygenation in the face of increasing peripheral resistance and cardiac workload. Oxygenation-sensitive (OS) cardiovascular magnetic resonance (CMR) can detect changes in myocardial oxygenation. The aim of this study was to assess myocardial oxygenation during and beyond the myocardial auto-regulation range.

**Methods.** Five anaesthetized swine underwent a left-sided thoracotomy to install a flow probe around the proximal left descending coronary artery (LAD). Blood pressure was manipulated from mean arterial pressures (MAP) of 40-180mmHg by continuous administration of Phentylephrine (16-500μg/min). Lower blood pressures were achieved by deep anaesthesia and additional α1-blockade with Urapidil. In a 3T MRI scanner, OS-images were acquired at 10-15mmHg increments in a mid left ventricular short axis slice and expressed as %change in signal intensity (SI) from a defined 70mmHg baseline. Blood pressure and coronary artery blood flow were continuously recorded.

**Results.** The auto-regulation range in these animals was visible with MAP between 40-110mmHg (grey). OS-SI changes (black) showed a good correlation to LAD blood flow (R=0.5, p<0.01), a strong correlation with MAP (R=0.6, p=0.001) and a weak correlation to the rate pressure product (R=0.3, p<0.05).

**Conclusion.** Myocardial oxygenation parallels LAD blood flow in healthy swine. There is no evidence for a compromise in myocardial oxygenation with increased cardiac afterload at higher blood pressures beyond the auto-regulation range.

**OP-027**

Echocardiographic prognosis of right-ventricular failure after implantation of a paediatric left ventricular assist device (LVAD)

Matthias Hommel, MD MBA1, Helmut Habaetzl, MD PhD2, Marian Kukucka, MD PhD1

1Department of Anesthesiology, German Heart Institute Berlin, 2Institute of Physiology, Charité Berlin

**Introduction.** Right ventricular failure is the most common complication in the early post-operative period after implantation of a LVAD. Multiple clinical and echocardiographic criteria have been published for the prognosis of right ventricular failure in adult and paediatric patients. To date, in the paediatric population no quantitative echocardiographic parameter has been validated for the prognosis of right ventricular failure after implantation of an LVAD.

**Methods.** Retrospective analysis of clinical and echocardiographic data from paediatric patients pre- and post-implantation of an LVAD was performed. Right ventricular failure was defined by minimal central- or mixed-venous oxygen saturation, maximal dosage of catecholamines and maximal central venous pressure during the first 48 hours after implantation of the LVAD.

**Results.** Inclusion of 48 patients with a median age of 6.2 years was possible. The percentage of right ventricular failure after implantation of the LVAD was 48 %. Diagnosis and concomitant organ dysfunctions were not correlated with the development of right ventricular failure. Among echocardiographic parameters only the tricuspid annular plane systolic excursion (TAPSE; p = 0.01) and the ratio of TAPSE to the apico basal diameter of the right ventricle (TAPSE /
RVEDD 3; p = 0.003) were correlated with right ventricular failure after LVAD-implantation. Outcome of patients with and without right ventricular failure after implantation of the LVAD was comparable.

**Conclusion.** The incidence of right ventricular failure in the studied paediatric patients was higher than the published data for adult patients, albeit lacking the relevance for the outcome in the paediatric population. The ratio of TAPSE to RVEDD 3 might facilitate the prognosis of right ventricular failure after implantation of an LVAD in paediatric patients.

OP-028

**Thromboelastometry detects impaired platelet aggregation during but not after paediatric cardiac surgery**

Birgitta Romlin, Fredrik Söderlund, Anders Jeppsson

*Department of Paediatric Anaesthesia and Intensive Care, Sahlgrenska University Hospital*

**Background & Aim.** Low platelet count and/or impaired platelet function increases the risk of bleeding complications in cardiac surgery. Reliable detection of impaired platelet function may improve treatment. We investigated whether thromboelastometry (TEG) detects clinically significant perioperative ADP-dependent platelet dysfunction.

**Methods.** Fifty-seven paediatric cardiac surgery patients were included in a prospective observational study. Modified rotational thromboelastometry (with heparinase) and multiple electrode platelet aggregometry were analyzed at five time points before, during, and after surgery. The accuracy of thromboelastometric indices of platelet function (maximum clot firmness (MCF) and clot formation time (CFT), to detect ADP-dependent platelet dysfunction (defined as ADP-induced aggregation of ≤30 units) was calculated with receiver operating characteristics (ROC) analysis, which also was used to identify optimal cut-off levels. Positive and negative predictive values for the identified cut-off levels to detect platelet dysfunction were determined.

**Results.** MCF and CFT had a high accuracy to predict platelet dysfunction during cardiopulmonary bypass (area under the ROC curve 0.89 and 0.83 respectively, both p<0.001) but not immediately after CPB (0.64 and 0.67, or at arrival to ICU (0.53 and 0.60). Optimal cut-off levels were MCF <43 mm and CFT >166 s. The positive and negative predictive value were high during cardiopulmonary bypass (87% and 67% respectively for MCF >43 mm; 80% and 100% for CFT >166s) but markedly lower after surgery.

**Conclusion.** In paediatric cardiac surgery, thromboelastometry has acceptable ability to detect ADP-dependent platelet dysfunction during but not after cardiopulmonary bypass.

**OP-029**

**NOD2 gene variant rs2066844 and association with post-operative respiratory failure phenotype in 517 elective adult cardiac surgical patients**

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*Medical University of Gdańsk, Dept. of Cardiac Anesthesiology*

**Background & Aim.** The rs2066844 NOD-2 gene single nucleotide polymorphism (SNV) causes in minor allele carriers Arg675Trp variant of NOD2 protein, failed NF-κB activation, and hence impaired production of proinflammatory mediators.(1) This SNV was reported in association with cancer, Crohn’s disease, and increased risk of bacteraemia in ICU patients.(1,2) It was considered, that minor allele carriers could present less aggravated inflammatory response to extracorporeal circulation. Evaluation of possible association with postoperative respiratory failure phenotype (PRF) was aimed in this study.

**Methods.** A randomized, controlled, single-blinded, study was conducted with IRB ethical approval. Patients undergoing elective lung resection were consented and randomly assigned to either HFNO or standard oxygen therapy for the first 24h postoperatively. Recovery from surgery was assessed using the PQRS scoring system for patient reporting, and measured 1, 2 and 7 days after surgery and compared with baseline.

**Results.** Sixty-one patients were studied. Baseline characteristics were similar between the two groups; 46% had video-assisted surgery (VATS) in the HFNO group compared with 48% in the control group, p>0.05. Geometric mean (SD) length of hospital stay was reduced in the high flow oxygen group, 2.7 (1.9) vs. control 4.0 (1.8) days, RR 0.68 (95% CI 0.48 - 0.86) p=0.030. Functional components of patient-reported recovery were also improved by 30% in the HFNO group (p<0.001).

**Conclusion.** Prophylactic post-operative HFNO therapy is associated with reduced length of hospital stay and improved recovery in patients after elective lung resection surgery, compared with standard oxygen administration.

**OP-032**

**The effect of prophylactic post-operative high flow nasal oxygen on patient recovery after lung resection surgery: a single blinded, randomised, controlled trial**

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1Papworth Hospital, Papworth Everard, Cambridge, CB23 3RE, UK, 2Department of Anaesthesia and Intensive Care, 3Department of Physiotherapy, 4Department of Cardiac Anesthesia and Surgery, 5Department of Research and Development ----- London School of Hygiene and Tropical Medicine, Keppel Street, London, WC1E 7HT, UK 2 Department of Medical Statistics

**Background & Aim.** Continuous positive airway pressure (CPAP) has been shown to improve recovery in patients after lung resection surgery. However CPAP is not used routinely because it is costly, labour intensive, requires admission to high-dependency or intensive care wards, and often poorly tolerated. High-flow nasal oxygen (HFNO) therapy (Optiflow, Fisher and Paykel Healthcare) is a potential alternative to traditional CPAP, which delivers humidified, low level, flow-dependent positive airway pressure. The aim of this study was to determine whether prophylactic post-operative HFNO was associated with improved patient recovery after lung resection surgery. Quality of patient recovery was assessed both objectively and subjectively.

**Methods.** A randomized, controlled, single-blinded, study was conducted with IRB ethical approval. Patients undergoing elective lung resection were consented and randomly assigned to either HFNO or standard oxygen therapy for the first 24h postoperatively. Recovery from surgery was assessed using the PQRS scoring system for patient reporting, and measured 1, 2 and 7 days after surgery and compared with baseline.

**Results.** Sixty-one patients were studied. Baseline characteristics were similar between the two groups; 46% had video-assisted surgery (VATS) in the HFNO group compared with 48% in the control group, p>0.05. Geometric mean (SD) length of hospital stay was reduced in the high flow oxygen group, 2.7 (1.9) vs. control 4.0 (1.8) days, RR 0.68 (95% CI 0.48 - 0.86) p=0.030. Functional components of patient-reported recovery were also improved by 30% in the HFNO group (p<0.001).

**Conclusion.** Prophylactic post-operative HFNO therapy is associated with reduced length of hospital stay and improved recovery in patients after elective lung resection surgery, compared with standard oxygen administration.
coexistence of: 1) mechanical ventilation after operation ≥ 18 hours, and 2) \( pO_2/\text{FiO}_2 \leq 300 \text{ mmHg} \). Genotype of rs2066844 was identified from blood sample obtained three hours after operation. After DNA extraction and amplification, PCR SNaPshot Multilane Kit was used to determine the genotype. Association with PRF was checked against influence of possible intra-operative confounder variables. Fisher-Exact test was used for analysis. Study protocol was approved by independent ethical committee.

**Results.** PRF was diagnosed in 80/517 (15.5 %) patients. PRF was significantly (\( p<0.05 \)) associated with: intraoperative complications (OR=4.5; 95%CI: 2.3-8.6; F-E \( p=0.000005 \)) and CPB time (Kruskal-Wallis \( p<0.0000005 \)).

Genotype distribution of rs2066844 was: CC – 93.6%, CT – 6.4%, TT – 0%. PRF was recessively expressed in wild allele carriers - respective prevalence in CC/ CT carriers: 16.5% / 0% (Fisher-Exact \( p=0.0051 \)). The association proved significant also after adjusting for intraoperative complications and CPB.

**Conclusion.** NOD2 rs2066844 common homozgyous CC-variant was associated with significantly higher risk of PRF in adult white Caucasians operated with use of cardiopulmonary bypass. In turn the minor T allele expressed protective effect against PRF.

### REFERENCES


**OP-034**

**Double lumen tube caused auto-PEEP during one-lung ventilation**

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*University Hospital Freiburg*

**Background & Aim.** Endobronchial double lumen tubes (DLT) are routinely used to enable total atelectasis and one-lung ventilation (OLV) for thoracic surgery. The small inner diameter of the DLT’s bronchial lumen increases the flow dependent resistance, which may result in incomplete expiration. As a consequence the end-expiratory pressure in the ventilated lung is increased with respect to the positive end-expiratory pressure set at the ventilator (auto-PEEP). We hypothesized that during OLV in patients DLTs contribute to the auto-PEEP to a relevant extent.

**Methods.** After informed consent airway pressure (Paw), flow rate and bronchial pressure (Pbronch) were measured in adult patients undergoing thoracic surgery at opened pleura (Ethic Committee: x2). Trachea were intubated with DLTs of the Robertshaw type (35, 37, 37 Fr, outer diameter (OD)) with the bronchial branch placed contralateral to the side of surgery. During pressure controlled OLV the inspiration to expiration (\( \text{I:E} \)) ratio was changed from 1:2 to 1:1, 1.1, 1.5:1, 2:1, consecutively. At each condition auto-PEEP was calculated based on Paw, flow rate, and Pbronch, measured within 50 ms at the end of the expiration. The DLT related pressure portion of the totally estimated auto-PEEP was quantified.

**Results.** 72 patients were included in the study (each DLT size was used in 24 patients). Over the entire breathing cycle, the root mean square difference between Paw and Pbronch was 2.3 ± 0.7 cm H2O (p < 0.001). Expiration time was shortened from 3.9 ± 0.3 seconds (\( \text{I:E} = 1:2 \)) to 2.0 ± 0.2 seconds (\( \text{I:E} = 2:1 \)) respectively. The mean total auto-PEEP was less than 2.9 ± 1.5 cm H2O (range 0 – 5.9 cm H2O). The DLT’s resistance caused between 25% and 31% of the total auto-PEEP, independent of the OD and the side of the DLT’s bronchial branch.

**Conclusion.** During pressure controlled OLV the resistance of the DLT causes a noticeably difference between airway pressure and bronchial pressure. While the overall value of auto-PEEP was low, the DLT-dependent portion of the total auto-PEEP was independent of the DLT’s OD. Pulmonary hyperinflation is partly reasoned by the DLT’s resistance. However, in adult patients the choice of the DLT does not increase the risk of auto-PEEP during OLV to a relevant extent.

** Oral Abstract Presentations 401**

**Wednesday, June 24, 2015**

**3:00 p.m.–3:30 p.m., Room F4/F5**

**OP-038**

**Impact of cardiopulmonary bypass (CPB) on lung injury and marginedate leukocyte dynamics during bilateral lung transplantation (LTX)**

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**Background.** Primary Graft Dysfunction (PGD) representing nonspecific ischaemia reperfusion injury remains the most important perioperative complication of LTX. Leukocyte mediated pulmonary inflammation has been implicated in cardiopulmonary bypass (CPB) and appears as a risk factor for the development of PGD. This study aimed to investigate i) morphological aspects of lung injury by Electron Microscopy (EM), ii) degree of pulmonary oedema by lung wet/dry weight ratios and iii) lung marginedate passenger leukocytes in the donor lungs in comparison to leukocyte numbers post-implantation and reperfusion, with and without CPB.

**Methods.** Lung biopsies were obtained prior to implantation (end of cold ischaemia) and following reperfusion (prior to closing the chest) from 27 patients undergoing bilateral sequential LTX. Fixed lung tissue was processed for EM (9 patients) and fresh lung tissue for single cell suspension analysis by flow cytometry (FC) following mechanical and enzymatic dissociation (18 patients). Lung-associated leukocytes were graded on a 4-point scale by EM. Lung-associated neutrophil counts and monocytes counts (based on CD14 and 16 staining), were analysed. Cell counts are expressed as \( \times 10^6 \) cells/g dry weight and shown as median and quartiles.

**Results.** EM demonstrated the presence of significant number of intravascular passenger leukocytes in the donor lungs, which increased after reperfusion with evidence of infiltration (1.5 (1, 2) vs. 3 (1.2, 3)[Fig]). The wet-to-dry ratio prior to implantation was similar between groups (6.5±2.3 vs. 6.6±2.5, p=0.942) but was higher in the off-pump group after reperfusion (5.4±0.9 vs. 6.9±1.8, p=0.033). Reperfusion time for biopsies tended to be higher in the off-pump groups, 77.5 (30.5, 216) minutes vs. 120
This exploratory study highlights that LTx surgery is associated with inflammatory mechanisms even when CPB is avoided. The donor lungs exhibited substantial retention of neutrophils and monocytes in both groups and reperfusion was associated with similar increases in lung-associated neutrophil and monocyte numbers. However, lung oedema was more pronounced in off pump biopsy samples. These data may have implications into lung injury according to the LTx surgery.

**Figure.** Intravascular leukocyte (L1) in the donor lung (A) and infiltrated leukocyte (L2) after reperfusion (B).

**OP-039**

The Munich Lung Transplant Group: intraoperative extra-corporal circulation in lung transplantation

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1Dept. of Anaesthesiology, University Hospital, Ludwig Maximilian University, Munich, Germany, 2Dept. of General-, Visceral-, Transplant-, Vascular- and Thoracic Surgery, University Hospital, Ludwig Maximilian University, Munich, Germany, 3Dept. of Biometrics Epidemiology, University Hospital, Ludwig Maximilian University, Munich, Germany, 4Transplantation Centre, University Hospital, Ludwig Maximilian University, Munich, Germany, 5Transplantation Centre, University Hospital, Ludwig Maximilian University, Munich, Germany, 6Transplant Centre, University Hospital, Ludwig Maximilian University, Munich, Germany, 7Clinic of Cardiac Surgery, University Hospital, Ludwig Maximilian University, Munich, Germany

**Introduction.** Indications for extracorporeal circulation (ECC) during lung transplantation (LuTx) comprise high pulmonary artery pressures, hypoxia and haemodynamic instability. Traditionally cardiopulmonary bypass (CPB) with full heparinisation is used in these situations while centres start to use more frequently extracorporeal membrane oxygenation (ECMO).

**Objectives.** The aim of this observational cohort study was to analyse transfusion requirements, coagulation parameters and outcome parameters in patients undergoing lung transplantation (LuTx) with intraoperative extracorporeal circulatory support, comparing cardiopulmonary bypass (CPB) and extracorporeal membrane oxygenation (ECMO).

**Methods.** Over a three year period, 49 of a total of 188 LuTx recipients were identified being set intraoperatively on either conventional cardiopulmonary bypass (CPB; n=22) or extracorporeal membrane oxygenation (ECMO; n=27). Intra-and postoperative transfusion and coagulation factor requirements as well as early outcome parameters were analysed.

**Results.** LuTx patients on CPB had significantly higher intraoperative transfusion requirements when compared to ECMO patients, i.e. packed red cells (9 units (5-18) vs. 6 units (4-8), P=0.011), platelets (3.5 units (2-4) vs. 2 units (0-3), P=0.034), fibrinogen (5 g (4-6) vs. 0 g (0-4) (P=0.013), prothrombin complex concentrate (3 IU (2-5) vs. 0 IU (0-2), P=0.001) and tranexamic acid (2.5 mg (2-5) vs. 2.0 mg (1-3), P=0.002). Also, ventilator support requirements (21 days (7-31) vs. 5 days (3-21), P=0.013) and lengths of ICU stays (36 days (14-62) vs. 15 days (6-44), P=0.030) were markedly longer in CPB patients. There were no differences in 30 day and 1 year mortality rates.

**Conclusions.** These data indicate a perioperative advantage of ECMO usage with low-dose heparinization over conventional CPB for extracorporeal circulatory support during LuTx. Long term outcome is not affected.

**OP-040**

Indication to ECMO during lung transplantation

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1Dipartimento di Anestesia Rianimazione (Intensiva e Subintensiva) e Terapia del dolore, Fondazione IRCCS Ca’ Granda – Ospedale Maggiore Policlinico, Milan, Italy, 2Dipartimento di Cardiochirurgia “A. De Gasperis”, Ospedale Niguarda Ca’ Granda, Milan, Italy, 3Servizio Perfusione E.P.S., Rome, Italy, 4Dipartimento di Fisiopatologia Medico-Chirurgica e dei Trapianti, Università degli Studi di Milano, Milan, Italy, 5Unità Operativa di Chirurgia Toracica, Fondazione IRCCS Ca’ Granda–Ospedale Maggiore Policlinico, Milan, Italy

**Introduction.** The indications to extracorporeal membrane oxygenation (ECMO) during surgery for lung transplantation (LTx) vary from centre to centre. Aim of the investigation was to retrospectively analyse the use of mean systemic-to-pulmonary pressure ratio (MAP/mPAP) to stratify the need of ECMO.

**Methods.** Thirty LTXs were performed at our institution between 05/2013 and 06/2014. Excluding ECMO-brige to transplantation (n=6), subjects were stratified according to MAP/mPAP ratio measured during pulmonary artery (PA) clamp. Subjects with a ratio below (Low) or above (High) the median value of MAP/mPAP (1.8 [1.5-2.4]) were analysed according to scheduling characteristics, intra-operative variables, and outcomes.

**Results.** 24 LTXs were included in the analysis, of which 12 double and 12 single LTXs (average LAS 37 [35-44]). After first lung PA clamp, mPAP increased from 30 [25-36] to 36 mmHg [29-44] (P<0.001), and MAP/mPAP decreased from 2.4 ± 0.7 to 2.2 ± 0.8 (P<0.001). All ECMOs were instituted in subjects of the Low group (8/12 vs. 0/12, Low vs. High, respectively, P<0.001). As assessed by multiple logistic regression analysis, MAP/mPAP index was an independent predictor of ECMO institution (P=0.002). Use of post-operative ECMO was greater in the Low group (P=0.037); primary graft dysfunction at 72 hours (PGD T72), ICU and hospital stay, 30-days and actuarial survival were similar between groups. Of the Low group subjects (n=12), 3 had ECMO instituted immediately after PA clamp because of
severe hemodynamic instability (ECMO group), 4 never went on ECMO (no-ECMO group), 5 needed ECMO soon after graft reperfusion (delayed-ECMO). Subjects with delayed-ECMO had worse outcome (Table below), despite similar donor and recipient characteristics.

**Table 1**

<table>
<thead>
<tr>
<th></th>
<th>Low</th>
<th>High</th>
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<tr>
<td>Oxygenation index</td>
<td>21.3 ± 8.3</td>
<td>3.9 ± 0.6</td>
</tr>
<tr>
<td>PaCO₂ (kPa)</td>
<td>8.8 ± 1.9</td>
<td>5.5 ± 0.7</td>
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<tr>
<td>Ventilation time (h)</td>
<td>4 [1-34]</td>
<td>1.5 [0-3]</td>
</tr>
<tr>
<td>ECMO in the ICU</td>
<td>4 (80)</td>
<td>1 (33.3)</td>
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<tr>
<td>ICU stay (d)</td>
<td>17.6 ± 17.4</td>
<td>15 ± 16.5</td>
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<tr>
<td>Hospital stay (d)</td>
<td>29.3 ± 11.8</td>
<td>22.5 ± 10.6</td>
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**Discussion.** Intra-operative MAP/mPAP ratio at the time of PA clamp test is an easy to obtain parameter useful to stratify the need of ECMO during LTx. To delay ECMO is harmful.

**REFERENCE**


**OP-045**

Intraoperative use of a cell saver augments the risk of postoperative infection associated with red blood cell transfusion in cardiac surgery

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1University Medical Center Utrecht, 2University Medical Center Groningen, The Netherlands

**Introduction.** Transfusion of allogeneic red blood cells (RBC) is associated with increased postoperative infections(1). Intraoperative use of a cell saver has shown to reduce transfusion of RBC(2). There is also evidence that cell savers reduce proinflammatory markers(3). We hypothesized therefore that use of a cell saver would result in less postoperative inflammation and infections.

**Methods.** 716 patients undergoing elective coronary, valve, or combined surgery were randomized in a multicenter trial of cell saver versus no cell saver. The main results have been published elsewhere(2). In this study we assessed postoperative interleukin-6, elastase and myeloperoxidase levels 3 hours after arrival in the intensive care and we compared the incidence of postoperative infections between the two groups, stratified for the use of RBC during hospital stay. Infections were classified using standardized definitions.

**Results.** There was no difference in demographic and intraoperative data between the two groups. A total of 104 (14.6%) patients had a postoperative infection. Patients who received RBC had more infections (20.0%) compared to patients who did not receive RBC (8.4%; Relative Risk 2.73, 95% confidence interval [1.72-4.33], p<0.001). Cell saver use was associated with reduced postoperative inflammatory markers. When patients did not receive RBC there was no effect of cell saver use on infection. However, in patients in whom RBC were transfused, use of a cell saver increased the risk of infection (RR 1.49 [0.99-2.23]), despite a reduction in inflammatory markers (table 1).
**Table 1:** Analysis of the association between cell saver use, inflammatory markers and infections, stratified for the use of RBCs. Interleukin-6 is expressed as mean ± SD. Elastase and myeloperoxidase are expressed as quotient of postoperative and baseline values. Median and inter quartile range [IQR] are given.

<table>
<thead>
<tr>
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<th>No RBC transfusion</th>
<th>RBC transfusion</th>
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<tr>
<td></td>
<td>Cell saver</td>
<td>Control</td>
</tr>
<tr>
<td>n</td>
<td>191</td>
<td>143</td>
</tr>
<tr>
<td>Infection n (%)</td>
<td>16 (8.4)</td>
<td>12 (8.4)</td>
</tr>
<tr>
<td>Interleukin-6 (pg.mL⁻¹)</td>
<td>298.1-257.1</td>
<td>330.6-414.8</td>
</tr>
<tr>
<td>Myeloperoxidase [IQR]</td>
<td>1.64 [1.1]</td>
<td>1.75 [1.15]</td>
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</table>

Discussion. We showed that perioperative RBC transfusion is a strong risk factor for postoperative infections. Despite a significant reduction in inflammatory markers use of a cell saver increased the infection risk in patients with RBC transfusion. The immunomodulating effects of RBC transfusion may be aggregated by the use of a cell saver.

REFERENCES


**OP-061**

Association between endotoxin activity and acute kidney injury in cardiac patients undergoing cardiopulmonary bypass

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Introduction. Several studies identified CPB as a major cause of AKI following cardiac surgery, which is associated with an increased risk of mortality and morbidity, due to the combined effects of the extracorporeal circuit, ischemia-reperfusion, splanchnic ischemia and the initiation of endotoxemia (1). The aim of this observational study was to verify whether prolonged CPB could induce variations of endotoxin activity (EA) during the postsurgical period, and whether they are associated with kidney dysfunction, evaluated by creatinine variations.

Methods and results. Eighteen patients were enrolled in the study. All patients underwent CPB for > 120 min. Median EA did not change over the first three observation times T0 (induction of anesthesia), = 0.45 [0.04-0.79], T1 (20 min from unclamping) = 0.45 [0.03-0.78] and T2 [1 h after unclamping] = 0.42 [0.07-0.71], while a significant increase was observed at 12 h (T3) (0.58 [0.16-1.0], p = 0.02)]. A continuous increase in creatinine was observed over 12 h following CPB (ANOVA p = 0.003; Table 1) as described in table 1. A linear correlation (R² = 0.38; p = 0.007) was found between the variation of creatinine and the variation of EA being the last calculated from baseline to peak.
values. The linear dependence was confirmed even when comparing peak EA to peak creatinine changes ($R^2=0.41$; $p=0.004$). At T0, no significant difference in EA levels was observed between patients who did or did not develop AKI [0.47 (0.04–0.78) vs. 0.43 (0.15–0.79); $p = 0.74$]. However, the AKI group was characterized by a continuous increase in EA from T0 to T3, becoming statistically significant at T3 [$T0 = 0.6 (0.32–1.0)$ vs. $T3 = 0.47 (0.04–0.78)$; $p = 0.004$]. In contrast, the non-AKI group did not show any differences in EA [$T0 = 0.47 (0.16–0.6)$ vs. $T3 = 0.43 (0.15–0.79)$; NS]. Table 2 reports all EA values among AKI and non-AKI groups.

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<th>Table 1</th>
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<tr>
<td><strong>T0</strong></td>
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<tr>
<td>Creatinine (mg/dL)</td>
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<td>ANOVA p=0.003</td>
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<th>Table 2</th>
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<tr>
<td><strong>T0</strong></td>
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<tr>
<td>EA non-AKI</td>
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<tr>
<td>EA AKI</td>
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Discussion. This study confirms that creatinine is influenced by CPB during cardiac surgery. EA variations compared to baseline seem to associate to creatinine variations. If confirmed, these results might identify a role for specific anti-endotoxin therapies currently used predominantly in abdominal septic shock. The small amount of patients allowed us only to suggest that EA is influenced by CPB and that variations of EA may be associated with creatinine variations.

REFERENCES

OP-063
The opposite effect of age on creatinine baseline estimates
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Background & Aim. The diagnosis of acute kidney injury (AKI) relies on accurately quantifying changes in serum creatinine. When baseline serum creatinine values (bSCr) are missing there are proposed estimations to calculate bSCr. (1) The aim of this study was to compare two recommended formulas to a cohort of cardiac surgery patients with known bSCr values and prove its reliability.

Methods. 7241 patients (2215 female) out of two centers (Medical University Vienna (MUV), n=4118; University Hospital Zurich (UZH), n=3123) who underwent cardiac surgery during a 46 month period were included. The formulas were: MDRD: $b$SCr = [75/(186 × age)$^{0.203}×(0.742$ if female) × (1.2 if black)]$^{0.887}$; LTV: $b$SCr = 0.74 – 0.2 (if female) + 0.08 (if black) + 0.003 × age. The observed SCR were plotted versus age for men and women.

Results. The MDRD model does not describe the overall trend of increasing bSCr with age at all, but instead predicts an opposite behavior. The LTV model correctly describes a positive correlation, but the results are entirely below the 25% quantile. (Figure1)

Conclusion. Estimate bSCr is of limited accuracy, and whenever possible a recorded bSCr should be used. Further we determine that using these formulas in clinical investigations a bias is immanent.

REFERENCE

OP-062
N-acetylcysteine versus dopamine to prevent acute kidney injury after cardiac surgery in patients with pre-existing moderate renal insufficiency
Omer Faruk Savluk, Fusun Guzelmeric, Yasemin Yavuz, Halide Ogus, Tulay Orki, Canan Guler, Emre Gurcu, Atakan Erklinç, Tuncer Kocak
Kartal Kosuyolu High Education And Training Anesthesiology

Introduction. The acute kidney injury occurring due to the cardiac surgery is a common and important complication of cardiac surgery that cardiopulmonary bypass (CPB) is applied and it is the second most common cause of acute kidney injury in the intensive care unit (1). Acute kidney injury associated with cardiac surgery is characterized by deterioration in kidney function which becomes symptomatic with a decrease in glomerular filtration rate following cardiac surgery. It has been argued that antioxidants reduced oxidative stress by reducing ischemic reperfusion during cardiac surgery (2).

Methods. 120 patients with coronary artery disease who had moderate renal impairment previously (GFR<60 ml/min) were divided into 3 groups randomly. Group N (40): the patients receiving NAC, Group D (40); the patients receiving renal-dose dopamine (2.5mcg/kg/min) and Group P(40); control group. In Group N; 50 mg/kg was administered as loading dose in 100 cc of 0.9% NaCl for 15 minutes and then 20 mg/kg/h as infusion in 100 cc of 0.9% NaCl during the operation. In Group D; 2.5mcg/kg/min dopamine was started after induction and given during the operation (400 mg dopamine in 100 cc of 0.9% NaCl). In Group P; 100 cc of 0.9% NaCl was administered after induction as a placebo for 15 minutes.

Results. March 2013-March 2014 120 patients with pre-existing moderate renal insufficiency were divided into 3 groups. Creatinine values significantly decreased in the PO 1st and 2nd days when compared with values in the preoperative value in Group N (p<0.001). EGFR values significantly increased in the PO 1st and
2nd days when compared with values in the preoperative value in Group N (p < 0.001).

Discussion. Oxidative stress causes renal tubular damage, accordingly causes proteinuria by increasing the glomerular permeability. Therefore, various drugs such as dopamine, mannitol, diuretics, fenoldopam, enalaprilat, dexamethasone and diltiazem are used to preserve the renal function during cardiac surgery. Recently, the protective effects of NAC on organ injuries, and especially renal injury due to the suggested beneficial effects of NAC as an antioxidant on oxidative stress are examined and investigated (3). We have found that i.v. prophylactic use of NAC had a protective effect on renal function.

REFERENCES

Oral Abstract Presentations 602
Thursday, June 25, 2015
9:30 a.m.–10:00 a.m., Room F2/F3

OP-067
Xenon as adjuvant to propofol anaesthesia in patients undergoing off-pump coronary artery bypass surgery: a randomized prospective controlled trial

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1KU Leuven, University of Leuven, Department of Anaesthesiology Leuven, Belgium, 2KU Leuven - University of Leuven, Cardiac Surgery, Leuven, Belgium, 3University hospital of the RWTH Aachen, Department of Anaesthesiology, Aachen, Germany

Introduction. Off-pump coronary artery bypass (OPCAB)-surgery is associated with a high risk for perioperative haemodynamic instability. Xenon anaesthesia has been shown to exhibit a favourable haemodynamic profile. Besides, xenon conveys notable cardio- and neuroprotective effects in animal experiments. These properties could render xenon an attractive option for the anaesthesia of patients undergoing OPCAB-surgery. Xenon has been demonstrated in vitro to exert its cardio- and neuroprotective effects in sub-anaesthetic concentrations. Due to the scarcity of xenon, anaesthesia with this noble gas is extremely costly. Hence, interventions that are suited to reduce xenon consumption without compromising its organ-protective effects would significantly increase the cost-effectiveness of xenon. We hypothesize that the administration of sub-anaesthetic xenon concentrations as an adjuvant to general anaesthesia with IV infusion of propofol is superior to general anaesthesia with propofol alone with respect to haemodynamic stability.

Methods. Fifty patients scheduled for elective OPCAB-surgery were included from June 2013 to February 2014. Patients were randomized to receive general anaesthesia with either 30 vol-% xenon adjuvant to a propofol infusion or with a propofol infusion alone. In both groups, anaesthesia was titrated to attain a bispectral index (BIS) between 40-60. Primary outcome was the total intraoperative dose of noradrenaline needed to achieve predefined haemodynamic goals. Secondary outcome parameters included safety variables such as the occurrence of adverse events (intraoperatively and during a 6-months follow-up after surgery), and the perioperative cardiorespiratory and inflammatory profile.

Results. Baseline and demographic data were similar in both groups. The combination of xenon with propofol allowed for a significant reduction of IV propofol needed to achieve the target BIS-values (mean ±SD: 3.5 ± 0.9 vs. 5.7 ± 1mg kg⁻¹h⁻¹, p < 0.0001). Likewise, patients received xenon as an adjuvant to propofol required less noradrenaline to maintain the haemodynamic goals (median [interquartile range (IQR)]: 370 [116-570] vs. 840 [335-1710]µg, p=0.004). No differences were noticed regarding safety, haemodynamic and respiratory parameters. Furthermore, intraoperative release of cardiac biomarkers and serum protein S100 were comparable between the groups.

Conclusion. The combination of xenon with propofol was superior to propofol alone regarding intraoperative noradrenaline consumption during elective OPCAB-surgery. Larger studies are warranted to investigate whether this finding can be translated into superior clinical outcomes. Only then, the additional costs for xenon may be justified.

OP-068
No difference in release of troponin I between sevoflurane and propofol anaesthetic regimes in off-pump myocardial revascularization

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1University Medical Center Ljubljana, Slovenia, 2University Rehabilitation Institute, Ljubljana, Slovenia, 3University of Ljubljana, Faculty of Economics, Ljubljana, Slovenia, 4University children’s hospital Belgrade, Serbia

Background. We investigated two anaesthetic regimes in terms of their protective effects from an ischemic injury of myocardium by monitoring the release of troponin I in off-pump myocardial revascularisation.

Methods. We conducted a randomised trial of 62 patients (18 women) who underwent off-pump coronary artery surgery between 2010 and 2012 at the University Medical Centre Ljubljana. Propofol was used for the induction of anaesthesia in both groups and continued in one group of 31 patients; in the other group of 31 patients, anaesthesia was maintained with sevoflurane. The troponin I serum concentration was determined before anaesthesia, on cross-section of the pericardium, upon completion of the distal coronary anastomoses, reperfusion, and 30 minutes, 12, 24 and 48 hours after admission to the intensive care unit (ICU). The data were analysed using two-way mixed ANOVA separately for men and women.

Results. Among both men and women we observed a clear change of values of troponin I over time in both groups (p < 0.001), with a peak at 12 hours after admission to the ICU and subsequent descent. There was no statistically significant difference between the groups either in the average troponin I
level (p=0.197 for men, p=0.629 for women) or the troponin I level time-course (p=0.264 for men, p=0.709 for women). However, the average troponin I levels were higher in the sevoflurane group than in the propofol group at all sampling points among men, and vice versa among women.

Discussion. We were unable to demonstrate statistically significant differences in protective effects of the two anaesthetic regimes in off-pump myocardial revascularisation. There might be a difference between men and women, but a larger study will be needed to verify it.

REFERENCE


OP-069

Effects of milrinone and epinephrine or dopamine on biventricular function and haemodynamics in an animal model with right heart failure after pulmonary regurgitation

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1Departments of Anaesthesia and Intensive Care Aarhus University Hospital, Aarhus, Denmark, 2Cardiothoracic and Vascular Surgery, Aarhus University Hospital, Aarhus, Denmark, 3Institute of Clinical Medicine, Aarhus University, Aarhus, Denmark

Background & Aim. Right ventricular (RV) failure due to chronic pressure overload is a main determinant of outcome in congenital heart disease. Medical management is challenging because not only contractility but also the interventricular relationship are important for increasing cardiac output. This study evaluated the effect of milrinone alone and in combination with epinephrine or dopamine on haemodynamics, ventricular performance and the interventricular relationship.

Methods. RV failure was induced in 21 Danish landrace pigs by pulmonary artery banding. After ten weeks, animals were re-examined using biventricular pressure-volume conductance catheters and pulmonary catheter.

Results. The maximum pressure in the RV increased by 113% (p<0.0001) and end-diastolic volume by 43% (p<0.002), while left ventricular pressure simultaneously decreased (p=0.006). Concomitantly, mean arterial pressure (MAP) (-15%, p=0.01), cardiac index (CI) (-20%, p<0.0001) and mixed venous oxygen saturation (SvO2) (-40%, p<0.0001) decreased. Milrinone increased CI (11%, p=0.008) and heart rate (HR) (21%, p<0.0001). Stroke volume index (SVI) decreased (7%, p=0.03), although RV contractility was improved. The addition of either epinephrine or dopamine further increased CI and HR in a dose-dependent manner but without any significant differences between the two interventions. A more pronounced increase in biventricular contractility was observed in the dopamine-treated animals. Left ventricular volume was reduced in both the dopamine and epinephrine groups with increasing doses.

Conclusion. In the failing pressure overloaded RV, milrinone improved CI and SvO2 and increased contractility. Albeit additional dose-dependent effects of both epinephrine and dopamine on CI and contractility, neither of the interventions improved SVI due to reduced filling of the LV.

OP-072

Does timing of tracheostomy following cardiac surgery influence patient outcome? A retrospective analysis of a single centre’s 10-year experience

Amir Mokhtari, Vinay Rao, Ashok Cherian, David O’Regan, Pankaj Kaul, Binur Arthur

Leeds General Infirmary

Background and Aim. Owing to the lack of strong evidence or guidance for the timing of tracheostomy in ventilator-dependent patients following cardiac surgery (1) we undertook this study to evaluate the effect of early, intermediate or late tracheostomy on early mortality and morbidity.

Methods. Retrospective multivariate analysis of variance of prospectively collected data from January 2005 to December 2014. 10763 patients underwent cardiac surgery of whom 191 ventilator-dependent patients underwent tracheostomy. Of these, 59 patients had early tracheostomy; ET (≤5 days), 96 patients had intermediate tracheostomy; IT (6 to 10 days) and 36 patients had late tracheostomy; LT (>11 days).

Results. Pre-operative characteristics were similar for the three groups. Overall in-hospital mortality for patients that underwent tracheostomy was 18.9% (36 patients). Mortality in ET, IT and LT groups was 18.6% (11 patients), 17.3% (17 patients) and 24.2% (8 patients) respectively (p=0.419). There was no statistical difference in duration of ventilation between the three groups (ET: 24 days; IT: 25 days; LT: 29 days, p=0.586). There was no statistical difference in post-operative pneumonia (ET: 27.1%; IT: 33.7%; LT: 21.2%, p=0.397).

Conclusion. Analysis of our 10-year data shows that timing of tracheostomy does not influence either early morbidity or mortality in patients undergoing cardiac surgery.

REFERENCE


The authors have no commercial associations or conflicting interests with any of the subjects discussed in this abstract.

OP-073

Effects of diclofenac premedication, as preventive analgesia on postthoracotomy pain and lung function test values

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University of Debrecen

Introduction. Preventive analgesia is defined as administration of analgetics or nerve blockade before the surgical procedure. As a result of the preventive antinociceptive treatment, the quantity of post-operative medications can be decreased, the analgesia has less complications and the patients are more satisfied [1,2].
In our study we intend to examine the preventive analgetic effect of diclofenac.

The hypothesis of the study is that preventive analgesia by single dose of diclofenac results in 10% decrease of the postoperative VAS scores as compared to the control group.

**Patients and methods.** Seventy patients were randomly allocated to two groups of 35 each:

- **DICgroup:** received a preoperative single oral 100 mg dose of diclofenac
- **CONgroup:** without diclofenac premedication

Epidural analgesia was administered in both groups. During a seven days period postthoracotomy surgical and shoulder pain intensity was assessed using Visual Analogue Scale (VAS). Patients’ respiratory function were also recorded with MIR spirolab II spirometer.

**Results.** There were no significant differences in cumulative buvipacaine dose (cBUC mg/kg) values of epidural administered drugs, neither in cumulative morphine equivalent dose (cMED mg/kg) of intravenously and per os administered drugs (p > 0.05).

There were no significant differences in cumulative VAS values in terms of thoracotomy pain, neither in cVAS values measured for shoulder pain (p > 0.05) (Table 1).

<table>
<thead>
<tr>
<th>DICgroup</th>
<th>CONgroup</th>
</tr>
</thead>
<tbody>
<tr>
<td>cBUCpreop</td>
<td>2.6 (2.2-3.1)</td>
</tr>
<tr>
<td>cMEDpreop</td>
<td>6.3 (1.5-30.2)</td>
</tr>
<tr>
<td>cMEDpostdrain</td>
<td>2.9 (0.8-3.1)</td>
</tr>
<tr>
<td>cVASth</td>
<td>34 (29.2-43.7)</td>
</tr>
<tr>
<td>cVASsh</td>
<td>2 (0-10.5)</td>
</tr>
</tbody>
</table>

Table 1: Cumulative doses and VAS scores (medians and IQR).

**Discussion.** Preventive analgesia with 100 mg diclofenac does not result in further significant reduction of VAS values as compared to controls. We hypothesise that epidural analgesia alone ensures adequate pain control.

**REFERENCES**

3. DB o l l i g e r1, M Filipovic2, E Seeberger1, M Gregor1, U Zenklusen1, MD Seeberger3, G AL u r a t iB u s e1

**OP-074**

A systematic review of one lung ventilation during thoracic surgery comparing the safety and efficacy of high and low tidal volumes.

Blair Wilson, Nikolaj Kotts, Julian Camilleri-Brennan, Olivia Morton, Mong Tung, Nandesh Patel, Sarah Mok, David Ryan, Peter Alston

University of Edinburgh College of Medicine and Veterinary Medicine

**Introduction.** Today, lung isolation is largely used to facilitate surgical access during thoracic surgery. Maintenance of the blood gas balance makes ventilation of the isolated, dependent lung problematic. Various strategies have been used to overcome the ventilation-perfusion mismatch that is associated with one-lung ventilation (OLV). However, such strategies may induce volutrauma, barotrauma and atelectrauma in the ventilated lung, leading to acute lung injury (ALI) and/or acute respiratory distress syndrome (ARDS). Different parameters of mechanical ventilation have been used to improve the safety and efficacy of OLV, with the use of high or low tidal volumes (VT) being the most contentious. The aim of this study was to undertake a systematic review and meta-analysis of the literature comparing the safety and efficacy of OLV using high and low VT mechanical ventilation.

**Methods.** A comprehensive literature search was performed on EMBASE, Web of Science and MEDLINE, from inception until October 2014, in order to identify studies comparing of high and low VT strategies for OLV. Reviews, single case reports and studies that were not obtainable in English were excluded. The systematic review of papers used the PRISMA 27-step checklist and each paper was critically appraised.

**Results.** Twelve studies fitting our criteria, were identified. To measure safety, five studies considered ALI/ARDS while four measured the release of pro-inflammatory cytokines. Significant association was found between a high VT and ALI/ARDS in two of these studies. Shunting and oxygenation were considered the primary measurements of efficacy in three and four of the studies found respectively. Two studies each considered shunting and oxygenation and found that lower VT were associated with more adverse effects than higher VT settings. Studies were not comparable, as they used dissimilar co-interventions so a meta-analysis could not be conducted.

**Discussion.** Based on the current literature, weak evidence indicates that lower may be safer than higher VT. However, there is no definitive evidence to currently advocate an optimal VT for OLV based on efficacy. To date, RCTs comparing high and low VT during OLV are limited and flawed, Future RCTs should have population sample sizes that are large enough to identify whether there is a clinically important difference in the incidences of ALI or ARDS between high and low VT mechanical ventilation. Definitions of high and low VT along with co-interventions such as the level of PEEP need to be standardised to allow comparison of results across different RCTs.

**REFERENCE**

aspirin responsiveness is rarely tested. A recent study in patients undergoing percutaneous coronary intervention showed an increased risk of myocardial ischemia and mortality in patients with high on-aspirin platelet reactivity (e.g., reduced aspirin responsiveness) (1). The aim of this prospective cohort study was to evaluate the prognostic impact of reduced aspirin responsiveness on long-term mortality and major thromboembolic and/or cardiac events in patients undergoing coronary artery graft bypass (CABG) surgery by a point-of-care platelet function analyzer.

Methods. We included 304 patients undergoing elective isolated CABG surgery with chronic aspirin intake until at least two days before surgery. Impedance platelet aggregometry (Multiplate®, Roche Diagnostics, Rotkreuz, Switzerland) was performed directly before and on the first day after surgery. Reduced aspirin responsiveness was defined as area under the curve in ASPI test (AUCASPI) ≥ 300 units in the preoperative assessment according to an own former study (2). All physicians in charge of the peri- and postoperative therapy were blinded for the results of aspirin responsiveness. The primary outcome was defined as composite of all-cause mortality and/or major adverse cardiac or thromboembolic events within 1 year.

Results. Thirty-seven of 304 patients (12%) showed reduces aspirin responsiveness. Thirty-one patients (10%) reached the primary endpoint. However, there was no difference in outcomes between patients with normal and reduced aspirin responsiveness in the Kaplan-Meyer survival analysis (P by log rank test = 0.504). Additional multivariate analysis adjusted for logistic EuroSCORE I and postoperative high-sensitivity troponin T levels also showed no association of reduced aspirin responsiveness with adverse outcome (hazard ratio 0.576 (95% confidence interval 0.128-2.585; P=0.471). Analyses on postoperative Multiplate® values were similar to analyses based on preoperative assessment.

Discussion. The results of the present study suggest that reduced aspirin responsiveness as evaluated by perioperative Multiplate® analyses is not associated with increased incidence of major adverse cardiac and thromboembolic events and mortality within 1 year after elective isolated CABG surgery. Our conclusion is limited by the rather low number of events and included patients.

REFERENCES

OP-94
Effects of the introduction of a cardiac surgery safety checklist on 30 day mortality and operative team culture: A cohort study
Nierich
Cardiac Anesthesiology

Background & Aim. Marked reductions in postoperative complications after implementation of the surgical WHO or Surpass checklist have been reported. Beside this pre-induction checklist, a dedicated cardiac checklist was developed and used before Incision. The cardiac safety checklist consisted of two parts: 1. Description of organ specific risks factors and 2. a focused TEE investigation, in order to identify preventable complications. The effect of implementation of the checklist on cultural behaviour in the operating theatre and on 30 day mortality was evaluated.

Methods. This prospective collected cohort study from 2010 to 2013 included 3,821 elective CABG, AVR or combined CABG/AVR patients in a tertiary university affiliated hospital. In-hospital mortality within 30 days after surgery and cultural operation team changes were the main outcome and effect estimates on mortality were adjusted for patient characteristics, surgical specialty and comorbidity.

Results. After checklist implementation, crude mortality decreased from 1.0% to 0.2% in CABG; 2.4% to 0.7% in AVR and 3.4% to 2.0% in combined CABG/AVR. Overall in hospital mortality decreased each year with 15% (2010: 2.5%; 2011:2%; 2012: 1.7%). Changes to the pre-operative plan were made in 12% of the cases (38% canulation site, 12% intracardiac adaptations, 12% proximal anastomosis and 31% other). Also the checklist implementation increased teamspirit (60% to 72%), team safety in communication (73% to 82%) and was considered as meaningful and beneficial for the patient (55% to 93%).

Conclusion. Implementation of this Cardiac Surgery Safety Checklist improved behaviour culture peri-operative and reduced in-hospital 30-day mortality.

OP-95
On-pump beating coronary artery bypass grafting in patients with left ventricular systolic dysfunction
Vladimir Lornivorotov, Vladimir Boboshko, Dmitry Nikolaev, Vladimir Shmiriev, Alexey Nesmachnys
State Research Institute of Circulation Pathology

Background & Aim. We hypothesized that on-pump beating coronary artery bypass grafting in patients with systolic dysfunction (preoperative LVEF < 35%) would have favorable effect on cardiac troponin I (cTnI) levels (primary outcome) and clinical outcome as to compare with conventional technique.

Methods. 60 patients with LVEF < 35% who received a coronary artery bypass grafting (CABG) under cardiopulmonary bypass (CPB) were randomized in two groups. In the control group (30 patients) conventional CPB with cardioplegia was used. In the study group, after initiating CPB, distal anastomoses were performed on beating heart stabilized with Octopus. Level of cTnI, rate of complications and 1-year mortality were analyzed. The statistical data analysis was conducted using Staта 11.2. For comparison of quantitative data, the Mann-Whitney test was used. Comparison of the qualitative data was performed using Fishere xact test. The survival rates were analyzed using the Kaplan-Meier method; the differences between the two groups were analyzed with the log-rank test.

Results. Groups were comparable in the duration of CPB, aortic cross clamp time and number of distal anastomoses performed (62 in the study group and 70 in the control group, p=0.3). The level of cTnI between groups did not differ. The rate of major complications (acute heart failure, myocardial infarction, stroke,
need for renal-replacement therapy) between two groups did not differ. The rate of atrial fibrillation was significantly lower in the study group (10% versus 33%, respectively, p=0.03). 1-year cumulative survival was 76.7% in the study group and 93.3% in the control group (p=0.04).

Conclusion. On-pump beating coronary artery bypass grafting in patients with left ventricular systolic dysfunction is associated with higher mortality rate at 1-year follow-up compared to standard on-pump arrested heart coronary surgery and, therefore, cannot be recommended for routine use.

OP-96

A large animal model of low cardiac output syndrome for studies of the gastrointestinal tract

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1Department of Cardiothoracic and Vascular Surgery, 2Department of Surgery, Faculty of Medicine and Health, Örebro University

Background & Aim. After open heart surgery the frequencies of cardiac dysfunction and cardiogenic chock are 20% and 2% respectively. This may cause impaired circulation and dysfunction of the gastrointestinal tract, which is associated with a systemic inflammatory reaction. We aimed to create a large animal model of low cardiac output (CO), where the effects of low CO itself and the effects of inotropic and vasoactive drugs on the metabolism and circulation of the gut can be further studied.

Methods. Central hemodynamics including semi-continuous CO were monitored in anesthetized and mechanically ventilated pigs (n=12). Superior mesenteric arterial blood flow and intestinal mucosal microcirculation were measured by an ultrasonic transit-time flowmeter and a laser Doppler probe respectively. Arterial, mixed venous and mesenteric vein blood samples were analysed. Intraperitoneal metabolites were sampled by a free-floating microdialysis catheter. A catheter was inserted into the pericardial space through a diaphragmatic window. In six pigs, cardiac tamponade was induced by instillation of colloidal fluid to create a stepwise reduction in CO to 75% (CO75%), 50% (CO50%) and 35% (CO35%) of the baseline value during one hour each. Six pigs served as controls.

Results. At baseline, the two groups were similar in all parameters. The cardiac tamponade caused a stable and controllable lowering of CO whereas the controls maintained CO. All animals survived up to CO35%, but at CO35% four of the six pigs died, and data are therefore not presented. At CO75%, mean arterial blood pressure (MAP) was unchanged compared to baseline values (59±3 vs 65±3 mmHg), whereas at CO50%, MAP significantly decreased to 35±4 mmHg. The blood flow in the superior mesenteric artery gradually decreased from 660±90 ml min⁻¹ at baseline to 350±50 ml min⁻¹ at CO50%. The mucosal intestinal microcirculation decreased to 68±5% of baseline at CO50%. The cardiac tamponade progressively increased arterial and mesenteric venous lactate concentrations reaching 7.5±0.8 mM and 8.0±0.9 mM respectively at CO50%. The arterial-mesenteric venous difference of lactate became increasingly negative without reaching significance compared to controls at CO50% (-0.5±0.3 vs -0.08±0.04 mM, p=0.07). In parallel the intraperitoneal lactate concentration and lactate/pyruvate ratio gradually increased to 9.8±1.1 mM and 25±2 respectively at CO50%.

Conclusions. Low CO causes impaired splanchic circulation and intestinal metabolism, even at a modest decrease of 25% of CO with maintained MAP. In addition, 50% reduction of CO results in decreased MAP and impaired mucosal microcirculation. This low CO model is reproducible and suitable for further investigations of the gastrointestinal effects of inotropic and vasoactive drugs.

OP-97

Assessment of lung injury and margined leukocytes following perfusion and reconditioning using the Lung Organ Care System (OCS)

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Background. As a novel perfusion platform, OCS is emerging as a promising alternative strategy to the hypothermic storage for transplantable lungs and for the evaluation and reconditioning of marginal lungs. The aim of the study was to investigate i) structural signatures of lung injury by Electron Microscopy (EM) ii) pulmonary oedema by wet/dry weight ratios and iii) leukocyte margination in transplantable vs. marginal lungs.

Methods. Of 16 lung allografts accepted for transplantation in the donor hospital and perfused and ventilated after the retrieval and during transfer (standard-OCS), we analysed lung biopsies obtained at the end of OCS perfusion from 2 standard-OCS. Further biopsies were obtained from 3 lungs that were considered marginal and were further assessed, but ultimately rejected for transplantation (rejected-OCS). Fixed lung tissue was processed for EM. Fresh samples were analysed using flow cytometry for retained neutrophils and for monocytes (based on CD14 and CD16 staining).

Results. Endothelial and epithelial cells were well preserved in standard OCS samples, with mild changes in the mitochondrial and lamellar bodies. Rejected-OCS lungs exhibited damage to the basal lamina, and severe alterations to the cellular architecture. EM revealed significant number of leukocytes in both standard and rejected-OCS lungs (Figure). Wet-to-dry ratio was higher in the rejected-OCS vs. the standard-OCS (7.4±1.8 vs. 5.9±2.0). Flow cytometry confirmed large numbers of retained neutrophils and monocytes in both standard and rejected OCS. Neutrophil counts were 5.0×3.4×10⁶ cells/g dry weight in standard and 5.6×2.6×10⁶ cells/g in rejected OCS biopsies. Monocyte numbers were 9.3×0.5×10⁶ cells/g and 3.0×0.6×10⁶ cells/g in the respective groups.

Conclusion. The clinical use of OCS has provided a unique opportunity to explore mechanisms of lung injury. In this exploratory study we were able to demonstrate clear structural and physiological lung damage in marginal lungs rejected following OCS. Significant number of passenger neutrophils and monocytes appear to be retained in the donor lungs following pulmonary flush although there were no differences between accepted and rejected lungs. Further mechanistic studies are
required to fully elucidate inflammatory mechanisms of donor lung injury and organ perfusion by OCS.

Figure. Evidence of intravascular leukocytes (*) in the donor lungs after OCS.

OPS8
Renal perfusion, filtration and oxygenation during cardiopulmonary bypass (CPB) – a clinical study
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Department of Cardiothoracic Anaesthesia and Intensive Care, Sahlgrenska University Hospital, Gothenburg, Sweden

Background. Acute kidney injury is a common complication after cardiac surgery with CPB (1). We evaluated the effects of CPB on renal perfusion, filtration and the renal oxygen demand/supply relationship.

Methods. After approval of the regional ethics committee, patients (n=14) undergoing combined cardiac surgery procedures during normothermic CPB were included, after informed consent. All had normal preoperative serum creatinine and a LVEF > 50 %. Systemic and renal variables were measured by pulmonary artery and renal vein catheters. Glomerular filtration rate (GFR) was measured by renal extraction of Cr-EDTA and renal blood flow (RBF) by the infusion clearance technique for para-aminohippuric acid (PAH) corrected for by renal extraction of PAH. Repeated measures ANOVA followed by Fisher’s PLSD post-hoc test were used for statistical analyses.

Results. Data presented as means ± SD

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pre-CPB</th>
<th>CPB (60’)</th>
<th>Post-CPB (30’)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAP (mmHg)</td>
<td>78 ± 14</td>
<td>74 ± 10</td>
<td>71 ± 6.6</td>
</tr>
<tr>
<td>CI (L/min/m²)</td>
<td>1.84 ± 0.38</td>
<td>2.49 ± 0.064**</td>
<td>2.39 ± 0.68**</td>
</tr>
<tr>
<td>RBF (ml/min/1.73m²)</td>
<td>502 ± 139</td>
<td>479 ± 103</td>
<td>539 ± 137</td>
</tr>
<tr>
<td>RBF/CI</td>
<td>0.287 ± 0.066</td>
<td>0.187 ± 0.044 **</td>
<td>0.220 ± 0.113</td>
</tr>
<tr>
<td>Haemoglobin (g/L)</td>
<td>125 ± 15.2</td>
<td>99 ± 12.6</td>
<td>103 ± 13.7</td>
</tr>
<tr>
<td>GFR (ml/min/1.73m²)</td>
<td>63.8 ± 27.7</td>
<td>69.6 ± 23.9</td>
<td>58.7 ± 14.5</td>
</tr>
<tr>
<td>RVO2 (ml/min)</td>
<td>9.0 ± 3.2</td>
<td>9.1 ± 3.8</td>
<td>11.8 ± 3.1</td>
</tr>
<tr>
<td>RO2Ex (%)</td>
<td>8.9 ± 4.1</td>
<td>14.1 ± 5.6 **</td>
<td>14.3 ± 4.3 **</td>
</tr>
</tbody>
</table>

MAP: Mean arterial pressure; CI: cardiac index; RDO2; renal oxygen delivery; RVO2; renal oxygen consumption; RO2Ex; renal oxygen extraction (=RVO2/RDO2); *p < 0.05, **p < 0.01.

Conclusion. CPB induces a renal oxygen demand/supply mismatch (=increased RO2Ex), due to a 25% fall in RDO2 in turn caused by a haemodilution and redistribution of RBF away from the kidneys.

OPS9
Mortality following cardiac surgery in patients above 80 years
Hanna-Jumma, Lau Darbar
University Hospitals of Leicester NHS Trust

Introduction. Increasing number of octogenarians are receiving cardiac surgery1,2. The estimated mortality rate for octogenarians having CABG is 8.1%, CAGB/AVR 10.1%, and CABG/MVR 19.6%3. We reviewed the peri-operative data at our unit between April-2010 and March-2014 to establish the mortality rate for our patients.

Methods. 1500 adult cardiac procedures are performed annually at our unit. All patients are admitted to adult intensive care unit postoperatively. Peri-operative data are stored electronically, and analysis was performed using Microsoft Excel Professional 2010.

Results. All causes of in-hospital mortality of octogenarians (4.9%) were 1.5 times higher than patients below 80 years (3.2%). This trend was maintained across different subgroups. The table below show patients’ characteristics according to surgery.

<table>
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<tr>
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</tr>
<tr>
<td>n=1786.</td>
<td>n=158</td>
<td>n=1393</td>
</tr>
<tr>
<td>Age (years)</td>
<td>67 (60-72)</td>
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</tr>
<tr>
<td>Euroscore Additive</td>
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<td>6%, (89) 0%, (0)</td>
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<tr>
<td>Medium (3-5)</td>
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<td>31%, (424) 0%, (0)</td>
</tr>
<tr>
<td>High (4-6)</td>
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</tr>
<tr>
<td>Euroscore Logistic</td>
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<td>9.5 (6-17) 18 (11-26)</td>
</tr>
<tr>
<td>Gender (%) female</td>
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<td>38%, (530) 69%, (53)</td>
</tr>
<tr>
<td>Urgency</td>
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<td>53%, (811) 35%, (55)</td>
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<tr>
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Discussion. These figures confirm the increased mortality following cardiac surgery with increased age. Euroscores increased with age and reflected increased co-morbidities for patients above 80 years. This increase in mortality was consistent per decade increase in age, associated with similar increase in the Euroscores. In order to improve surgical outcome for elderly patients with significant comorbidities and limited physiological reserve, there is need for integrated peri-operative care with anaesthetic input in the pre-operative period in ensuring optimal selection, risk stratification and optimisation of these patients. This integrated approach to care could influence the overall outcome of these patients.

REFERENCE

ORAL ABSTRACT PRESENTATIONS

OP-101
Mortality following cardiac surgery in patients above 80 years
Hanna-Jumma, Lau Darbar
University Hospitals of Leicester NHS Trust

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RENAMENTS


OP-102
Renal outcome of goal-directed haemodynamic therapy varies with the applied haemodynamic monitoring in the high risk surgical patient
Koen Lapage, Piet Wyfels, Stefan De Hert, Patrick Wouters
University Hospital Ghent

Background & Aim. In high risk surgical patients, goal-directed haemodynamic therapy (GDHT) protocols have shown to reduce mortality, attenuate perioperative organ injury and enhance postoperative recovery[1]. GDHT algorithms use different filling parameters to guide treatment. Static Filling Parameters (SFP)-based algorithms use predefined central venous pressure (CVP) and pulmonary capillary wedge pressure (PCWP) values to guide fluid administration. Algorithms using Fluid Challenge Parameters (FCP) use a fast acting cardiac output measurement device (e.g. Doppler, Pulse contour analysis) to measure changes in cardiac output after fluid loading. A threshold value is predefined and used to guide the study-specific fluid management. Dynamic Filling Parameters (DFP)-based algorithms implement ventilation-induced changes in cardiac output like stroke volume variation (or a surrogate like pulse pressure variation) to assess the effectiveness of fluid loading. Of these SFP has been shown to be of insufficient value to predict fluid responsiveness[2]. Aim: To test the hypothesis that the effects of GDHT algorithms on surgical outcome could be confirmed on an updated dataset as reported in the literature. To test the hypothesis that the renal outcome may vary with the specific filling parameter used to guide GDHT algorithm decision making.

Methods. We conducted a systematic review and meta-analysis of the literature on perioperative GDHT. We used specific keywords to search the CENTRAL, MEDLINE and EMBASE databases for randomized controlled trials (RCT) dated between 01/04/2012 until 31/12/2014. Using these limitations, our search updated the dataset compiled by Grocott et al[1]. We divided the retrieved data in 3 groups based on the filling parameter used in the different GDHT algorithms described above. The results were statistically analysed in a random effects model. The report treatment effect as relative risk (RR) reduction, visualised in Forest plots.

Results. The literature search resulted in the addition of 13 RCTs (1939 patients) to the available dataset containing 7231 participants. We confirm the benefit of GDHT treatment algorithms to reduce mortality based on the pooled data (RR 0.78; 95% CI 0.62 to 0.99). DFP-based treatment algorithms improved renal outcome (RR 0.41; 95% CI 0.22 to 0.77). In this subgroup analysis, we noted a greater risk reduction for the DFP-based GDHT algorithms compared to the FCP-based GDHT algorithms (RR 0.98; 95% CI 0.69 to 1.40; p < 0.05).

Conclusion. This meta-analysis confirms the advantage of a GDHT algorithm to improve postoperative outcomes in the high risk surgical patient. In terms of renal outcome, there is a significant benefit when GDHT algorithm was guided by dynamic filling parameters.

REFERENCES

We recommend the use of our proposed format for recording Perioperative TOE and more multi-centre surveys to be conducted in order to achieving uniform recording process.

Oral Abstract Presentations 802
Thursday, June 25, 2015
3:00 pm–3:30 pm, Room F2/F3

OP-107

Readmission costs related to cardiac surgery. Analysis of risk factors and costs within six months after discharge using an administrative registry
Andrea Rossi Zadra1, Enza Caruso2
1AO Città della Salute e della Scienza di Torino, Italy, 2Università di Perugia and Capp, Modena, Italy

Background. Overall expenditure for cardiac surgery patients with high preoperative risk is increased because of high rate of readmission. The need of prolonged stay in intensive care units is a determinant of organ failure. We analyzed the impact of patient characteristics on readmission risk and on global costs of reimbursement from the National health service.

Methods. We analyzed demographic data, diagnosis and procedures listed according to ICD-9CM definitions of the administrative registry of Regione Piemonte, and selected 2067 patients who received cardiac surgery in 2009. Readmission history related to postoperative complications was followed for six months after discharge. We identified the ICD-9CM codes for perioperative morbidities and procedures that are known risk factors for increased hospital and ICU length of stay and included rehabilitation. Hazard models were used to identify predictors of readmission. The impact on the total expenditure for each patient was evaluated with regression analysis.

Results. 528 out of 2067 (25.54%) patients had in total 877 readmissions, and 1547 underwent rehabilitation. Length of stay, tracheostomy, heart failure and the use of IABP or ECMO are both strong risk factors for readmission and increase of costs. Tracheostomy alone accounted for an increase of 24367 euros. Perioperative respiratory or renal failure, infection or peripheral arterial disease predicted increased risk of readmission but not additional costs.

Discussion. Our results are similar to outcome described in literature. The ICD-9CM coding system for administrative purposes might be a reliable indicator for the actual clinical risk and predict an increase of expenditure.

REFERENCE
1. 30-day readmissions after coronary artery bypass graft surgery in New York State. Hannan EL et al. JACC Cardiovasc Inter. 2011 May;4(5):569-76

OP-108

Perioperative glucose control during on-pump elective coronary artery bypass graft in type 2 diabetes mellitus patients
L. Kuznetsova
Russian National Centre of Surgery named after B.V.Petrovsky

Background & Aim. An appropriate perioperative glucose control in type 2 diabetes mellitus (DM) patients is a great challenge. In addition to concomitant metabolic disturbances, hyperglycaemia is caused by peri-operative stress, cardiopulmonary bypass (CPB), the use of glucose-containing solutions, inotropes and steroids. Maintenance of an appropriate blood glucose (BG) level has been associated with better outcomes, including lower mortality. The aim was to compare the efficacy and safety of 2 methods of insulin therapy (computerized predictive algorithm (CPA) and "empirical therapy" (iv. bolus or infusion).

Methods. 90 patients with type 2DM, undergoing elective on-pump CABG. Group 1 (empirical therapy) insulin was given as a bolus or infusion. Group 2 ("SGC"), insulin was given using dynamic CAP (Space Glucose Control), BBraun, Germany). Glucose levels were measured in arterial blood with ABL - 800 Flex* ("Radiometer, Denmark) at the following points: operation start (); heparin (); start, middle, end of CPB (III, IV, V); protamine (VI), surgery end (VII). Hyperglycemia was considered as BG level over 10 mmol/L, severe hyperglycemia () – over 12 mmol/L; hypoglycaemia is less than 4.4 mmol/L.

Results. The incidence of hyper- and hypoglycemia (% of patients) are presented in table 1.

<table>
<thead>
<tr>
<th>STAGES</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>VI</th>
<th>VII</th>
<th>HYPO-cases</th>
<th>TOTAL insulin (ED)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group I</td>
<td>23</td>
<td>45</td>
<td>67</td>
<td>75</td>
<td>72</td>
<td>87</td>
<td>80</td>
<td>1</td>
<td>12±3</td>
</tr>
<tr>
<td>Group II</td>
<td>20</td>
<td>40</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>0</td>
<td>18±3</td>
</tr>
</tbody>
</table>

Conclusion. Despite higher doses of insulin, due to doses calculation for a particular patient, there were no hypo- episodes, which makes this therapy safer.

OP-109

The sedative effect of remimazolam in general anesthesia for cardiac surgery measured by Narcotrend
Camrine Bevilacqua1, Stefan Probst1, Mariola Soehngen2, Jörg Ender1
1Department of Anesthesiology, Heart Center Leipzig, Germany, 2PAION Deutschland GmbH

Background & Aim. Cardiac surgery is burdened with an increased intra-operative awareness of up to 2%. In conjunction with the fast-track concept, i.e., fast weaning and extubation at the end of the surgical procedure, quick off-set of the sedation is of growing importance and thus becomes another main target for each sedative that is employed in general anesthesia.

Methods. We conducted a prospective, randomized, single blind, clinical Phase 2 study testing the new, short-acting benzodiazepine remimazolam against a standard regimen of propofol and sevoflurane. For general anesthesia allowing cardiac surgery, either remimazolam or the combination of propofol and sevoflurane were administered together with fentanyl for induction and remifentanil for maintenance. Success was defined as no need for rescue sedative. Depth of sedation was measured with the Narcotrend® monitor. A Narcotrend index between 30 and 50 was regarded as ideal, but strict adherence was not mandatory. An independent, blinded observer assessed post hoc whether the administration of the rescue sedative medication was justified based on the Narcotrend index.
Results. Based on randomization, remimazolam was administered to 62 patients while the combination of propofol/sevoflurane was administered to 28 patients. Rescue sedative medication was needed in one patient (1.6%) on remimazolam and one patient on propofol/sevoflurane (3.6%). For both patients, the post-hoc assessment by a blinded observer revealed that the application of rescue sedative medication was justified.

During the maintenance phase of the general anaesthesia, a Narcotrend index of 60 or less was found in 94.6% ± 5.9% of the time in the remimazolam group vs 96.9% ± 2.61% of the time in the propofol/sevoflurane group. In 40.0% ± 31.00 vs 64.1% ± 26.25% of the time, the recommended, but not mandatorily requested range from 30 to 50 was adhered to. During 91.5% ± 7.87 vs 88.7 % ± 13.49 of the time, the mean Narcotrend index per group was found between 20 and 50.

Conclusion. The success rate of sedation allowing cardiac surgery achieved with Remimazolam was very similar to that of the combination of propofol/sevoflurane. This applied to success measured clinically in terms of the use of rescue sedative medication and to the depth of sedation assessed with the Narcotrend monitor. An analysis by pre-defined ranges of the Narcotrend index showed a tendency to slightly deeper sedation under remimazolam.

Oral Abstract Presentations 803 Thursday, June 25, 2015 3:00 p.m.–3:30 p.m., Room G3

OP-114
Enhanced recovery after surgery programme in elective subrenal abdominal aortic aneurism repair: a single centre experience
Laura Pasin1, Pasquale Nardelli1, Daniela Febres1, Alessandro Belletti1, Omar Saleh1, Mattia Bellandi1, Martina Baiardo Redaelli1, Gianluca Patemoster1, Giovanni Landoni2,3, Alberto Zangrillo1

1Department of Anesthesia and Intensive Care, IRCCS San Raffaele Scientific Institute, Milan, Italy, 2Department of Cardiovascular Anesthesia and Intensive Care, San Carlo Hospital, Potenza, Italy, 3Vita-Salute San Raffaele University, Milan, Italy

Background & Aim. The enhanced recovery after surgery (ERAS) programme is a multimodal perioperative care pathway developed to achieve early recovery for patients undergoing major surgery and includes patient education, multimodal analgesia, goal-directed fluid management, early mobilization and oral nutrition, reduction in the use of postoperative nasogastric tube and drains. In our centre, ERAS program started to be applied to patients undergoing elective subrenal abdominal aortic aneurism repair in September 2012. Since limited evidence on ERAS in vascular surgery setting has been published so far, we decided to report our experience as a major centre of vascular surgery.

Methods. Data of all patients undergoing open subrenal abdominal aortic aneurism (AAA) repair between June 2009 and December 2014 were recorded. Primary endpoint was the incidence of postoperative complications between patients receiving ERAS approach and patients receiving conventional perioperative care. Secondary endpoints were: surgical time, length of hospital stay, unplanned intensive care unit admission, surgical reintervention and in-hospital mortality between groups. Propensity score matching based on baseline clinical variables was performed to correct for any bias.

Results. A total of 1,078 open subrenal AAA repair were performed during the study period. Forty-four cases were excluded because urgent/emergent procedures. Six-hundred and sixty-three patients underwent surgery between June 2009 and September 2012 and received standard perioperative care while 371 patients underwent surgery between September 2012 and December 2014 and received ERAS approach. After propensity score adjustment we matched all 371 ERAS cases one-to-one to those who received standard perioperative care. A total of 742 patients were included. We found no differences in

OP-158
Malnutrition assessed by phase angle: relation with outcomes after cardiac surgery
D. Ringaitiene1,2, D. Ginete1y2, J. Sipylaite1,2, V. Vicka2

1Vilnius University Clinic of Anaesthesiology and Intensive Care, Dept of Anaesthesiology & Intensive Care, Vilnius, Lithuania, 2Vilnius University, Faculty of Medicine, Vilnius, Lithuania

Background & Aim. Bioelectrical impedance analysis (BIA) is simple and non-invasive technique to evaluate changes in body composition and nutritional status. Phase angle, determined by BIA, detects changes in tissue electrical properties and has been found to be a prognostic indicator in several chronic conditions. BIA, detects changes in tissue electrical properties and has been found to be a prognostic indicator in several chronic conditions. This applied to success measured clinically in terms of the use of rescue sedative medication and to the depth of sedation assessed with the Narcotrend monitor. An analysis by pre-defined ranges of the Narcotrend index showed a tendency to slightly deeper sedation under remimazolam.

Results. Based on randomization, remimazolam was administered to 62 patients while the combination of propofol/sevoflurane was administered to 28 patients. Rescue sedative medication was needed in one patient (1.6%) on remimazolam and one patient on propofol/sevoflurane (3.6%). For both patients, the post-hoc assessment by a blinded observer revealed that the application of rescue sedative medication was justified.

During the maintenance phase of the general anaesthesia, a Narcotrend index of 60 or less was found in 94.6% ± 5.9% of the time in the remimazolam group vs 96.9% ± 2.61% of the time in the propofol/sevoflurane group. In 40.0% ± 31.00 vs 64.1% ± 26.25% of the time, the recommended, but not mandatorily requested range from 30 to 50 was adhered to. During 91.5% ± 7.87 vs 88.7% ± 13.49 of the time, the mean Narcotrend index per group was found between 20 and 50.

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postoperative cardiovascular, renal and gastrointestinal complications ($p>0.05$). A significant reduction in postoperative pulmonary complications ($p<0.01$) and trend towards a reduction in length of hospital stay ($p=0.075$) in ERAS group were recorded. (Table 1)

**Conclusions.** ERAS program is effective in reducing postoperative pulmonary complications and helps to reduce length of hospital stay after subrenal AAA repair.

Table 1. Outcome of ERAS patients versus patients receiving standard perioperative care

<table>
<thead>
<tr>
<th>Standard Perioperative</th>
<th>ERAS (n=371)</th>
<th>Care (n=371)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgical time (min)</td>
<td>125 [100-150]</td>
<td>125 [100-160]</td>
<td>0.261</td>
</tr>
<tr>
<td>Hospital stay (days)</td>
<td>5.6 [5.4-6.5]</td>
<td>6.4 [5.5-6.5]</td>
<td>0.075</td>
</tr>
<tr>
<td>Adverse events (n, %)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unplanned ICU admission</td>
<td>5 (1.35%)</td>
<td>10 (2.70%)</td>
<td>0.22</td>
</tr>
<tr>
<td>Pulmonary complications</td>
<td>19 (5.12%)</td>
<td>39 (10.51%)</td>
<td>0.0064</td>
</tr>
<tr>
<td>Kidney Injury</td>
<td>27 (7.28%)</td>
<td>23 (6.29%)</td>
<td>0.55</td>
</tr>
<tr>
<td>Cardiovascular complica-</td>
<td>18 (4.85%)</td>
<td>19 (5.12%)</td>
<td>0.82</td>
</tr>
<tr>
<td>Surgical re-intervention</td>
<td>3 (0.81%)</td>
<td>9 (2.43%)</td>
<td>0.55</td>
</tr>
<tr>
<td>Mortality</td>
<td>1 (0.27%)</td>
<td>0</td>
<td>0.99</td>
</tr>
</tbody>
</table>

OP-115

**The effect of desflurane and propofol protocols on preconditioning in coronary artery bypass graft surgery**

Didem Onk1, Fatih Ozcilk2, Ufuk Kuyrukylidyiz2, Murat Günay3, Oruç Alper Onk1, Tülin Akarsu Ayazoglüt4, Abdulkadir Çoban1, Ayşin Alagöl5

1University Erzincan, 2Erzincan Military Hospital, 3Göztepe Training and Research Hospital

**Background & Aim.** Preconditioning is one of the most powerful mechanisms for preventing myocardial ischemic injury during coronary artery bypass graft(CABG) surgery. The aim of our study was to investigate the effects of propofol and/or desflurane protocols against ischemia-reperfusion damage in CABG in terms of preconditioning.

**Methods.** A total of 90 ASA III patients scheduled for CABG surgery were included into the study. The patients were randomly allocated into three groups: Group 1(n:30) received propofol infusion(5-6 mg.kg$^{-1}$.h$^{-1}$) and fentanyl infusion(3-5 mcg.kg$^{-1}$.h$^{-1}$), Group 2(n:30) received propofol infusion(5-6 mg.kg$^{-1}$.h$^{-1}$),fentanyl infusion(3-5 mcg.kg$^{-1}$.h$^{-1}$) and 5% desflurane for 15 min before and after cross-clamping, and Group 3(n:30) received propofol infusion(2-3 mg.kg$^{-1}$.h$^{-1}$),fentanyl infusion(3-5 mcg.kg$^{-1}$.h$^{-1}$) and 5% desflurane.TNF-$\alpha$, h-FABP levels were measured on the day before the operation(S1), at the pump before aortic cross-clamping(S2), after declamping(S3), and at the postoperative 24 h(S4).

**Results.** In Group 1, there was a significant difference between S2 and S4 TNF-$\alpha$ levels, while there was no difference in other groups ($p<0.05$). S4 TNF-$\alpha$ levels of Group 3 were lower than TNF-$\alpha$ levels of Group 1 and Group 2 ($p<0.05$). S2 and S3 h-FABP levels in Group 3, were found to be lower than S2 and S3 h-FABP levels in Group 1 ($p<0.05$). A moderate correlation was established between h-FABP and TNF-$\alpha$ ($r=0.4721$, $p<0.0001$).

**Conclusions.** The administration low-dose propofol and continuous desflurane for preconditioning in CABG anesthesia was found to be superior to administration of propofol only or propofol and short-term administration of desflurane for anesthesia on the basis of proinflammatory cytokines.

**OP-130**

**Effect of levosimendan on diastolic function in patients undergoing coronary artery bypass grafting-a comparative study**

Vishwas Malik, Arun Subramanian

All India Institute of Medical Sciences

**Background & Aim.** To compare the efficacy of Levosimendan with Nitroglycerin in patients with isolated diastolic dysfunction undergoing coronary artery bypass grafting (CABG)

**Methods.** 30 patients with isolated diastolic dysfunction undergoing on pump CABG were randomized into two groups receiving Levosimendan or Nitroglycerin infusion. The infusion was started prior to sternotomy and continued in the postoperative period. Perioperatively, diastolic function was serially evaluated at three different time points using echocardiography. N-terminal fragment of pro-B-natriuretic peptide (NT pro BNP) levels were measured in both the groups.

**Results.** There was a significant improvement in diastolic function as measured by isovolumic relaxation time ($p=0.0001$, $p=0.001$) and deceleration time ($p=0.0001$, $p=0.0001$) in the Levosimendan group from the baseline in patients with impaired relaxation. Similarly, tissue Doppler imaging also revealed an improvement from the baseline in patients with a pseudonormal pattern ($p=0.018$, $p=0.001$). Further there was a significant improvement in the above parameters when compared to the Nitroglycerin group. The NT pro BNP levels also demonstrated a similar pattern between the two groups ($p=0.03$, $p=0.02$) when Levosimendan was compared with Nitroglycerin in patients with a pseudonormal pattern on echocardiography.

**Conclusion.** Levosimendan is superior to Nitroglycerin in improving the diastolic function irrespective of coronary revascularization.

**REFERENCE**


**OP-131**

**Effects of milrinone and epinephrine or dopamine on biventricular function and haemodynamics in an animal model with right ventricular failure after pulmonary artery banding**

Janus Adler Hyldebrandt, MD1,2, Eleonora Sivén, MD1,2, Peter Agger, MD1,2, Christian Alcaraz Frederiksen, MD PhD3, Johan Heiberg, MD,2,3 Kristian Wemmelt, MD,3, Hanne Berg Ravn, MD PhD DMSc3

1Departments of Anaesthesia and Intensive Care, Aarhus University, Aarhus, Denmark, 2Cardiothoracic and Vascular Surgery, Aarhus University, Aarhus, Denmark, 3Institute of Clinical
**Background & Aim.** Right ventricular failure (RVF) secondary to pulmonary regurgitation (PR) impairs right ventricular (RV) function and interrupts the interventricular relationship. There are few recommendations for the medical management of severe RVF after prolonged PR.

**Methods.** PR was induced in 16 Danish landrace pigs by plication of the pulmonary valve leaflets. Twenty-three pigs served as controls. At re-examination the effect of milrinone, epinephrine and dopamine was evaluated using biventricular conductance and pulmonary catheters.

**Results.** Eighty-one days after PR was induced, RV end-diastolic volume index (EDVI) had increased by 33% (p=0.006) and a severe decrease in the load-independent measurement of contractility (PRSW) (-58%; p=0.003). Lower cardiac index (CI) (-28%; p<0.0001), mean arterial pressure (-15%; p=0.01) and mixed venous oxygen saturation (SvO2) (96%; p<0.0001) were observed compared to the control group. The interventricular septum deviated towards the left ventricle (LV). Milrinone improved RV-PRSW and CI and maintained systemic pressure while reducing CVP. Epinephrine and dopamine further improved biventricular PRSW and CI equally in a dose-dependent manner. Systemic and pulmonary pressures were higher in the dopamine-treated animals compared to epinephrine-treated animals. None of the treatments improved stroke volume index (SVI) despite increases in contractility. Strong correlation was detected between SVI and LV-EDVI, but not SVI and biventricular contractility.

**Conclusion.** In RVF due to PR, milrinone significantly improved CI, SvO2 and CVP and increased contractility in the RV. Epinephrine and dopamine had equal inotropic, but a greater vasopressor effect was observed for dopamine. SV was unchanged due to inability of both treatments to increase LV-EDVI.

**OP-132**

A retrospective comparison of aerosolized milrinone and aerosolized iloprost in the setting of postbypass pulmonary hypertension

Theofani Antoniou1, Christina Antzaka1, Panagiota Rellia1, Apostolos Thanopoulos1, Kassiani Theodoraki1

1Onassis Cardiac Surgery center, Athens, Greece, 2Aretaieion University Hospital, Athens, Greece

**Background.** During cardiac operations, weaning from cardiopulmonary bypass (CPB) may prove challenging as a result of superimposed acute right ventricular (RV) dysfunction in the setting of elevated pulmonary vascular resistance (PVR). The aim of this study was to retrospectively evaluate the effect of inhaled milrinone versus inhaled iloprost in patients with persistent pulmonary hypertension following discontinuation of CPB.

**Methods.** Thirteen patients with elevated PVR post bypass were administered 20 μg of inhaled iloprost. These patients were retrospectively matched with thirteen patients who were administered inhaled milrinone at a cumulative dose of 50μg/kg. Both drugs were administered through a disposable aerosol-generating jet nebulizer device and inhaled for a 20-min period. Haemodynamic measurements were performed before inhalation-baseline (T0), 20 min after the start of inhalation (T1), 40 min after the start of inhalation (T2) and 60 min after the start of inhalation (T3).

**Results.** p<0.05 versus T0; p<0.05 between the two groups

<table>
<thead>
<tr>
<th>variable</th>
<th>group</th>
<th>T0</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPAP, mmHg</td>
<td>Milrinone</td>
<td>41.0 ± 3.8</td>
<td>32.9 ± 3.7</td>
<td>31.4 ± 4.7</td>
<td>35.7 ± 4.0</td>
</tr>
<tr>
<td></td>
<td>Iloprost</td>
<td>40.5 ± 4.7</td>
<td>30.9 ± 4.7</td>
<td>27.3 ± 3.0</td>
<td>26.9 ± 2.7</td>
</tr>
<tr>
<td>PVR, dyn sec cm²</td>
<td>Milrinone</td>
<td>365 ± 112</td>
<td>226 ± 63</td>
<td>252 ± 78</td>
<td>341 ± 93</td>
</tr>
<tr>
<td></td>
<td>Iloprost</td>
<td>369 ± 106</td>
<td>222 ± 60</td>
<td>232 ± 77</td>
<td>255 ± 51</td>
</tr>
<tr>
<td>CI, l min⁻¹ m⁻²</td>
<td>Milrinone</td>
<td>2.0 ± 0.3</td>
<td>2.5 ± 0.4</td>
<td>2.5 ± 0.4</td>
<td>2.3 ± 0.5</td>
</tr>
<tr>
<td></td>
<td>Iloprost</td>
<td>2.0 ± 0.3</td>
<td>2.5 ± 0.3</td>
<td>2.6 ± 0.3</td>
<td>2.6 ± 0.3</td>
</tr>
<tr>
<td>MAP, mmHg</td>
<td>Milrinone</td>
<td>73.7 ± 9.8</td>
<td>74.8 ± 10.7</td>
<td>70.8 ± 9.2</td>
<td>74.4 ± 8.0</td>
</tr>
<tr>
<td></td>
<td>Iloprost</td>
<td>77.4 ± 8.3</td>
<td>76.0 ± 12.1</td>
<td>76.4 ± 10.6</td>
<td>77.1 ± 7.1</td>
</tr>
<tr>
<td>SVR, dyn sec cm²</td>
<td>Milrinone</td>
<td>1101 ± 282</td>
<td>1034 ± 240</td>
<td>980 ± 234</td>
<td>965 ± 127</td>
</tr>
<tr>
<td></td>
<td>Iloprost</td>
<td>1032 ± 203</td>
<td>989 ± 230</td>
<td>968 ± 197</td>
<td>1007 ± 215</td>
</tr>
</tbody>
</table>

**Conclusion.** Both substances proved to be selective pulmonary vasodilators, since they induced significant reductions in MPAP and PVR and significant increases in CI, whereas MAP and SVR were not affected. In a direct comparison, pulmonary vasodilation attributed to iloprost seems to be of greater magnitude and of longer duration as compared to that of inhaled milrinone. This is probably due to iloprost’s longer duration of action.

**OP-137**

Does topical tranexamic acid reduce the postoperative bleeding in patients undergoing primary valve replacement surgery?

Kanagarajan Natarajan, Nimisha Mariam Eapen, Gomathy Jeefa, Benjamin Ninan

Institute of Cardiovascular Diseases, Madras medical mission hospital

**Introduction.** Postoperative blood loss remains a major problem in cardiac surgery. Antifibrinolytic agents successfully reduce the bleeding, but there are some controversies concerning adverse effects like thrombo-embolic events, seizures after their systemic use. Topical application of these agents may reduce the bleeding as well as systemic adverse effects. We analyzed the effectiveness of topically applied Tranexamic acid on post operative bleeding and transfusion requirements.

**Methods.** In a prospective observational study, 100 patients who had undergone elective valve Replacements (Aortic and Mitral) were included. They were divided into two groups: Group I (n=50) did not receive Tranexamic and Group II (n=50) received topical application of Tranexamic acid (2g of Tranexamic acid diluted in normal saline to 50 ml and poured onto cardiac surface and pericardial cavity before stoma closure) . The pre-op, intra-op and post op variables were analyzed. All continuous variables were compared using chi-square test and categorical variables using student’s t test.

**Results.** The average blood loss at 5 hours after the surgery was 520ml in Group I and 160 ml in Group II (p value = 0.561). The proportion of patients received postoperatively Fresh frozen plasma(FFP) and platelets(PLT) differed significantly between the two groups (group I, n = 5 and 1; group II, n = 6 and 0; p value of
0.09 and 0.01* respectively). None of the patient was reexplored for excessive bleeding in both groups.

<table>
<thead>
<tr>
<th>Blood products</th>
<th>Group I</th>
<th>Group II</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>FFP</td>
<td>5</td>
<td>1</td>
<td>0.09</td>
</tr>
<tr>
<td>PLT</td>
<td>6</td>
<td>0</td>
<td>0.01*</td>
</tr>
</tbody>
</table>

Conclusion. Topical use of tranexamic acid may be useful in reducing the postoperative bleeding and the requirement of Blood product transfusion.

REFERENCE


OP-138

Influence of red blood cell transfusion onSvcO2 after cardiovascular surgery

Nordine Zeroual, Gianluca Samarani, Jules Galais, Marine Saour, Marc Mourad, Géraldine Culas, Remy Coves, Jacob Eliet, Philippe Gaudard, Pascal Colson

DAR ADV, CHRU Montpellier, France

The decision to transfuse is mainly taken according to hemoglobin level (Hb) (1,2) but venous oxygen saturation (SvO2) might be helpful to guide transfusion. We carried out a study to evaluate SvO2 changes before and after blood transfusion after cardiovascular surgery.

Methods. Patients admitted in ICU after cardiovascular surgery over 5 months (September 2014 to February 2015), who were transfused, have been included in the study. Patients with active bleeding, operated on emergency, or in critical condition were excluded. The decision to transfuse was made according to guidelines (1). Samples were collected through central venous catheter to measure respectively Hb and SvO2 (co-oxymetry). Statistical analysis was performed with Mann-Whitney test. Data are expressed as median [25%; 75%] and p < 0.05 considered as statistically significant.

Results. 100 consecutive patients have been included. Hb before transfusion was 7.3 g/dl [6.8; 7.8], SvO2 66.9% [60; 73] without any correlation between both (Spearman r = 0.001; NS). SvO2 was not significantly different between patients with Hb < 7 g/dl (n=36) and patients with Hb ≥ 7g/dl (n=64) (65.9% [59.3;77.7] vs. 67.7% [60.5;72.2] respectively; p=0.92). SvO2 after transfusion (RBC 2 [1:2]) increased significantly (71.9% [66.3;77.4]) as well as Hb (9.1 g/dL [8.6;9.8]) (p<0.001) but the observed change in SvO2 is related to patients with SvO2 < 65% before transfusion (p<0.001), not when SvO2 ≥ 65%.

Conclusions. According the study, 64% patients have high pretransfusion SvO2 and experienced no SvO2 improvement after transfusion, that questions its benefit. Whether a restrictive transfusion protocol guided by SvO2 would be safe requires further studies.

REFERENCES


Oral Abstract Presentations 1003
Friday, June 26, 2015
9:30 a.m.–10:00 a.m., Room G3

OP-142

Support with intra-aortic balloon pump vs. Impella2.5® and organ blood flow-an experimental closed-chest porcine model of ischaemic heart failure

Ole K. Møller-Helgestad1, Christian B. Poulsen2, Evald H. Christiansen1, Jens F. Lassen1, Hanne B. Ravn1

1Department of anaesthesiology and intensive care Aarhus University, 2Department of cardiology Aarhus University, 3Department of cardiology University of Copenhagen, 4Department of Cardiothoracic anaesthesiology University of Copenhagen

Background & Aims. Left ventricular failure is the main cause of death after an acute myocardial infarction (1). European guidelines recommend mechanical support on top of pharmacological treatment, but there is currently no strong scientific evidence on any mechanical assist device available. The aim of our study was to compare blood flow to the heart, brain and kidneys, during left ventricular failure and support with the intra-aortic balloon pump (IABP) and the Impella® 2.5

Methods. 13 Danish landrace pigs were anaesthetised and the right carotid artery was surgically exposed and a flow probe was surmounted. Blood flow in the LAD and renal artery were measured by means of two intravascular Doppler FloWires®. Baseline measurements were obtained before the LAD was occluded for 45 minutes followed by 30 minutes of reperfusion. The Impella® and IABP were inserted via the left and right femoral artery, respectively, and tested both individually and combined followed by a no-support phase in all animals.

Results. Fig. 1.

The IABP alone did not improve any parameters. Carotid and renal blood flow were higher on Impella®-support vs. no support (Fig.1). Perfusion pressure was 78±7 mmHg on Impella®-support vs. 68±5 mmHg on no support (p < 0.0001). Mixed venous oxygen saturation was 63±7% on Impella®-support vs. 59±7% on no support (p < 0.0001). Blood flow in the LAD remained unchanged despite Impella®-support.

Conclusion. In this study, blood flow to the brain and kidneys were higher on Impella®-support vs. no support whereas the IABP did not differ from no support.
OP-144
Assessment of intraoperative Trans Oesophageal image quality and adherence to British Society of Echocardiography guidelines

Anand Jain1, Giampaolo Martinelli2, Andrzej Zmuda3, Mariarita Lombroso3
1Manchester Royal Infirmary UK, 2New Cross Hospital, Wolverhampton, UK

Introduction. Trans Oesophageal Echocardiography (TOE) is an essential imaging modality in cardiac surgery. Various international societies provide guidelines to acquire a minimum dataset in the intraoperative setting.

Aim. To assess the intraoperative TOE image quality and compare with British Society of Echocardiography (BSE) guidelines

Methods. A retrospective analysis of TOE images of 100 patients undergoing cardiac surgery was performed. The images were assessed against BSE minimum dataset guidelines. The image quality was graded good, acceptable and poor according to depth, focus, gain and scale adjustments. Use of zoom, 3D, special measurements/views and special annotations were also recorded.

Results. Out of the total 100 patients, the image quality was good in 58, acceptable in 32 and poor in 10 patients. 3D was used in 69 patients, zoom in 66, special measurements in 22, special views in 34 patients and annotations in 7 patients. In pre bypass studies, only 30% of the BSE recommended studies were acquired whereas in post bypass studies, the compliance was 31%. Highest number of pre bypass studies recorded were mid oesophageal 4 chamber (96), long axis view (84), right inflow/outflow (69), 2 chamber (68), trans gastric mid papillary (67) and commissural view (61). In the post bypass studies, 4 chamber (76) and aortic valve long axis view (56) were the most recorded views.

Conclusion. The TOE studies were more focussed and targeted due to time constraint in operation theatre explaining the low compliance with BSE guidelines. However, a high percentage of studies included 3D full volume assessment. We recommend a case based proforma for coronary artery bypass grafts, valve and aortic surgeries and presence of two anaesthetists for complex cases. We also encourage more cardiac anaesthetists to achieve TOE accreditation.

REFERENCE

Oral Abstract Presentations 1101
Friday, June 26, 2015
11:45 a.m.–12:30 p.m., Room F4/F5

OP-159
Effects of colloids and crystalloids on extravascular lung water content in cardiac surgery patients: randomized controlled equivalence trial

Evgeny Fominskiy, Vladimir Lomivorotov, Gleb Moroz
Academician EN Meshalkin Novosibirsk Research Institute of Circulation Pathology

Background & Aim. To demonstrate equivalence of colloid and crystalloid solutions in terms of their effect on extravascular lung water index (EVLWI) during goal-directed volume replacement in coronary artery bypass grafting (CABG) patients.

Methods. Patients were randomized to receive either balanced crystalloid (Cryst group, n=31) or 4% gelatin (Gel group, n=29) or balanced 6% hydroxyethyl starch 130/0.42 (HES group, n=31) for maintaining global end-diastolic volume index within 680-850 ml m-2 and priming of the cardiopulmonary bypass. Primary outcome was the area under the curve (AUC) of EVLWI during surgery and the 1st postoperative day (POD1) which was determined by PICCO plus. It was estimated from the pilot study that 13 patients in each group would suffice for constructing
three confidence intervals (CI) that would include true differences between mean AUCs with probability of 99% and type I error rate of 5% while within the equivalence range of ±15 ml·kg⁻¹·h⁻¹. Intention to treat analysis was used.

**Results.** The means (99% CI) of EVLWı AUCs were in Cryst group 63.6 (58.4-68.8), in Gel group 61.7 (56.8-66.6), in HES group 65.2 (60.0-70.4) ml·kg⁻¹·h⁻¹. The 99% CIs for the pairwise difference between mean EVLWI AUCs were fully within a prespecified equivalence range (Tab. 1).

<table>
<thead>
<tr>
<th>Cryst group-Gel group</th>
<th>Cryst group-HES group</th>
<th>Gel group-HES group</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.85 (-9.33-5.63)</td>
<td>-1.62 (-12.60-9.35)</td>
<td>-3.47 (-14.21-7.26)</td>
</tr>
</tbody>
</table>

Fluid balance on the POD1 was more positive in Cryst group 1920 [1333-3355] ml as compared to Gel group 1440 [443-1460] ml and HES group 1055 [130-1640] ml (P=0.0003). No difference was found regarding hemodynamics, the use of vasoactive and inotropic drugs. Blood loss, erythrocytes transfusion, and the incidence of adverse events were not different between the groups.

**Conclusion.** Balanced crystalloid, 4% gelatin, and 6% HES 130/0.42 within goal-directed volume replacement showed equivalence with regard to extravascular lung water content in CABG patients despite more requirements in crystalloid.

**OP-160**

Modern hydroxyethyl starch and Acute Kidney Injury after cardiac surgery: a prospective multicenter cohort

Vives M1, Callejas R2, Duque P2, Echarri G2, Hernandez A2, Sabate A1, Bes M1 Monedero P on behalf of the *Grupo Espanol de Disfuncion Renal tras Cirugia Cardiaca* (GEDRCC2)

1Hospital Universitari Bellvitge, University of Barcelona, 2Clinica Universidad de Navarra, University of Navarra, 3University Hospital of South Manchester NHS Trust

**Background & Aim.** Recent trials suggest that the use of i.v. hydroxyethyl starch (HES) solutions is associated with increased risk of acute kidney injury (AKI) in critically ill patients1,2. It is uncertain whether similar adverse effects occur in surgical patients. Our aim is to determine renal safety of 6% HES 130/0.42 used during and after cardiac surgery.

**Methodology.** Multicenter prospective observational cohort study at 28 different hospitals and cardiac ICU. One thousand sixty seven consecutive patients with cardiopulmonary bypass surgery from 15th of September 2012 to 15th of December 2012 were included.

**Results.** 1,067 patients were included in the analysis. 350 patients (32.8%) used 6% HES 130/0.4 intraoperatively and postoperatively. AKI after cardiac surgery was diagnosed in 385 of 1,076 patients (36%). Overall in-hospital mortality was 4.4% (47 of 1,067 patients).

Adjustment variables were those known to be associated with risk of AKI. We included baseline characteristics of the patients, surgical procedure-related and treatment in the ICU-related variables. Those variables were the following: age, sex, BMI, baseline Left Ventricle ejection fraction, Preoperative cardiogenic shock, use of preoperative IABP, unstable angina, pulmonary HTN, HTN, Baseline hemoglobin, COPD, Diabetes, previous surgery, urgent surgery, peripheral arterial disease, hospital, Euroscoare, Cleveland Score, use of diuretics 48h prior to surgery, intraoperative use of vasopressors, Type of surgery, CPB time, intraoperative minimum hemoglobin, intraoperative RBC transfusion, Chronic Kidney Disease, use of noradrenaline or adrenaline, use of postoperative IABP and reintervention in 48h postoperatively.

With multivariate logistic regression, however, the results of this study showed that intraoperative and postoperative use of 6% HES 130/0.4 (vs non-HES) did not significantly increase the risk of AKI (37.43% vs 35.43%; OR1.03, 95% confidence interval 0.74-1.43, p=0.84) in the patients undergoing cardiac surgery. Propensity score matching confirmed that intraoperative and postoperative use of modern hydroxyethyl starch (vs non-HES) did not significantly increase the risk of AKI (n=670, OR 1.02, 95% confidence interval 0.93-1.11, p=0.63) and dialysis required (OR 1.002, 95% confidence interval 0.97-1.03, p=0.83).

**Conclusion.** The intraoperative and postoperative use of modern hydroxyethyl starch was not associated with an increase risk of AKI and RRT after cardiac surgery.

**REFERENCES**


**OP-161**

Prophylaxis of postoperative nausea and vomiting (PONV) in fast-track cardiac anaesthesia

Elham Hasheminejad

University of Leipzig

**Objective.** The aim of our study was to evaluate the efficacy of a PONV prophylaxis protocol (PPP) in fast-track cardiac anaesthesia.

**Methods.** To perform this retrospective observational study, data were gathered from anaesthesia and PACU electronic reports, before and after implementation of PPP. A sample of at least 132 patients per group was calculated as necessary to achieve a 40% reduction in PONV. A standardized anaesthetic regimen was applied to all patients and they received piritramid at least 132 patients per group was calculated as necessary to achieve a 40% reduction in PONV. A standardized anaesthetic regimen was applied to all patients and they received piritramid 0.1mg/Kg upon arrival in PACU followed by immediate termination of anaesthesia. After implementation of PPP all patients received dexmethasnon 4 mg at the induction of anaesthesia and in PACU droperidol 1,25mg was injected to all women and those men who underwent thoracotomy. Those with a past history of PONV received ondansetron 4mg as well. Qualitative data were statistically analysed by X² test and quantitative data by t student. Results are presented as mean (±SD) and percentage (p<0.05).

**Results.** Records of 313 patients (72% males/ 28% females) were studied, 154 cases before and 159 after PPP. The overall PONV incidence was 42% before vs statistically significant reduction to 5% after PPP. Pre-prophylaxis PONV incidence was higher in women with sternotomy, however it was similar in both genders with thoracotomy. Reduction of PONV incidence was statistically significant in all subgroups after implementation of prophylaxis protocol.

<table>
<thead>
<tr>
<th>PONV</th>
<th>Sternotomy (n= 226)</th>
<th>Thoracotomy (n=87)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>F (n=57)</td>
<td>M (n=56)</td>
</tr>
<tr>
<td>Pre-prophylaxis</td>
<td>21.3%</td>
<td>75%</td>
</tr>
<tr>
<td>Post-prophylaxis</td>
<td>4.5%</td>
<td>3.4%</td>
</tr>
<tr>
<td>p</td>
<td>0.001</td>
<td>0.000</td>
</tr>
</tbody>
</table>
**Conclusion.** Our prophylactic regimen significantly reduced the incidence of PONV. Due to its benefits to a high quality care of patients, this prophylactic regimen could be considered as part of a successful fast-track approach after cardiac surgery.

**REFERENCE**


**OP-162**

The effects of hydroxyethyl starch (130/0.4) as the priming solution on microcirculation in coronary bypass grafting (CABG) surgery

Banu Kılıçaslan1, Bilge Çelebioglu1, Hemra Çıl1, Meral Kanbak1,Can İnce1

1Hacettepe University, Faculty of Medicine, Dept. of Anesthesiology and Reanimation; 2Academic Medical Center (AMC) of the University of Amsterdam and Department of Translational Physiology, Department of Intensive Care, Erasmus Medical Center Rotterdam

**Introduction.** Hydroxyethyl starch (HES) solution is used as a priming solution in cardiopulmonary bypass (CPB) on adult patients but its effects on microcirculation is unclear. Thus, the present investigation was performed to compare the effects of RL and HES as the priming solutions on microcirculation in CABG surgery.

**Methods.** Following ethical committee approval and informed consent, 20 patients who underwent CABG surgery were included in this study. During CPB, Group RL received Ringer’s Lactate (n=10) and Group HES received HES (130/0.4) (n=10) as priming solution. Demographic, clinical and haemodynamic parameters were recorded. SDF imaging technique was used to evaluate the sublingual microcirculation. Haemodynamic variables (Ht, MAP, CVP, CO, PCWP), laboratory parameters (Htc, BUN, creatinine, lactate and K+) and microcirculatory variables (Total vascular density-TVD (mm/mm²), microvascular flow index-MFI (AU), perfused vessel density-PVD (mm²/mm²), proportion of perfused vessels-PPV (%) and heterogeneity of perfusion -PPVHI (%) of vessels were obtained after induction, before CPB, during CPB, at the end of the operation and at the 24th hour. These images have been analysed by usingAVA (Automated Vascular Analysis) software.

**Results.** In the two groups, changes in TVD and PVD values occurred during CPB period (p<0.05). In the HES group, small vessels of TVD from 15.75 (13.14-17.61) to 13.40 (7.55-15.49) and PVD from 15.05 (12.27-16.96) to 12.53 (7.24-15.20) were decreased. In the RL group, small vessels of TVD from 13.23 (8.86-17.76) to 9.98 (8.36-15.65) and PVD from 13.68 (9.88-18.01) to 10.68 (6.17-15.84) were decreased. While these parameters return to baseline values at the end of the surgery in the HES group, in the RL group, these changes remained until at the 24th hour. The PPV and PPVHI values did not change in both groups (p>0.05). MFI in small sized vessels in group HES were lower than in group RL (p<0.05) but these values did not affect in both groups at any time (p>0.05)

**Conclusion.** We concluded that HES (130/0.4) could be used as the CPB priming solution in patients undergoing cardiac surgery but it may have not some advantages to improve microcirculation.

**REFERENCES**


**OP-163**

Effects of colloid solutions on kidney integrity in cardiac surgery patients: a post-hoc analysis of a randomized study

Evgeny Forminskiy, Vladimir Lomivorotov, Gilev Moroz

Research Institute of Circulation Pathology

**Background & Aim.** There is a controversy regarding the effects of hydroxyethyl starches (HES) and gelatins (Gel) on kidney integrity in perioperative care. We performed a post-hoc analysis of data extracted from a randomized controlled trial.

**Methods.** Patients referred for coronary artery bypass grafting (CABG) surgery were included in this study. Following ethical committee approval and informed consent, 20 patients who underwent CABG surgery were included in this study. During CPB, Group RL received Ringer’s Lactate (n=10) and Group HES received HES (130/0.4) (n=10) as priming solution. Fluids were given from anesthesia induction up to the end of the CPB priming solution in patients undergoing cardiac surgery: effects of cardiopulmonary bypass and anesthesia. Ann Thorac Surg 2009;88:1396-1403.

**Results.** The rate of AKI was similar between the groups: 4 (13%) patients in Cryst group, 7 (24%) patients in Gel group, 3 (10%) patients in HES group (p=0.334). All of the patients had the 1st stage of AKI. Urine output on POD1 was significantly higher in Cryst group 4300 [3688–4975] ml compared to Gel group 3350 [2800–3975] ml and HES group 3550 [2863–4125] ml (p=0.002). There were no differences in peak sCr levels between the groups: 105±17 μmol -l-1 in Cryst group, 114±31 μmol -l-1 in Gel group, 110±24 μmol -l-1 in HES group (p=0.365). Patients in Cryst group had lower peak uNGAL concentration (10 [8-18] ng -ml-1) compared with patients in Gel group (22 [12-34] ng -ml-1) and HES group (17 [12-26] ng -ml-1; p=0.011). There were no differences in hemodynamics, the use of inotropic drugs and diuretics.

**Conclusion.** There were signs of more renal impairment caused by 4% gelatine and 6% HES 130/0.42 as compared with balanced crystalloid when fluid administration is targeted to optimise cardiac preload in CABG patients. Further studies are needed.

**OP-164**

Predicting renal failure in a single cardiac centre

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University Hospital of South Manchester, Wythenshawe UK

**Background & Aim.** Renal failure causes increased mortality and morbidity post cardiac surgery. We evaluated our perioperative management of renal failure patients to discover if patients requiring continuous veno-venous haemofiltration (CVVH) could have been predicted, factors which worsen their outcome, and whether they required renal support after discharge.
Methods. Retrospectively, we evaluated the preoperative variables of all cardiac surgery patients in the period March to May 2014. We applied Thakar’s [1] method of risk scoring. Patients who required renal support in the year 2013 were similarly evaluated, including postoperative variables. We compared the patients who required filtration with those who didn’t. Categorical parameters were compared using Fisher’s Exact tests. Continuous normally distributed data was analysed with two-sample t-tests, and non-normal data was analysed using Mann-Whitney U tests. Haemofiltration status was further analysed using a multivariable logistic regression model with forward selection method. It assessed inclusion of significant predictors (10% level) from the univariate analyses. We evaluated the CVVH group for determinants of increased ICU stay.

Results. In order of statistical significance factors differing between patient cohorts were pre-operative eGFR, ACE inhibitors, and Thakar Risk Score (p=0.049). eGFR (OR 0.960 per unit increase, p<0.001) and not taking ACE inhibitors (OR 0.311, p=0.014) were independently identified as negative predictors for requiring CVVH when adjusted for one another. There was a statistically significant association between day of commencement of CVVH and ICU length of stay. (p=0.001)

Conclusion. Patients that required CVVH were best predicted by a lower baseline eGFR and taking ACE inhibitors. Thakar score performed moderately well. A simple risk score with only two variables was produced, but this would require validation on a much larger scale. The association between day of CVVH and ICU length of stay suggests a benefit from early renal support for higher risk patients.

REFERENCE

<table>
<thead>
<tr>
<th></th>
<th>No CVVH</th>
<th>CVVH</th>
<th>p-value</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>(N=102)</td>
<td>(N=31)</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>21 (20.6%)</td>
<td>10 (33.3%)</td>
<td>0.152</td>
</tr>
<tr>
<td>Male</td>
<td>81 (79.4%)</td>
<td>20 (66.7%)</td>
<td></td>
</tr>
<tr>
<td>ACE Inhibitors Stopped</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>36 (35.3%)</td>
<td>22 (71.0%)</td>
<td>0.002</td>
</tr>
<tr>
<td>No</td>
<td>7 (6.9%)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>N/A</td>
<td>59 (57.8%)</td>
<td>9 (29.0%)</td>
<td></td>
</tr>
<tr>
<td>eGFR</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Median</td>
<td>75.0</td>
<td>54.0</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Bypass Time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>99.5</td>
<td>119.5</td>
<td>0.072</td>
</tr>
<tr>
<td>XClamp Time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>64.0</td>
<td>77.5</td>
<td>0.543</td>
</tr>
<tr>
<td>Thakar Risk Score</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-2</td>
<td>67 (65.7%)</td>
<td>9 (30.0%)</td>
<td>0.002</td>
</tr>
<tr>
<td>3-5</td>
<td>27 (26.5%)</td>
<td>17 (56.7%)</td>
<td></td>
</tr>
<tr>
<td>6-8</td>
<td>3 (2.9%)</td>
<td>3 (10.0%)</td>
<td></td>
</tr>
<tr>
<td>9-13</td>
<td>5 (4.9%)</td>
<td>1 (3.3%)</td>
<td></td>
</tr>
</tbody>
</table>
P-01

Individualized protamine dosing based on a computerized pharmacokinetic model

M.I. Meesters1, D. Veerhoek2, J.R. de Jong1, G. Kuiper1, C. Boer1

Department of 1Anesthesiology and 2Cardio-thoracic Surgery, Institute for Cardiovascular Research, VU University Medical Center

Introduction. Protamine has intrinsic anticoagulant properties and protamine dosing based on a fixed dosing ratio to heparin might overdose protamine impairing patient hemostasis. This study compared hemostasis of fixed ratio protamine dosing to protamine dosing based on a novel computerized pharmacokinetic (PK) model of heparin.

Methods. This case-control study included 109 patients undergoing elective cardiac surgery with CPB. In 56 patients protamine was dosed in a fixed ratio, while 63 patients received protamine based on the PK-model. Study parameters included delta activated clotting time (ΔACT = ACT after protamine minus preoperative ACT), aPTT, rotational thromboelastometry (INTEM and HEPTEM), blood loss and blood transfusion. Data was analysed by Student’s T-test or Mann Witney test.

Results. There was no difference in the amount of heparin administrated (414 ± 107 mg (fixed ratio group) vs. 403 ± 90 mg (PK-group); n.s.), whereas protamine dosing was considerably different with a protamine/heparin-ratio of 1.1 ± 0.3 for the fixed dosing ratio and 0.5 ± 0.1 for the PK-group, p < 0.001. The ΔACT values were different (+17 ± 77 s for the fixed ratio group and +6 ± 15 s for the PK-dosed group). Postoperative aPTT values were similar (42 ± 13 s vs. 43 ± 5 s; n.s.). Thromboelastometric data were prolonged in the routine practice group compared to the PK-group, INTEM clotting time (CT) 250 ± 76 s vs. 198 ± 32 s and HEPTEM CT 275 ± 105 vs. 198 ± 32 s (both p < 0.001). Median packed red blood cell transfusion (0 (0-2) vs. 0 (0-0)), fresh frozen plasma transfusion (1 (1-2) vs. 0 (0-0)) and platelet concentrate transfusion (0 (0-1) vs. 0 (0-0)) were different between the fixed ratio and PK group, respectively (all p < 0.001). Although postoperative hemostasis differed 24-hour postoperative blood loss did not differ between the fixed ratio and PK group, (389 (293-548) ml vs. 340 (243-525) ml; n.s.).

Conclusion. Patient-tailored protamine dosing based on a pharmacokinetic model resulted in a significant reduction of protamine dosing with better hemostasis and fewer blood product transfusion when compared to fixed ratio protamine dosing.

P-02

Anesthetic management of a patient with might mentricular mitipcardium moked cyst hydatid

Ömer Faruk Boran, Aykut Urfaloğlu, Mahmut Arslan, Gökçe Gişi, Bora Bilal, Hüseyin Yıldız, Hafize Öksüz

Kahramanmaraş Sütçü Imam University

Introduction. Cardiac echinococcosis is rare and medical treatment may be insufficient to prevent fatal complications. We aimed to share our perioperative management in a cardiac echinococcosis case.

Case. In transthoracic echocardiography and magnetic resonance examination of 14 years old and 48 kg in weight female patient; who admitted to the pediatric cardiology clinic with complaints of fainting, palpitations and fatigue, 8875 mm axial size cystic lesion that is in continuity with heart muscle in right ventricular was detected. Considered at ASA II risk group the patient was premedicated with iv midazolam, chlorphenoxamine, ranitidine, metoclopramide and methylprednisolone. After preoxygenation with 100 % O2, anesthesia was induced with propofol 2mg/kg, fentanyl 3 mcg/kg and rocuronium 0.6 mg/kg. The patient was intubated at the first attempt and a right internal jugular vein catheter was inserted under ultrasound-guided. After the Allen test, radial artery was canulated. After median sternotomy and establishing aortobicaval cannulation and cardiopulmonary bypass, cross-clamping was applied. After perfusion started, the heart was arrested with cardioplegia. Then, cyst was entered with a transverse incision and the contents of the cyst were aspirated and washed with hypertonic saline simultaneously and germinative membrane was removed. Right ventricular epicardium was closed and cross clamp was removed. For postoperative analgesia 0.1 mg/kg morphine was given. After 22 hours, the patient was extubated and she was discharged on the postoperative 5th day.

Discussion. Cardiac cyst hydatid is an emergency situation that must be diagnosed and treated as soon as possible. The opening of the cyst in heart chambers and the pericardium may lead to fatal complications. Cyst fluid has highly antigenic properties and with the spread during the surgery, it can cause complications ranging from a benign urticaria to anaphylaxis. (1-2) The implementation of H1 and H2 receptor blockers in advance is recommended to minimize the changes due release of the cyst contents into circulation during the operation. The benzodiazepine and corticosteroids may also be helpful in preventing the effects related to histamine release (3).

REFERENCES


P-03

Intracoronary administration of levosimendan in acute coronary syndrome with decreased left ventricular ejection fraction: a case series

Vjera Marinov, Nenad Karanovic, Mladen Carev, Dubravka Kocen, Mihajo Lojpur, Zdenko Covic

University Hospital Center Split

Introduction. In patients (pts) undergoing cardiac surgery, intracoronary (IC) administration of levosimendan can provide optimal regional distribution, enabling favourable effects (cardioprotective and positive inotropic), and avoiding potentially harmful systemic
hypotension. This may be beneficial in ischemic heart disease and reduced left ventricular ejection fraction (LVEF).

**Methods.** Our first case was done in an urgent manner due to acute myocardial stunning during the weaning from cardiopulmonary bypass (CAB), in an acute ST-segment myocardial infarction (STEMI). The result was lifesaving. We continued with the method in several cases with acute STEMI or unstable pectoral angina (AP). Urgent coronary artery bypass grafting (CABG) was performed as "on-pump" or "off-pump" (OPCAB) procedure. Levosimendan was administered as intraoperative bolus (125-250 μg), in each coronary artery graft. Intravenous (IV) infusion (0.1-0.2 μg - kg\(^{-1}\) - min\(^{-1}\)) was continued for 24-48 h, with continuous IV infusion of norepinephrine (0.1 mg - ml\(^{-1}\)), if needed. Cardiac function was objectied with LVEF (%) (Teicholz, transoesophageal echocardiography), thermodilution cardiac index (CI) (ml - m\(^{-1}\)) and systemic vascular resistance (SVR) (dynes - sec - cm\(^{-5}\)). Time to extubation, ICU and hospital discharge was expressed in postoperative days (POD).

**Results.** Comparing immediate preoperative and postoperative CI, SVR, and LVEF values, IC administration of levosimendan exerted prompt improvement of hemodynamics and cardiac contractility. We observed 6 pts (4 females, 2 males). There were 3 acute STEMI with CABGx3, and 3 unstable AP, 1 with CABGx2, and 2 with OPCABx3. Immediate preoperative and postoperative values of LVEF, CI, and SVR, were 22-46%, 1.6-3.3 ml - m\(^{-2}\), and 1043-1738 dynes - sec - cm\(^{-5}\), vs. 39-60%, 2.9-3.9 ml - m\(^{-2}\), and 679-1264 dynes - sec - cm\(^{-5}\), respectively. Time to extubation, ICU and hospital discharge were between POD 1-3, 2-6, and 7-18, respectively.

**Discussion.** We administered IC levosimendan in ischemic myocardium with decreased LVEF, aiming for local drug spread to ensure faster and effective manifestation of beneficial drug effects. Because of surgical revascularization and continuous IV infusion, we are not able to define exact contribution of IC administration to the final outcome. However, we consider IC administration of levosimendan a promising method for improvement of decreased cardiac function in acute onset of cardiac ischemia.

P-04

**The relationship between changes in meteorological parameters and the outcome of paediatric cardiac surgery**

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\(^1\)Semmelweis University, School of Doctoral Studies, \(^2\)Szent István University, \(^3\)Hungarian National Meteorological Survey, \(^4\)Gottsegen Hungarian Institute of Cardiology, \(^5\)Semmelweis University, Department of Anaesthesiology and Intensive Therapy

**Background & Aim.** Recently several associations have been discovered regarding the effects of meteorological parameters on cardiovascular diseases. Previous studies often concentrated on arbitrarily defined rare and sudden changes in weather. Our aim was to investigate the most susceptible patients and to explore the effects of the degree of changes in dynamic parameters on outcomes of paediatric cardiac surgery.

**Methods.** We retrospectively analysed the data of 1665 consecutive paediatric patients undergoing open-heart surgeries. Meteorological data was obtained via the national survey database. Parameters used included daily temperatures, barometric pressure, wind speed, and relative humidity. Daily meteorological variables were analysed up to a week preceding surgery and 3 postoperative days were recorded for major outcomes. For statistical analysis, model-based recursive partitioning was applied using the ‘party’ package of the R Statistical Environment. Fitting a logistic regression model assessed the effect of a certain parameter on the outcome, whereas the influence of patient age and operation complexity was learned by recursive partitioning.

**Results.** In patients 139 to 419 days old, the change of average temperature between the first preop. day and the day of surgery was associated with higher risk of postop. infection (odds increases by 22% with every Δ C, 95%CI: 6.8%-39.6%). In patients 448 to 1432 days old, undergoing more complex surgeries, the change of average relative humidity between the first preop. day and the day of surgery was associated with higher risk of postop. pulmonary complications (odds increases by 8% with 1% growth in humidity, 95%CI: 1.5%-15.6%).

**Conclusion.** While there are empirical data on the effects of the weather on human physiology, the mechanisms and causative relationships are yet to be discovered. We used a statistical framework capable of evaluating changes in parameters and showed the effects of meteorological variables on outcomes in an otherwise multifactorial setting. Our results suggest, that meteorological parameters might play an important role in the planning of paediatric cardiac surgeries.

P-05

**Comparison of human albumin solution vs standard solutions in ICU post-cardiac surgery**

Christopher McGinley

Adarsh Lal, Golden Jubilee National Hospital, University of Dundee

**Background/Aim.** To compare Human Albumin Solution (HAS), Alburex 5, vs standard solutions, determine any physiological differences in the patient groups post-cardiac surgery and evaluate financial implications for the Golden Jubilee. National Hospital. HAS is licensed in the UK for “restoration and maintenance of circulating blood”. A Cochrane systematic review in 2011 comparing HAS vs. Standard solutions concluded that for hypovolaemia there is no evidence that HAS reduces mortality. Alburex costs £35, has a pH of 6.4-7.4 and the chloride content is 150 mmol/L. Standard solutions cost £2-6, pH (7.4 - 6.5) and chloride content of 103-111 mmol/L.

**Method.** A retrospective study of 50 patients admitted to ICU postcardiac surgery who received HAS as part of fluid therapy within 24 hours of admission. A control group of 50 patients who did not receive HAS were selected on a surgical case for case match. The most significant result for each biochemical parameter was documented for analysis.

**Results.**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>HAS</th>
<th>Control</th>
<th>HAS</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid Balance (0-24hrs) (ml)</td>
<td>1387</td>
<td>1553</td>
<td>±181.58</td>
<td>±193</td>
</tr>
<tr>
<td>Base Excess (mEq/L)</td>
<td>-2.33</td>
<td>-0.702</td>
<td>±0.85</td>
<td>±0.83</td>
</tr>
<tr>
<td>Creatinine (μmol/L)</td>
<td>106.7</td>
<td>101.2</td>
<td>±10</td>
<td>±10.6</td>
</tr>
<tr>
<td>Lactate (μmol/L)</td>
<td>2.73</td>
<td>2.804</td>
<td>±0.41</td>
<td>±0.31</td>
</tr>
<tr>
<td>Choline (mmol/L)</td>
<td>111</td>
<td>109.8</td>
<td>±0.88</td>
<td>±0.94</td>
</tr>
<tr>
<td>Total Volume of Fluids (0-24hrs) (ml)</td>
<td>2684</td>
<td>3012</td>
<td>±225</td>
<td>±220</td>
</tr>
<tr>
<td>No. patients receiving Blood Products</td>
<td>11</td>
<td>18</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Volume Blood Products (ml)</td>
<td>561.9</td>
<td>782.6</td>
<td>±139</td>
<td>±122</td>
</tr>
<tr>
<td>Chest drain output 4hrs (ml)</td>
<td>251.9</td>
<td>391</td>
<td>±50</td>
<td>±67.6</td>
</tr>
<tr>
<td>Chest drain output 24hrs (ml)</td>
<td>612.2</td>
<td>740</td>
<td>±84.3</td>
<td>±96.4</td>
</tr>
</tbody>
</table>
Conclusion. Patients receiving HAS appear to have metabolic acidosis, marginally increased creatinine and chloride levels, with minimal change to Lactate and fluid balance. The metabolic acidosis is likely due to the chloride content of HAS. According to the Stewart hypothesis, hyperchloraemia is implicated in the pathogenesis of metabolic acidosis. The volume of blood products required for HAS patients was considerably less, and fewer required transfusions. Chest drain output was less in HAS patients at both 4 and 24 hours post-operatively. A meta-analysis with comparable variables concluded similar results. However, many variables are implicated in post-operative bleeding. HAS patients cost on average £90 for the first 24 hours of fluid therapy, and the control group cost £15-20, so it does not seem a financially justifiable alternative. Further prospective study is required in monitoring the peri-operative care of patients to review theories in the current literature.

REFERENCE
NTG or a different vasodilator. The first measurement was after transecting the LIMA, the second just before or just after starting bypass.

Figure 1: search results.

Results. Data from five RCT’s were analyzed (N=140). Median Oxford score was 1.8. The use of systemic NTG resulted in a significant increase in blood flow of the LIMA (p < 0.00001). In the postoperative period measurements of blood flow and documentation of myocardial ischemia were not performed.

Conclusion. Application of systemic nitroglycerine in the pre-bypass period of CABG-surgery improved the LIMA's blood flow. Postoperative data however is not available and documentation of myocardial ischemia due to LIMA vasospasm was lacking, which supports the need for further trials in this field.

Poster Session 2
Wednesday, June 24, 2015
1:00 p.m.-2:00 p.m., Poster Exhibition Area

P-07

Sevoflurane and isoflurane – pharmacokinetics and cardioprotective effects during cardiopulmonary bypass

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1Department of Anesthesia and Intensive Care Medicine, University Hospital Basel, Basel, Switzerland, 2Milton S Hershey Medical Center, Hershey, PA, USA, 3Institute of Hygiene and Environmental Medicine, RWTH Aachen, Aachen, Germany, 4Division of Cardiac Surgery, Department of Surgery, University Hospital Basel, Basel, Switzerland, 5Institute of Medical Informatics, Statistics and Epidemiology, University Leipzig, Leipzig, Germany, 6Division of Clinical Pharmacology and Toxicology, University Hospital Basel, Basel, Switzerland

Background. The use of volatile anaesthetics in cardiac anesthesia is very common. They offer two main advantages: First they protect cardiomyocytes against hypoxic conditions, what readily occurs while the aorta is cross clamped for coronary artery bypass graft surgery. They have a very rapid onset of effect while ensuring a sufficient depth of anesthesia. On the other hand they are rapidly eliminated independent of the patients liver- or kidney-function thus favoring an early postoperative extubation. The aim was to describe the pharmacokinetics of the volatile anaesthetics during cardiopulmonary bypass

Methods. 31 Patients undergoing coronary bypass graft surgery by the use of a heart-lung machine type minimized extracorporeal circulation were prospectively enrolled. They were randomly assigned to anaesthesia maintenance during

ECC with sevoflurane or isoflurane. We also measured the release of troponine, time to extubation, length of hospital stay and the 30 day mortality.

Results. 30 Patients completed the protocol. The half-life period in the arterial line during wash in was 1.09 ± 0.11 min for isoflurane respecticely 0.83 ± 0.12min for sevoflurane, during washout 1.21 ± 0.28 min and 1.04 ± 0.24 min. Direct postoperative high sensitive troponin concentration of the isoflurane group was 0.156 ± 0.091 μg/ml and 0.355 ± 0.312 μg/ml on the
first postoperative day, the measurements of in sevoflurane group were 0.222 ± 0.116 μg/mL and 0.225 ± 0.111 μg/mL. There was no significant difference between the two volatile anaesthetics. Time to extubation was 8.6 (5.3-10.4) hours in the isoflurane group and 7.8 (6.6-9.3) hours in the sevoflurane group (p=0.1), length of hospital stay was 7 (6-8) days and 7 (7-9) days (p=0.234).

Conclusion. In this study we found the half – life period of sevoflurane was about 25% shorter than the half-life period of isoflurane in the arterial line during wash-in and wash-out. There were no differences in postoperative high sensitive troponin levels, even no differences in length of intubation length of hospital stay, respectively 30 day mortality between the isoflurane and the sevoflurane group.

REFERENCE

P-08
Macromolecule administration favors fluid restrictive strategy during cardiac surgery, but causes bleeding, transfusion requirement and haemodynamic support after surgery
G. Samarani, N. Zeroual, J. Villard, R. Ruiz, F. Gourcerol, P. Colson
Department of Anesthesia and Intensive Care D, CHRU Montpel-lier, France

Introduction. Fluid management strategy during cardiac surgery is currently made using crystalloids as well as colloid preparations. However, macromolecule solutions has been associated with no improvement compared to crystalloids as well as complications, like impaired renal function in sepsis patients and bleeding. Impaired renal function was also confirmed for cardiac surgery patient. We designed a study in order to understand if a fluid therapy restrictive to crystalloids only would have influenced intraoperative management and immediate postoperative clinical outcome in cardiac surgery patients.

Matherials and Methods. We carried out an observational, retrospective study. We systematically included adult patients undergoing cardiac bypass with or without a valve surgery for seven months. Non-inclusion criteria were kidney failure requiring dialysis, emergency surgery, platelets <100000/mm³, coagulation impairment. Fluid therapy was performed using crystalloids only (OFF Colloids group). The control group (Colloids group) included patients undergoing the same kind of surgery, consecutively operated during a period of two months, when fluid management strategy had no restriction on colloids utilization, and had at least 500 ml HEA (130/0.42/0.8, 6%) infused as part of the cardiopulmonary bypass (CPB) priming. Per and postoperative fluid therapy, bleeding, transfusion rate, vasopressors use, renal function, mechanical ventilation time were measured. Statistical analysis was performed with Mann-Whitney test for non parametric data (presented as median +/-25-75 percentile) and with Chi squared test with Yates correction or exact Fisher test (presented as percentages, OR and RR(95% confidence interval).

Results. 52 patients were included in the OFF Colloids group and 51 in the Colloids group. Peroperative fluid volume was significantly higher in the OFF colloids group compared to Colloids group (4650 ml (4250-5750) OFF Colloids versus 3000 ml (2500-3500) Colloids; p < 0.01). However, hemodilution was not significantly different between the two groups (Hemoglobin 8.5 g/dl (7-9.9) for OFF Colloids vs. 8.6 g/dl (7,4-9.4) for Colloids at nadir CPB and 10 g/dl (9.5-11.2) vs. 10,4 g/dl (9,4 – 11,3) after CPB p > 0.2), as well as diuresis (1 ml/Kg/h (0.8-1.6) vs. 1 ml/ Kg/h (0.6-1.7); p > 0.2), transfusion rate (13.3% vs. 13.4%; p > 0.2) and vasopressors utilization (30% vs. 27%, p > 0.2). However, during the immediate postoperative period, fluid volume was higher in Colloids group (750 ml (0-1000) vs. 500 ml (0-687); p = 0.04). Moreover, bleeding was significantly higher in patients from the Colloids group (715 ml (555-995) versus 620 ml (500-785); p = 0.03). Mechanical ventilation time in patients from the Colloids group was also significantly higher (620 min (540 – 720) vs. 540 min (480 – 618); p = 0.02), as well as vasopressor utilization (28% vs. 10%, OR 0,18(0,03-0,9); RR 0,31(0,08-1,15); p = 0.03). No difference in renal function was found (48 hours creatinine gap +0,4mg/dl (0,3 – 0,8) vs. +0,2mg/dl(0,2-0,7); p > 0,2; diuresis 0,8 ml/Kg/h (0,6-1,1) vs. 0,7 ml/Kg/h (0,6-0,9); p > 0,2).

Conclusions. Peroperative use of macromolecule for fluid administration results in less volume administered during surgery but without effect on plasma hemoglobin level and transfusion requirement. Conversely, macromolecule use is associated with more bleeding and transfusion immediately after surgery. These results suggest that the short term benefic effect during surgery of HEA on hemodynamic (less fluid given) is challenged by secondary deleterious effect on bleeding and transfusion.

REFERENCES

P-09
Does off pump coronary artery bypass (OPCAB) surgery reduces transfusion requirements?
O. Jansoniene, F. Caliandro, H. Day, C. Walker, L. Kuppurao
Harefield Hospital. Royal Brompton & Harefield NHS Foundation Trust, London

Background & Aim. Cardiac surgery is one of the biggest consumers of blood and blood products. Blood transfusion is not without hazards, increasing the risks of infection, length of stay (LOS) in ICU and hospital, multi organ dysfunction and death. (1) The aim of our study was to find out whether OPCAB reduces transfusion requirements compared to on pump CABG. Methods. Patient demographics, EuroSCORE, preop Hb and platelet count, transfusion requirements during first 48hrs of surgery were collected for all patients underwent CABG in the year of 2013.
Results. 500 patients underwent CABG (269 OPCAB, 131 On pump) during the study period. There was no difference in the baseline characteristics between these two groups. Transfusion data is given below. (Diagram 1).

![Diagram 1: Transfusion of blood and blood products during CABG](image)

Conclusion. OPCAB reduces the requirement of Fresh Frozen Plasma (FFP) and platelet but not red cell transfusion compared to on pump CABG. Red cell transfusion was consistently higher in patients undergoing urgent and emergency CABG.

REFERENCE


P-10

Validation of viscoelastic coagulation tests with TEG and ROTEM during cardiopulmonary bypass

Erik Ortmann1, Antonio Rubino1, Balsam Altemimi1, Timothy Collier2, Martin W. Besser1, Andrew A. Klein1

1Papworth Hospital, Cambridge, UK, 2London School of Hygiene and Tropical Medicine, London, UK

Background & Aim. Visco-elastic point-of-care tests such as TEG and ROTEM are increasingly used to guide haemostatic therapy after cardiac surgery. Their use during cardiopulmonary bypass (CPB) has the potential advantage of earlier information about haemostasis allowing the preparation of blood products. However, testing during CPB might be affected by heparinization and its reversal with protamine and has not been validated (1). The aim of this study was to assess the clinical utility of visco-elastic coagulation tests during cardiopulmonary bypass to predict post-bypass coagulation status and to guide therapy.

Methods. In this prospective study, TEG and ROTEM tests were performed in fifty-two adult patients undergoing elective cardiac surgery at two time points: near the end of cardiopulmonary bypass (on-CPB) and after heparin reversal with protamine. Information about coagulation was collected in the laboratory (hemochron Microcoagulation Systems1 using ACT-+ or ACT-LR cartridges).

Results. ACT was prolonged in a concentration dependent way towards the end of cardio-pulmonary-bypass which was well outside a clinically acceptable difference. For intrinsically activated tests, clotting times were different and outside the pre-specified limit on TEG (p<0.01) but not on ROTEM (p=0.67), while clot strength was well within the clinical limit on both devices (≥94% of patients). For extrinsically activated tests, clotting time was different on ROTEM (p<0.01) but not on TEG (p=0.24), but both were within the clinical limit. The clot strength was different on TEG (p<0.01) but not on ROTEM (p=0.57) while both were within the pre-specified limit in 98% of patients.

Conclusion. Results from TEG and ROTEM tests performed towards the end of cardio-pulmonary-bypass are clinically comparable to results after reversal of heparin. Amplitudes indicating clot-strength were the most stable parameters across all tests whereas clotting times showed more variability. In contrast laboratory testing of fibrinogen using the Clauss assay was essentially invalid during cardiopulmonary bypass.

REFERENCE


P-11

Impact of dabigatran, rivaroxaban, apixaban and edoxaban on activated clotting time: an in vitro study

Anne-Sohie Dincq1, Jonathan Douxfils2, Maximilien Gourdin1, Jean-Michel Dogné2, Bernard Chatelain1, François Mullier3, Sarah Lessire1

1Catholic University of Louvain, 2University of Namur

Background. Activated clotting time (ACT) is used to monitor anticoagulation by unfractionated heparin in patients undergoing catheter ablation for atrial fibrillation regardless of the preprocedural anticoagulation. It is recommended to achieve and maintain an ACT between 300- 400 s1.

Aim. To study the impact of Non Vitamin-K antagonist oral anticoagulants (NOACs) on ACT using 3 different assays.

Methods. A catheter was placed in the antecubital vein from one healthy donor to ensure that the delay between the blood sampling and the experiment was always within 30 seconds. The 4 NOACs were spiked at increasing concentrations from 0 to 1000ng/mL. ACT was measured in the local laboratory (homemade ACT) or at bedside on the Hemochron Microcoagulation Systems1 using ACT-+ or ACT-LR cartridges.

Results. ACT was prolonged in a concentration dependent way with the 4 NOACs. ACT is more sensitive to dabigatran followed by rivaroxaban, edoxaban and lastly apixaban. The results were similar in the two replicates at subtherapeutic, therapeutic and supratherapeutic peak concentrations of NOACs. The ratios between homemade ACT at 100ng/ml and 0 ng/ml were 1.8, 1.3, 1.1 and 1.0 for dabigatran, rivaroxaban, edoxaban and apixaban, respectively. At 50ng/ml NOACs have no or minor influence on ACT-+, ACT-LR and homemade ACT (ratio: 1.1-1.2). For supratherapeutic (>400 ng/ml) concentrations, ACT-+ is more sensitive than ACT-LR.

Conclusion. Maintaining NOACs until catheter ablation leads to residual NOACs concentrations that may influence ACT, depending on the delay since the last intake. The current international guidelines focusing on the ACT should be adapted to the use of the different NOACs.
Background & Aim. The respiR8® monitor is a novel device measuring respiratory rates (RR) accurately by quantifying the humidity of exhaled air. So far this monitor has been assessed in volunteers and in patients after abdominal surgery (1). The aim of this observational audit was to assess the frequency of abnormal breathing patterns after cardiac surgery with the respiR8® monitor.

Methods. A series of patients undergoing cardiac surgery age 60 years and above were connected to the non-invasive respiR8® monitor for up to 5 hours after extubation. We recorded postoperative apnoea (10s of no breathing activity or a RR ≤6 breaths/min), tachypnea (≥18 breaths/min), bradypnoea (≤10 breaths/min), max/min RR and oxygen saturation (SatO2) every 10min during the first hour and every 30min thereafter.

Results. 9 patients undergoing bypass and/or valve surgery were studied. All patients were extubated within 6hrs post-operatively, and monitored with the respiR8® monitor within two hours for a median of 2.5hrs (range 2-4.5hrs). 7 patients developed at least one episode and 6 patients at least 5 episodes of postoperative apnoea. All patients had at least 2 episodes of postoperative tachypnea with a median max RR of 31 (range 27-36 breaths/min). One patient showed one episode of SatO2 below 90%.

Discussion & Conclusion. Current clinical practice for measurements of postoperative RR includes ECG recorded chest excursions, which can be misleading as it may indicate a RR without gas movement. Pulse oximetry may only be a late indicator of hypoventilation. However, irregular breathing patterns postoperatively are essential clinical signs for optimizing postoperative clinical care.

We have demonstrated in a small case series that post-operative irregular breathing patterns after cardiac surgery occur frequently in the majority of patients.

REFERENCE
anaesthesia monitor. It uses processed electroencephalo-
gram signals to produce a dimensionless number which represents the depth of anaesthesia. NAP 5 found that
anaesthetists use depth of anaesthesia monitors in approxi-
mately 2.8% of cases overall and in 23% of cases involving
TIVA with neuromuscular blockade.

**Objectives.** The objective of this audit was to review the use of BIS monitoring at a specialist cardiothoracic hospital (Royal Brompton Hospital).

**Methods.** We conducted a prospective audit of all patients who underwent a surgical procedure under general anaesthesia from November 2014 to February 2015. Data were collected from the electronic database and included:

1. Surgical procedure
2. Anaesthetic technique
3. Use of BIS
4. Timing of BIS monitoring (pre- or post-induction)

**Results.** A total of 481 patients were included in the audit. 282 patients (59%) received inhalational anaesthesia with end-tidal monitoring while 199 patients (41%) received TIVA. All patients received neuromuscular blocking drugs. BIS monitoring was used in 189 patients (39% overall) and in 95 patients (48%) who received TIVA. Of the patients who had BIS monitoring, 23% had it in place prior to induction of general anaesthesia.

**Conclusions.** Cardiothoracic anaesthesia is associated with a higher risk of accidental awareness. This may be the result of conservative anaesthetic doses, opioid-based anaesthesia and altered pharmacokinetics of anaesthetic drugs during cardiopulmonary bypass. Royal Brompton Hospital performs extremely well in terms of BIS use, when compared with the NAP figures.

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**P-15**

A 5-year-single-centre experience: outcome after continu-
ous renal replacement therapy (CRRT) for acute renal failure
following cardiac surgery

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**Background & Aim.** Acute kidney injury following cardiac surgery is multi-factorial and results in significant morbidity and mortality. We aim to review the outcome of patients receiving CRRT for renal failure following cardiac surgery.

**Methods.** We conducted a prospective audit for 5-years in the Cardiac Surgical Intensive Care Unit, Royal Victoria Hospital, Belfast, UK. We recorded perioperative demographics, reasons for development of renal failure, commencement and duration of CRRT, renal recovery, need for continuing intermittent haemo-
dialysis (IHD) and 30-day mortality. Those continuing on IHD were followed up for 90 days

**Results.** From February 2008 to March 2014, 5200 adult cardiac surgeries were performed. Of these, 281 patients required CRRT post-operatively. The reasons recorded singly or in combination were preoperative renal impairment (32.9%), acidosis & rising lactates (27.2%), bleeding requiring high transfusion requirements (17.2%), deteriorating renal profile (14.9%) and overload (4.2%). Of the patients who received CRRT, 134 (51.3%) made complete renal recovery, while 60 died (23%) within 30 days. The remaining 67 (25.7%) patients transitioned to IHD of which 29 (43.3%) made complete renal recovery and 4 died (6%) within 1 month, 34 (50.7%) required permanent IHD while further 7 (20.6%) died in next 60 days making 90-day mortality of 11 (16.4%).

**Conclusion.** Firstly, incidence of requiring CRRT was 5%. Secondly, the half of them made complete renal recovery within 30 days. Finally, for patients who transitioned from CRRT to IHD, outcome was less good. Our outcomes are consistent with reported mortality rates in literature [1].

**REFERENCE**


**P-16**

Regional cerebral oxygen desaturation measured by near-
infrared-spectroscopy is not a reliable indicator for cerebral outcome after aortic arch surgery

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**Background & Aim.** In this retrospective study in adults the relationship between intraoperative regional oxygen cerebral (de) saturation (rScO2) and the incidence of neurological deficit (stroke, delirium) after aortic arch surgery was investigated.

**Methods.** From 2010 to 2012 all patients undergoing aortic arch surgery with bilateral antegrade selective cerebral perfusion during deep hypothermic circulatory arrest at 20 C were included. Before induction of anaesthesia bilateral NIRS sensors (INVOS 5100, Somanetics, Troy, USA) and one EEG sensor (BIS, Aspect Medical, Norwood USA) were placed on the forehead routinely. Relative values of bilateral rScO2, BIS, cardiac index, mean arterial pressure, pulse rate, arterial oxygen saturation, mixed venous oxygen saturation, haemo-
tocrit and blood temperature were monitored continuously during surgery. Cumulative values of rScO2 decrease > 20% of baseline (min%) captured as the area under the curve (AUC) were calculated¹. Analysis of variance for repeated measure-
ments (ANOVA) was used for comparison of rScO2 values at different time points and logistic regression analysis and t-test to assess associations between NIRS measures and cerebral outcome.

**Results.** 53 adult patients were analysed. 49 (92.5%) patients suffered aortic dissection Stanford Type A/DeBakey Type I and four patients DeBakey Type II. Eleven (20. 6%) patients
developed stroke of varying degrees. Two patients in the stroke (group N) and four in the non-stroke group (group C) died. In both groups demographic and procedural data such as duration of surgery, CPB, cumulative cross clamp, deep hypothermic cardiac arrest, selective antegrade cerebral perfusion and reperfusion were not significantly different. Post-operative delirium was significantly more frequent in the stroke group (90.9%) compared to the non-stroke group (33.3%). No significant difference was found for rScO2 value decrease > 20% from the baseline, rScO2 < 50% from the baseline and for rScO2 AUC in both hemispheres between the groups (Table 1).

Conclusion. Regional oxygen cerebral desaturation measured by NIRS is no reliable indicator for neurological outcome after aortic arch surgery in adults.

<p>| Table 1 Intraoperative data of cerebral monitoring, data are expressed as number (%) or mean±SD |
|-------------------------------------------------|------------------------|------------------------|</p>
<table>
<thead>
<tr>
<th>Group N</th>
<th>Group C</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>rScO2 right &gt; 20%</td>
<td>11 (100)</td>
<td>36 (85.7)</td>
</tr>
<tr>
<td>rScO2 left &gt; 20%</td>
<td>11 (100)</td>
<td>39 (92.9)</td>
</tr>
<tr>
<td>rScO2 right &lt; 50%</td>
<td>8 (72.7)</td>
<td>31 (73.8)</td>
</tr>
<tr>
<td>rScO2 left &lt; 50%</td>
<td>8 (72.7)</td>
<td>33 (78.6)</td>
</tr>
<tr>
<td>rScO2 AUCright, %min</td>
<td>2028 ± 1895</td>
<td>132 ± 1712</td>
</tr>
<tr>
<td>rScO2 AUCleft, %min</td>
<td>2395 ± 1908</td>
<td>1727 ± 1803</td>
</tr>
<tr>
<td>BIS rise, min</td>
<td>96 ± 60</td>
<td>92 ± 53</td>
</tr>
</tbody>
</table>

P-17

Neutrophil lymphocyte ratio as a mortality predictor following hypoplastic left heart surgery

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Introduction. Hypoplastic left heart syndrome has a high mortality pathology which requiring early diagnosis and early surgical intervention in congenital heart disease. There are vast numbers of reports in the literature about the biomarkers of inflammation and their association with cardiovascular risk(1). The neutrophil lymphocyte ratio (NLR) is such a measurement instrument and it has been determined to be potentially useful biopredictor of inflammation in cardiovascular disease(2). In this study, we aimed to investigate the newly introduced inflammatory biomarker, neutrophil/lymphocyte ratio, as mortality predictor following operations for hypoplastic left heart syndrome.

Methods. Between May 2011-August 2014 38 patients who underwent operations for hypoplastic left heart syndrome in our clinic was prospectively analyzed. The baseline characteristics of the patients and and preoperative neutrophil lymphocyte ratio were determined. The primary endpoint was all-cause mortality.

Results. 15 patients(39.5%) died of whom 5 deaths occurred during the first day. Univariate analyses revealed a significant difference in the preoperative neutrophil lymphocyte ratio between the groups in which mortality was seen and the group in which no mortality was observed (p<0.001). The receiver operating characteristic (ROC) curve showed a threshold value of 2.57 for neutrophil/lymphocyte ratio (AUC=0.74 sensitivity: %78, specificity: %65). Logistic regression analysis of the variables with significant differences between groups revealed that the neutrophil/lymphocyte ratio ratio over its threshold value was an independent predictor for mortality(OR:5.5, 95 %CI 0.7-9.5 p=0.007).

Discussion. Markers of inflammation can provide information about the prognosis of acute heart failure. Lymphocyte and neutrophil counts are markers and may vary depending on the severity of inflammation. Lymphopenia is a common finding during stress responses due to increased levels of corticosteroids and lymphocyte apoptosis(3). The lymphocyte count is reduced in patients with different cardiovascular disturbances. Reported that the baseline white blood cell count is an independent predictor of mortality in patients with left ventricle dysfunction(4). Both elevated neutrophil count and reduced lymphocyte count may be associated with poor cardiovascular prognosis. Thus, NLR can be used as a prognostic marker. NLR is simple, cheap, rapidly available and independent indicator of short and long term mortality following operations for hypoplastic left heart syndrome.

REFERENCE

1. Kussmann BD, Relationship of intraoperative cerebral oxygen saturation to neurodevelopmental outcome and brain magnetic resonance imaging at 1 year of age in infants undergoing biventricular repair, Circulation 20:245-254, 2010

REFERENCES


P-18

Effect of blood transfusion strategy on mortality in cardiac surgery: a meta-analysis of randomized controlled trials

Evgery Forniskiy, Martina Crivellari, Laura Pasin, Gianluca Paternoster, Luca Lucchetta, Alberto Castella, Fabrizio Monaco, Giovanni Landoni, Alberto Zangrillo

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Background & Aim. The existing evidence supports the use of restrictive strategy in blood management in a variety of medical
conditions. The last meta-analysis of randomized controlled trials (RCTs) in heart surgery did not show any association between transfusion trigger and change in adverse events including mortality [1]. However, contemporary RCTs revealed contrary results. The aim of this study was to compare the longest follow-up mortality of restrictive and liberal blood transfusion strategies in adult cardiac surgery patients by meta-analysis of RCTs.

Methods. Studies were identified in PubMed, The Web of Knowledge, Transfusion Evidence Library, and ClinicalTrials.gov databases from January 2000 to March 2015 by two researchers independently. Inclusion criteria were RCTs comparing liberal and restrictive transfusion triggers in adult cardiac surgery and evaluating mortality. Data were analysed according to the intention to treat. Mantel-Haenszel method with random-effects analysis model was performed using RevMan 5 software.

Results. Two conference proceedings were excluded due to the lack of the necessary information. Five trials randomizing 2,670 patients were included. The overall analysis showed that the use of liberal transfusion strategy was associated with a statistically significant reduction in the longest follow-up mortality compared with liberal strategy (40/1,339 [3.0%] in the liberal group versus 61/1,331 [4.6%] in the restrictive group; Odds Ratio, 1.55; 95% CI, 1.03–2.33; p = 0.04). There was no heterogeneity between trials (p = 0.49; I² = 0%).

Conclusion. The use of liberal blood transfusion strategy may reduce the longest follow-up mortality in cardiac surgery patients.

REFERENCE


Best Poster Presentations
Friday, June 26, 2015
11:00 p.m.–12:00 p.m., Room G3

BP-1

Experimental ex-vivo lung perfusion with sevoflurane: effect on donors after circulatory death (DCD) lung grafts in a rodent model

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Purpose. Ischemia-reperfusion injury is a key mechanism of graft damage during lung transplantation, which could be targeted by therapies applied during ex-vivo lung perfusion (EVLP). The inhalational anaesthetic Sevoflurane was found to protect to some degree against ischemia-reperfusion injury1. In this experimental study we wanted to determine the therapeutic potential of volatile Sevoflurane added to the perfusate during EVLP of damaged lung grafts.

Methods. Two groups of 6 Sprague-Dawley rats were used. After cardiac arrest and a warm ischemic time of 1 hour the lungs were flushed with cold Perfadex®; harvested and kept for 2 hours at 4°C. Normothermic EVLP during 3 hours was performed using a customized circuit primed either with Steen solution; only (control group) or supplemented within the first 30 minutes of EVLP with a gas mixture containing 2% of sevoflurane (treatment group). Differential oxygen partial pressures in the perfusate (Δvapo2), pulmonary artery pressure (PAP), vascular resistance (PVR), lung compliance (LC), peak airway pressure (PAWP) and lung weight gain (WG) were measured. At the end of EVLP, protein and lactate dehydrogenase (LDH) levels were determined in bronchoalveolar lavage (BAL) and interleukin-6 (IL-6) and protein carbonyl (index of oxidative stress) were measured in lung tissue.

Results. Normothermic EVLP of lungs harvested after warm ischemia resulted in markedly declined Δvapo2, LC, and elevated PAP, PVR, PAWP, WG. In contrast, lungs treated with Sevoflurane during EVLP displayed significantly improved LC, reduced weight gain and significantly lower LDH and protein carbonyl levels as compared to controls. PAWP and IL-6 were diminished in treated lungs, but were not statistically different to controls.

Conclusion. The intravascular administration of sevoflurane during EVLP reduces oxidative stress and improves the functional status of DCD rat lungs in this experimental setting.

REFERENCE


BP-2

The chronic vs acute effects of atenolol on intestinal ischemia and reperfusion injury in atherosclerotic rats

Tulun Ozturk1, Kamli Vural2, Ibrahim Tuğlular3, Ahmet Var4, Taner Kardal1, İ-Israel Aydemir5, Omer Erdogan6

1Anesthesiology and Reanimation Celal Bayar University Faculty of Medicine, 2Pharmacology Celal Bayar University Faculty of Medicine, 3Histology, Biochemistry Celal Bayar University Faculty of Medicine, 4Cardiovascular Surgery Celal Bayar University Faculty of Medicine

Background & Aim. Intestinal I/R occurs during abdominal aortic aneurysm surgery and cardio pulmonary bypass and is associated with high mortality [1]. We studied the effects of oral vs intravenous beta-blocker atenolol (AT) on treatment of intestinal ischemia and reperfusion in rats.

Methods. In the ischemia model, superior mesenteric artery was clamped for 60 minutes(l) and afterwards reperfused(R) for 120 minutes. Rats were divided into 6 study groups; Group 1: Sham+normal diet(ND), Group 2: IR+ND, Group 3: Sham+high-fat diet(HFD), Group 4: IR+HFD, Group 5: IR+AT Acute (ATA), Group 6: IR+AT Chronic (ATC). In ATA group 1.5 mg kg⁻¹ atenolol was administered through femoral vein 5 minutes prior to I/R. In ATC group 3 mg kg⁻¹ d AT was administered via gastric lavage for 8 weeks. After I/R the ileal segment was mounted in organ baths. Contraction reactions on 10⁻⁵ - 10⁻⁴ acetylcholin(ACh) concentrations were recorded. Thin ileal slices were stained for histopathologic and immunohistochemical analysis.

Results. Ch induced contractions of ileum was significantly higher in I/R+ND and IR+HFD groups compared to both AT groups (p < 0.01). There was no significant difference between Sham and AT groups (p > 0.05). In I/R+ATA group there was significantly less NOS positive cells compared to I/R+ATA (p > 0.05). When compared to I/L, the number of IL1 positive cells were significantly higher in I/R+ATA and I/R+ATC compared to I/R groups (p < 0.01). There was a significant
Increase in the number of TUNEL positive cells in I/R group compared to sham and I/R+HFD groups. I/R+ATA and I/R+ATC groups showed significantly less apoptotic cells (p < 0.01).

Conclusion. These results showed that decrease in ACh induced contraction due to I/R was reversed in both ATC and ATA groups and that AT treatment decreased intestinal injury during reperfusion by the oxidative stress. Histological findings showed number of IL8 and TUNEL (+) cells decreased after AT treatment of I/R. Compared to ATA; ATC treatment showed better protection against I/R.

REFERENCES

BP-4
Postoperative delirium following cardiac surgery: an analysis of incidence, risk factors and outcome
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Introduction. Postoperative delirium (POD) is a common and serious complication after cardiac surgery and numerous studies have confirmed this in occurrence from 10% to 60% (1), patients have an increased risk of developing POD that is associated with poor outcomes (2). The aim of this study was to identify POD incidence, potential risk factors and to evaluate clinical outcome.

Methods. A single-centre cohort of 292 patients undergoing elective cardiac surgery were prospectively enrolled. The patients were assessed and monitored preoperatively, during surgery and in the early postoperative period. The CAM-ICU delirium assessment tool was conducted.

Results. The incidence of POD was 27.74% and it most common on 2.14(±0.73) post-operative day. The analysis showed that POD prolonged the length of the ICU stay 5.8 (±2.89) vs 3.86(±1.91) days, p < 0.001, patients after POD more frequent was required re-intubation (OR: 13.169; 95% CI 1.456-119.087, p = 0.022) and had had the prolonged length of the postoperative hospital stay > 10 days (OR: 2.060; 95% CI 1.226-3.460, p = 0.006). Univariate logistic regression of possible risk factors for POD analysis revealed pre-, peri- and postoperative risk factors as predictors of POD. Multivariate analysis remained as an independent predictors for POD: age > 70 yr (OR: 2.227; 95% CI 1.325-3.742, p = 0.003), ejection fraction < 42% (OR: 2.398; 95% CI 1.397-4.117, p = 0.002), length of stay in the hospital before surgery > 6 days (OR: 1.840; 95% CI 1.064-3.180, p = 0.029), combined valve repair and CABG surgery (OR: 2.083; 95% CI 1.153-3.761, p = 0.015), duration of CPB > 86 min (OR: 2.068; 95% CI 1.182-3.618, p = 0.009) and postoperative atrial fibrillation (OR: 2.244; 95% CI 1.158-4.347, p = 0.007).

Discussion. Our current analysis suggests that POD is a frequent complication and worsen patient outcome following cardiac surgery. POD may affect the many reasons and a multifactorial risk model should be applied to identify patients at an increased risk of developing POD. Our study and other examples in the literature (2) suggest that many factors cannot be changed or avoided but some can be modified and it depends from us: if to shorten the length of stay in the hospital before surgery < 6 days, it may reduce the number of patients who develop POD. By the way, a large prospective randomised study in this regard is needed.
REFERENCES


BP-5

Effects of sevoflurane vs. propofol on mitochondrial functional activity after ischemia-reperfusion injury in patients undergoing CABG surgery with cardiopulmonary bypass

Aida Kinderyte1, Edmundas Sirvinskas2,3, Andrius Macas1, Liuda Brogieien, Vilimante Borutaite4

1The Department of Anesthesiology, Hospital of Lithuanian University of Health Sciences, Kaunas, Lithuania, 2The Department of Cardiac, Thoracic and Vascular Surgery, Hospital of Lithuanian University of Health Sciences, Kaunas, Lithuania, 3Institute of Cardiology, Lithuanian University of Health Sciences, Kaunas, Lithuania, 4Biochemical Laboratory of the Institute of Neurosciences, Lithuanian University of Health Sciences, Kaunas, Lithuania

Background & Aim. After prolonged ischemia, reperfusion can cause major injury and lead to cell death. The aim of the present study was to compare the protective properties of sevoflurane and propofol on mitochondrial function and the energetic status of the human heart.

Methods. We evaluated adult patients scheduled for first-time elective CABG surgery with CPB. After giving informed consent, 72 patients were enrolled in the study. Used a sealed, opaque envelope method to allocate the patients to one of the two study groups to be anesthetized either with sevoflurane (Group S) or propofol (Group P). We used skinned fibers prepared from human right atrial appendage tissue. The human atrial tissue obtained from patients before cardioplegia and after aortic cross-clamp removal.

Results. The results of mitochondrial respiration in human atrial fibers were analyzed before cardioplegia and after reperfusion, there were no significant differences in the routine (V02/flow) and State 3 (V02/flow) respiration rates between the groups. There was a slight (not statistically significant) increase in the State 4 (V02/state 4) respiration rate in Group P compared to Group S. However, after the addition of exogenous cytochrome c, the State 4 respiration rate increased more obviously in Group P (by 68%) compared to Group S (+47%), thus, the effect of cytochrome c was, by 27%, significantly higher in Group P. A similar effect was obtained after cardioplegia. There was an increase in the State 4 respiration rate after the addition of cytochrome c by 88% in Group S and by 104% in Group P, showing that the damage to the mitochondrial outer membrane was more (by 14%) pronounced in Group P.

Conclusion. Neither volatile nor intravenous anesthetics were able to protect the outer mitochondrial membrane from damage during ischemia-reperfusion. However, mitochondrial respiratory chain activity of cardiomyocytes was not significantly disturbed.

REFERENCE


REFERENCES

Posttextubation stridor in neonates and children undergoing cardiac surgery: two year of institutional experience
Ayşur Çamkıran Fırat, Özlem Ozkalayci, Ebru Kaval, Murat Oızkan, Arash Pirat
Departments of Anesthesiology Baskent University Faculty of Medicine, Ankara, Turkey

Introduction. To describe risk factors associated with respiratory distress after extubation in the pediatric cardiac intensive care unit.

Methods. A retrospective observational study was performed involving patients (n=514) undergoing pediatric cardiac surgery at a single university hospital from January 1, 2011 to December 31, 2012, excluding deaths. The patients were under 8 years of age. The study approved by the local Institutional Review Board. Clinical characteristics, surgical data, and intensive care unit outcome were obtained from medical records.

Extubation criteria mainly were based on the clinical judgement of the surgeon, anesthesiologist and pediatric cardiologist. Extubation criteria included neurologic status to ensure airway and hemodynamic status with minimal inotropic support (dopamine ≤ 5 μg/kg/min, no nitrinone, no adrenaline), minimal ventilator setting (FiO₂ < 0.5, peak inspiratory pressure ≤25 cmH₂O) and appropriate arterial blood gases.

Continuous variables compared using Mann-Whitney U tests and categorical variables were compared using One-way Anova and chi-square when appropriate. Logistic regression models were used to determine variables impacting respiratory distress after extubation.

Results. The patients were categorized into two groups according to postoperative stridor: Group PES (n=104) and group non-PES (n=410). Median age in group PES was smaller than group non-PES (9.5±14.5 months and 20.38±21.82 months, respectively, p<0.005) and weight in group PES was less than group non-PES (5.7±3.5 kg and 8.9±5.6 kg, respectively, p<0.005).

Compared to preoperative intubation (24% and 4.4%, respectively, p<0.005), with syndrome (22.1% and 10.2%, respectively, p<0.005) and required cardiopulmonary bypass (67.1% and 32.9%, respectively, p<0.009) were significantly higher in group PES.

Multivariate logistic regression revealed that age (95% CI 0.97-1.03, p>0.38) is not predictor of PES, however weight (95% CI 0.76-0.98, P<0.03), with syndrome (95% CI 1.46-4.89, p<0.01), preoperative intubation (95% CI 2.18-9.12, p<0.005) and required cardiopulmonary bypass (95% CI 1.16-3.76, p<0.014) predictors of PES.

Discussion. Our study resulted that post-operative post-extubation stridor is observed more frequently on new born and children who were undergone cardiopulmoner by pass and having syndrome associated with preoperative endotracheal intubation history. This study also proves that body weight has a more important effect on post-extubation stridor than age contrary to popular belief.

REFERENCES
P-21

Can we predict acute kidney injury (AKI) following coronary artery bypass surgery (CABG)?


Background & Aim. Acute kidney injury (AKI) after coronary artery bypass grafting (CABG) is common and increases the risk of postoperative complications, morbidity and mortality. The aim of this study is to find out the incidence of AKI following CABG in our institution and the preoperative factors associated with AKI.

Methods. Retrospective data from all non-dialysed patients undergoing isolated CABG at our institution were collected for the year 2013 (n=503). Patient demographics, logistic EuroSCORE, pre and post-operative renal profile, operative urgency, need for haemofiltration, length of stay in ICU and outcome were collected. Postoperative AKI was defined as a rise of 50% or more in baseline serum creatinine.

Results. Results are given in table 1.

Table 1. Univariate analysis of preoperative variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Univariate Model</th>
<th>Odds Ratio (95% CI)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td>1.04 (1.01, 1.08)</td>
<td>0.005</td>
</tr>
<tr>
<td>Gender: Male</td>
<td></td>
<td>0.67 (0.35, 1.31)</td>
<td>0.24</td>
</tr>
<tr>
<td>Pre Op Creatinine &gt; 120</td>
<td></td>
<td>2.18 (0.99, 4.81)</td>
<td>0.054</td>
</tr>
<tr>
<td>Pre op eGFR (MDRD)</td>
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<td>0.988 (0.977, 0.999)</td>
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</tr>
<tr>
<td>Logistic Euro score:</td>
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<td></td>
<td></td>
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<tr>
<td>&lt;5.0</td>
<td></td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>5.0-9.99</td>
<td></td>
<td>1.44 (0.66, 3.16)</td>
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</tr>
<tr>
<td>10.0-14.99</td>
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<td>2.51 (0.96, 6.56)</td>
<td>0.06</td>
</tr>
<tr>
<td>&gt;= 15.0</td>
<td></td>
<td>16.91 (6.78, 42.21)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Conclusion. Older patients undergoing urgent and emergency CABG with a baseline creatinine of 120 μmol/l and above are at the increased risk of developing post-operative Acute Kidney Injury (AKI). Multivariable analysis showed that EuroSCORE of 15 and above is an independent risk factor for developing AKI after CABG.

REFERENCE

P-22

Association of the postoperative trend of B-Type natriuretic peptide (BNP) values and cardiac morbidity and mortality

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1Basel University Hospital, Basel, Switzerland, 2Hirslanden Clinic, Zurich, Switzerland, 3St. Gallen Cantonal Hospital, St. Gallen, Switzerland

Introduction. BNP is a predictor of cardiac morbidity and mortality prior to cardiac surgery and potentially postoperatively. We hypothesize that the change in BNP concentrations from the first to second postoperative day ("delta BNP") will differently affect all-cause mortality in patients undergoing on-pump cardiac surgery.

Methods. In this secondary analysis of prospectively collected data, we included those patients undergoing on-pump cardiac surgery from 08/2008 to 05/2011 with BNP measurements at 6am of both the 1st and 2nd postop. day. Our primary and secondary endpoints were all-cause mortality and mortality and/or major adverse cardiac events (MACE) defined as acute coronary syndrome, cardiac arrest, congestive heart failure, or revascularization at 12 months. ROC analysis was conducted for cut-off determination. We analyzed Kaplan Meier survival curves for increasing and decreasing delta BNP, in addition to a Cox regression adjusting for the EuroSCORE II, surgical factors, and biomarkers.

Results. We analyzed 725 patients (72% male; mean age 67 ± 11 years) of whom 351 had decreasing and 374 had increasing delta BNP values, respectively, with a total of 70 deaths occurring. The Kaplan Meier curves (Fig. 1) showed significantly increased survival and MACE-free survival for patients with increasing delta BNP. Multivariate adjustment for the EuroSCORE
Changes in the psychosocial status after cardiac surgery in a 10-years follow-up study

Enikő Holndonner-Kirst¹, Lili Varga², Andrea Szekely¹

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Background & Aim. Since the mortality after cardiac surgery has radically decreased in the last decades, the researchers take much interest in the postoperative psychosocial status and quality of life. On the other hand, psychosocial factors have been identified as risk factors for adverse long-time outcome after cardiac procedures.

Methods. 180 patients, having undergone elective coronary artery bypass graft or valve surgery in Gottsegen Győrgy Hungarian Institute of Cardiology between July 2000 and May 2001, were enrolled in our prospective study. Anamnestic medical and psychosocial factors, a wide range of intra- and postoperative clinical factors and complications were recorded. The Beck depression inventory (BDI), state and trait anxiety tests were recorded preoperatively, half, one, two, three, four, five, seven and ten years postoperatively. The social support, negative affectivity (NA), social inhibition (SI) tests were sent in the postoperative second, fifth, seventh and tenth year. Medical status and hospitalisation history were also asked at each interview. We used all-cause mortality and major adverse cardiac and cerebrovascular event (MACCE) as clinical end-points.

Results. Age, the value of preoperative risk assessment scores, length of postoperative ICU stay and early complications, preoperative STAI-T, STAI-S, BDI as well as mean postoperative SI, STAI-T and BDI scores had significant adverse effect on both endpoints, while educational level were significantly protective in both.

In a multivariable model with Euroscore the reoperation, circulatory failure were significant risk factors for both, while educational level was found to be protective for survival. Significant elevation was observed in STAI-S, STAI-T, BDI, NA, SI during the follow-up, but it was independent from the occurrence of MACCE.

Conclusion. Psychosocial factors have a significant impact on survival and occurrence of MACCE after cardiac surgery, while higher educational level might be protective factor.

P-24

The influence of dexmedetomidine on the quantity of postoperative cognitive disorders after cardiac surgery

Piotr Jakubow

Cardiosurgery Department

Background & Aim. Despite the progress of technology, the cognitive dysfunction and delirium in the postoperative period after cardiac operations still exist.(1,3) Dexmedetomidine, a selective alpha 2 adrenal receptor agonist, revealed anesthesia and a brain protective role.(2)

Methods. The study evaluated a group of 150 patients staying in the postoperative department after different cardiac surgery operations. Patients were divided into 5 groups in terms of different kinds of sedative drug used and its connection to opioid drugs. Patients were assessed a battery of cognitive tests a week before and within 10 days, after surgery, in some patients a lab study S-100, NSE, BDNF was performed. In the course of sedation, handling and recovery from the infusion of the drug were assessed by the nursing staff.

Results. In the study group, the total quantity of cognitive disorders, including delirium within 10 days after the operation, has occurred in 12% of propofol group, 10.6% in the midudian and 9.7% in the Dexametodetimine group. Steering sedation was best assessed in a group of Propofol, but in this group there was the most unexpected reaction to the stimulation after discontinuation of the infusion. The amount of uncontrolled psychomotor agitation after the end of sedation was the smallest in the group of Sufentanil and Midaniam or Dexametemodine. In the study, neuropsychological tests in Dexametemodine and Sufentanil group showed better results in the long-term memory in a recall subtest.

Conclusion. The application of Dexametemodine does not adversely affect cognitive function observed in the postoperative period. This is probably a protective effect of hippocampal neuronal inflammatory response.

REFERENCES

Results. In total 7 fellows in Leipzig and 1 fellow in Basel have completed their fellowship since accreditation. Actually 3 fellows in Leipzig and 1 in Basel are in the program. For details of individual workload see Table 1. The numbers of performed anaesthesia by types of operations are shown in Table 2. Transplants are only performed in Leipzig, therefore the fellows from Basel visit HCL for one month.

Table 1. Workload of individual fellows

<table>
<thead>
<tr>
<th>Fellow/Centre</th>
<th>Anaesthesia numbers</th>
<th>Anaesthesia</th>
<th>EACVI Exam</th>
<th>EACVI Certificate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/HCL Ireland</td>
<td>383</td>
<td>313</td>
<td>410</td>
<td>•</td>
</tr>
<tr>
<td>2/HCL India</td>
<td>250</td>
<td>286</td>
<td>323</td>
<td>•</td>
</tr>
<tr>
<td>3/HCL India</td>
<td>228</td>
<td>307</td>
<td>215</td>
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<td>4/HCL India</td>
<td>273</td>
<td>180</td>
<td>250</td>
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</tr>
<tr>
<td>5/HCL Egypt</td>
<td>167</td>
<td>303</td>
<td>186</td>
<td>•</td>
</tr>
<tr>
<td>6/HCL Egypt</td>
<td>312</td>
<td>291</td>
<td>298</td>
<td>•</td>
</tr>
<tr>
<td>7/HCL Egypt</td>
<td>268</td>
<td>146</td>
<td>197</td>
<td>•</td>
</tr>
<tr>
<td>8/HCL Ukraine</td>
<td>290</td>
<td>40</td>
<td>141</td>
<td>•</td>
</tr>
<tr>
<td>9/HCL India</td>
<td>200</td>
<td>71</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>10/HCL Saudi</td>
<td>50</td>
<td>18</td>
<td>•</td>
<td>•</td>
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<tr>
<td>11/USB Germany</td>
<td>206</td>
<td>150</td>
<td>359</td>
<td>•</td>
</tr>
<tr>
<td>12/USB Germany</td>
<td>165</td>
<td>115</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>

In progress.

Table 2. Types of operations, mean value per fellow/year

<table>
<thead>
<tr>
<th>Operations</th>
<th>HCL</th>
<th>USB</th>
</tr>
</thead>
<tbody>
<tr>
<td>CABG</td>
<td>62</td>
<td>66</td>
</tr>
<tr>
<td>Single valve</td>
<td>91</td>
<td>30</td>
</tr>
<tr>
<td>Combined</td>
<td>23</td>
<td>31</td>
</tr>
<tr>
<td>Aortic operations in circulatory arrest</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>Emergency Type A dissection</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Transapical and transcatheter aortic valves</td>
<td>20</td>
<td>14</td>
</tr>
<tr>
<td>Heart/Lung transplantation</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

Discussion. Both centres offer a good clinical workload reflecting the guidelines for a centre that offers an EACTA fellowship program. To ensure high quality and comparable education for the European cardiac fellows there is a need for quality assurance among the accredited European centres.

Poster Session 5
Friday, June 26, 2015
1:00 p.m.–2:00 p.m., Poster Exhibition Area

P-26

Oxygen balance and systemic inflammation after cardio-pulmonary bypass in elderly patients with different intensive care duration

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Background & Aim. The aim was to investigate the prognostic significance of oxygen balance and systemic inflammation after cardio-pulmonary bypass (CPB) in elderly patients (pts).

Methods. We evaluated 78 pts aged more than 74 years old undergoing cardiac surgery. Mixed venous saturation (SvO2), oxygen delivery (DO2), oxygen consumption (VO2), O2 extraction rate (ERO2), arterio-venous O2 difference (A-V O2), lactate level after CPB, postoperative leukocytosis, intensive care unit (ICU) stay were registered. Data are given as mean ± SD. Student’s t-test was used with P < 0.05 as significant.

Results. Fifty two pts were discharged from ICU within one day after surgery (group 1). The rest 26 pts (group 2) had ICU staying 5±2 days, characterized by lower post-CPB DO2, VO2, ERO2, A-V O2, higher SvO2, lactate (table). Leucocytes number had the significant (p < 0.05) direct correlation (r=0.58) with SvO2, and inverse (r=−0.64) with A-V O2.

Discussion. Both centres offer a good clinical workload reflecting the guidelines for a centre that offers an EACTA fellowship program. To ensure high quality and comparable education for the European cardiac fellows there is a need for quality assurance among the accredited European centres.

REFERENCE

P-27

Pulmonary and lobar isolation in a patient with aspergilloma within a tuberculous cavity

M. Granell, A. Arnau, E. Garcia del Olmo, L. Gonzalez, R. Guijarro, J.A. de Andrés

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Introduction. Thoracic surgery in lung abscesses always need healthy lungs or lobes isolation to prevent its infection.

Case Report. A 22-years old patient had a surgical history of right pneumothorax and a major pulmonary tuberculosis treated with antibiotic treatment. Two years later of this disease he presented an aspergilloma within the residual tuberculous cavity in the upper left lobe (Fig.1. Tuberculous cavity (TAC)). This patient underwent a surgery of resection of the upper left lobe. The anesthesia was performed by a thoracic epidural block, an anesthetic induction by propofol and rocuronium, and final anesthetic maintenance by sevofluorane, remifentanil and rocuronium.

Airway management was performed by the insertion of a 39 French left double lumen tube (DLT) and a Cohen bronchial blocker (BB) insertion into the left lower bronchus through the endobronchial lumen of DLT guided by a flexible fiberscope. This method tried to isolate the lower left lobe (LLL) of the upper left
lone avoiding the infection of healthy pulmonary areas during the perioperative surgery and anesthetic maneuvers. Left lung was collapsed during all the surgery without problems and at the end of the surgery LLL was recruited successfully.

Discussion. Lung isolation in thoracic surgery’s patients with lung infection is very important and necessary to ensure a good result. Some experts recommended lung isolation with DLT in patients with pulmonary infections because it has a very high success rate [1]. However, we think as other authors that the BB are very useful to blockade some lobe or segments lung [2]; moreover, in same cases as this we present the lung could be isolated more completely by combining the insertion of DLT and BB guided by flexible fiberscope [3].

REFERENCES

P-28
Comparison of crystalloid and colloid solutions on extravascular lung water in lung resection
S. Kucukgoncu, Z. Sungur, F. Demircan, I. Kuseyri, A. Demir, M. Senturk
Istanbul University

Introduction. Lung resection requires mostly fluid restriction on perioperative course[1]. Crystalloid and colloid solutions may have different attitudes within extravascular space. The aim of this study is to compare effects of crystalloids and colloids on extravascular lung water during lung surgery.

Methods. After Ethical Committee approval, patients undergoing to elective thoracotomy were included for this study. They were randomly assigned to two groups; the first one (GI) was treated with crystalloid and the second group (GII) with gelatine solutions. Anaesthesia induction and maintenance were similar for all subjects as well as ventilation strategies. Each patient had a thoracic epidural catheter to assume perioperative analgesia. Prior to induction each patient had a fluid bolus of 7ml.kg⁻¹ according to group, and fluid infusion continued 1-2ml.kg⁻¹ h⁻¹ during surgery. In case of hypotension a fluid bolus of 250ml gelatine should be administered if central venous pressure (CVP) was below 12mm-Hg. If hypotension was with higher CVP, noradrenaline infusion had to be started. Similarly each patient may have a bolus of 250ml study solution, whether urine output decreases to lower than 1ml.kg.h⁻¹. CVP should to be considered for a second bolus in diminished urine output.

Hemodynamic variables were measured preoperatively, and postoperatively 1st, 6th, 12th, 24th, 36th, 48th hours. Operative data, perioperative fluid balance, complications and length of stay were noted.

Statistical analysis were performed with ANOVA for repeating variables or Mann-Whitney U test for continuous variables. Chi-square was used to compare frequency between groups.

Results. Demographic and preoperative data were similar between groups. Fluid balance during surgery was significantly higher in GI than GII (respectively 1045±220 vs 770±270ml, p<0.05). Other operative variables (time, resection type, noradrenaline requirement, etc) had no difference as well as postoperative creatinine levels. Extravascular lung water (EVLW) tended to decrease in GII, however there was no significant difference between groups in any time of the study.

Discussion. Crystallloid solution is associated with a greater balance than gelatine uniquely during surgery for lung resection. Both solutions resulted in comparable EVLW throughout the study.

REFERENCE

P-29
Effects of thoracic epidural analgesia on cytokine response for one lung anaesthesia
I. Kuseyri, Z. Sungur, M. Yornuk, S. Kucukgoncu, B Ozkan, P. Vural, M., Senturk,
Istanbul University

Introduction. One-lung anaesthesia (OLA) is known to promote an inflammatory response. Protective ventilation or inhalational anaesthetics have been revealed to modulate cytokine response through OLA (1, 2). Thoracic epidural analgesia (TEA) is gold standard for lung surgery, and can affect inflammatory response. The aim of this study is to investigate effects of TEA and systemic analgesia on cytokine levels within OLA.

Methods. After Ethical Committee approval, patients undergoing to elective thoracotomy were included for this study. They were randomly assigned to two groups; in the first one (GI), analgesia was accomplished with TEA and in the second group (GII) with systemic opioid. Anaesthesia induction was similar for all subjects. Maintenance of anaesthesia was achieved with propofol according to bispectral index. Ventilation strategies were identical for both groups. Operative data, ventilation variables, propofol consumption, peroperative fluid balance were noted.

Inflammatory response was assessed with serum interleukin 6 and 8 (IL 6 and 8), tumour necrotizing factor (TNF), intercellular adhesion molecule (ICAM 1) levels at three times; preoperatively, at first and 24th postoperatively (T0, T1, T2). Length of stay of each subject was also recorded.

Statistical analyses were performed with ANOVA for repeating variables or Mann-Whitney U test for continuous variables. Chi-square was used to compare frequency between groups.

Results. From forty-six eligible patients forty-one achieved the study, 18 in GI and 23 in GII. Demographic and operative data
were comparable between groups; except propofol consumption which was significantly lower in GI than in GII (respectively 4.2±0.9 vs 9.1±1.1ml.kg.h⁻¹; p<0.05). Analgesia was adequate for whole study group. There was no significant difference between preoperative cytokine levels. We observed that IL 6 levels raised significantly for both groups compared to preoperative values in T1 and also in T2 (p<0.05). Concerning IL 8 levels there was no significant difference at T1; whereas IL 8 levels were significantly lower in GI than in GII at T2 (respectively 16.6±15.3 and 39±28.6ng.ml⁻¹; p<0.05).

**Discussion.** IL 8 is recognized as a potent neutrophil chemotactic factor which has a shorter time of transcription (3). It seems to have an initial role for inflammatory response. TEA appears to inhibit IL 8 increase for OLA. This effect cannot be explained by effective analgesia as both groups had low pain scores.

**REFERENCES**


**P-30**

**Effects of the non-dependent high-frequency jet ventilation on quality of operative field and oxygenation during one-lung ventilation for video-assisted thoracoscopic surgery**

Fatma Nur Kaya, Serkan Terkanlioglu, Elif Basagan-Mogol

Uludag University

**Background & Aim.** To completely deflate the non-dependent lung (NL) is an essential component of video-assisted thorascoscopic surgery (VATS). Therefore, VATS procedures represent an indication for one-lung ventilation (OLV) with the associated impairment of oxygenation. The selective application of CPAP or high-frequency jet ventilation (HFJV) to the NL improves arterial oxygenation (1). However, these applications may be poorly tolerated during VATS because of the obstruction of the surgical field by the partially inflated lung. We studied the effects of the application of the NL- HFJV during OLV on the surgical access and oxygenation parameters for VATS.

**Methods.** Forty two patients were studied. All patients were ventilated using volume controlled mode with the following settings: tidal volume 6 ml/kg of ideal body weight, respiratory rate 12 bpm, VE ratio 0.5, PEEP 5 cm H2O, and FiO2 to maintain SpO2 of 92-96%, throughout the procedure. During OLV, HFJV was performed using a frequency of 200 bpm, with a driving pressure (DP), of 0.1 bar, and FiO2 of 0.7 was applied to the NL of randomly selected patients. Adequacy of surgical conditions was evaluated using a visual analog scale and the changes in haemodynamics, airway mechanics (peak/ plateau pressures) and oxygenation were recorded.

**Results.** The quality of operative field, the changes in haemodynamics and airway mechanics were similar in both groups during VATS. However, the application of NL-HFJV resulted in more improved arterial oxygenation (p<0.05).

**Conclusion.** We used higher frequency and lower DP during HFJV, unlike previous study (1). HFJV had a beneficial effect on oxygenation during OLV, without any significant effects on quality of operative field.

**REFERENCE**


**P-31**

**Carotid endarterectomy in octogenarians: A 5-years single centre experience**

Laura Pasin 1, Pasquale Nardelli 1, Daniela Febres 1, Alessandro Belletti 1, Omar Saleh 1, Mattia Bellandi 1, Livia Manfredini 1, Gianluca Paternoster 1, Giovanni Landoni 1, 2, Alberto Zangrillo 1, 3

1Department of Anesthesia and Intensive Care, IRCCS San Raffaele Scientific Institute, Milan, Italy, 2Department of Cardiovascular Anesthesia and Intensive Care, San Carlo Hospital, Potenza, Italy, 3Vita-Salute San Raffaele University, Milan, Italy

**Background & Aim.** Surgical carotid endarterectomy still remains the most effective treatment for reducing the risk of stroke in patients with significant carotid stenosis. In fact, endovascular carotid stenting is associated with a higher incidence of periprocedural and long-term minor stroke when compared to carotid endarterectomy although long-term functional outcome and risk of major stroke are comparable. However, advanced age resulted to be associated with an increased risk of complications after carotid endarterectomy. Therefore we decided to evaluate the outcome of carotid endarterectomy in octogenarians when compared to younger patients in our high-volume centre.

**Methods.** Data of all patients who underwent carotid endarterectomy between June 2009 and December 2014 in our centre were recorded. Patients were categorized into those <80 and ≥80 years of age. Propensity score matching based on baseline clinical variables was performed to correct for any bias. Primary outcome of the study was the difference in combined stroke and death. Secondary outcomes were incidence of postoperative myocardial infarction, need for surgical reintervention and intensive care unit admission, surgical time and length of hospital stay.

**Results.** A total of 2,463 carotid endarterectomies were performed during the study period. Among them, patients ≥80 years of age were 439. After propensity score adjustment we were able to match all octogenarians one-to-one to younger patients and a total of 878 patients were included in the analysis. No differences in postoperative combined stroke and death were found between groups (p>0.05). No differences in secondary outcomes were recorded (p>0.05). (Table 1)

**Conclusions.** Octogenarians who suffer from carotid artery stenosis can safely undergo carotid endarterectomy in a high-volume centre.

<table>
<thead>
<tr>
<th>Table 1. Outcome of patients &lt;80 versus ≥80 years of age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgical time (min, median [IQR])</td>
</tr>
<tr>
<td>Reoperation</td>
</tr>
<tr>
<td>Admission to ICU</td>
</tr>
<tr>
<td>Major Stroke</td>
</tr>
<tr>
<td>Minor Stroke</td>
</tr>
<tr>
<td>Myocardial Infarction</td>
</tr>
<tr>
<td>In-hospital mortality</td>
</tr>
<tr>
<td>Combined Stroke and Death</td>
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</tbody>
</table>
Introduction. The aim of this study was to determine a more effective and a more secure method by comparing the need of additional local anesthesia, incidence of complications and sedation need on patients undergoing carotid endarterectomy (CEA) associated with cervical plexus block and ultrasound guided perivascular regional anesthesia of the internal carotid artery.

Methods. After approval of the Ethics Committee of the hospital, and patients’ informed consents were obtained, 58 patients were scheduled for elective CEA under regional anesthesia were randomly assigned to one of the two groups. Group perivascular (PV), at the level of the base of the carotid bifurcation, the needle was inserted at the lateral border of the sternocleidomastoid muscle and, guided by ultrasound, around the carotid artery, where prilocaine and bupivacaine (2% prilocaine 7.5 ml and 0.5% bupivacaine 7.5 ml) were injected. Group deep cervical plexus block (DCPB), the classical approach to a deep cervical plexus block was to perform separate injections at C2, C3 and C4, where prilocaine and bupivacaine (totally 2% prilocaine 7.5 ml and 0.5% bupivacaine 7.5 ml) were injected. Also, both of two groups were to perform superficial cervical plexus block which was a subcutaneous blockade of the different nerves of the anterolateral neck. It involved puncturing the investing fascial layer before 2% prilocaine 7.5 ml and 0.5% bupivacaine 7.5 ml were injected.

Results. The members of both groups of PV and DCPB were in the same range of age, body weight and gender (respectively 66.6±6.8 years and 69.5±7.5 years, 79.2±15.1 kg and 73.9±9.7 kg, rate of male patient 46.7% and 53.3%, for all comparisons p>0.05).

The satisfaction of the surgeon (4.41±0.73 and 4.55±0.68), anesthesiologist (4.69±0.60 and 4.52±0.83) and the patient (4.21±0.82 and 4.45±0.95) during the operation were identical (p>0.05). Both of the groups did not differ in the means of using additional local anesthesia (1% prilocaine) (respectively 7.97±8.62 mg and 7.24±11.07 mg, p=0.43), however Group PV required more midazolam compared to Group DCPB (respectively 1.06±0.81 mg and 0.43±0.69 mg, p=0.02).

The complications of disfiga (13.8% and 17.2%) and shoulder movements (0% and 4.8%) related to applied block were similar on both groups (respectively Group DCPB and PV, p=0.78 and p=0.32) while the hoarseness was observed at a higher rate on Group PV (26.9%, CI 0.01-0.37 and 73.1%, CI 0.39-0.85, p=0.003).

Discussion. We conclude that the described ultrasound-guided perivascular anesthesia technique is effective for carotid artery surgery. The satisfaction of anesthesiologist, operator and the patient were similar on CEA associated with cervical plexus block and ultrasound guided perivascular regional anesthesia of the internal carotid artery. The required amount of midazolam was increased and hoarseness was observed more frequently on operations associated with USG block applications.
Intraoperative intracardiac echocardiography (ICE) during CABG surgery – a case report

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¹Charité - Universitätsmedizin Berlin, Department of Anesthesiology and Intensive Care Medicine, ²Charité - Universitätsmedizin, Department of Cardiovascular Surgery

Introduction. Today, in case of severe perioperative hemodynamic instability a multiplane transeosophageal echocardiography (TOE) is recommended to determine underlying pathophysiological causes, e.g. hypovolaemia, reduced myocardial contractility [1, 2]. However, there exist some contraindications to TEE insertion, e.g. eosophageal pathology, and an intraoperative transthoracic approach (TTE) is mostly impossible. Therefore, we here present our first experience of intraoperative ICE usage.

Methods & Results. A 72-year old man suffering a 2-vessel coronary artery disease was scheduled for elective CABG surgery. He presented with a reduced left ventricular ejection fraction (LVEF 45%) and had previous eosophageal surgery due to cancer. After uncomplicated induction of general anaesthesia a 9 French introducer was inserted in the right internal jugular vein. The ICE probe (AccuNav®, 8 French) was covered with a sterile plastic sheet, which is normally used for pulmonary artery catheter, and then inserted via the introducer. The plastic sheet was connected to the retainer of the introducer. It was thus possible to advance, withdraw or rotate the probe in an absolute sterile manner. Finally, the probe was connected to a standard echocardiographic hardware system. With this approach we were able to qualitatively estimate a) filling and global contractility of both ventricles, b) the mitral valve, c) the aortic valve [3], d) the tricuspid valve and e) the pulmonary valve. Self-limitating rhythm disturbances when advancing the probe into the right ventricle for evaluation of the left ventricle and the subvalvular apparatus of the mitral valve were the only recognised ICE related side effects.

Conclusion. Intraoperative ICE was feasible during CABG surgery. Biventricular function and all valves could be qualitatively examined. ICE thus seems to be an useful alternative in situations where TOE and TTE are impractical.

REFERENCES

The effects of epicardial high-intensity focused ultrasound and conventional cryoablation for maze procedures on the postoperative time course of high sensitive troponin T

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Background & Aim. Previous work has shown increased myocardial necrosis markers after cryoablation MAZE procedures (CRYO) [1]. Sparse data are available about the time course of troponin following surgical treatment of atrial fibrillation by epicardial high-intensity focused ultrasound (HIFU) [2].

Methods. Sixty-two patients were analyzed retrospectively (CRYO: n=17; HIFU: n=11; matched controls (CON): n=34). Plasma levels of high-sensitive troponin (hsTNT) were determined preoperatively, immediately after surgery, and on the morning of the first to third postoperative day. Data were analyzed non-parametrically.

Results. Demographics and surgical core data (duration of surgery, cardiopulmonary bypass, and crossclamp time) revealed no significant differences between groups. Patients treated with CRYO more frequently underwent mitral surgery in comparison with the HIFU group that more often received aortic valve replacement. Additionally, CRYO-patients had a lower preoperative estimated glomerular filtration rate than HIFU and CON patients. Postoperative HsTNT levels showed a peak on the morning after surgery, decreased thereafter and were always significantly higher in the CRYO- in comparison with the CON-group. Immediately after surgery, hsTNT levels in the HIFU-group were also higher than in the CON-group. No further differences in hsTNT levels were observed between the HIFU and the CON-group.

Conclusions. Taking into account the small sample size, differences in surgical procedures, and preoperative renal function, the present study suggests that HIFU is associated with lower troponin levels than conventional CRYO in patients undergoing MAZE procedures. However, also HIFU may lead to higher than normal troponin levels immediately after surgery.

REFERENCES

P-35

Evidence of staphylococcal exposure following angiography being responsible for increased anti-staphylococcal antibodies in cardiac surgical patients

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¹Royal Brompton & Harefield NHS Trust, London, UK, ²UCL Hospitals, London, UK, ³Karolinska Institute, Stockholm, Sweden

Background & Aim. Cardiac surgery patients have greater levels of anti-staphylococcal antibodies compared with healthy volunteers (1). This study examines if staphylococcal exposure occurs during angiography.

Method. Following institutional consent, patients scheduled for coronary angiography had blood (7ml) taken and serum stored. A sample was taken at four weeks to allow measurement of response to antigenic stimulation. Serum was analysed by ELISA assays for IgG class of endotoxin core antibodies (EndoCab) and staphylococcal antibodies.
Conclusions. The magnitude of change in levels of antibody against α-toxin and teichoic acid are significantly greater than that for EndoCab over a 4 week period. Negative changes may indicate consumption in patients that fail to show antigenic stimulation, indicative of a hypo-responsive immune system. Low anti-staphylococcal antibody levels may be associated with adverse outcome after cardiac surgery (2). Pre-operative exposure to staphylococcus during coronary angiography may be protective and a form of ‘active vaccination’ prior to surgery.

REFERENCES

P-37
Trace elements and antioxidant response on cardiopulmonary bypass system
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Ankara University Medical Faculty

Background & Aim. In this study, the effects of cardiopulmonary bypass on the trace elements and antioxidant defence system were investigated by measuring selenium, copper, zinc levels and the activities of glutathion peroxidase (GSH-Px) and superoxide dismutase (SOD) in the plasma and erythrocytes of the patients with ischemic heart disease (n:15) and the patients with mitral valve disease (n:15) whose coronary arteries are normal.

Methods. The measurements were carried out in the blood samples taken before operation and ischemia, during ischemia and reperfusion. At sampling periods, the biochemical and hematological analyses and hemodynamic measurements were also performed. The relationship between these data and the plasma levels of the trace elements and antioxidant enzymes were examined.

Results. In the both of the patient groups, the preoperative plasma levels of selenium, copper and zinc were found to be lower than those reported for healthy Turkish people. A significant increase has been observed both in the levels of trace elements and the activity of GSH-Px during ischemia and reperfusion. The increments in these levels may be attributed to the adaptive response of the organism against oxidant stress.

Conclusions. The results obtained in this study showed that cardiopulmonary bypass leads to oxidant stress and the endogenous antioxidant system has rapidly become active as a response to this oxidant stress. It can be concluded that measurements of the levels of blood trace elements for the patients whose cardiac operations have been planned and replacement of these elements in the days before operation would strengthen to antioxidant defence systems.

P-38
Neuropsychological disorders after cardiac surgery with CPB: what harms more?
Yergali Miyerbekov1, Tleuberdi Kuandykov2, Vladimir Mutagirov2
1National Scientific Centre of Surgery, 2City Clinical Hospital №7

Objective. To study factors affected neuropsychological disorders rate in pts underwent cardiac surgery with cardiopulmonary bypass (CPB).

Material and Methods. After the Local Ethics Committee approval and informed consent we studied 97 pts. 18 pts aged 17-56 (40.4±10.2) years underwent heart valves surgery with moderate hypothermia (Group I, “open-heart”), 57 pts aged 30-66 (49.8±8.4) years underwent myocardial revascularization with moderate hypothermia (Group II, “closed-heart”) and 22 pts aged 38-60 (49.5±6.6) years underwent myocardial revascularization with normothermic bypass (Group III, “closed-heart”). We used 5 computerized psychometric tests to assess neuropsychological status. This set includes 21 parameters for assessment of visual-motor reaction; rate and adequacy of complex sensorimotor reactions, memory characteristics, dynamic eye accuracy, attention, ability to concentrate and switch; rate of information processing, intelligent ability. Pts were tested 2 days prior surgery and 2 weeks after surgery. Data were processed with χ2 analysis and Fisher test. Deterioration of postoperative testing of one or more standard deviation (s) we considered as the criterion of cognitive impairment.

Results and Discussion. The rate of cognitive tests performance impairment in pts after “open-heart” surgery (Group I) was 27.33±13.03% (max 55.5%). Neuropsychological deterioration in group II (“closed heart”+hypothermia) was 28.63±10.18% (max 52.6%). In Group III (“closed heart”+normothermia) it was 31.64±12.2% (max 54.5%). There was significant deterioration in performance of tests by 22.3-33.4% in pts underwent normothermic CPB. Thus we found that hypothermia had neuroprotective effect in pts underwent cardiac surgery with CPB.

Conclusions. 1. Cognitive impairment in pts underwent cardiac surgery with CPB may reach 55.5%. 2. We have found no difference between “open heart” and “closed heart” pts operated with hypothermic CPB. 3. “Closed heart” pts operated with normothermic CPB had higher rate of neuropsychological disorders.

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Analysis of postoperative pulmonary complications after 120 patients lung resection
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Background & Aim. We try to evaluate the incidence of postoperative pulmonary complications after lung resection in lung cancer patients.

Methods. 120 consecutive patients underwent lung resection were analysed retrospectively with respect to postoperative pulmonary risk factors. We registered preoperative, perioperative and postoperative variables.

Results. A total of 120 scheduled lung resection patients (96 men and 24 women) were considered (5 ASA I, 56 ASA II, 58 ASA III, 3 ASA IV). The most often diseases were hypertension (42 %), COPD (22.6%), neurologic disease (15.6%), heart failure (8.3%). Average thoracic surgery was 171.7 minutes and the lung resection performed were 19 pneumonectomy, 41 lobectomy, 2 bilobectomy and 56 wedge resection. Anesthesia technique was usually thoracic epidural analgesia (94.7%), protective ventilation (72.5%), restrictive fluid administration and blood transfusion perioperatively. Pulmonary complications rate was 21.2% and the most often were pneumothorax (8.6%), respiratory failure (6.4%), pleural effusion (4.6%), pneumomy (1.7%), empyema (1.4%) and atelectasis (1.7%). There wasn’t any death and only one ICU readmission during the 30st postoperative days.

Conclusion. The rate of postoperative pulmonary complications was lower than others authors.

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