SCA89

DETECTING AORTIC DISSECTION USING MODIFIED TRANSESOPHAGEAL ECHOCARDIOGRAPHY

van Zaane B[1]; Nierich A[2]; van 't Hof AWJ[2]; Brandon Bravo Bruinsma G[2]; Cheung A[3]; Buhre W[1]; Moons KGM[1]
University Medical Center Utrecht[1], Utrecht, The Netherlands; Isala Clinics[2], Zwolle, Overijssel, the Netherlands; University of Pennsylvania[3], Philadelphia, PA, USA

Background: Aortic dissection is an acute illness requiring prompt diagnosis and therapy. The most readily available and accurate diagnostic, often transesophageal echocardiography (TEE), is usually requested as initial diagnostic. Limitation of TEE is the inability of imaging the entire thoracic aorta due to the interposition of the trachea between esophagus and aorta. A recent extension of conventional TEE (further referred to as the A-view® method) achieves imaging of the ascending aorta arch by replacing air in the trachea with saline using a balloon-catheter (the A-view® catheter, Cordatec Inc., Zoersel, Belgium). This method may improve the diagnostic accuracy of conventional TEE, and thus the detection of aortic dissection. We describe three cases to illustrate the use of the A-View® method for detecting dissections or intramural hematoma of the distal ascending aorta and aortic arch.

Case 1: A 68-year-old male with a history of chronic obstructive pulmonary disease, aortic stenosis with insufficiency and a dilatation of the ascending aorta of 53 mm presented with acute retrosternal chest pain. Computer aided tomography (CT) showed a Stanford type A dissection. The A-view® method confirmed the diagnosis of an aortic dissection (Figure 1); additionally a large intimal tear halfway the ascending aorta was found and there was no involvement of the branch vessels. Patient underwent emergency operation with replacement of the aortic root and of the ascending aorta with circulatory arrest

Case 2: A 68-year-old woman with a history of hypertension presented at the emergency department with pain in epigastrium, radiating to the back. CT showed a Stanford type B dissection. Since doubt remained on the location of the intimal tear and on the remaining flow through the false lumen the A-view® method was performed. This showed a local aneurysm of the aortic arch between the innominate and left subclavian artery with an intimal dissection at the division of the aneurysm and the descending aorta. The aneurysm compressed the left carotid artery, there were no signs of dissection in the aortic arch and ascending aorta and there was no persistent flow in the false lumen. Patient underwent replacement of the distal aortic arch and the proximal descending aorta trough a left lateral thoracotomy.

Case 3:
A 79-year-old man with a history of hypertension and right upper lobe lobectomy presented with right thoracic pain, dyspnea, and pain at deep breaths. Pulmonary embolism could not be identified but a Stanford type B dissection was diagnosed using CT. During the following week patient remained stable under conservative therapy. To evaluate progress of the dissection into the aortic arch the A-view® method was performed. This confirmed the dissection; there was no progression of the dissection into the ascending aorta, the left carotid artery or the innominate artery.

Conclusions: The A-view® method is capable of visualizing the distal ascending aorta and the proximal aortic arch with its side-branches. Without the use of ionizing radiation, intravenous contrast agents, and without risky transportation, it provides a unique, widely available, well-tolerated method in humans for diagnosing aortic dissections and to guide therapy.

SCA90
POSTER WITHDRAWN BY AUTHOR

SCA91

CARDIOVASCULAR EFFECTS OF ORAL TRIIODOTHYRONINE IN PATIENTS UNDERGOING VALVULAR CARDIAC SURGERY

Choi Y[1]; Lee JY[1]; Hong SW[1]; Jung SM[2]; Lee JH[1]

Yonsei University College of Medicine[1], Seoul, Republic of Korea; Yonsei University College of Medicine, Seoul, Republic of Korea; Konyang University College of Medicine[2], Daejeon, Daejeon, Republic of Korea

Introduction: Cardiopulmonary bypass produces a state of functional hypothyroidism characterized by low serum levels of tri-iodothyronine (T3). Theoretically, supplementing T3 during this period should result in improved hemodynamics as well as patients outcome. Subsequently, attempts to avoid the transient hypothyroidism associated with cardiopulmonary bypass have been made with intravenous T3 supplementation showing contradictory results. Another problem with preemptive intravenous T3 supplementation was transient supranormal increase in T3 level. Oral T3 supplementation may provide a more steady increase in T3 level and exert beneficial effect in this setting however evidence is limited. The aim of the present study was to determine whether pretreatment with single oral T3 could prevent serum T3 reduction, and improve hemodynamics and clinical outcome.

Methods: After IRB approval, 47 adults patients scheduled for valvular heart surgery were randomized either to receive single oral T3 40 mg (group T, n = 22) or placebo (group C, n = 25) before induction of anesthesia. Blood samples were collected for determination of serum levels of total T3, thyroxine (T4) and thyroid stimulating hormone (TSH) before administration of oral T3 or placebo (T0) and 1 (T1), 6 (T2) and 18 (T3) hour after removal of the aortic cross-clamp. Hemodynamic parameters and use of vasoactive and/or inotropic agents were recorded during the operative period and the first 24 h after arrival at the intensive care unit (ICU).

Results: T3 levels were significantly higher in the group T than group C at T1. T3 level was maintained within the normal range in the group T throughout the study period, whereas it was decreased to below normal level in the group C at T3. The serum levels of T4 and TSH and hemodynamic variables were comparable between the groups throughout the study period. In the group T, both vasoactive and inotropic agent requirements were significantly reduced during and after cardiopulmonary bypass, and also in ICU. Length of hospital stay was significantly longer in the group T.

Conclusion: Pretreatment with single oral T3 prevented the reduction in T3 level after valvular heart surgery, without disproportional elevation to supranormal level. Furthermore, this simple supplementation exerted clinical benefits as shown as subsequent reduction in vasoactive and inotropic agent requirements and shorter length of hospital stay.

ANESTH ANALG 2008;106(SCA Suppl):1-128

SCA92

CHANGES IN MYOCARDIAL PERFORMANCE INDEX WITH ABDOMINAL AORTIC CROSS CLAMP APPLICATION

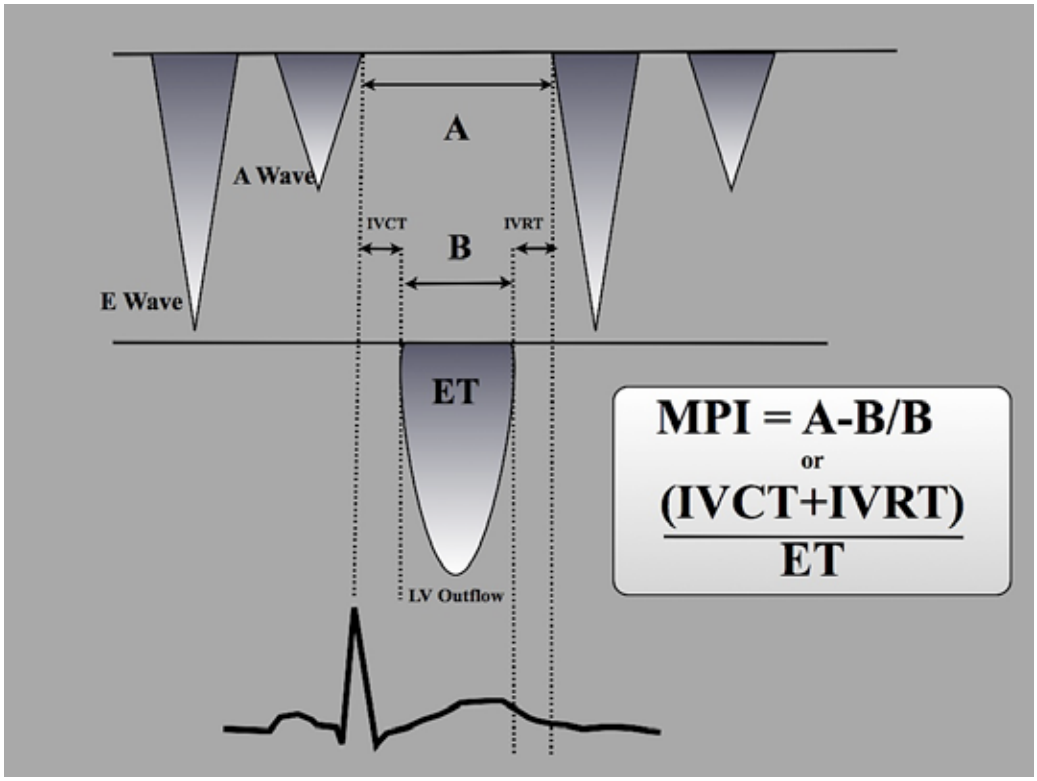
Zhao X; Matyal R; Subramaniam B; Karthik S; Bose R; Panzica P; Mitchell, MD J; Mahmood F
BIDMC, Boston, MA, USA

Introduction: Myocardial Performance Index (MPI) is an echocardiographically derived index of myocardial function (Systolic and Diastolic). It is relatively heart rate and load-independent and has been shown to be of prognostic value in patients with acute myocardial infarction and dilated cardiomyopathy. It consists of the sum of isovolumetric contraction and relaxation time divided by the ejection time (Figure 1). An increase in MPI value from baseline is suggestive of myocardial dysfunction. We used MPI to assess changes in myocardial function with abdominal aortic cross clamp (XCL) application during elective abdominal aortic aneurysm (AAA) surgery.

Methods: After institutional board review approval transesophageal echo examinations were carried out on 28 patients undergoing infra-renal AAA surgery. MPI measurements were made from a combination of mid-esophageal and deep transgastric windows utilizing pulse wave Doppler to measure transmitral and left ventricular outflow tract flows to calculate MPI (Figure 1). MPI was measured before XCL application, during and then after unclamping of aorta.

Results: We were able to measure MPI in all patients. T test was carried out to assess for significance of the change in the MPI with clamping and unclamping of aorta. 21/28 (75%) patients demonstrated increase in MPI value with XCL application, which returned to baseline value after unclamping of aorta. The average MPI, Pre-XCL was 0.35 (0.11-0.71), On-XCL was 0.48 (0.20-1.0) and Post-XCL was 0.30 (0.15-0.79). The change in MPI was significant with clamping ($p = .0008$), and unclamping ($p = .0003$).

Discussion: There is a significant increase in the value of MPI with abdominal aortic XCL application in the infra-renal position which is suggestive of myocardial dysfunction (Systolic and Diastolic). MPI can be used to assess myocardial dysfunction during AAA surgery.



SCA93

ASSESSMENT OF LEFT VENTRICULAR REGIONAL FUNCTION BY TRANSESOPHAGEAL ECHOCARDIOGRAPHY: COMPARISON OF VISUAL ESTIMATION WITH SPECKLE TRACKING

Marcucci C[1]; Keller D[1]; Mackensen G[1]; Podgoreanu M[1]; Mahajan A[2]; Phillips-Bute B[1]; Mathew J[1]; Swaminathan M[1]
DUMC[1], Durham, NC, USA; UCLA[2], Los Angeles, CA, USA

Introduction

The evaluation of left ventricular (LV) regional function during cardiac surgery relies mainly on visual estimation (VE) of wall thickening from two-dimensional (2D) images obtained by transesophageal echocardiography (TEE). However, this method is subjective and prone to variability in interpretation. Speckle tracking or 2D-strain imaging (2DS) allows the angle-independent measurement of longitudinal (LS) and radial strain (RS) of myocardial segments. The objective of this study was to evaluate whether VE of regional function was comparable to 2DS in identifying myocardial segments with abnormal motion by TEE in patients undergoing cardiac surgery.

Methods

After regulatory approval, informed consent was obtained from 22 cardiac surgery patients. Between induction and surgical incision, images were acquired in standard mid esophageal long axis views. Spectral Doppler through the aortic valve was recorded for timing purposes. All the images were obtained on Vivid 7 machines (GE Vingmed, Norway) and analyzed offline using EchoPac 6.1.2 software. Maximum LS and RS were calculated for each segment. Contractility of individual segments was graded by VE according to a 4-point scale by a cardiac anesthesiologist experienced in TEE (normal, hypokinetic, akinetic and dyskinetic). Fishers exact test, Spearmans rank correlation coefficient(rho) and the Kappa coefficient (k) for agreement were calculated using SAS 9.1. A normal segment was defined as being scored as normal on VE and with a LS of < -15% or RS of > 30% . A p value of less than 0.05 was considered significant.

Results

A total of 414 segments were evaluated. A greater number of segments were not assessed by 2DS than by VE [38(9%) vs 79 (19%); $p<0.0001$]. By VE, 274 segments were scored as normal, 84 as hypokinetic, and 18 as akinetic. By 2DS, LS ranged from -37 to +14%, the range for RS was -21 to +143%. There was poor agreement (on 58% segments) between VE and 2DS (for both, LS and CS). There was disagreement in 140 out of 335 segments (42%) and was largely due to normal scores given by VE to 95 (67%) segments with abnormal strain on 2DS.The correlation coefficients p-values and K-coefficients for the various comparisons are shown in the table.

Conclusion

We found poor agreement between VE and 2DS techniques in the assessment of regional LV function by TEE. The disagreement was largely attributable to segments with abnormal strain assessed as normal by VE. While VE is a simple method, it may be insensitive in detecting subtle abnormalities in segmental function compared to 2DS. However, while 2DS is accurate, it is time-consuming and cannot be consistently acquired in all segments. Poor tracking of segments in TEE due to artifacts, foreshortening, or translational motion may contribute to errors in speckle tracking. Further research is needed to determine the optimal methods for assessment of regional wall motion that are objective, accurate and reproducible.

Comparison	ρ	p	κ
Visual estimate vs LS	-0.2	<0.0001	0.13
Visual estimate vs RS	0.04	0.5	0.17

Spearman's Rank (ρ) coefficients "p" values and κ-coefficient for the comparison of visual estimate of segmental function vs LS and RS measured by 2DS.

ANESTH ANALG 2008;106(SCA Suppl):1-128

SCA94

DESCRIPTIVE STUDY OF BLOOD TRANSFUSION AND BLOOD CONSERVATION IN CARDIAC SURGERY IN AN ACADEMIC CENTER

Neira V; Syed S; Hankinson J; Sawchuk C; Thabane L
McMaster University, Ottawa, Ontario, Canada; McMaster University, Hamilton, ON, Canada

Background:
Cardiac Surgery consumes more transfusions than any other surgical procedure. Significant variation has been found in transfusion management among institutions. Transfusion is an independent factor for morbidity, mortality and quality indicator in coronary artery bypass surgery (CABG) surgery in Ontario.

Objective: To describe transfusion management and blood conservation interventions in adult patients undergoing cardiac surgery with CPB at Hamilton General Hospital (HGH).

Methods: Database review of 502 consecutive adult patients undergoing cardiac surgery with CPB at HGH collected between August and December 2004. The perioperative use of blood product transfusions and blood conservation interventions were compared in patients undergoing cardiac surgery: CABG (group 1), single valve (group 2), combined CABG + single valve (group 3), miscellaneous: ascending aorta replacement, double valve or other complex procedures (group 4), and re-operations: REDO CABG (group 5), REDO single valve (group 6), REDO combined (group 7), REDO miscellaneous (group 8).

Results: A high transfusion rate for all components was observed (74%). Significant differences in transfusion rates and intensity of transfusion were found for all components for each group of surgery. The least transfused groups were groups 1, 2 and 5, intermediate transfusion rates groups 3, 6 and 7; high transfusion rates groups 4 and 8. Estimated red blood cell loss better discriminated complexity of surgery finding homogeneous subsets as low bleeding groups: 1, 2, 5 and 6, intermediate bleeding was noted in groups 3, 4 and 7 and group 8 had high bleeding. We can describe our institution as high transfusion low bleeding for groups 1, 2, 5 and 6, and high transfusion high bleeding in complex procedures, groups 3, 4, 7 and 8. The majority of transfusion were given intraoperatively (40%) or in the immediate post operative period (40%). Indicators of appropriateness of transfusion (ICU admit hemoglobin and transfusion dose of FFP) suggest liberal use of blood products. We found routine use of antifibrinolytics (96%), frequent use of DDAVP (30.5%), but infrequent (less than 2%) use of other blood conservation modalities.

Conclusions: The results suggest liberal rather than conservative approach in blood transfusion management at HGH. A redesign of the transfusion process with a multidisciplinary and multimodal approach with specific guidelines in blood utilization, preoperative optimization, point of care coagulation testing, the use of pharmacological and non pharmacological maneuvers to reduce bleeding and cell salvage could be useful to conserve the use of blood products. Multicentric cooperative studies are required to evaluate patient and institutional factors in cardiac surgery blood conservation programs.

References:
Anesthesiology 1998; 88: 327 33
Can J Anesth 1991; 38: 511 7.
Ann Thorac Surg 2007; 83: S27 86

SCA95

HALF-MOLAR SODIUM-LACTATE SOLUTION HAS A BENEFICIAL EFFECT IN PATIENTS AFTER CORONARY ARTERY BYPASS GRAFTING

Boom C[1]; Leverve X[2]

National Cardiovascular Center Harapan[1], Jakarta Selatan, Jakarta, Indonesia; Universite Joseph Fourier[2], France

Objectives : To evaluate the clinical efficacy and safety of a solution containing half-molar sodium-lactate (HL) and to compare this to Ringer's Lactate (RL) solution as fluid resuscitation in post-coronary artery bypass grafting (CABG) surgery patients.

Design : Prospective randomized open label study. Setting : The first 12 hours post-CABG surgery in the ICU Patients : There were 230 patients enrolled in the study : 208 were analyzed, with 109 patients from the HL group and 99 patients from the RL group.

Interventions : Patients received over the first 12 hours post-CABG 10 ml.kgBW-1 HL solution in the HL group versus 30 ml.kgBW-1 of RL in the RL group.

Measurements and Results : Efficacy was assessed by hemodynamic status, body fluid balance and concomitant inotrope utilization. Safety was assessed by laboratory parameters and the absence of adverse effects. Post operative cardiac index (CI) increase was significantly higher in HL than in RL group ($p<0.002$), while pulmonary vascular resistance index was significantly lower ($p<0.002$). Together with urinary output, other hemodynamic parameters were comparable, indicating similar tissue perfusion in both groups despite a far lower fluid infusion in the HL group than in the RL group. Therefore, a significant negative fluid balance was achieved in the HL but not in the RL group (-790+71 versus +43 +115 ml.12 hours-1, $p<0.0001$ for HL and RL respectively). No adverse event was observed.

Conclusion : Half-molar sodium-lactate solution is both effective and safe as fluid resuscitation in post-CABG patients, compare to RL, its use results in a higher cardiac index (CI) with less volume being infused,resulting in a negative post-operative body fluid balance.

References :

1. Boldt J: Volume Therapy in Cardiac Surgery.Ann Cardiac Anesth 2005,8:104-116.
2. Mustafa I,Leverve XM:Metabolic and Hemodynamic Efects of Hypertonic solutions:Sodium-Lactate versus Sodium Chloride Infusion in Postoperative Patients.Shock 2002,18(4):306-310.
3. Chiolero RL,Revelly JP,Leverve XM et al: Effects of Cardiogenic Shock on Lactate and Glucose Metabolism After Heart Surgery.Crit Care Med 2000,28(12):3784-3791.
4. Leverve XM: Energy Metabolism in Critically Ill Patients : lactate is A major Oxidable Substrate.Curr Opn Clin Nutr Metab Care 1999,2(2):165-169
5. Leverve X, Mustafa I, Peronnet F: Pivotal Role of Lactate in Aerobic Metabolism. In: Yearbook of Intensive Care and Emergency Medicine.Edited by J.V.Berlin: Springer-Verlag;1998:588-596.
6. Mustafa I,Roth H,Hanafiah A et al: Effect of Cardiopulmonary Bypass on Lactate Metabolism.Intensive Care Med 2003,29(8):1279-1285.
7. Schurr A:Lactate: The Ultimate Cerebral Oxidative Energy Substrate?, J Cerebral Blood Flow Metab 2006,26(1)142-152.
8. Barbee RW, Kline JA,Watts JA: Depletion of Lactate by Dichloroacetate Reduces Cardiac Efficiency After Hemorrhagic Shock. Shock 2000,14(2):208-214.
9. Kline JA,Thornton LR, Lopaschuk GD et al:Lactate Improves Cardiac Efficency After Hemorrhagic Shock. Shock 2000,14(2):215-221.
10. Levy B,Mansart A, Montemont C et al: Myocardial lactate Depriviation is Associated with Decreased Cardiovascular Performance, Decreased Myocardial Energetic, and Early death in Endotoxic Shock. Intensive Care Med 2007,33(3):495-502.

ANESTH ANALG 2008;106(SCA Suppl):1-128

SCA96

PLASMA DONOR GENDER AND RESPIRATORY COMPLICATIONS AFTER CORONARY ARTERY BYPASS SURGERY

Welsby I[1]; Troughton M[2]; Phillips-Bute B[1]; Stafford-Smith M[1]
DUMC[1], Durham, NC, USA; UAB[2], Birmingham, AL, USA

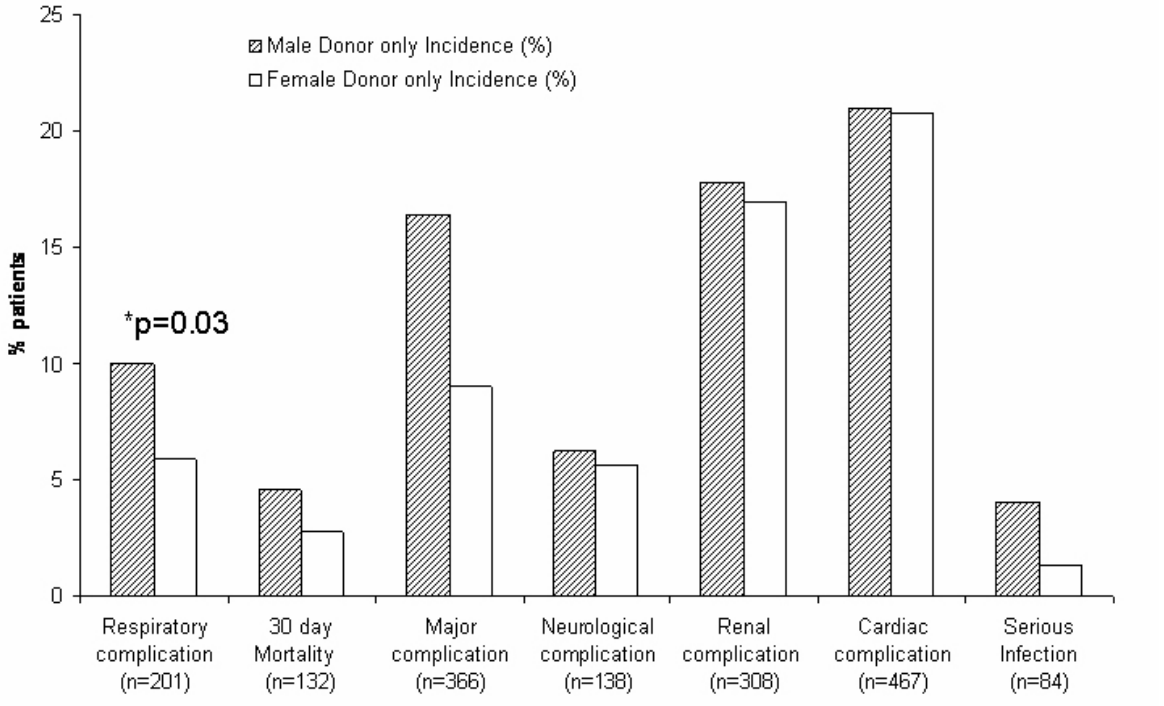
Introduction: Some countries have imposed major restrictions on female donor plasma since its use has been linked with cases of transfusion-related acute lung injury (TRALI) and less extreme pulmonary dysfunction.(1) Pregnancy-related antibodies are a proposed mechanism for the link between TRALI and donor gender. Postop pulmonary dysfunction is relatively common in transfused cardiac surgery patients, but the role of donor gender in this setting has not been investigated. Therefore, we sought to determine the relationship between plasma donor gender and respiratory complications after cardiac surgery involving plasma transfusion.

Methods: Patient data prospectively collected at the Duke Heart Center was retrospectively matched with American Red Cross blood donor records for all on-pump, non-emergent CABG procedures between Sep93 and Jun02 (n=8300). A matched-pairs analysis compared respiratory complication rates (adult respiratory distress syndrome and/or pulmonary edema), between the subset of cardiac surgery patients receiving plasma only from female and only from male donors. Secondary analyses included all transfused patients and other complications including 30day postop mortality.

Results: Matched pairs analysis identified a lower respiratory complication rate in recipients of female-donor plasma (5.9 versus 10%; p=0.03, n=780, Figure). In addition, whole population analysis (complication vs. no complication) found plasma transfused to patients suffering respiratory complications was less likely to come from female donors (39.1% versus 45.2%, p=0.03, n=2157). Other secondary matched pairs analyses (Figure) showed fewer major complications (9.0 vs. 16.4%; p = 0.001) and serious infections (1.3 vs. 3.6%; p = 0.03) in recipients of female donor plasma, and a trend towards reduced 30 day mortality (2.8 vs. 4.6%; p = 0.17).

Conclusions: In cardiac surgery patients receiving plasma transfusions we observed a relationship between female donor source and reduced respiratory and other complications. These findings contrast with increased TRALI risk with female donors in case studies. An approach to investigate TRALI that is based on case series is sound, however, by design evaluates a limited set of patients. Case series TRALI studies risk overlooking other more common but subtle effects of donor gender only evident in larger patient groups that collectively may be even more important. Our findings are unexpected and require validation in other populations, but raise concern in regard to policies aimed at improving blood product safety by excluding transfusion of female-derived plasma.

Reference: Transfusion 2004;44:1674-5



SCA97

THE OUTCOME OF MINIMALLY INVASIVE MITRAL VALVE SURGERY IN PATIENTS WITH SEVERE MITRAL STENOSIS WITHOUT AORTIC CROSS CLAMPING

Moahmed T; Sathappan K; Theilade C; Churchwell K
Vanderbilt University, Nashville, TN, USA

Back ground:
Mitral valve (MV) surgery is increasingly performed through small thoracotomies . New technologies for cardiopulmonary bypass, special surgical instruments, and the use of video-thoracoscopic assistance all facilitate these procedures. It has been previously shown that mprovements in surgical technique and setup allow for achievements of the same quality with minimal invasive access as conventional MV surgery with less surgical trauma, decreased pain and recovery time, and better cosmesis, resulting in improved patient satisfaction.Our institution has focused on minimally invasive mitral valve operations through right anterior minithoracotomy as described by Chitwood and associates [1,2].

Methods:
From July 2006 to Sep. 2007,46 elective minimally invasive mitral surgical procedures in patients with severe mitral stenosis (25 male, 21 female; mean age, 61+/- 4 years, have been performed in our department through a right anterolateral small thoracotomy.

Data Analysis
All data were collected in an Excel, (Microsoft). Data are presented as mean values +/- SD. Testing of variables was compared by paired t test.A p value of less than 0.05 was chosen to define statistical significance.

Results:
The mitral valve was replaced in all the 46 patients. Mean cardiopulmonary bypass averaged 106+/-15 minutes. Intraoperative TEE showed competent valve function after all mitral valve replacement.26 patients had a Maze procedure. Only one patient died due to postoperative complications and sepsis. Mean postoperative ventilation time was 8+/- 2 hours, with only three patient required mechanical ventilation for more than 48 hours. 8 out of 46 patients developed post operative atrial fibrillation and 2 cerebrovascular accident .The echocardiogram done at 6 months follow up showed improvement of LVEF at 38%.Average time of admission to discharge was about one week.

Discussion:
The parasternal approach, as described by Cosgrove[3] necessitates partial rib resection. Loulmet and colleagues[2] promoted various types of partial sternotomies, which endanger the continuity of the right internal thoracic artery.We used a small anterolateral thoracotomy in the fourth intercostal space, which does not interrupt the osseous continuity of the chest, and thus maintains its integrity[2]. The present study documents the safety of minimally invasive mitral valve surgery without transthoracic aortic clamping in 46 patients with severe mitral stenosis and moderately depressed left ventricular ejection fraction. Overall mortality and morbidity data compare favorably with the data of the STS database.

Conclusion:
Minimally invasive mitral valve surgery in patients with severe mitral stenosis without aortic cross clamping is safe and a good alternative to the conventional approach.

References:
1.Chitwood, W.R., Jr., et al., Video-assisted minimally invasive mitral valve surgery: the “micro-mitral”
operation. J Thorac Cardiovasc Surg, 1997. 113(2): p. 413-4.
2.Aybek, T., et al., Two hundred forty minimally invasive mitral operations through right
minithoracotomy. Ann Thorac Surg, 2006. 81(5): p. 1618-24.
3.Navia, J. and D. Cosgrove, Minimally Invasive Mitral Valve Operations, in The Annals of Thoracic
Surgery. 1996, Soc Thorac Surgeons. p. 1542-1544.

ANESTH ANALG 2008;106(SCA Suppl):1-128

SCA98

GENOMIC INFLUENCES CHARACTERIZING AMBULATORY AND POST-CARDIAC SURGERY ATRIAL FIBRILLATION

Mathew J; Podgoreanu M; White W; Shaw A; Newman M; Mathew J
Duke University, Durham, NC, USA

Introduction: Atrial fibrillation (AF) is a common arrhythmia in the general population, occurring with greater frequency in the elderly; additionally, it often develops as a complication of cardiac surgery. A recent genome wide association study[1] found that two DNA sequence variants on chromosome 4q25 were significantly associated with the occurrence of AF in large nonsurgical populations of European and Chinese descent. We therefore hypothesized that these same single nucleotide polymorphisms (SNPs) would be associated with the development of AF after cardiac surgery. In secondary analysis, we also conducted a genome-wide association study of postoperative AF.

Methods: 110 patients undergoing CABG surgery with cardiopulmonary bypass were genotyped at 317,000 loci using the Illumina HumanHap300 BeadChip at the institutional Genotyping Core Facility. Two samples were run in duplicate for quality control purposes. Subjects displaying acute or chronic preoperative AF (n=10) were excluded from analysis. The risk of postoperative AF in each patient was calculated using a validated risk index.[2] A recursive partitioning genome association method (HelixTree) was used to split into groups by the risk index as well as by race. No postoperative AF was observed among African American and Native American patients (n=15), thus further genetic analyses were conducted in Caucasians only. WGAViewer was used to visualize and annotate the full set of p-values from the whole genome association study; $p < 4.2 \times 10\text{-}7$ was required for genome-wide significance.

Results: The mean age of the study population was 63.7 ± 10.1 years; 22.7% were female, 86.4% were Caucasian, and the mean AF risk index score was 13.8 ± 9.5. New-onset postoperative AF was detected in 25.5% of the patients. As expected, patients with higher AF risk scores (>16) were significantly more likely to develop AF ($p = 4.32 \times 10\text{-}4$) than those with lower scores. Assessment of the two variants previously reported revealed that SNP rs2200733 and rs1033464 were marginally associated with postoperative AF (p=0.388 and 0.035 respectively in low risk patients and p=0.019 and 0.011 in higher risk patients). In the whole genome analysis, no SNPs were found to be significantly associated with AF at genome-wide significance level, with the leading candidates yielding a p-value of $1.02 \times 10\text{-}6$ in patients with lower risk scores and $1.15 \times 10\text{-}6$ in those with high scores. Of note, a majority of the most significantly associated SNPs were either intronic or intergenic.

Conclusions: In this pilot study, we found marginal associations with postoperative AF of two DNA sequence variants previously associated with AF in the nonsurgical population. The genome-wide scan identified novel candidate SNPs for follow-up testing that may improve our ability to elucidate the genetic susceptibility to postoperative AF.

Reference:
1. Gudbjartsson, DF, et al. Nature 2007; 448: 353.
2. Mathew JP, et al. JAMA 2004: 291:1720.

SCA99

IS GENERAL ANESTHESIA UNDER CONVENTIONAL MECHANICAL VENTILATION SUITABLE TO MANAGE THE PATIENTS DURING PEDIATRIC CARDIAC CATHETERIZATION.

Kanazawa T

Okayama University Hospital, Okayama City, Okayama, Japan

Background

Pediatric patients undergoing cardiac catheterization require anesthetic management including adequate analgesia, sedation, immobility and cardiovascular stability. Currently deep sedation has been widely provided as standard method during the catheterization to preserve spontaneous breathing, because it is thought that positive pressure ventilation might affect hemodynamic and respiratory status, and confuse the cardiac catheterization data. However, deep sedation without mechanical ventilation might cause hypercarbia and hypoxia due to hypoventilation in patients during the procedure and influence pulmonary vascular resistance. And also, inadequate sadation to avoid respiratory depression might cause sympathetic response or patients' movement. The general anesthesia can maintain hemodynamic and respiratory status but the adequacy of general anesthesia controlling ventilation and circulation tightly in patients undergoing cardiac catheterization has not been widely examined.

Methods

Retrospective chart review of 206 children aged 0 day to 15 years underwent cardiac catheterization under general anesthesia from 2005 to 2006 was conducted. The incidence of changes in systolic blood pressure more than 20% of baseline, changes in heart rate more than 20% of baseline, decrement in SpO&sub2; greater than 5 points from baseline, and desaturation required oxygen supplementation were compared with those in published data, in which sedation with spontaneous breathing were applied as anesthetic methods. Patients received 3-5mg/kg thiopental, 2mg/kg fentanyl and 0.1mg/kg vecuronium intravenously for induction, subsequently they were intubated. Patients inhaled oxygen only for induction, and inhaled sevoflurane (0.5-1%) in air for maintenance, and received additional dosage of fentanyl and vecuronium as necessary. Ventilator settings were manupurated to maintain PaCO2 of 40mmHg.

Measurements and Result

No patient changes in heart rate of more than 20% from baseline. No patient decreases more than 5 points SpO&sub2; nor needs oxygen supplementaion. Only 2 patients changed in systolic arterial pressure of more than 20% from baseline. Compared with these results, previous reports showed much higher incidence of unfavorable episodes during catheterization (table1). Besides, mean PaCO2 is 39.3 m;m;Hg in our observation.

Conclusions

General anesthesia using fentanyl and sevoflurane under conventional mechanical ventilation is safe and suitable to control cardiovascular and respiratory conditions in patients undergoing pediatric cardiac catheterization.

Table 1 Change of hemodynamic and respiratory parameter during procedure

	Okayama university	Alexander 2003	Zeynep 2006	Zeynep 2006
Anesthesia method	General anesthesia Controlled ventilation	Deep sedation (propofol) Spontaneous breathing	Deep sedation (dexmedetomidine) Spontaneous breathing	Deep sedation (propofol) Spontaneous breathing
Change of >20% blood pressure	0.97%(2/206) systolic	11.1%(5/45) mean	22.7%(5/22) mean	40.9%(9/22) mean
Change of >20% heart rate	0%(0/206)	8.8%(4/45)	27.2%(6/22)	31.8%(7/22)
Decrement of >5 points SpO2	0%(0/206)	6.7%(3/45)	13.6%(3/22)	22.7%(5/22)
Use oxygen	0%(0/206)	6.7%(3/45)	13.6%(3/22)	22.7%(5/22)
PaCO2 mmHg (mean)	39.3	–	–	–

ANESTH ANALG 2008;106(SCA Suppl):1-128

SCA100

THE DETERIORATION OF THE DIASTOLIC FUNCTION DURING OFF-PUMP CABG DEPENDS ON REGIONAL WALL MOTION ABNORMALITIES

Seino Y[1]; Nomura M[1]; Ozaki M[1]; Mizunuma M[2]; Tomaru T[2]

Tokyo Women's Medical University[1], Shinjuku, Tokyo, Japan; Showa University Fujigaoka Hospital[2], Yokohama, Kanagawa, Japan

Backgrounds:
The patients with coronary artery disease frequently have diastolic dysfunction and sometimes cause hemodynamic instability. This study investigated the change of diastolic function with transesophageal echocardiography (TEE) during off -pump coronary artery bypass grafting (OPCAB) surgery.

Methods:
Twenty-three patients scheduled for OPCAB surgery were enrolled in this study. Mitral inflow velocities, deceleration time, mitral annular velocities were recorded in midesophageal four chamber view with TEE (ProSound SSD-5000 ALOKA, Tokyo, Japan) at the points after thoracotomy, during each anastomosis and after the end of anastomosis. The ratio of early diastolic filling velocity and atrial filling velocity (E/A) and the ratio of early diastolic filling velocity and early diastolic annular velocity (E/e') were calculated. In addition left ventricular dimensions and regional wall motion abnormalities were recorded after thoracotomy and fractional shortening (FS) and wall motion score index (WMSI) were also calculated. Statistical analysis was performed with one-way ANOVA. A p value of <0.05 was considered statistically significant.

Results:
The mean age of the patients was 70.3±8.9 years, and on average 3.5±0.9 grafts per patient were performed. The mean FS and WMSI were 31.1±8.1% and 1.57±0.5, respectively. E/e' was 8.20±2.58 after thoracotomy, 11.34±4.72 for the left anterior descending artery grafting (LAD), 10.45±4.60 for the diagonal artery grafting (DG), 10.18±3.87 for the obtuse marginal artery grafting (OM), 8.49±3.35 for the posterolateral artery grafting (PL), 7.78±2.95 for the posterior descending artery grafting (PDA) and 9.21±2.62 after the end of anastomosis. E/A was 0.91±0.23 after thoracotomy, 1.06±0.47 for LAD, 1.02±0.45 for DG, 0.86±0.42 for OM, 0.84±0.37 for PL, 0.71±0.23 for PDA and 1.12±0.70 after the end of anastomosis. E/e', E/A and e' velocity did not significantly change at each point. However, deceleration time significantly decreased during LAD and PL anastomosis ($p<0.01$) compared with baseline. In the patients with WMSI£1.5 (n=9), E/e' and E/A for LAD was significantly higher and deceleration time was lower compared to baseline. On the other hand, in the patients with WMSI>1.5 (n=14) E/e' for LAD was higher, E/A was similar and deceleration time was significantly lower compared to baseline. The increase of E/e in the lower WMSI group was more than in the higher WMSI group. No significant difference with E/e', E/A and deceleration time was found between the groups.

Discussion
The parameters of diastolic function derived from TEE (E/e', E/A and deceleration time) did not significantly change during and after OPCAB. However the grafting to LAD reduced diastolic function more than others induced with a temporary ischemia of left ventricle. This deterioration of diastolic function was obvious in the lower WMSI group. In addition, the early diastolic annular velocity was not affected with heart distortion and stabilizing.

Conclusions:
The diastolic function doesnt improve just after off pump CABG Regional wall motion abnormalities could have an effect on the change of diastolic function during the grafting.

SCA101

MEASUREMENT OF LEFT VENTRICULAR SYSTOLIC STRAIN : A COMPARISON OF TRANSTHORACIC AND TRANSESOPHAGEAL ECHOCARDIOGRAPHICTECHNIQUES

Marcucci C[1]; Keller D[1]; Mackensen GB[1]; Podgoreanu M[1]; Mahajan A[2]; Phillips-Bute B[1]; Mathew J[1]; Swaminathan M[1]
DUMC[1], Durham, NC, USA; UCLA[2], Los Angeles, CA, USA

Background The measurement of myocardial strain has been established as a reliable and reproducible technique for assessment of left ventricular systolic function using transthoracic echocardiography (TTE). However, the reliability of equivalent myocardial strain measurements made using transesophageal echocardiography (TEE) remains unclear. We therefore tested the hypothesis that left ventricular myocardial strain measurements made by TEE are comparable to those made using TTE.

Methods. After institutional review board approval and informed consent, 12 patients undergoing elective cardiac surgery were enrolled in this study. After induction of general anesthesia, a TTE exam was performed (Vivid 7, GE Vingmed, Horten, Norway) and apical (4-chamber, 2-chamber, long axis (LAX)) and parasternal short axis (SAX) (basal, mid-papillary and apical) views were obtained. A continuous wave spectral Doppler trace through the aortic valve was obtained for timing purposes. Following the TTE exam, the equivalent images for TEE were obtained in the mid esophageal (4-chamber, 2-chamber and LAX) and transgastric SAX (basal, midpapillary and apical) views. All images were taken before surgical incision, at end expiration, in harmonics mode, with a frame rate of 60-90 frames per second. The analysis was done off-line using EchoPac 6.1.2 (GE Vingmed) Correlation and Bland-Altman analysis was calculated for global longitudinal and circumferential strain and for the different views. Statistical analysis was performed using SAS 9.1.

Results. One patient was excluded from analysis because of poor image quality. 76% of the segments were tracked in TTE versus 83% in TEE. There was good agreement on longitudinal strain measurements made by TEE and TTE (see table). However, correlation was poor between the two techniques for circumferential strain.

Conclusion. In a limited sample size, longitudinal myocardial strain measured by TEE was comparable to TTE, while correlation for circumferential strain was poor. This is likely due to greater translational motion and higher drop-out rate of segments in transgastric views. Longitudinal strain measurement is a feasible technique for myocardial function assessment by TEE. Further research on its use in assessment of intraoperative myocardial function is warranted.

Longitudinal Strain				Circumferential Strain			
View	r	p	Bias Mean±SD	View	r	p	Bias Mean±SD
Global	0.8	0.0017	3.7 ± 3.3	Global	0.4	0.3	4.8 ± 5.3
4Chamber	0.9	0.0004	3.1 ± 3.2	Basal	-0.1	0.7	6.2 ± 6.9
2Chamber	0.8	0.003	4.6 ± 3.6	Midpap	0.5	0.17	4.6 ± 4.3
LAX	0.5	0.16	3.5 ± 5.3	Apical	0.7	0.04	1.5 ± 7.2

Pearson correlation coefficients (r), p-value for correlation and bias (Bland-Altman Mean of differences (TTE – TEE) and standard deviations (SD)) of TTE vs TEE for global longitudinal and circumferential strain and global strain in the different echocardiographic views.

ANESTH ANALG 2008;106(SCA Suppl):1-128

SCA102

INTRAOPERATIVE TEE DIAGNOSIS OF SUBACUTE MECHANICAL VALVE THROMBOSIS IN A PATIENT RECEIVING ENOXAPARIN BRIDGE THERAPY FOR ANTICOAGULATION

Frogel J; Mallu S
Henry Ford Hospital, Detroit, MI, USA

A 66 year old female with a past medical history of rheumatic heart disease that required palcement of a mechanical bileaflet St. Jude valve in 1985 and chronic hepatitis C presented for redo sternotomy and aortic valve replacement for symptomatic moderate aortic stenosis. A preoperative TEE showed a calcified aortic valve with moderate stenosis and mild aortic insufficiency. Her mechanical mitral valve had normal leaflet excursion and a transvalvular mean gradient of 2 mmHg.

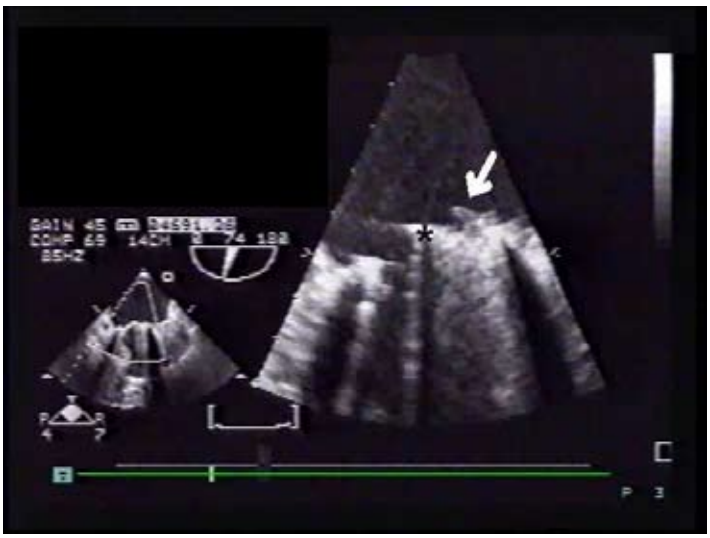
One week prior to her scheduled procedure she was placed on enoxaparin 1mg/kg twice daily and her warfarin was stopped. She underwent a transvenous hepatic biopsy that was complicated by renal artery injury which delayed her originally scheduled surgery for 5 weeks. The patient remained on enoxaparin for the entire six week period preceding surgery.

On the day of surgery, intraoperative TEE confirmed moderate aortic stenosis with an ejection fraction of 45%. Examination of the mitral valve demonstrated that the anterior leaflet of the St. Jude valve was stuck in the closed position. Close inspection of the valve revealed a small mobile thrombus adherent to the atrial side of the immobile leaflet (figure 1). Gradients across the valve were elevated (peak 11 mmHg, mean 6 mmHg) and consistent with mild mitral stenosis.

Surgical inspection of the mitral valve confirmed the TEE findings. The patient underwent aortic valve replacement with a 20mm AP-ATS mechanical valve and a mitral valve replacement with a 28mm AP-ATS mechanical valve (ATS Medical Inc. Minneapolis, MN).

The use of enoxaparin in patients with mechanical heart valves remains controversial. Despite a caution in the enoxaparin package insert to the contrary, the 2004 American College of Chest Physicians Conference on Antithrombotic and Thrombolytic Therapy concluded that enoxaparin use is safe for patients with mechanical heart valves who require cessation of vitamin K antagonists. In contrast, in the 2006 ACC/AHA Guidelines for the Management of Patients with Valvular Heart Disease low molecular weight heparin received only a class IIb recommendation for bridging therapy, underscoring the paucity of evidence supporting its use. As this case demonstrates, patients with prosthetic valves receiving low molecular weight heparin for bridging anticoagulation may be at risk for acute or subacute valve thrombosis and a high index of suspicion must be maintained when caring for these patients in the perioperative period.

Shapira Y, Sagie A, Battler A. Low molecular-weight heparin for the treatment of patients with
mechanical heart valves. Clin Cardiol 2002;25:322-327.
Salem DN, Stein PD, Al-Ahmad A, Bussey HI, et al. Antithrombotic therapy in valvular heart diseasenative
and prosthetic: the seventh ACCP conference on antithrombotic and thrombolytic therapy. Chest
2004;126:457-482.
Bonow RO, Carabello BA, Chatterlee K, de Leon AC, et al. ACC/AHA guidelines for the management of
patients with valvular heart disease: a report of the American College of Cardiology/ American Heart
Association task force on practice guidelines. Circulation 2006; 114: e84-e231.



SCA103

EFFECT OF A PERIOPERATIVE BETA-BLOCKER INITIATIVE ON THE INCIDENCE OF ATRIAL FIBRILLATION AFTER THORACOTOMY

Frisk S; Zhang H; Amar D
Memorial Sloan-Kettering Cancer Center, New York, New York, USA

Background: To reduce the incidence of postoperative cardiovascular morbidity, a beta-blocker initiative (BBI) was recently started at our institution. The purpose of this study was to assess the effect of this BBI on the incidence of atrial fibrillation (AF) after major thoracic surgery compared to historical groups receiving diltiazem prophylaxis or placebo.

Methods: In an ongoing QA project, we prospectively collected data on 53 patients aged ³ 60 yr. undergoing lobectomy or pneumonectomy and enrolled in the BBI (metoprolol 25 mg PO daily 1 wk. preoperatively, titrated to heart rate of £60 bpm and then PO for 14 days). The current study group was compared with age and gender matched patients from our previous placebo-controlled, randomized, double-blind study (1), comparing prophylactic diltiazem (n=53) to placebo (n=53) against in-hospital postoperative AF.

Results: BBI patients had a greater incidence of hypertension and had undergone less pneumonectomy in comparison to the other 2 groups (Table 1). The incidence of AF in the control group [14/ 53 (26%)] was similar to that in the diltiazem group [11/53 (21%), P=0.49] but trended to be significantly greater than in the BBI group [7/53 (13%), P=0.09]. Average heart rate was higher in the control group in comparison to either the BBI or diltiazem groups (Table 2).

Conclusion: These preliminary data suggest that a target-specific heart rate BBI is likely to decrease the incidence of postoperative AF in comparison to routine care. Further study is needed to confirm these findings and examine whether BBI is superior to diltiazem prophylaxis against postoperative AF.

1. J Thorac Cardiovasc Surg 2000; 120:790-8.

Table 1. Patient Characteristics

	Beta Blocker (N =53)	Diltiazem (N = 53)	Control (N = 53)
Age, yr.	71±7	71±7	71±7
Weight (kg)	75 ±17	74±12	76±17
Male (%)	22(42)	22(42)	22(42)
Smoking (%)	38(72)	45(54)	45(85)
Hypertension (%)	30(57)*	18(34)	18(34)
CAD (%)	7(13)	5(9.4)	7(13)
Diabetes (%)	7(13)	5(9.4)	6(11)
FEV1% pred.	86±20	80±19	84±23
DLCO % pred.	84±17	78±18	79±19
Lobectomy	51(96)	44(83)	40(76)
Pneumonectomy	2(4)**	13(24)	9(17)

Data are mean ± SD or n (%). *P < 0.024, Beta Blocker vs. Diltiazem or Control groups.
**P=0.05 BBI vs. Control group and P=0.004 vs. Diltiazem group.

Table 2.

Heart Rate	Beta Blocker (N =53)	Diltiazem (N =53)	Control (N = 53)
Preoperative	69±12	73±10	76±12*
POD1	79±10	75±11	85±13**
POD2	82±11	82±11	89±13**
POD3	80±9	83±12	91±15**

Data are mean±SD and were analyzed by repeated measures ANOVA.
*P < 0.01, Control vs. Beta Blocker group.
** P < 0.01, Control vs. Beta Blocker or Diltiazem groups.

ANESTH ANALG 2008;106(SCA Suppl):1-128

SCA104

DOES APROTININ AFFECT SURVIVAL IN DOUBLE-LUNG AND HEART-LUNG TRANSPLANTATION?

Hill C; Ahlbrand S; Cornelissen C; Fujiki M; Mora-Mangano C; Oakes D; Dhillon G
Stanford University, Stanford, CA, USA

Introduction: Aprotinin (Trasylol®, Bayer) use in patients requiring cardiothoracic surgery reduces perioperative blood loss and the inflammatory response to cardiopulmonary bypass. (1) However, several studies suggest that aprotinin may increase the risk of adverse outcomes in coronary surgery patients. Mangano and colleagues reported that aprotinin, compared to other anti-fibrinolytics, increases the risk of post-operative renal dialysis 2-3 fold, depending on dosage. (2) Similarly, this group found that patients prescribed aprotinin are less likely to be alive 5 years after surgery. (3) In patients requiring lung transplantation, aprotinins anti-inflammatory properties may improve postoperative pulmonary function and recovery. (4,5) However, there are no data regarding the potentially beneficial effect of aprotinin on survival following lung transplantation. We therefore hypothesized that the use of aprotinin compared with amicar use improves survival among patients undergoing lung or heart/lung transplantation using CPB.

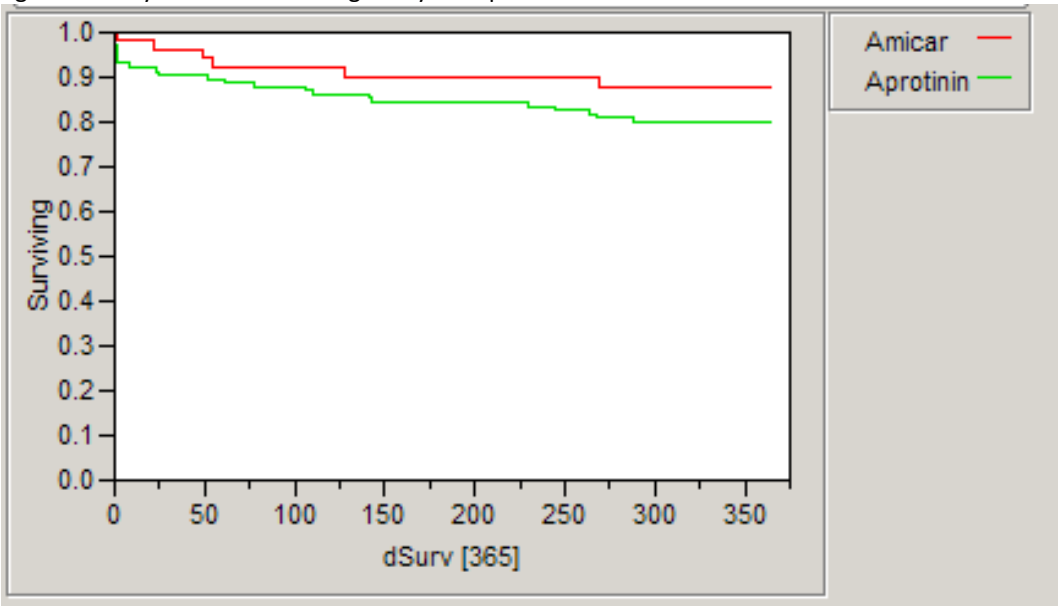
Methods: We reviewed the charts of all double-lung or heart-lung transplantation surgery patients cared for at the Stanford University Medical Center between 1996 and 2007. We collected data regarding the duration of stay in the ICU and hospital, and survival over the first year following transplantation. We analyzed the data using Chi-square assessments and constructing Kaplan-Meier Survival Curves where appropriate. Additionally, resource utilization (length of ICU, hospital stay, ventilator hours) was compared among groups.

Results: Aprotinin was not associated with reduced mortality at 1 week (aprotinin versus amicar: 6.9% v 1.9%; p= 0.14), 1 month (9.5% v 3.8%; p= 0.17), 6 months (15.5% v 9.4%; p= 0.27), and at 1 year (19.8% v 11.3 %; p= 0.16). Kaplan-Meir survival analyses demonstrated similar findings (figure). Aprotinin was not associated with improved resource utilization versus amicar.

Conclusions: Among patients undergoing isolated lung, or heart-lung transplantation , aprotinin does not offer survival advantage, or improved resource utilization, over amicar.

1. Circulation. 1995; 92:2236-24.
2. N Engl J Med. 2006; 354(4):353-65.
3. JAMA. 2007; 297(5):471-9.
4. Transplant Proc. 2007; 39:489-92.
5. Eur J Cardiothorac surg. 2006; 29:210-5.

Figure. One-year Survival among Study Groups



SCA105

TSE "MASK" IMPROVES OXYGENATION IN SEDATED PATIENTS DURING TEE

Tse J; Corless M; Barsoum S; Shindler D; Cebula J; Negron M; Cohen S; Hunter C
UMDNJ-Robert Wood Johnson Medical School, New Brunswick, NJ, USA

INTRODUCTION: Most patients undergoing transesophageal echocardiography (TEE) outside OR tolerate it well with topical anesthesia, light sedation and oxygen (O2) via nasal cannula (NC). However, even light sedation may cause O2 desaturation (Desat) in patients with severe cardiopulmonary diseases. A NC delivers inadequate O2 when the mouth is kept open with a bite block and a TEE probe in place. Anesthesiologists may be asked to manage patients with severe O2 Desat, inadequate sedation or difficult airway. A plastic sheet (TSE Mask) has been shown to convert an ineffective NC into an effective face tent1-2. It improves oxygenation and reduces the need for assisted ventilation in deeply sedated patients during upper endoscopy1-2. It has been used in our Echocardiography Lab in the past year. We would like to determine its effectiveness in improving oxygenation in high-risk patients during TEE.

METHODS: This is a retrospective review of TEE procedure records (3/071/08). Airway and baseline room air (RA) O2 saturation (Sat) were parts of pre-procedure evaluation. Patients received topical anesthesia (15 cc viscous lidocaine and benzocaine spray x 3) and NC O2 (5 l/min). Midazolam (0.5-4 mg) and/or meperidine (12.5-50 mg) were administered in small increments to achieve light sedation prior to TEE probe insertion. A TSE Mask was prepared using a clean clear specimen bag at bedside1-2 and used to cover patient's nose and mouth if O2 Desat occurred (Group 1, n=21). It was also used in the beginning of sedation because of severity of patients diseases and/or low baseline RA O2 Sat (Group 2, n=16). We excluded 2 groups of patients in order to evaluate effects of NC O2 and TSE Mask on the same patient. These are patients who received only NC O2 throughout the case and those who received NC O2 and TSE Mask from the start without evaluating O2 Sat while receiving only NC O2. The paired Students t-test is used for statistical analysis. A p value <0.05 is considered as statistically significant. Data are presented as Mean±S.D.

RESULTS: Group 1 patients had an average baseline RA O2 Sat of 95±3% that was significantly improved (97±2%) with NC O2 (5 l/min) (Table 1). However, these patients experienced significant O2 Desat (93±3%) with sedation. Their oxygenation was promptly and significantly improved with a TSE Mask (97±2%) and was maintained after insertion (98±2%) and prior to removal of TEE probe (98±3%). Group 2 patients had a slightly lower baseline RA O2 Sat (93±4%) that was significantly improved by NC O2 (96±3%). Their oxygenation was further significantly improved with a TSE Mask (98±2%) and was maintained throughout the procedure (98±2%).

CONCLUSION: These data show that TSE Mask improves oxygenation in sedated patients and prevents O2 desaturation during TEE. This technically simple and effective face tent may improve patient safety and should be routinely used during TEE.

REF: 1. Anesth 102:484, 2005 2. Anesth 107:A922, 2007

Table 1. Effects of TSE "Mask" on O_2 Saturation in sedated patients during TEE.

O_2 Saturation	RA	NC	NC Pre-TM	NC+TM	NC+TM π	NC+TM ρ
Group 1 (n=21)	95±3 %	97±2 % *	93±3 %#	97±2 % ϕ*	98±2 % ϕ*	98±3 % ϕ*
Group 2 (n=16)	93±4 %	96±3 % *	N/A	98±2 % *#	98±2 % *#	98±2 % *#

RA: Room Air; NC: 5 l/min O_2 via Nasal Cannula; TM: TSE "Mask"; N/A: Not Applicable;
π: After TEE probe insertion; ρ: Prior to TEE probe removal.
* Significantly different from RA, $p<0.002$, Paired Student's t-test; # Significantly different from NC, $p<0.003$;
ϕ Significantly different from Pre-TSE Mask, $p<0.001$.

ANESTH ANALG 2008;106(SCA Suppl):1-128

SCA106

POST-CARDIAC SURGERY ACUTE KIDNEY INJURY BEFORE AND AFTER APPLICATION OF APROTININ-USE GUIDELINES

Swaminathan M; Phillips-Bute B; Shaw A; Welsby Ian; Mathew J; Lin S; Hill S; Stafford-Smith M
Duke University Medical Center, Durham, NC, United States

Introduction

Acute kidney injury (AKI) and coagulopathy are common serious complications of cardiac surgery. While aprotinin is associated with AKI, antifibrinolytic use may prevent AKI by avoiding extreme perioperative anemia and transfusion. Whether blood-sparing effects of aprotinin (vs. lysine analogues) may be justified based on anemia/transfusion risk has not been investigated. We examined outcomes at a single institution to evaluate for temporal changes in AKI associated with implementation of risk-based aprotinin use guidelines (vs. aminocaproic acid).

Methods

After institutional review board approval, data was obtained for all cardiac surgeries from 12 months before to 13 months after introduction of institutional guidelines for antifibrinolytic use (aprotinin vs. aminocaproic acid).(1) Data from the first month after guideline introduction was not used. Guideline criteria categorized patients by surgeon into high, intermediate-emergent, intermediate-elective and low anemia/transfusion risk subgroups. Post-guideline aprotinin use was highly variable but did not increase for any group (range 0-100% reduction). Only subgroups where there was a large pre-to-post guideline reduction in aprotinin use (³50% patients) were included in the primary analysis. AKI was defined using peak postoperative rise in serum creatinine relative to the preoperative baseline (%DCr). Mean %DCr was compared before and after guideline implementation with a simple t-test. A similar secondary analysis of subgroups with smaller reductions in aprotinin use (<50% patients) was also performed.

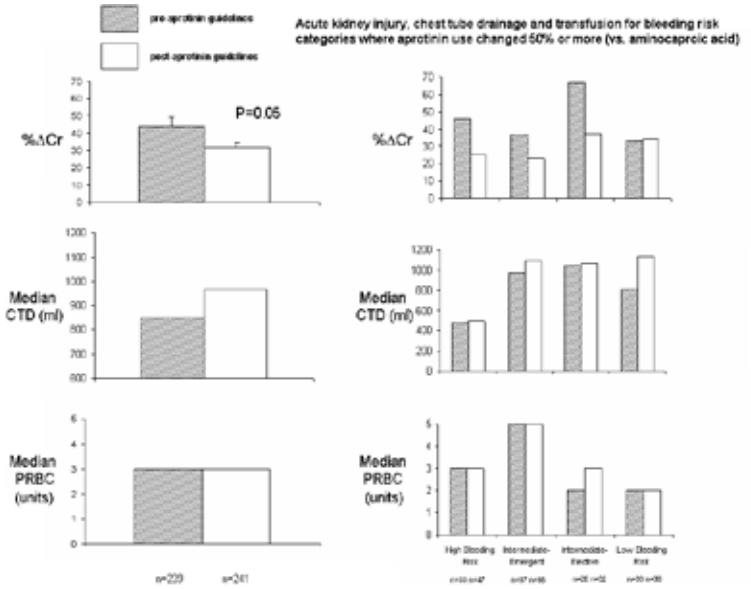
Results

Overall aprotinin use declined from 60% (n=479/801) to 20% (n=156/766) after institution of guidelines. Procedure and patient characteristics by surgeon were similar pre-to-post aprotinin use guidelines in the overall sample and in the anemia/transfusion risk subgroups. In the subset of groups with large reductions in aprotinin use (pre- 82%, n=239; post-guidelines 17%, n=241) there was a significant decrease in postoperative AKI (%DCr 43.8 vs. 31.7%, p=0.05; Figure). In the group with smaller reductions in aprotinin use (pre- 49%, n=562; post-guidelines 23%, n=525) there was a non-significant reduction in AKI (%DCr 34.2 vs. 32.8%, p=0.76).

Conclusions

In this retrospective study, there was a significant decline in post-cardiac surgery AKI associated with reduced aprotinin use (vs, aminocaproic acid). Notably, this effect appeared unrelated to bleeding risk group (Figure) and was accompanied by greater chest tube drainage (CTD) but not red cell (PRBC) transfusion. Conclusions to be drawn from such a small dataset are limited, but do not support a rationale that aprotinin nephrotoxicity is offset by its hemostatic advantage over aminocaproic acid in high risk patients.

Reference: Anesthesiology 2007;107:A1601



SCA107

INTEGRATION OF ADVANCED PATIENT SIMULATION INTO RESIDENT EDUCATION FOR CARDIAC ANESTHESIA TRAINING

Lynch J; Torsher L
Mayo Clinic, Rochester, MN, USA

Introduction:
Simulation in health care has been used as an educational tool for decades. Current simulation devices include several computer-controlled mannequin simulators, and anatomic models for invasive procedure simulation. These devices are often applied to a variety of cardiac educational activities. Discussion with residents revealed a perceived deficiency of experience weaning patients from cardiopulmonary bypass (CPB). We sought to supplement this experience with simulation-based teaching during the cardiovascular anesthesia rotation.

The Scenarios:
Scenarios for simulating weaning a patient from CPB have been developed using the SimMan®; (Laerdal Medical Corporation, USA) platform. A typical operating room setup is utilized, with all participants dressed in full scrub attire. Surgical drapes are in place, exposing the chest of the mannequin where photographs of CPB cannulation techniques are placed during each scenario. Two pieces of tubing wrapped in red or blue tape are secured to the drapes to simulate arterial and venous CPB tubing. The anesthesia resident assumes the role of the sole anesthesia-care provider for a patient near the end of CPB. Various combinations of problems are integrated into the scenarios and include ventricular fibrillation, bradycardia, hypotension, hypertension, ventricular failure, and protamine reactions. The anesthesia provider must recognize each problem and initiate appropriate treatment. They are also expected to direct the perfusion and surgical personnel through the weaning process. The scenarios can be performed with a minimum of two people other than the anesthesia provider; one person as the surgeon, and the other as the perfusionist who can run the scenario on a laptop computer if needed.

The SimMan®; platform can easily reproduce the hemodynamic state seen with CPB by selecting the narrowest pulse pressure, desired ECG rhythm, and pulmonary artery and central venous pressures. Trends and Handlers can be programmed to transition from state-to-state in the scenario, selecting any combination of hemodynamic parameters to be changed in each step. With the SimMan®; platform, each physiologic variable is independent of the others, allowing greater flexibility for programing different physiologic responses to medications and treatments for on-CPB and off-CPB states. Hemodynamic parameters can be changed in real-time if one wishes to deviate from the programmed transitions.

Each scenario is followed by 30-45 minutes of educational debriefing. Feedback from the resident participants has been positive, stating that these sessions are valuable educational experiences during their rotation.

Conclusion:
The SimMan®; simulator has provided the ability to create scenarios allowing residents to gain experience weaning patients from bypass. As our program has evolved, we have incorporated additional equipment and personnel to add to the realism of the situation. However, these scenarios can be created and effectively performed with minimal personnel and resources.

References
Eason MP. Semin Cardiothorac Vasc Anesth. 2005;9(4):309-23
Sinz E. Semin Cardiothroac Vasc Anesth. 2005;9(4):291-307

ANESTH ANALG 2008;106(SCA Suppl):1-128

SCA108

A COMPARATIVE RANDOMIZE STUDY OF 300 CASES OF LMA(PROSEAL) WITH STANDARD ORAL ENDOTRACHEAL TUBE FOR ANESTHESIA AND POST OPERATIVE VENTILATION IN CORONARY ARTERY BYPASS GRAFTING

Shastri N
Heart Care Clinic, Ahmedabad, Gujarat, INDIA

Introduction: This study is design to evaluate the difference in overall out come between two devices used to prolonged ventilation (more than 12hrs)in CABG , where endotracheal intubation is routine . It2 produces haemodynamic instability and lead to tachycardia,hypertension and myocardial ischemia in patient with CAD. E.T. tube in the trachea for long time may lead to the certain damage to the upper airway or by its introducing technique. LARYNGEAL MASK AIRWAY (LMA) is used to ventilate the patient in short surgical procedure with spontaneous or control ventilation. The long ventilation was never a good idea due to the gastric insufflations of the inspiration gas. After development of the Proseal LMA , gastric insufflation problem is reduced. In this study we have compared the long duration usage in about 300 cases in each group E(E.T). AND L(LMA).

Method: With IRB approval we studied overall out come (endotracheal intubation to extubation) in 300 cases in GROUP E(E.T.Tube used for ventilation) and 315 L(LMA used for ventilation) posted for CABG with normal LV function & stable angina.Exclusion criteria was mouth injury or opening less than 20 mm.Induction of Anesthesia, muscle relaxant, maintenance and monitoring was same in both the group.We looked for the Hemodynamic response with Laryngoscope and tube in GROUP E, and Introducer and LMA in group L. Attempt, re- placement, injury, during the procedure was noted, Ventilation like Peak airway pressure,compliacnce,PEEP,Leakage,SpO2,EtCo2,Blood gases were monitored in both the groups through out the surgery .Requirements of the sedatives and muscle relaxation was noted during the surgery . Post operative analgesia was standardized . During the weaning ,same monitoring continued in the ICU .Extubation was planned after reversing agents.

Results :Group E :Avg ventilation time :13 +/-3 hrs. 8 pt had procedure injury, 20-30% change in the hemodynmics during placement ,remained for 4-7 mins and regressed over 4-7 mins, 11 had ecg changes ,3 required beta blocker.Chest compliance avg 43+/-6, EtCO2 35+/-7,Peak 14+/-4,peep 0-3cm of water. At weaning ,19 pt had soreness in throat,8 had brochospasm , 4 had high PaCO2 No morbidity or mortality at 4th day. Group : L : Avg. ventilation time 11 +/-2.5 hrs,2 pt had injury,8-14% change in the hemodynamics,remained for 2-5 mins,regresses over 1-4 mins.2 had ecg changes, no treatment required.compliance 38 +/-5,At weaning Peak 18+/-3 cm of h2O,3 pt had soreness.17 had high paco2(42-51 mmhg).6 pt conversion to E.T. due to unsatisfactory placement and leak.

Conclusion: LMA (Proseal) is surely worth considering for airway management in CABG with fast track. Produces less hemodynamics instability . But ventilation monitoring is mandatory to avoid leak and hypoventilation related problem.

References:

1, Cardiovascular changes with the laryngeal mask airway in cardiac anaesthesia, : S. R. Bennett, D. et.al.
British Journal of Anaesthesia, 2004, Vol. 92, No. 6 885-887
2, An Alternative Airway in Cardiac Surgery? Ghosh et al. Ann Thorac Surg.1997; 63: 921-922
3, Laryngeal mask airway in cardiac surgery. Can J Anaesth. 1994 oct;41(10):1016.

SCA109

TRACHEAL EXTUBATION IN OPERATING ROOM AFTER OPCAB SURGERY

Rao R; Kumar K; Dal A; Dronam raju A
Apollo Heath City, Hyderabad, Andhra Pra, India

Aim-To determine the feasibility of on table extubation of patients undergoing OPCAB surgery with out thoracic epidural analgesia.

Method-All the 350 patients were premeditated with oral lorazepam. They were induced with fentanyl, thiopentone, pancuronium / vecuronium; maintained with isoflurane/sevoflurane, oxygen, air and bolus dose of fentanyl.All the patients received intravenous magnesium sulphate, 20 to40 meq. After administration of heparin patients were maintained with 100% oxygen, isoflurane/sevoflurane and fentanyl. Nitrous oxide was restarted soon after protamine administration. Muscle relaxant was not used after the first dose unless there is patient movement. The patients core temperature was held above 36 degree C. The OR temperature was kept at 22-23 degree C, a warm water blanket was kept on the table.After the closure of the chest inj. Diclofenac and inj ondansetron was given and patient were weaned from anesthesia and put on assisted ventilation.Once the spontaneous ventilation started, muscle relaxant was reversed with inj neostigmin and inj glycopyrolate. Ventilation was then maintained with oxygen and nitrous oxide (1:1). After the skin closure patients were put on 100% oxygen and were extubated if they fulfill the set criteria e.g.Respond to simple command,Spontaneous and smooth ventilation,ETCO2 <40, SpO2> 95% on fiO2 of 0.5 ,Respiratory rate <30,Temperature(rectal/nasal)>35 °C ,Absence of uncontrolled arrhythmia Pre and post-extubation haemodynamics, respiratory parameters, arterial blood gas patient compliance, sedation score, pain score, analgesia requirement, ionotropic support, re-intubation, ECG changes, CPK-mb were observed for 24 hrs after surgery.

Result- Extubation in the OR within 10 minutes of skin closure was achieved with our technique with out TEA. All patients showed improved recovery of mental status, early mobilization and oral intake of food; stable haemodynamics except for 3 patients who required re-intubation for re-exploration for bleeding. There is no increase in requirement of ionotropes or additional dose of analgesia. None of these patients required non-invasive ventilation.

Conclusion-We have studied 350 patients who underwent extubation on the operating table after OPCAB; we have found that the patients withstood the procedure without any added morbidity or discomfort. The procedure is therefore safe and added to the early recovery of the patient, which is the aim of fast-tracking anaesthesia.

DEMOGRAPHIC PROFILE

Patient Variable	Mean	STDEV
Age(y)	54.2	7.763
Sex M:F	298:52	
Weight	65.2	6.413
EF%	56.94	9.745
No of graft	2.84	0.853
	Frequency %	
Smoker	36	
Alcoholic	37	
Hypertension	73	
Unstable angina	26	
Previous MI	21	
LM disease	6	
RWMA	41	
Diabetes	37	
COPD	8	
Renal disease	2	
CVA	0.3	

HAEMODYNAMIC PROFILE

Parameter	Pre-Induction	Pre-Extubation	Post-Extubation (30 min)	Post-Extubation (4hrs)	Post-Extubation (8hrs)	Post-Extubation (12hrs)
Heart Rate	85.71	93.42	93.14	105.28	97	94.14
ABP-Systolic	154	129.85	120.85	129	138.57	135.57
ABP-Diastolic	75.57	68	62.14	67.85	73.28	69.71
ABP-Mean	105.14	91.14	83.71	92.28	98.14	90
PAP-Systolic	26.28	32.57	27.42	31.71	31.85	28.42
PAP-Diastolic	14.14	15.85	12.28	16.85	15.57	17
PAP-Mean	18.85	22.85	17.42	21.71	21.85	19

RESPIRATORY PROFILE

Parameters	Pre-Induction	Pre-Extubation	Post-Extubation (30 min)	Post-Extubation (4hrs)	Post-Extubation (8hrs)	Post-Extubation (12hrs)
Respiratory rate	17.28	23.71	20.57	24	22	21.71
SpO2	95	97.14	96.95	97.91	97.58	97.57
PaO2	77.65	167.78	122.08	143.94	126.35	132.07
PaCO2	34.47	43.74	40.7	42.52	39.04	39.91
pH	7.42	7.28	7.28	7.31	7.35	7.39

Time Variable	Mean	STDEV
Surgical Time(min)	275	35.416
End of surgery to extubation(min)	5.71	2.69
Total time in OR after extubation(min)	8.5	2.85
Total time in ICU(hrs)	31.85	9.2
Total time in step down ICU(hrs)	33.42	9.071

Complications	No. of cases	%
Reintubation	3 (for re-exploration due to bleeding)	0.66
ECG Changes	19	5.33
Arrhythmia	7 (four had AF and three had ventricular ectopic)	1.3
ST changes	12(elevated in all leads may be due to pericardial reaction)	4.0
Stroke	0	0
Death	0	0
Awareness	0	0

ANESTH ANALG 2008;106(SCA Suppl):1-128

SCA110

C-REACTIVE PROTEIN (CRP) GENE VARIANTS ARE ASSOCIATED WITH PEAK CRP LEVELS FOLLOWING CORONARY ARTERY BYPASS GRAFT SURGERY

Perry T[1]; Muehlschlegel J[1]; Fox A[1]; Collard C[2]; Liu K[1]; Body S[1]; Shernan S[1]

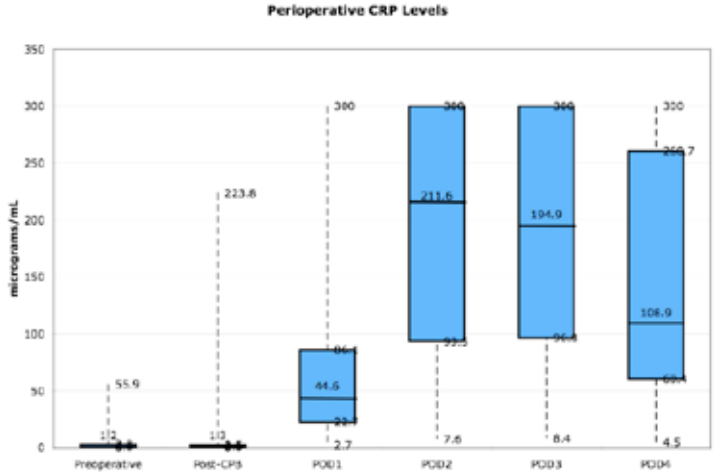
Brigham and Women's Hospital[1], Boston, MA, United States of America; Texas Hear Institute[2], Houston, TX, United States of America

Introduction: C-reactive protein (CRP) is markedly elevated following cardiac surgery. The heritability of baseline CRP levels in healthy subjects has been established, with specific CRP gene variants being known to influence ambulatory CRP levels. Additionally, IL-6 is known to regulate CRP expression at the transcriptional level. However, the influence of CRP or IL-6 gene variants on peak CRP levels following cardiac surgery is largely unexplored. We examined the association between CRP and IL-6 gene variants, and peak CRP levels following coronary artery bypass graft (CABG) surgery with cardiopulmonary bypass (CPB).

Methods: A multicenter candidate gene association study was undertaken to examine the association between CRP and IL-6 gene variants, and CRP levels following CABG surgery with CPB. Perioperative CRP levels were measured at six time points: immediately prior to surgery, post-CPB and on postoperative days (POD) 1-4. Subjects with a recent (<2 weeks) myocardial infarction, preoperative cardiac troponin I (cTnI) level greater than 0.17 ng/mL, preoperative white blood cell count >10.0/mm3 and preoperative serum CRP levels >60mg/mL were excluded from analysis. Nineteen candidate CRP and 21 IL-6 single nucleotide polymorphisms (SNPs) were examined for association with postoperative CRP levels after adjusting for patient demographics, perioperative risk factors, and medications.

Results: 604 subjects with complete clinical and genotyping data were examined. Median preoperative CRP level was 1.2 mg/mL. Postoperative CRP level was significantly elevated at all time points. Median peak postoperative CRP level was 293.3mg/mL, and occurred on POD 2 or 3 in 80.5% of patients. Clinical covariates associated with increased peak postoperative CRP were male gender (P=0.002), body mass index (BMI) (P=0.05) and perioperative administration of leukocyte-replete blood products (P=0.02). After adjusting for clinical covariates and time, and accounting for multiple comparisons, the triallelic promotor rs3091244 T allele (P=6.3x10-3) and the exonal rs1800947 C allele (P=2.4x10-4) were significantly associated with higher postoperative CRP levels. No IL-6 polymorphism was associated with postoperative CRP level.

Conclusion: We have identified two CRP gene variants associated with altered CRP levels in a cohort of patients undergoing cardiac surgery with CPB. These associations have not been previously described in the cardiac surgery patient population. Despite IL-6s reported promotion of CRP gene expression, IL-6 gene variants were not associated with peak postoperative CRP levels in our study population. Further research is necessary to determine if these CRP gene variants are also associated with adverse perioperative outcomes.



SCA111

HYPOTENSION INDUCED BY RIGHT ATRIAL INFLOW OCCLUSION FOR THORACIC AORTIC ENDOVASCULAR STENT PLACEMENT

Carvalho N; Lee W; Martin T; Gravenstein N; Peng Y
University of Florida, Gainesville, FL, USA

Introduction: Endoluminal devices to treat aortic disease continue to increase in popularity because of decreased perioperative morbidity compared with open repair. Distal migration during stent deployment can occur particularly with intrathoracic endografts. Induced hypotension is sometimes necessary for accurate endograft deployment. It is also helpful to prevent hypertension if adjunctive ballooning near the arch and proximal descending thoracic aorta is needed to ensure snug endograft seating. We describe a technique for transiently and precisely inducing hypotension by balloon occlusion of right atrial (RA) inflow.

Case Report: A 71 year old male underwent general anesthesia for endovascular relay thoracic stent graft placement to repair a 7.9 cm saccular aneurysm of the proximal descending thoracic aorta. After stent deployment distal to the left common carotid artery, there was still some antegrade perfusion of the left subclavian artery as well as a type 1 endoluminal leak. Hypotension was induced by RA inflow balloon occlusion in order to facilitate safe balloon molding of the proximal aortic arch attachment site. A medtronic reliant balloon was advanced via the right femoral vein under fluoroscopic guidance to the level of the RA and inflated to 25 ml. This was then gently retracted caudally to occlude the inferior vena cava inflow. The initial BP was 114/47 and this declined linearly to 65/37 within 1 minute (Figure 1). After discontinuing inflow occlusion the BP returned to 118/50 within 2 minutes without any overshoot. The baseline HR of 66 increased to a maximum of 78. Oxygen saturation remained at 100%. The procedure was completed successfully without complications.

Discussion: Several techniques have been used to induce hypotension for endovascular procedures. Pharmacological choices include deepening the anesthetic, nitroglycerin, sodium nitroprusside or a combination of these. The main downside of this approach is the variations in responsiveness of individual patients and the comparatively slow offset. High doses of adenosine have also been used to induce asystole, but the duration of asystole is unpredictable and cardiac activity may resume prior to completed stent deployment. Imposing a high level of PEEP in an attempt to reduce preload is another alternative to induce hypotension. However, this technique requires general anesthesia and also has a significant failure rate. The technique of RA inflow occlusion described above is an old concept with a novel application. It has the advantages of quick onset, no myocardial depression, no elevated cerebral venous pressure, no blood pressure overshoot upon discontinuation. It is reliable, prompt, and reversible and provides the ability to rapidly and discreetly adjust the degree of hypotension in real time according to the measured response.

References: Rousseau H: Stent-graft repair of thoracic aortic aneurysms. Tech Vasc Interv Radiol - 01-Mar-2005; 8(1):61-72.

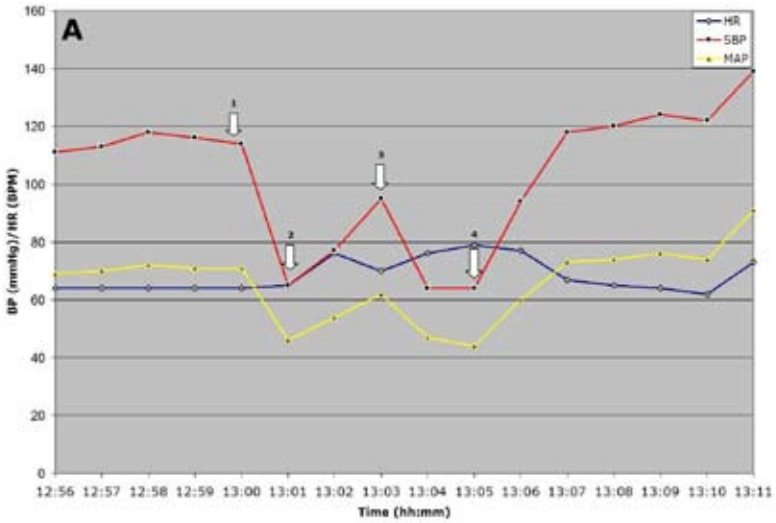


Figure 1: **1 – atrial inflow occlusion initiated**
2 – target hypotension reached
3 – proximal aortic molding balloon inflated
4 – atrial balloon relaxed and deflated

ANESTH ANALG 2008;106(SCA Suppl):1-128

SCA112

IS REAL-TIME-3D SUPERIOR TO 2D-TRANSESOPHAGEAL ECHOCARDIOGRAPHY TO IDENTIFY SEGMENTAL INVOLVEMENT OF THE MITRAL VALVE IN MITRAL REGURGITATION?

Jungwirth B; Glower D; Swaminathan M; Phillips-Bute B; Mathew J; Adams D; Mackensen GB
Duke University Medical Center, Durham, NC, USA

Background: Preoperative comprehensive evaluation of the mitral valve (MV) is essential for an optimized surgical approach to MV repair. Two-dimensional transesophageal echocardiography (2D-TEE) remains as the clinical standard for this evaluation, although recent studies show that three-dimensional (3D) reconstruction may add value to 2D-TEE especially in patients with complex MV anatomy.(1) However, 3D reconstruction is limited by motion artifacts requiring electrocardiogram and respiratory gating, long acquisition times and a time consuming off-line process. To overcome some of these limitations real-time (RT) 3D-TEE was recently introduced. The current study was designed to investigate the accuracy of RT-3D-TEE versus 2D-TEE in identifying the segmental involvement of the MV and underlying pathology in mitral regurgitation (MR).

Methods: With IRB approval, 2D-TEE and RT-3D-TEE images from 23 patients undergoing MV repair or replacement for MR were studied. Prior to surgery, all patients underwent a comprehensive TEE evaluation including standard 2D images for evaluation of the MV (four mid-esophageal views) as well as the 3D en face view with the RT-3D-TEE Matrix transducer (IE33 system; Philips Medical Systems, Andover, MA). These images were assessed by two board-certified echocardiographers, with one echocardiographer analyzing the images in real-time, and the other reviewing the digitized images off-line while blinded to surgical intervention and findings. The assessment included the identification of abnormal MV segments as well as the pathology leading to MR. The concordance between each echocardiographic assessment and the surgical finding as gold standard was determined. Both, 2D and 3D assessments as well as the raters were compared with the McNemar test.

Results: RT-3D-TEE was superior in identifying abnormal MV segments (93% correct) compared to RT-2D-TEE (71% correct, $p < 0.001$, table 1A), while assessment of the underlying pathology was comparable between the two modalities (97% correct for 3D and 95% for 2D, table 1B). Off-line assessment revealed no difference between 3D and 2D-TEE neither for the segments involved (53% correct for 3D and 61% for 2D, table 1A) nor for the underlying pathology (87% for 3D and 83% for 2D, table 1B). Off-line analysis of all but four segments (in two patients) was feasible using 3D images. Real-time (live) evaluation of the MV was superior to off-line analysis for both modalities in correctly identifying both, abnormal segments and underlying pathology ($p < 0.05$, table 1A and B).

Conclusion: RT-3D-TEE more accurately identified segmental involvement of the MV in patients with MR when compared to RT-2D-TEE and therefore might be helpful in optimizing the surgical approach to MV repair. However, real-time TEE evaluation rather than off-line review appears to be indispensable for both 2D and 3D-TEE to accurately assess the MV.

Reference: (1) R. Garcia-Orta J Am Soc Echocardiogr 2007;20: 4-12

Table 1A)

Segment analysis	Real-time rating (% correct)	Off-line rating (% correct)	McNemar (comparing raters)
2D	71.02	60.87	.03
3D	93.23	53.38	<.0001

Table 1B)

Pathology analysis	Real-time rating (% correct)	Off-line rating (% correct)	McNemar (comparing raters)
2D	94.57	82.61	.01
3D	97.83	86.96	.006

Table 1A) shows the comparison between the real-time and the off-line assessment for both, 3D-TEE as well as 2D-TEE. The percentage of accurately rated segments was obtained by comparison to the surgical finding.
Table 1B) shows the corresponding comparison for analysis of the underlying pathology.

SCA113

NATURAL HISTORY OF RENAL DYSFUNCTION AFTER BILATERAL ORTHOTOPIC LUNG TRANSPLANT

Satyapriya A; Balsara K; Davis R; Phillips-Bute B; Welsby I; Lin S
Duke University Medical Center, Durham, NC, USA

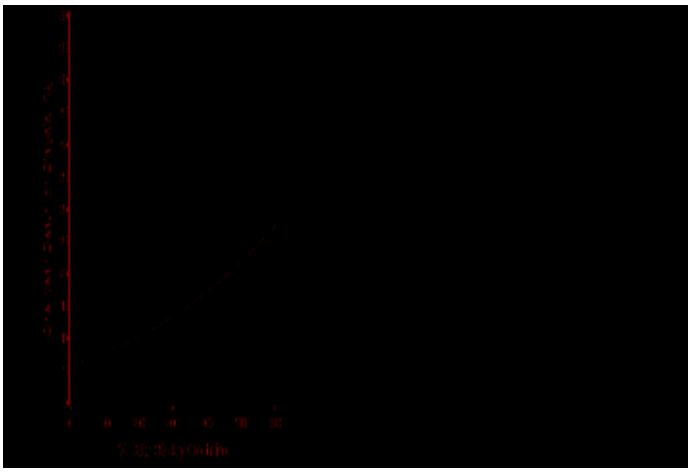
Purpose: Renal failure increases morbidity and mortality after Lung Transplantation (LT) (1). Anesthesiologists commonly observe renal dysfunction (RD) after LT, so our purpose was to define the time course of dysfunction and its association with hard outcomes.

Methods: We retrospectively reviewed charts and electronic records of adult, primary, off-pump LT patients between January 2000-2006 (n=215). Renal dysfunction (RD) was described as percentage increase in creatinine from baseline ((postop creatinine-baseline creatinine)/baseline creatinine) * 100) in a logistic regression model to determine odds ratios (95% confidence intervals) for developing death or dialysis at one year. We studied patients at POD 3 (Acute RD, ARD) and POD 30 (Sustained RD, SRD).

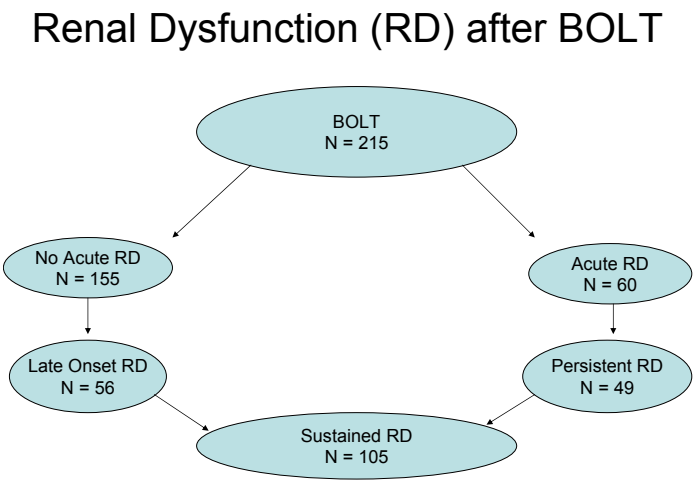
Results: The incidence of RD by POD 3 and 30 was 28% (n=60) and 49% (n=105) respectively. While 49 patients (23%) showed renal injury at both time points, 11 patients (5%) recovered from ARD and 56 (26%) patients without ARD developed SRD. The percent delta creatinine at 30 days is significantly associated with the likelihood of dialysis and death at one year (odds ratio 1.003 (1.001-1.006); $p<0.05$). In contrast, percent delta creatinine at 3 days was not, however a trend was noted (odds ratio 1.004 (0.999-1.009); $p>0.05$).

Conclusion: SRD affects long term outcome in primary, off pump BOLT patients. Our study shows a significant association between SRD and the composite endpoint, death or dialysis. Patients with increased percent delta creatinine at 3 days also appeared to have a trend towards worsened outcome as well, however did not have a statistically significant association. Future studies should focus on etiologies of both ARD and SRD, as there are both patients who had ARD which did not progress to SRD as well as those patients without ARD who did go on to develop SRD. It is imperative that in the future we search for ways in which to prevent SRD as it had increased association with death or dialysis in contrast to ARD which did not.

References:
(1) Kuitunen A. Ann Thorac Surg (2006)
(2) Palmer SM. Am J Transpl (2005)



Results from a logistic regression model showing association between % delta creatinine at 30 days and death or dialysis at 1 year.



ANESTH ANALG 2008;106(SCA Suppl):1-128

SCA114

COMPARISON OF THE HYBRID PROCEDURE TO THE STAGE I NORWOOD REPAIR FOR NEONATES WITH HYPOPLASTIC LEFT HEART SYNDROME

Motta P[1]; Castro P[1]; Mossad E[2]; Farid I[3]

Cleveland Clinic[1], Cleveland, OH, US; Texas Children's Hospital[2], Houston, TX, US; Akron Children's Hospital[3], Akron, OH, US

Introduction: Neonates with hypoplastic left heart syndrome (HLHS) undergo a staged surgical repair that continues to carry a high mortality (1). The hybrid procedure is an alternative intervention for these high-risk patients in an attempt to improve their survival (2). However, its advantage remains unclear and may even carry a higher risk in some reports (3).

Methods: We reviewed the records of 14 pediatric patients who underwent hybrid procedures between July 05 and July 07 and compared them with 28 historical controls who underwent the Norwood. Data abstracted included: demographics, perioperative variables and outcomes. Data are presented as mean +/- SD and analyzed using a student t-tesy and Fisher test.

Results: HLHS was the most common diagnosis of single ventricle in both groups (Hybrid = 71.4%, Norwood = 89.2%). Demographics are shown in table 1, pre and postoperatives variables in table 2. The outcomes were similar in both groups. The 30 day mortality (hybrid = 3/14, 21.43% vs Norwood = 4/28 , 14.81% p = 0.67), inter-stage mortality (hybrid = 3/14, 21.43% vs Norwood =2/28 , 7.41% p = 0.15) and total mortality (hybrid = 6/14, 42.86% vs Norwood = 6/28, 22.22% p = 0.27)

Discussion: Surgical palliation with Norwood procedure remains the treatment of choice for HLHS. However for higher risk patients the hybrid procedure has been considered an alternative. Both populations had similar gestational age, but the weight, and ascending aorta diameter were smaller in the Norwood group. Associated anomalies were more common in the hybrid group. The duration of the hybrid procedure was shorter, required less postoperative inotropic support and had fewer immediate postoperative complications. However, diastolic blood pressure was lower following the hybrid procedure due to the larger stented ductus allowing a run-off into the pulmonary circulation. The survival in the hybrid group was similar to what has been reported (2). The 30-day mortality, inter-stage mortality and overall mortality were similar for both groups. In our series, the hybrid procedure offered no advantage over the Norwood repair, and its role still remains unclear. This report is limited by the small population size and the possibility of a learning curve for the hybrid procedure. Future investigations including multicenter randomized trials will identify differences in preoperative risk, outcomes and advantages specific for each technique.

References:

1. Artrip JH, et al: (2006) Ann Thorac Surg;82:1252-1259
2. Bacha , et al: (2005) J Thorac Cardiovasc Surg; 131: 163-71
3. Li et al: (2007) Circulation 116;I-179-I-187

Table 1: Demographics (mean ± standard deviation / %)

	Hybrid	± SD	Norwood	± SD	p value
Gestational Age (weeks)	38.6	1.3	37.86	2.31	0.2
Age at operation (days)	9.57	4.75	5.19	3.36	0.006
Weight (kg)	3.28	0.55	2.87	0.57	0.03
Diameter of Ascending Ao	3.81	1.77	2.61	1.25	0.04
Duration of Surgery (minu	278.29	114.74	362.14	95.44	0.03
Associated anomalies (%)	7	50%	6	21.40%	0.08
Complications (%)	1	7.10%	24	85.70%	0.01
Inhalation agent (%)	10	71.43%	16	59.26%	0.5
Fentanyl mcg/kg	27.4	28.73	59.98	27.18	0.001

Table 2: Preoperative and Postoperative variables (mean ± standard deviation)

	Hybrid		Norwood		
Preoperative variables	**Mean**	**±SD**	**Mean**	**± SD**	**p value**
SaO2	81.83	13.95	87.82	9.19	0.18
FiO2	19.81	1.46	21.17	1.36	0.0074
PaO2	42	8.19	50.18	13.02	0.02
SBP	65.14	6.79	66.82	10.15	0.53
DBP	37.36	5.26	36.57	7.65	0.7
Inotrope use (%)	12	85.70%	26	96.30%	0.59
Postoperative variables					
SaO2	76.45	9.51	82.29	9.8	0.0011
FiO2	26.64	21.11	35.14	5.32	0.0508
PaO2	40.68	5.48	55.39	15.11	0.02
SBP	69.93	15.58	65.36	12.71	0.3521
DBP	32.57	7.09	41.86	11.21	0.0023
Inotrope use (%)	11	78.50%	28	100%	0.03

SCA115

CHANGES IN MITRAL VALVE GEOMETRY FOLLOWING REPAIR OF ISCHEMIC MITRAL REGURGITATION

Karthik S; Mahmood F; Subramaniam B; Panzica P; Lerner A; Jervis K; DeLatorre R
BIDMC, Boston, MA, USA

Ischemic mitral regurgitation (MR) may occur due to mitral annulus and left ventricular dilation. Papillary muscle and segmental left ventricular dysfunction may also cause leaflet restriction causing MR. Availability of three-dimensional (3D) echocardiography in the operating room has made it possible to assess changes in the geometric structure of the mitral valve apparatus. It is also possible to assess the effects of different repair techniques on these geometric parameters.

Methods: We used the Siemens Sequoia C-512 ultrasound system (Mountainview CA) with an omniplane TEE probe for acquisition of multiple 2D images at five degrees interval from zero to 180 degrees. This rotational acquisition was gated to R-wave of the EKG. These five degree cut-planes were volume rendered to obtain an en-face view of the mitral valve. Mitral Valve Research Package (TomTec Imaging Systems GmbH, Munich, Germany) a software for geometric reconstruction of mitral valve as used for analysis. Antero-Posterior (AP), Lateral-Medial (ML), Spericity Index (AP/ML diameter) and Non-Planarity angle values were generated (Figure 1). The average time required for acquisition and reconstruction ranged from 2-3 minutes.

Results: Between May 2006 and July 2007, 102 three-dimensional mitral valve reconstructions were performed. 9 reconstructions were found to be of poor quality preventing further analysis. 5 patients had atrial fibrillation preventing appropriate R wave gating. 4 patients had severely dilated left atria causing ultrasound dropout. 34 of 93 patients had mitral valve repairs. 16 patients were identified as having ischemic mitral regurgitation (IMR) . Their Carpentier classification is given in table 1. Of the 16 patients with IMR, the mean mitral annulus area decreased from 10.85 to 5.5 cm2 after annuloplasty ring placement. All diameters of the mitral valve decreased post repair (Figure 1). The mean non-planarity angle increased from 135.73 degrees to 142.63 degrees. The sphericity index remained relatively unchanged after repair Table 2).

Discussion: It is possible to analyze the mitral valve geometrically in a timely fashion in the operating room. There are significant changes in mitral valve geometry after annuloplasty ring placement which are manifested as changes/reductions in valve diameters.

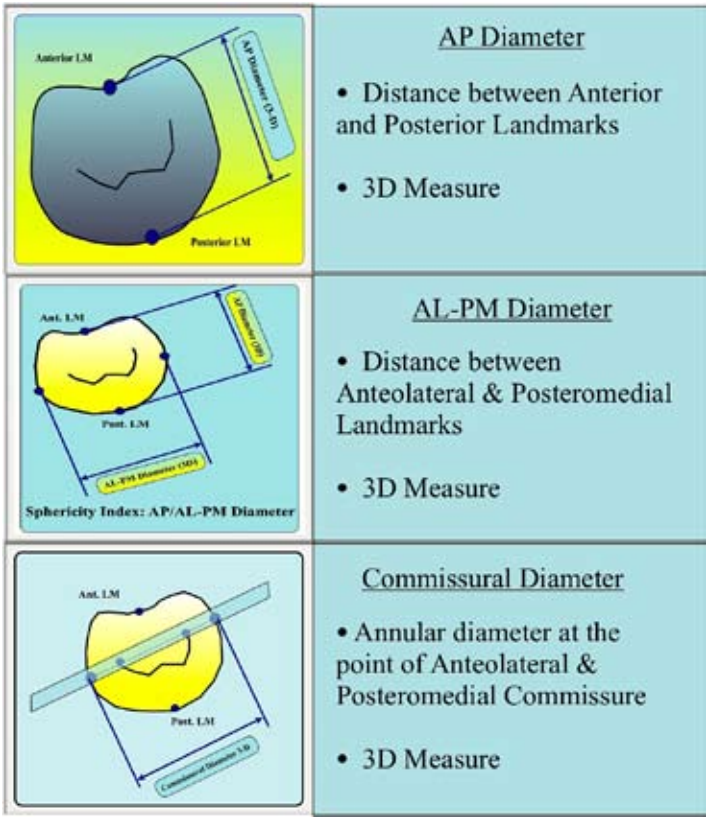
Table 1: Ischemic Mitral Regurgitation

Carpentier class	Number of Pts
Type I	6
Type III	6
Type I + IIIb	4
Total patients	16

Geometric parameters	Pre-Repair	Post- Repair
Mitral Annulus Area	10.85 cm2	5.5 cm2
Mitral Annulus perimeter	12.94 cm	9.47 cm
Sphericity Index	0.87	0.85
NonPlanarity Angle	135.73	142.63
AP Diameter	3.38 cm	2.37 cm
Commisural Diameter	3.38 cm	2.55 cm
ALPM Diameter	3.39 cm	2.79 cm

Geometric parameters	Pre-Repair (Average)	Post- Repair (Average)
Mitral Annulus Area	10.85 cm2	5.5 cm2
Mitral Annulus perimeter	12.94 cm	9.47 cm
Sphericity Index	0.87	0.85
NonPlanarity Angle	135.73	142.63
AP Diameter	3.38 cm	2.37 cm
Commisural Diameter	3.38 cm	2.55 cm
ALPM Diameter	3.39 cm	2.79 cm

Table 2



ANESTH ANALG 2008;106(SCA Suppl):1-128

SCA116

PREDICTORS OF POSTOPERATIVE DELIRIUM IN CORONARY SURGICAL PATIENTS

Otomo S; Baba T; Maekawa K; Yoshitake A; Goto T
Kumamoto Chuo Hospital, Kumamoto, Japan

Backgrounds

Neurological dysfunction after cardiac surgery is a devastating complication. Delirium, a central nervous dysfunction, has been reported to occur in approximately 10 to 28 % and is associated with increased morbidity, mortality and duration of hospital stay. However, the pathophysiology of delirium remains elusive. We investigated the incidence, predictors, and the etiology of postoperative delirium.

Methods

Data were collected prospectively on 96 patients who underwent elective coronary artery bypass grafting between October 2004 and March 2007. All patients underwent preoperative brain magnetic resonance imaging (MRI) and angiography to assess for prior cerebral infarcts, carotid artery stenosis, and intracranial arterial stenosis. Epiaortic ultrasound was performed at the time of surgery to assess for atherosclerosis of the ascending aorta. Four cognitive tests were performed preoperatively and 1 week postoperatively. Neuropsychological (NP) dysfunction was defined as a decrease in an individuals performance in more than two tests of at least 20% from baseline. Delirium was assessed by the NEECHAM confusion (NCS) and Delirium Rating scales (DRS, score 0 to 32). NCS was preoperatively evaluated for estimating delirium, and DRS was performed postoperatively during 3 days following the day of extubation. We defined delirium as scores above 12 on the DRS.

Results

Postoperative delirium occurred in 12 patients (12.5 %). Delirious patients had significantly higher rates of preoperative cognitive dysfunction (Hasegawa Dementia Scale < 24, 42 vs. 8 %, P=0.006), scores less than 26 on the NCS (25 vs. 1.2 %, P=0.005), peripheral vascular disease (50 vs. 14 %, P=0.003), a history of cerebrovascular disease (50 vs. 9.5 %, P<.001), preoperative cerebral infarcts in MRI (67 vs. 26 %, P=0.014), severe carotid atherosclerosis (plaque score 11.7±6.4 vs. 8.4±4.9, P=0.0039) and high Euro SCORE (6.3±2.3 vs. 4.5±2.7, P=0.038) than patients without delirium. Additionally, postoperative delirium was associated with significantly higher NP dysfunction rate (50 vs. 17 %, P=0.008) and postoperative stroke occurred only in one delirious patient.

Discussions

Our results suggest that systemic atherosclerosis and cerebral microembolism are associated with the development of delirium after CABG surgery. Rudolph et al. also reported atherosclerosis was a significant risk factor for postoperative delirium. To prepare for prompt diagnostic and therapeutic intervention after surgery, it is important to identify patients at risk for delirium before surgery, and to select operative strategies that prevent hypoperfusion and microemboli. Further study is needed to investigate the association between delirium and NP dysfunction after cardiac surgery.

Conclusion

Postoperative delirium is associated with preoperative cognitive dysfunction, scores less than 26 on the NCS, peripheral vascular disease, a history of cerebrovascular disease, preoperative cerebral infarcts in MRI, severe carotid atherosclerosis and high Euro SCORE. Further study is needed to reveal the etiology of postoperative delirium.

Reference

1) Selnes OA, et al. Lancet 1999; 353: 1601-1606
2) Rudolph JL, et al. J Am Geriatr Soc 2005; 53: 462-466

SCA117

A RETROSPECTIVE REVIEW OF APROTININ'S SAFETY AND EFFICACY IN NEONATES UNDERGOING CARDIOPULMONARY BYPASS

Guzzetta N; Evans F; Baker M; Fazlollah T; Miller B
Emory University School of Medicine, Atlanta, GA, USA

Background: Recent concern about the safety of aprotinin administration to adult cardiac surgical patients has led to its temporary suspension from worldwide markets. However, few studies have examined its safety in pediatric patients. Pediatric studies evaluating aprotinins safety have been hindered by the heterogeneity of pediatric patients and the inconsistency of clinical protocols. In this investigation, we retrospectively reviewed neonatal cardiac surgical cases performed at our institution over a two year period to determine the safety and efficacy of aprotinin in a specific pediatric patient population using a consistent clinical protocol.

Methods: Two hundred and two consecutive neonates scheduled for palliative or corrective congenital cardiac surgery requiring cardiopulmonary bypass from January 1, 2005, through February 28, 2007, were included in this retrospective investigation. Markers of safety included 72-hour postoperative renal dysfunction, need for dialysis (peritoneal or hemodialysis), thrombosis and in-hospital mortality. Efficacy of aprotinin was assessed by postoperative blood loss and transfusion requirements. Clinical outcomes, specifically duration of mechanical ventilation and length of ICU stay, were also recorded.

Results: Neonates were divided into two groups: those who received aprotinin (n = 157) and those who did not (n = 45). Twenty four-hour postoperative serum creatinine (Cr) levels were significantly greater than baseline levels in both groups. The elevated Cr level returned to baseline by 72-hours postoperatively in the no aprotinin group, but remained significantly elevated in the aprotinin group (Table 1). However, this elevated 72-hour postoperative Cr level in the aprotinin group did not reach the criterion for defining renal dysfunction as previously described in the adult literature (50% greater than preoperative levels). Multivariable regression analysis identified CPB time as the only significant predictor of postoperative renal dysfunction. Furthermore, the need for postoperative dialysis, the incidence of postoperative thrombosis and in-hospital mortality were not statistically significantly different between the two groups. Twenty four-hour chest tube drainage, transfusion requirements and clinical outcome variables were also not different between the two groups.

Conclusion: This investigation supports the conclusion that aprotinin is safe to use in neonates undergoing cardiac surgery. Our data show no increase in postoperative dialysis, postoperative thrombosis or in-hospital mortality in neonates receiving aprotinin. However, our data do suggest that aprotinin may indeed prolong the recovery of elevated 24-hour postoperative Cr levels to baseline values. Despite this positive safety profile, we found no evidence to support aprotinins efficacy in reducing postoperative blood loss and transfusion requirements this patient population.

Table: Mean creatinine levels

	Aprotinin (n = 157)	**No aprotinin (n = 45)**
Preop creatinine	0.66 ± 0.21	0.66 ± 0.17
24-hour postop creatinine	0.88 ± 0.28*	0.81 ± 0.25*
72-hour postop creatinine	0.82 ± 0.45*+	0.72 ± 0.25

Values expressed as mean ± SD.

* $p < 0.001$ vs pre-op, + $p \leq 0.05$ vs "no aprotinin" group

ANESTH ANALG 2008;106(SCA Suppl):1-128

SCA118

LOW CONTINUOUS CENTRAL VENOUS OXYGEN SATURATION (SCVO2) IN PEDIATRIC PATIENTS UNDERGOING CARDIAC SURGERY

Crowley R; Ho J; Sanchez E; Corniea J; Canales C; Lee K; Mahajan A
UCLA, Los Angeles, CA, USA

Introduction: Central venous oxygen saturation (ScvO2) can be used to determine adequate tissue perfusion during cardiac surgery. Studies in adults have shown that ScvO2 can detect global hypoxemia despite apparently normal standard hemodynamic parameters, and low ScvO2 is associated with increased risk of postoperative complications in adult cardiac surgery patients. Similar association in pediatric patients is less known; therefore, using a recently available pediatric ScvO2 catheter, we prospectively studied continuous ScvO2 in pediatric patients undergoing cardiac surgery in the operating room (OR) and intensive care unit (ICU). We aim to determine the influence of perioperative ScvO2 on patient outcomes and correlation of ScvO2 with standard hemodynamic parameters.

Methods: Following institutional review board approval and parent informed consent, thirty patients undergoing cardiac surgery and requiring central venous catheterization were enrolled. A double or triple lumen (4.5 F/5 cm, 4.5 F/8 cm, or 5.5F/ 8 cm) central venous catheter (PediaSatTM, Edwards Lifesciences, Irvine, CA) was selected according to patient size. The tip was placed in superior vena cava (SVC) above the caval-atrial junction and was confirmed via transesophageal echocardiography. Continuous ScvO2, heart rate (HR), mean arterial pressure (MAP), central venous pressure (CVP), arterial pulse-ox (SpO2), temperature (core and peripheral) were obtained perioperatively and every two hours in the ICU up to 24 hours post surgery. Venous blood gases (VBG) and lactate were obtained at pre-determined time points in the OR and ICU. Patients with cyanotic lesions were placed in individual subgroup for analysis. Non parametric Spearman correlation (rs) methods were used to assess associations and the potential influence of OR predictors on patient ICU outcomes. Bland-Altman analysis was employed to compare ScvO2 and VBG measurements.

Results: Mean age 3 years (range 0.1-9 years) and mean weight 13.5 kg (range 3.1- 28 kg). Preliminary findings indicate there were no significant Spearman correlations between the length of time patients sustained perioperative ScvO2 decline of <10% or <20% below baseline saturation and urineoutput, lactate, length of ICU stay, and length of intubation. However, statistically significant correlations resulted between the length of time patients sustained perioperative ScvO2 decline of <50% below baseline saturation and urine output (rs=-0.4), lactate (rs=0.4), length of ICU stay (rs=0.5), and length of intubation (rs=0.4). Analysis of 210 paired data sets of ScvO2 and VBG measurements showed a difference of means (bias) of 1.04 % with + 4.82 % precision.

Discussion: Preliminary results suggest that extended periods of low perioperative ScvO2 is associated with increased risk of poor ICU outcomes in pediatric patients undergoing cardiac surgery. Our results support the potential use of ScvO2 as a target parameter in high-risk pediatric patients to improve outcome. Further investigation should focus on defining target ScvO2 levels specific to patient groups and quantifying ScvO2 temporal responsiveness to changes in standard hemodynamic parameters.

SCA119

CAN THROMBOELASTOGRAPHY BE USED TO GUIDE RECOMBINANT FACTOR VIIA THERAPY FOR REFRACTORY HEMORRHAGE AFTER CARDIAC SURGERY? AN OBSERVATIONAL STUDY.

Wasowicz M; Meineri M; McCluskey S; Mitsakakis N; Karkouti K
Toronto General Hospital/University Health Network, University of Toronto, Ontario, Canada

Background. The recombinant activated factor VII (rFVIIa) is frequently used in excessively bleeding cardiac surgical patients who are not responding to standard therapy and surgical treatment. Usually, rFVIIa is administered according to clinical protocols and standard coagulation test are unable to guide this therapy. The aim of this study was to etermine if: 1) any coagulation defects could be identified by TEG; 2) if TEG could be used to predict response to rFVIIa; and 3) if TEG could be used to monitor effects of rFVIIa.

Material and Methods. Study protocol was approved by local REB. During studied period of time we analyzed 38 patients who underwent cardiac surgery in our Institution and received rFVIIa for intractable bleeding. Standard coagulation tests and TEG measurements were performed before and after administration of rFVIIa. Administration of rFVIIa was guided by clinical protocol. For TEG measurements we analyzed un-activated samples, and kaolin or tissue factor activated samples. All data were collected retrospectively from patients records. Patients were divided into 2 groups: responders and non-responders using following criteria: 2 investigators independently review the medical records and make a judgment call about whether rFVIIa was effective. In case of disagreements we had a third person (investigator) to review and make determination. Patient characteristics for the two groups were compared The values of coagulation variables (both TEG and standard) were compared between responders and non-responders to rFVIIa, using Fishers Exact (for categorical) and Wilcoxon Signed Rank tests (for continuous variables). TEG measurements pre and post rFVIIa administration were compared using non parametric (Wilcoxon Signed Rank) paired tests.

Results. Both reviewers classified the same patients as non-responders and review by third investigator wasnt necessary. 30 pts were classified as responders and 8 as non-responders (Pts. characteristics presented in Table 1). Responders received significantly less FFP,Plts and RBC transfusions after rFVIIa was administered. No other significant differences were found. The results of TEG analysis performed before and after administration of rFVIIa were not significantly different. It applies to measurements done with non-activated blood as well as tissue factor or kaolin activated blood. Additionally, 2 or more abnormalities in kaolin activated TEG performed before rFVIIa is given indicated high odds that therapy could be ineffective.

Conclusions In conclusion, since the results of TEG analysis performed before and after rVIIa is given are not significantly different, TEG does not seem to be useful to monitor, guide and follow effects of rFVIIa given to patients who had cardiac surgery and bled excessively. On the other hand, kaolin activated TEG is a useful predictor of non-responding to rFVIIa therapy after cardiac surgery complicated with excessive bleeding.

TABLE I Patient Characteristics

Variable	*Total (N=38)*	*Reponders (N=30)*	*Non-responders (N=8)*	*P-value*
Age (years)	65 (20-82)	65 (20-82)	57 (20-73)	0.15
Female	14 (36.8%)	10 -(33.3%)	4 (50%)	0.43
Surgical Variables				
Redo surgery	12 (31.6%)	7 (23.3%)	5 (62.5%)	0.0806
Ascending Aorta/Arch	6 (15.8%)	4 (13.33%)	2 (25%)	
Congenital	3 (7.9%)	3 (10%)	0 (0%)	
LVAD/TX	1 (2.6%)	0 (0%)	1 (12.5%)	
Single Valve/ACB	13 (34.2%)	12 (40%)	1 (12.5%)	
Other	15 (39.5%)	11 (36.67%)	4 (50%.)	
Received Aprotinin	12 (31.6%)	7 (23.33%)	5 (62.5%)	0.0806
Re-exploration				
before 1st dose rFVIIa	12 (31.6%)	11 (36.7%)	1 (12.5%)	0.39
after 1st dose rFVIIa	3 (7.9%)	1 (3.33%)	2 (25%)	0.11

rFVIIa= recombinant factor VIIa; Acsending Aorta/Arch= Surgery on Ascending Aorta or Aortic Arch; Congenital= Surgery for omplex adult cardiac congenital disease; Single Valve/ACB= Isolated coronary artery bypass grafting or single valve surgery; Other= other cardiac surgical procedure; Received Aprotinin= all others received tranexamic acid.

ANESTH ANALG 2008;106(SCA Suppl):1-128

SCA120

OFF-PUMP CABG AND ON-PUMP CABG: A RETROSPECTIVE REVIEW OF INTRAOPERATIVE GLUCOSE CONTROL AND INSULIN REQUIREMENTS

Hanni K; Soong W; Avram M; Patel K; Afifi S
Northwestern University, Chicago, IL, USA

Introduction: Cardiac surgery requiring cardiopulmonary bypass (CPB) is known to cause hyperglycemia. Elevated peak serum glucose during CPB is an independent risk factor for death and morbidity in both diabetic and nondiabetic patients.[1] Initiation of CPB leads to an amplification of the inflammatory response generated by surgical stress. Manifestations of this inflammatory cascade include hyperglycemia and insulin resistance. It therefore seems feasible that avoidance of CPB and the additional amplification of the inflammatory response may improve intraoperative glucose control.

Methods: After IRB approval, 129 patients presenting for coronary artery bypass grafting (CABG) at our institution from October 2005 to July 2006 were identified from a Society of Thoracic Surgeons database. We performed a retrospective cohort study examining the incidence and degree of intraoperative hyperglycemia, insulin requirements, and demographics in patients undergoing cardiac surgery with and without CPB. Groups were divided into those with history of diabetes (40) and those with no history of diabetes (87). Each group was further stratified into on-pump and off-pump CABG (OPCAB). Peak glucose (mg/dl) p value was determined using unpaired t-test. Insulin (units) p value was determined using Mann-Whitney U-test.

Results: There was no statistical difference in gender and age between diabetics and non-diabetics. Insulin requirements and peak serum glucose were significantly elevated in on-pump CABG compared to off-pump CABG in both diabetics and non-diabetics. (Table 1 and Table 2) Discussion: Tight glucose control of patients in the intensive care unit has been shown to reduce morbidity and mortality of surgical patients.[2] Much has been made of the development of a technique for maintaining euglycemia during CPB and the pitfalls of hypoglycemia. [3] Our data suggests that the bodys glycemic balance is better preserved with OPCAB than on-pump CABG in both diabetic and nondiabetic patients. Though this may seem intuitive, no one has compared intraoperative OPCAB and on-pump CABG glycemic control, this highlights the need for a prospective trial to confirm our data. Also, further knowledge of the difference in glycemic balance between OPCAB and on-pump CABG may lead to the development of different postoperative hyperglycemic protocols for each group.

1. Doenst T, et al. Thorac Cardiovasc Surg 2005;130:1144-50
2. Van Den Berghe G et al. N Engl J Med 2001;345:1359-67
3. Chaney MA, et al. Anesth Analg 1999;89:1091-5

Table 1. Intraoperative characteristics of patients stratified by CPB and a history of diabetes and OPCPB and a history of diabetes

	CPB with a History of Diabetes	OPCAB with a History of Diabetes	Difference (95% CI)	P Value
N	28	12		
Males/Females	21 (75.0%)/7 (25.0%)	11 (91.7%)/1 (8..3%)	-16.7% (-37.5% to 13.2%)*	0.3955**
Age (yr)	63.9 ± 11.4	65.0 ± 14.5	-1.1 (-9.8 to 7.5)	0.7911†
Insulin (units)	35 (10 – 137)	8.5 (0 – 70)	20 (10 to 38)	< 0.0011‡
Peak glucose (mg/dL)	247 ± 46	165 ± 49	82 (49 to 115)	< 0.0001†

Data are presented as number (%), median (range), and mean ± S.D.

*The 95% confidence interval for the difference was calculated using the Farrington & Manning score.

**The P value given is the probability determined by Fisher's exact two-sided hypothesis test about the difference.

† The P value given is the probability determined by the unpaired t-test.

‡ The P value given is the probability determined by the Mann-Whitney U-test.

N = 27

Table 2. Intraoperative characteristics of patients stratified by CPB and no history of diabetes and OPCPB and no history of diabetes

	CPB with No History of Diabetes	OPCAB with No History of Diabetes	Difference (95% CI)	P Value
N	57	30		
Males/Females	45 (79.0%)/12 (21.0%)	22 (73.3%)/8 (26.7%)	5.6% (-12.2% to 25.7%)*	0.5978**
Age (yr)	63.3 ± 10.0	68.8 ± 10.3	-5.5 (-10.0 to -0.9)	0.0184†
Insulin (units)	10 (0 – 53)	0 (0 – 15)	10 (10 to 15)	< 0.0001‡
Peak glucose (mg/dL)	255 ± 57	152 ± 32	103 (81 to 126)	< 0.0001†

Data are presented as number (%), median (range), and mean ± S.D.

*The 95% confidence interval for the difference was calculated using the Farrington & Manning score.

**The P value given is the probability determined by Fisher's exact two-sided hypothesis test about the difference.

† The P value given is the probability determined by the unpaired t-test.

‡ The P value given is the probability determined by the Mann-Whitney U-test.

N = 56

SCA121

ACUTE PREOPERATIVE PLASMAPHERESIS IN PATIENTS WITH HEPARIN-INDUCED THROMBOCYTOPENIA FOR CARDIAC SURGERY

Barron M; Gaitan B; Katz J; Shariatmadar S; Andrews D
University of Miami Miller School of Medicine, Miami, FL, USA

Introduction. Safe and effective management of patients(pts) undergoing cardiac surgery with heparin-induced thrombocytopenia (HIT) remains a clinical challenge. Recommendations and consensus for anticoagulation in patients with HIT are lacking, and comparative trials of usage await prospective study(1,2). There are many clinically limiting and proscribing properties of the direct thrombin inhibitors(3,4). Alternate treatment approaches include plasmapheresis, therapeutic plasma exchange(TPE) with active physical removal of the heparin associated IgG, and has been reported anecdotally, notably for acute thrombotic HIT and salvage therapy(5,6,7). Because of concerns of direct thrombin inhibitor use, and pt related conditions, we describe the use of acute TPE/plasmapheresis for confirmed HIT in acute cardiac surgery.

Methods and Results. 3 pts with the clinicopathologic syndrome of HIT (combined history of diagnosed HIT less than 100 days from previous heparin exposure, platelet count<100,000, recent decline in platelet count>50% by previous heparin exposure, and positive platelet factor 4 (PF4) antibodies(Ab)) who required urgent cardiac surgery with cardiopulmonary bypass(CPB) received immediate preoperative TPE followed by rechallenge with full systemic heparinization for CPB. All three patients were redo/multiple sternotomies, predicted extended CPB times, and one was a cardiac transplant recipient. Each pt recieved a weight-based TPE with a 1.5 plasma volume exchange with FFP as the replacement solution. PF4 levels were assayed prior to and immediately following TPE. The PF4 Enhanced Test Solid Phase ELISA(GTI http://www.gtidiagnostics.com)simultaneously measures IgG, IgM, and IgA heparin-associated Ab. The threshold for positive detection is >0.40 OD (optical density units). All 3 pts had positive PF4 levels and achieved acute reductions in PF4 values to undetectable levels. All pts tolerated the TPE procedure well, had no difficulties initiating uncomplicated anticoagulation for CBP, no thrombotic complications, blood product utilization was not beyond expected, and went to the ICU with undetectable PF4 levels for the first 24 hrs.

Conclusion. The use of TPE in HIT in this setting and for this purpose has not been reported to date. TPE has been used in other clinical scenarios including HIT thrombosis by reducing PF4/heparin Abs(7). It is known that the presence and level of the Abs, regardless of thrombocytopenia are associated with increased morbidity and mortality in cardiac surgery(1). Antigen assays(ELISA) are highly sensitive for detecting anti-PF4/heparin Abs and because these tests respond positively to clinically insignificant levels, seronegativity was postulated to be a reliable surrogate for clinical safety for acute heparin reexposure(2). Suggesting formal study, TPE may be a viable option in HIT.

1.Levy J et al. Anes Analg 105:3;570-582 2.Murphy GS et al. J. Cardio Vasc Anes 21:1;113-126
3.Stratman et al. Anes Analg 2004;98:1635-1639 4.Koster et al. Current Opinions in Anesthesiology
17(1):71-73.2004 5.Dager WE et al. Ann Pharmacother 36;489-503 6.Messmore H et al. Pifarrerr, ed.
New Anticoagulants for the Cardiovascular Patient. Hanley and Belkus 1997:83 7.Antonevic NM et al. J
Clin Apheresis 21:252-255.2006

ANESTH ANALG 2008;106(SCA Suppl):1-128

SCA122

RETROGRADE PERCUTANEOUS AORTIC VALVE REPLACEMENT IN SEVERE AORTIC VALVE STENOSIS: ANESTHESIA MANAGEMENT AND SHORT TERM OUTCOME

Basciani R; Henle S; Zobrist C; Wenaweser P; Windecker S; Eberle B
University Hospital Bern, BE, Switzerland

Background: Percutaneous aortic valve replacement (PAVR) emerges as alternative treatment option for severe symptomatic aortic valvular stenosis in high-risk patients (1). We describe anesthesia management and outcome of a first patients series in our institution.

Patients and Methods: With IRB approval and written informed consent, 18 patients (8 m / 10 f; mean age: 85±5 y,) presenting with symptomatic (mean NYHA class: 2.7±1.0) severe aortic stenosis (valve area: 0.6±0.2 cm²) at high-risk for surgical valve replace¬ment (logistic EuroSCORE: 28±16%, STS score 12±8) underwent PAVR using the CoreValve Revalving System (n=16) or the Edwards-SAPIEN valve (n=2) between August and December 2007. Pre-procedural evaluation revealed significant coronary artery disease in 67%, a left ventricular ejection fraction of 51±19%, systolic pulmonary hypertension >60mm Hg in 33%, previous cardiac surgery in 22%, peripheral vascular disease in 44%, and renal failure (creatinine >200µmol/l) in 11%.

Results: PAVR was performed using general anesthesia with intubation (GA) in 7/18, and Monitored Anesthesia Care (MAC: local anesthesia, sedative/analgesic supplement) in 11/18 patients. Monitoring included radial and pulmonary artery catheters, and two temporary transvenous pacers for rapid pacing. Edwards-SAPIEN valves were placed with TEE guidance under GA. Vasopressor infusions were necessary in 7/7 patient under GA (100%) and in 5/11 under MAC (45%). Total procedural duration was 138±36 min. At the end of the procedure, 15/18 patients were extubated, awake and neurologically adequate. One patient was converted from MAC to GA during a short period of CPR following valve placement, but recovered fully on postoperative day (POD) 1; another patient, already on mechanical ventilation preoperatively, was extubated at POD 2. Yet another patient (1/18; MAC) died from massive aortic regurgitation after valvuloplasty prior to PAVR (intraprocedural mortality, 6%). In 17 patients (94%), device success was achieved (immediate decrease in aortic valve mean gradient from 50±12 to 7±6 mmHg; aortic regurgitation mean grade 1.8±0.7 and no case of severe paravalvular leak post PAVR). Three patients (17%) required GA later for surgical revision of vascular access sites. There was no peri-procedural cerebrovascular accident, coronary obstruction, tamponade, infection or conversion to valve surgery.

Conclusions: Our early experience of PAVR in selected high-risk elderly patients with severe aortic stenosis demonstrates acceptable device success, good hemodynamic results and rapid post-interventional recovery. MAC was associated with more hemo¬dynamic stability and less pharmacological intervention.

Reference: 1) Webb JG, Pasupati S, Humphries K et al. Circulation 2007;116(7):755-763

SCA123

DISPROPORTIONATE INCREASE IN ACUTE RENAL FAILURE ASSOCIATED WITH CARDIAC TRANSPLANTATION IN THE UNITED STATES

Martinelli S; Phillips-Bute B; Shaw A; Stafford-Smith M; Patel U; Milano C; Swaminathan M
Duke University Medical Center, Durham, NC, USA

INTRODUCTION

The overall rate of acute renal failure (ARF) in hospitalized patients has been increasing in recent years. Although more complex types of cardiac surgery are associated with a higher incidence of ARF, trends in ARF following cardiac surgery of varying complexity have not yet been elucidated. Because of more inclusive patient selection over time, we hypothesized that the rate of ARF would be greater among more complicated cardiac procedures such as valve and cardiac transplantation (CTx) when compared with isolated coronary bypass (CABG) surgery.

METHODS

Data from the Nationwide Inpatient Sample (NIS) was used in this IRB approved study. The study population consisted of discharges over a sixteen year period (1988-2003) grouped according to surgery type as: CABG, CABG with mitral valve (MV), CABG with other valve, valve alone, and CTx. Multivariable logistic regression was used to model ARF using age, gender, number of valves repaired, number of bypass grafts performed, and a set of 29 comorbidities as independent variables. Each procedure group was compared to the CABG group as a reference group in order to determine if the incidence of ARF was increasing at similar or different rates. All analyses were performed using the SAS statistical software (version 9.1, SAS Inc, Cary, NC).

RESULTS

Over the sixteen year study period, the incidence of ARF increased significantly in all cardiac surgery groups, ($p<0.001$ for all; Fig 1) When compared to the reference CABG group, the slope for the CTx group is positive, indicating that a greater proportion of patients following CTx are developing ARF compared to those undergoing CABG (Table 1). However, the slopes for the other groups are negative ($p<0.001$ for all), which suggests that smaller proportions of patients who undergo these procedures are developing ARF compared to those who undergo CABG.

DISCUSSION

ARF is common following CTx and its incidence is increasing at a faster rate among CTx patients when compared to CABG patients. This disproportionate increase in ARF rates may be due to changes in criteria for CTx during this time period. The number of transplant patients who have had previous cardiac procedures is also increasing, and prior cardiac surgery is a known risk factor for ARF. Unexpectedly, the rate of ARF in other complex procedures is not increasing at the same rate as CABG surgery. This could be attributed to improved surgical technique for these complex procedures. Our study highlights the increasing burden of ARF in CTx surgery and suggests that more resources are needed to reduce the incidence of ARF in this population.

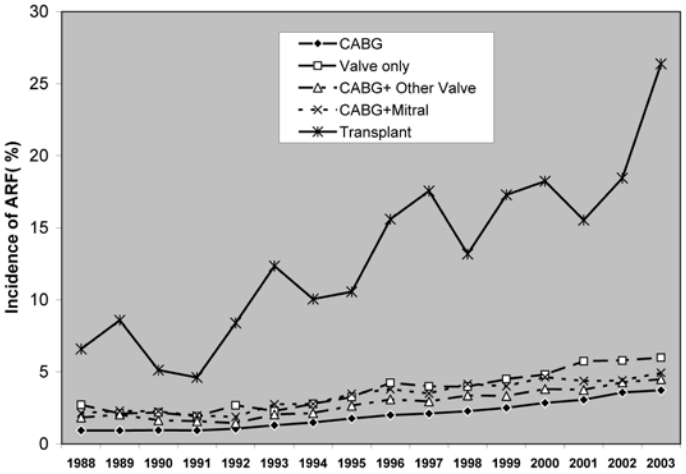


Table 1 Multivariable logistic regression results

Parameter	Parameter Estimate	P value
Year	0.1060	<.0001
Group (reference group is CABG only)		
Valve only	-0.1638	<.0001
CABG Valve	-0.5259	<.0001
CABG Mitral	-0.2657	<.0001
Transplant	1.6449	<.0001
Group * Year Interaction terms (reference group is CABG only)		
YEAR*valve only	-0.0164	<.0001
YEAR*CABG valve	-0.0146	<.0001
YEAR*CABG Mitral	-0.0233	<.0001
YEAR*Transplant	0.0426	<.0001

Model C index = 0.82
* Model contains an additional 32 covariates, which are not shown here

ANESTH ANALG 2008;106(SCA Suppl):1-128

SCA124

AORTIC VALVE REPLACEMENT AND ACUTE KIDNEY INJURY: MINIMALLY INVASIVE PARASTERNOTOMY VERUSUS MEDIAN STERNOTOMY

Ten Clay S; Phillips-Bute B; Glower D; Mathew J; Swaminathan M; Shaw A; Stafford-Smith M
Duke University Medical Center, Durham, NC, USA

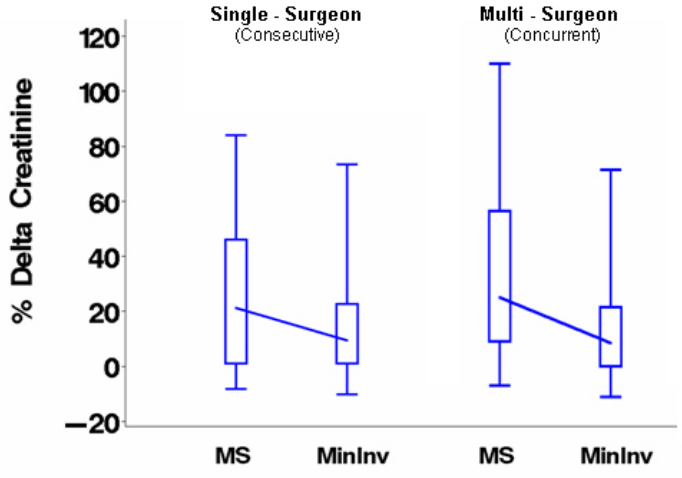
Introduction: Post-operative acute kidney injury (AKI) is a common, serious complication of aortic valve surgery. Two studies have reported a reduction in post-operative AKI with minimally invasive mitral valve surgery (port-access mini-thoracotomy versus conventional median sternotomy) (1,2). However, AKI has not been compared for minimally invasive aortic valve surgery (port-access mini-parasternotomy versus conventional median sternotomy). Therefore we tested the hypothesis that a surgical strategy including selective use of minimally invasive parasternotomy (MinInv) for aortic valve surgery is associated with a different degree of AKI compared to conventional surgical strategy with a median sternotomy incision (MS).

Methods: With IRB approval, we evaluated data from all isolated aortic valve replacement operations at a single institution between 1999 and 2006. One surgeon changed practice during 2003; before 2003 this surgeon used primarily conventional median sternotomy (MS) approach for aortic valve surgeries whereas after this time a majority of cases involved a port access mini-parasternotomy approach (MinInv). Multivariable analysis adjusting for known renal risk factors (1,2) was used to determine the association of surgical strategy with a marker of AKI(3); peak postoperative fractional rise in creatinine greater than 25% (%DCr>25%). A single surgeon primary analysis of aortic valve surgeries was performed comparing pre-2003 (MS/MinInv, n=154/17) and post-2003 (MS/MinInv, n=75/98) approaches; 2003 procedures were excluded (the transition period). A secondary time-concurrent analysis including all aortic valve procedures compared the single surgeon post-2003 experience with post-2003 for all other surgeons (MS/MinInv, n=260/4). P<0.05 was considered significant.

Results: In the single surgeon analysis, we observed a highly significant independent association between surgical strategy and likelihood of %DCr>25%, indicating a greater risk of AKI in the period when MS was the primary approach (Figure; Odds Ratio 2.41, P=0.001). Similar findings were noted in the secondary (time-concurrent) analysis (Figure; Odds Ratio 3.20, P<0.0001).

Conclusions: We present retrospective evidence of reduced AKI associated with the port-access mini-parasternotomy approach for aortic valve replacement surgery compared to the conventional median sternotomy incision, after adjustment for other renal risk factors. Our findings suggest that this minimally invasive approach to aortic valve surgery may be preferable to conventional methods for patients with high renal risk.

References:
1. Ann Thor Surg 2003;75:812-9.
2. Heart Surgery Forum 2007:10(5):E401-7.
3. N Engl J Med 1994; 331:1449-50.



SCA125

ASSESSMENT OF GLOBAL LEFT VENTRICULAR FUNCTION WITH TRANSESOPHAGEAL ECHOCARDIOGRAPHY: COMPARISON OF SPECKLE TRACKING WITH CONVENTIONAL INTRAOPERATIVE MEASUREMENTS

Marcucci C[1]; Keller D[1]; Mackensen G[1]; Podgoreanu M[1]; Mahajan A[2]; Phillips-Bute B[1]; Mathew J[1]; Swaminathan M[1]
DUMC[1], Durham, NC, USA; UCLA[2], Los Angeles, CA, USA

Introduction. The evaluation of left ventricular (LV) function during cardiac surgery by transesophageal echocardiography (TEE) relies mainly on ejection fraction (EF) estimation on grayscale images or quantitative measurements using spectral Doppler. However, these methods are either subjective or dependent on Doppler angle. Speckle tracking is a new technology that allows the angle independent measurement of longitudinal (LS) and circumferential (CS) myocardial strain, also known as two-dimensional strain (2DS). The objective of this study was to evaluate the feasibility of using speckle tracking by TEE as a tool to assess LV function by comparing its performance with conventional echocardiographic measures.

Methods. After regulatory approval and informed consent, 23 adult patients undergoing elective cardiac surgery were enrolled. After anesthetic induction and before surgical incision, images were acquired in standard mid esophageal (ME) long axis (LAX) and transgastric (TG) short axis (SAX) views. Spectral Doppler through the aortic and mitral valve was recorded for calculating MPI. EF was calculated using the modified Simpsons method. In addition, a visual estimate of EF using a 6 point scale (<15%, 15-25%, 25-35%, 35-45% 45-55% and >55%) in each patient was obtained from an anesthesiologist experienced in TEE. Global LS and CS (from LAX and SAX views respectively) was calculated using the 2DS function. All images were analyzed offline using EchoPac 6.1.2 software (GE Vingmed, Norway). The Kappa (K) coefficient was calculated to evaluate the agreement on identifying global ventricular dysfunction identified as LS <-15%, CS <-15%, EF < 55% and MPI > 45%. Pearsons correlation coefficient (r) was calculated for the comparison of continuous variables, the spearmans Rank (rho) coefficient was used for comparison of non-parametric variables with SAS software (SAS 9.1, Cary, NC).

Results. Global LS measurements from LAX views were obtained in all patients. Segment drop-out in the SAX views precluded Simpsons method estimation of EF in five cases. In these and an additional six cases, CS could not be calculated for similar reasons, and was therefore excluded from correlation analysis. The correlation coefficients, p values and K coefficient for the different comparisons in the LAX views are presented in the table.

Conclusion. In this study, global LS measurements of the left ventricle by speckle tracking showed good correlation, but only moderate agreement for the identification of normal ventricular function, compared to the evaluation of LV EF by visual estimation and modified Simpsons methods. Poor correlation and no agreement were found between LS and MPI. This may be partly attributed to poorly defined timing measurements in the deep TG views used for MPI calculation in some cases. Speckle tracking could not be used consistently for CS calculation by TEE, limiting its utility in routine assessment of LV function.

Longitudinal Strain by 2DS vs	Correlation Coefficient	p	κ
EF by modified Simpson's method	r =-0.7	0.001	0.53
Visual EF estimate	ρ = 0.7	0.002	0.45
MPI	r = 0.2	0.6	0.14

Correlation coefficients, p values and Kappa values for comparison of global LS versus EF estimation by visual estimate and modified Simpson's method, and MPI.

ANESTH ANALG 2008;106(SCA Suppl):1-128

SCA126

IS WHOQOL-BREF QUESTIONNAIRE A RELIABLE AND VALID TOOL FOR THE ASSESSMENT OF QUALITY OF LIFE IN PATIENTS WITH CORONARY ARTERY DISEASE?

Najafi M; Sheikhvatan M; Montazeri A; Sheikhfatollahi M
Tehran Heart Center, Medical Sciences/University of Tehran, Tehran, Iran

Background: Using the reliable and valid tools for the assessment of quality of life in patients with coronary artery disease is necessary. The objective of this study was to ascertain the validity and reliability of the WHOQOL-BREF questionnaire in an Iranian population of CAD patients.

Materials and Methods: The validity and reliability of the SF-36 and BREF has been studied in 268 patients (as intervention group) and 275 patients (as reference group) hospitalized with coronary artery disease and matched age, sex ratio, risk factors for CAD, and the number of coronary vessels involvement. Internal consistency was measured by Cronbachs a and inter-scale correlation. Concurrent validity was tested by the Pearsons correlation that was calculated between the physical, psychological, and social domains of the WHOQOL-BREF and physical functioning, mental health, and social functioning of the SF-36, respectively.

Results: The weak correlations were found between the physical, psychological, and social domains of the WHOQOL-BREF and physical functioning (r=-0.011, P=0.869), mental health (r=0.129, P=0.036), and social functioning (r=0.064, P= 0.299) of the SF-36, respectively. For all eight subscales of the SF-36 and four domains of the WHOQOL-BREF, Cronbachs a were 0.825 and 0.701, respectively, that exceeded 0.7. Also, the mean of inter-scale correlation were 0.427 (0.246-0.757) and 0.380 (0.300-0.495), respectively.

Conclusion: The WHOQOL-BREF questionnaire is less applicable instrument compared to SF-36 with lower reliability and validity for the evaluation of QOL in CAD patients.

SCA127

ALTERED HEPARIN RESPONSIVENESS DURING CARDIOPULMONARY BYPASS IN PATIENTS WITH INFECTIVE ENDOCARDITITS

Hong SW[1]; Lee JY[1]; Choi Y[1]; Jung SM[2]; Lee JH[1]

Yonsei University College of Medicine[1], Seoul, Republic of Korea; Yonsei University College of Medicine, Seoul, Republic of Korea; Konyang University College of Medicine[2], Daejeon, Republic of Korea

Introduction: Heparin resistance (HR) is occasionally encountered in cardiac surgery. Although infective endocarditis (IE) is being acknowledged as a risk factor for HR during cardiopulmonary bypass (CPB), currently available evidence is limited to several case reports. The objective of this study was to investigate heparin responsiveness in IE patients undergoing elective cardiac surgery in a prospective, controlled trial.

Methods: All consecutive adult patients scheduled for elective cardiac surgeries requiring the use of CPB. Sixteen patients with stabilized IE without signs of active inflammation (IE group) and 48 patients without systemic infection (Control group) undergoing valvular heart surgery were included. Preoperative hematologic, coagulation profiles and predisposing factors to HR and amount of administered heparin during CPB were recorded. HR was defined when activated clotting time (ACT) was less than 400 seconds after initial dose of 300 IU/kg of heparin and/ or heparin sensitivity index (HSI) was below 1.0.

Results: Preoperative antithrombin III; activity was significantly lower and fibrinogen level was significantly higher in the IE group. ACT after initial heparinization was significantly shorter in the IE group. HSI was significantly lower and number of patients with HSI below 1.0 was significantly greater in the IE group. The incidence of HR was higher in the IE group.

Conclusion: Responsiveness to heparin during CPB was significantly reduced in the IE group and it seems to be associated with preoperative hypercoagulability and reduced antithrombin III; activity. Therapeutic measures for adequate heparinization during CPB, such as antithrombin III; concentrate, should be considered in these patients even when they are in stabilized condition without signs of active inflammation.

ANESTH ANALG 2008;106(SCA Suppl):1-128

SCA128

PREOPERATIVE SERUM ALBUMIN AS PREDICTOR OF OPERATIVE MORTALITY AND MORBIDITY IN PEDIATRIC CARDIAC SURGERY

Giraldo J; Montes F; Del Real A; Sepulveda Y; Estrada Y; Riaño D
Fundación Cardio Infantil, Bogota, Cundinamar, Colombia

INTRODUCTION: Preoperative malnutrition has been associated with poor outcome after cardiac surgery (1). Serum albumin concentration (S-albumin) is considered a classic parameter of nutritional assessment (2). Although multiple studies have evaluated the usefulness of S-albumin as predictors of morbidity and mortality in adult cardiac patients, the influence of this factor on the occurrence of complications following pediatric cardiac surgery is less well understood. The aim of the present study was to investigate S-albumin and anthropometric parameters as markers of outcome in children undergoing open heart surgery.

METHODS: After IRB approval we prospectively studied 156 consecutive children undergoing elective cardiac surgery with cardiopulmonary bypass from October 1, 2005 to September 30, 2006. Children were excluded from the study if they presented with low birth weight, were taking corticosteroids, or had preexisting renal failure, hepatic failure, or active infection. Patient characteristics (sex, age, weight), medical history, diagnosis and type of cardiac surgery according to the ConsensusBased Method for Risk Adjustment for Surgery for Congenital Heart Disease were registered (3). Anthropometric indicators of nutritional status were evaluated before surgery according to standards of the World Health Organization and the National Center for Health Statistics. Preoperative S-albumin was obtained as part of a routine preoperative assessment. Cardiopulmonary bypass time, aortic cross-clamp time, circulatory arrest, use of vasoactive drugs, duration of mechanical ventilation, and postoperative length of hospital stay were registered. Morbidity, mortality and cause of death were recorded. The correlation between indicators of nutritional status and postoperative outcome variables was assessed by univariate and multivariate analyses; $P < 0.05$ was considered significant.

RESULTS: The demographic characteristics of patients and the type of surgical procedure are listed in table 1. Sixteen patients (9.7%) had an S-Albumin less than 3.5 g/dl preoperatively. Compared with patients with normal albumin, hypoalbuminemic patients had an increased frequency of postoperative infection, low cardiac output, and sepsis (all p less than 0.05). Mean postoperative length of stay was markedly prolonged in these patients (5 vs 10 days; p less than 0.001), and mortality also tended to be higher (13.3 vs 2.1%; $P = 0.074$). Malnutrition measured by anthropometric values had a variable relationship with these outcomes.

CONCLUSION: Our preliminary results show that hypoalbuminemia is a powerful indicator of an increased risk of perioperative complications in children undergoing open cardiac surgery. Increased attention to nutritional factors is warranted in these patients.

REFERENCES:

1. J Thorac Cardiovasc Surg 1999; 118: 866-73
2. J Parenter Enteral Nutr 1997; 21: 81-90
3. Thorac Cardiovasc Surg 2002; 123: 110-8

SURGERY GROUPS	NUMBER OF PATIENTS	AGE (months)	SEX (F/M)	Mortality
	n	median (range)	n	n
Group 1	40	49 (5-156)	20/20	2
Group 2	39	24 (1-192)	24/15	0
Group 3	68	12 (1-204)	31/37	3
Group 4	8	11 (1-180)	3/5	0
Group 5	0	0	0	0
Group 6	1	15	0/1	0
Total	156	22 (1-204)	78/78	5