PRESIDENT’S MESSAGE

By Solomon Aronson, MD, FACC, FACC, FAHA, FASE

It’s been an Honor and a Privilege

When my presidency began 2 years ago, I asked that all of us continue to support the SCA - our society - no less than the manner that led us to our noteworthy and successful past. As I now prepare to turn over the gavel to Scott Reeves, I can say with pride and certainty that our society - with the dedicated help and commitment from our membership, has moved forward and we have much to celebrate and be proud of. As we prepare to enter an era of certain change for our profession, there remains much to do. However, it is with the spirit of our history of meeting challenges that I would like to review some of the significant moments that occurred in the SCA over these last two years.

• A new interactive website was created to help facilitate our goal of outreach and enable us to build creative electronic educational opportunities.

• We now have a comprehensive, self-directed professional development program in echocardiography and clinical ultrasound. The “SCA On-CUE” program launched with Course Directors: Colin Royse and Alistair Royse, is the first On-line Clinical Ultrasound and Echocardiography Courses provided to SCA members and should complement our other conferences, workshops, and update meetings.

• Our new website also features a member friendly option including a portal with online dues payment, CME registration and discounts, CME verification and certificates, member directory, free job postings as well as a “SCA MEMBER FORUM” page.

• After a request from our membership committee led by Glenn Murphy, the SCA introduced social media services (Facebook) to its members.

• The electronic fellowship education lecture series created by many volunteers who worked with Steve Ginsberg in developing content was launched.

• An inaugural and now what appears to be an annual SCA-STS symposium brokered by Stan Sherman was agreed to by SCA and STS leadership and will be held at the annual STS and SCA meetings respectively.

• The ASA and SCA worked together to create, promote and house a basic TEE instructional tool with NBE acknowledgement for anesthesiologists to achieve TEE basic certification.

• A contract for management of the CV Fellowship match program was negotiated and signed on behalf of all cardiovascular-thoracic fellowship accredited programs.

• The CV Fellowship match program was launched.

• The SCA launched the Annual Thoracic Anesthesia symposium which was chaired by Peter Slinger.

• After a herculean effort by many individuals, most notably Mark Stafford Smith and Al Cheung, the SCA formally submitted a 400 plus page application to the ABA for sub-specialty certification. This marks an important step in a long process that began over 8 years ago when the SCA was granted fellowship accreditation status.

• After countless hours of work and commitment by many individuals the SCA has now successfully completed negotiations with the STS for an adult cardiac anesthesia database module to be enveloped into the existing STS adult cardiac surgery database. The SCA is pleased to now be a part of this premiere data set as an Adult Cardiovascular Anesthesia module going forward. The 60 database fields in the cardiac anesthesia module were created with help from a work group led by Joseph Mathew. These fields are comprehensive and will enable one to capture patient risk factors, operative techniques, processes, and clinical outcomes. This database relationship between the SCA and the STS leapfrogs our society into a leading position to shape and manage our future with evidence based arguments regarding the value of anesthesia sub-specialty care. This partnership with the STS Adult Cardiac Surgery Database – the largest cardiothoracic surgery outcomes and quality improvement program in the world – connects our soon to be created databank to more than 4.9 million cardiothoracic surgical procedure records.

Now that the plan to have a SCA database formally exists, it is important that we all participate. The Society of Cardiovascular Anesthesiologists invites and encourages you to join your colleagues in participating in the SCA-STS National Database for the collection of adult cardiac anesthesia clinical data because we are in the best position to measure our clinical performance accurately and objectively.

This SCA/STS national database has many participation benefits including:

• A standardized format for data collection to assess the care of adult patients undergoing cardiothoracic operations

• Quarterly performance outcomes reports in a risk-adjusted format which allows comparison of local outcomes to regional benchmarks and national standards

• Analysis of major outcomes and process-of-care measures that impact adult cardiac surgery patients

• Composite quality measure scores for CABG and AVR and associated ratings

Continued, next page >>
• Risk profiles of patients in your practice benchmarked against national standards
• Feedback reports to identify areas for quality improvement
• Reports feedback to document outcomes for quality improvement initiatives
• Assessment data on new technology and techniques
• Documentation of the quality of care delivered by your practice for interested third-party entities

• Participation in a national quality improvement effort for adult cardiac surgery that has an impact at the local, regional, and national levels.

Thank you for working so hard to help push the SCA forward. This is my last president’s message and it’s been an Honor and a Privilege to serve the SCA as your president.
The Effect of Fish Oil on Hemostasis and Coagulations During Cardiac Surgery

Ischal Erez, MD, Anna Kowalczyk, MD and Hong Liu, MD
University of California Davis Health System, Sacramento, CA 95817

The effects of polyunsaturated omega-3 fatty acids (n-3 PUFAs), typically consumed in a form of fish oil, have been studied for years. It is widely known that PUFAs exert an anti-inflammatory effect, reduce triglyceride levels and impair platelet aggregation (1). More recent literature points to the ability of n-3 PUFAs to modulate myocardial calcium channels, decrease fatty acid synthesis and up-regulate gene expression for fatty acid oxidation (4). Additionally, changes in vascular endothelium have been discovered in response to n-3 PUFAs, including increased prostacyclin production (3). The purported cardiovascular benefits may include secondary prevention of cardiovascular disease, prevention of post angioplasty restenosis, graft re-stenosis after CABG and even post surgical dysrhythmias (3,4). However, the potential anticoagulant effect of fish oil has caused many centers - including ours – to recommend cessation of n-3 PUFAs at least 2 weeks prior to elective surgery. The question arises - is this an evidence-based practice?

The proposed mechanism of platelet inhibition by n-3 PUFAs is fatty acid insertion into the platelet membrane, resulting in change of its surface charge (1). Measured bleeding time in patients taking n-3 PUFAs supplements has been shown to increase up to 1.5 times in laboratory conditions. Despite this, many clinical studies show that bleeding does not increase in these patients, even during hospitalizations for myocardial infarction when potent anticoagulants are used (2). Multiple other studies evaluating fish oil in percutaneous coronary angioplasty confirmed that bleeding does not increase in patients consuming n-3 PUFAs (5). These studies show lack of added bleeding risk in non-surgical patients and those undergoing minimally invasive procedures, but what about surgical patients?

Two studies have demonstrated that in spinal decompression and spinal arthrodesis there is no difference in surgical bleeding when patients take fish oil (6,7). Another study revealed that n-3 PUFA supplementation added to TPN after major abdominal surgery did not increase bleeding risk (8). In a review of 19 clinical trials of either vascular surgery or procedures involving femoral artery punctures, no increase in bleeding events was observed (5). Lastly, in a recent large randomized blinded placebo controlled trial examining the effect of fish oil on preventing post-cardiac surgery atrial fibrillation (OPERA trial), no difference in clinically significant bleeding was found between the two groups. In fact, fewer blood products were administered perioperatively in the n-3 PUFA group (9).

It stands to reason that decreasing platelet aggregation and increasing the bypass graft endothelial prostacyclin levels might actually benefit CABG patients. Additionally, if fish oil reduces the incidence of atrial fibrillation following heart surgery, perhaps we should routinely treat these patients with n-3 PUFAs. Indeed, in an animal study, cod liver oil alone was superior to aspirin and diprydiamole in reducing post CABG graft intimal hyperplasia (10). However, several studies evaluating restenosis after percutaneous coronary angioplasty have shown mixed results. Two meta-analyses suggested only a modest improvement in restenosis rates (11,12). Moreover, the OPERA trial failed to demonstrate a decrease in atrial fibrillation post heart surgery (9). At this time there is insufficient evidence to support routine prescription of omega-3 fatty acids pre-operatively for heart surgery.

When confronted with the decision to postpone an operation based on recent fish oil intake, it is tempting to focus on the previously described impairment in platelet function. However, the available literature fails to demonstrate any clinically significant increase in bleeding - both in medical and surgical patients, including those undergoing cardiac surgery. Furthermore, although the data conflict, there may be a benefit to n-3 PUFA intake in the form of decreased intimal thickness and reduced graft restenosis post CABG.

In summary, despite the known inhibition of platelet aggregation, clinically significant bleeding does not increase with the use of n-3 PUFAs. Since there is no evidence of harm, and given the implications of cancelling a major operation for both patients and health care systems, it seems prudent to proceed with an elective CABG in a patient taking fish oil supplements.

References
5) Bays H, Safety considerations with omega-3 fatty acid therapy. *Am J Cardiol*. 2007;99:35-43
Title: Intraoperative High-Dose Dexamethasone for Cardiac Surgery

Author: Dieleman J, Nieric AP, Rooseel PM, DECS Study Group et al.

Reviewer: Mohammed Minhaj, MD
University of Washington

Abstract Excerpt

The use of prophylactic corticosteroids in cardiac surgery is still a widespread practice. This study attempted to quantify if the use of intraoperative high-dose dexamethasone had an impact on the incidence of major adverse events in patients undergoing cardiac surgery. Between 2006-2011, 4494 patients were enrolled at 8 surgical centers in the Netherlands. Patients had to be over the age of 18 and were randomized to receive either a single intraoperative dose of 1 mg/kg of dexamethasone or placebo. The main outcome measures were a composite of death, myocardial infarction, stroke, renal or respiratory failure within 30 days of randomization.

Out of the 4,494 patients who were randomized, 4,482 could be evaluated for the primary outcome. Of the patients who reached the primary end point, 157 had received dexamethasone and 191 had received a placebo. There was no statistically significant difference between the two groups. With respect to secondary end points, patients who received dexamethasone had statistically significant decreases in duration of mechanical ventilation, length of ICU/hospital stay, and higher serum glucose concentrations.

Reviewer’s Comments

The prophylactic use of corticosteroids in cardiac surgery has waxed and waned over the past few decades. Originally thought to benefit patients by reducing the inflammatory response to surgery and cardiopulmonary bypass, several studies demonstrating potential adverse consequences of corticosteroid use tempered overall enthusiasm for its use.

This study attempted to compare high dose dexamethasone to placebo. There were several strengths to this study, including: randomized, multicenter, double-blinded, design. The authors also stated that this was the first large study on the subject, as previous studies were much smaller. However, they used dexamethasone, while most centers in North America typically administer methylprednisolone perioperatively, so the results may not necessarily apply to our patient population. There is an ongoing trial further examining the use of methylprednisolone that should offer more information about this agent.

The overall results that dexamethasone did not result in any improvement in adverse events postoperatively was not very surprising. However, in the subgroup analysis patients who received steroids had improved pulmonary function, demonstrated by reduced ventilator times and a reduction in risk of pneumonias and other infections. While chronic steroid use is associated with higher infection rates, seemingly the single dose used in this trial did not result in a higher risk of this complication. It should be noted however, that the study was not designed to assess this and future work directed at pulmonary outcomes seems warranted.

In conclusion, the results of this study suggest that prophylactic high-dose dexamethasone does not result in a decrease of adverse events in the first 30 days post cardiac surgery and should not be used. Ongoing studies examining the administration of high-dose methylprednisolone and future work directed at the impact of steroid administration on pulmonary outcomes will better identify the role (if any) steroids play in patients undergoing cardiac surgery.

Cardiomyocyte Proliferation Contributes to Heart Growth in Young Humans


Reviewer: Theodore A. Alston, MD, PhD
Massachusetts General Hospital, Harvard Medical School

Abstract

Collaborators at Harvard, Boston U., Vanderbilt, and U. Sydney find that human heart cell proliferation may occur for many years after birth. Thirty-six left ventricular myocardial samples from humans aged 0-59 years were obtained from unused hearts harvested for transplantation or from cadaveric hearts with short postmortem intervals. As expected, the percentages of heart cells in mitosis and cytokinesis were highest in infants and decreased to low levels by 20 years. During the first year of life, the percentage of cardiomyocytes in mitotic phase was 0.04%. Between 10 and 20 years, this decreased to 0.009% but remained detectable in hearts from subjects older than 40 years of age. Though cardiomyocyte mitosis was detectable throughout life, cytokinesis (visible division) was not evident after 20 years. In the age range of 0–1 year, 0.016% of cardiomyocytes were in cytokinesis. Between 2 and 10 years, it was 0.01%, and in the second decade of life, the value decreased to 0.005%. Impressively, the number of cardiomyocytes in the left ventricle increased 3.4-fold between the first and twentieth year of life.

Apparently, cardiomyocyte proliferation contributes to developmental heart growth in young humans. The authors propose that “children and adolescents may be able to regenerate myocardium, that abnormal cardiomyocyte proliferation may be involved in myocardial diseases that affect this population, and that these diseases might be treatable through stimulation of cardiomyocyte proliferation.”

Comments

The human heart was long believed to grow by enlargement but not proliferation of cardiomyocytes during postnatal development. However, cardiomyocyte proliferation is now seen as a likely mechanism of cardiac growth and regeneration, at least during the period of developmental heart growth between birth and adolescence.

Cardiovascular anesthesiologists may be increasingly called upon to facilitate procedures intended to stimulate cell proliferation in the heart. Furthermore, our drugs need to be examined for any deleterious (or beneficial) effects on heart cell proliferation.

Effect Of Rescue Breathing During Cardiopulmonary Resuscitation On Lung Function After Restoration Of Spontaneous Circulation In A Porcine Model Of Prolonged Cardiac Arrest


Reviewer: Laura Myers MD
Massachusetts General Hospital

During return of spontaneous circulation (ROSC) after cardiopulmonary resuscitation (CPR), there is inflammation in the pulmonary vasculature as blood begins to flow back into the pulmonary vessels. This can lead to pulmo-
Previous studies have shown that positive pressure ventilation could help pulmonary edema. Therefore, the authors hypothesized that rescue breathing during CPR, which would be a form of positive pressure ventilation, could prevent pulmonary edema. They randomized 28 male pigs into 3 groups: 12 with continuous compressions (CC), 12 with 30:2 compression/rescue ventilation (CV) and 4 with sham CPR. Forty-eight hours prior to the experiment, baseline lung V/Q scans were performed. The pigs were induced with IV anesthesia, intubated and maintained on volume controlled ventilation with tidal volume 15mL/kg and rate of 15/minute. Catheters were inserted into the EJ and femoral veins and ventricular fibrillation was induced by simultaneous electrical shock. The pigs were detached from the ventilator and untreated for 8 minutes. Chest compressions were done by experienced researchers, who were not the investigators themselves. The quality of chest compressions was monitored. Pigs received shocks and epinephrine pushes and were either pronounced dead after 4 rounds of shocks or were put back on the ventilator after ROSC and maintained for 4 hours in an intensive care setting. Pigs were ultimately euthanized and the right lower lobe was dissected. Repeat V/Q scans of the lungs were performed at 24 hours post-resuscitation.

The authors report no statistically significant difference in the following outcomes between CC and CV groups: rate of ROSC, number of shocks needed for ROSC, neurologic function post-ROSC or survival. However, they report a statistically significant difference in the thoracopulmonary compliance, airway resistance, dead space and lower inflection point in the CC group compared to VC and sham groups at all timepoints (1-, 2-, 4hr post-ROSC).

There were no significant differences in aortic pressure, cardiac output or ejection fraction after ROSC between VC and CC. However, the Pao2 in the VC group after ROSC was significantly higher than in the CC group. Additionally, the number of areas of V/Q mismatch after ROSC was significantly lower in the VC group compared to the CC group. The lung injury histopathology score was lower in the VC compared to the CC group.

These data indicate that rescue breathing does not affect clinical outcomes after cardiac arrest and ROSC but may improve post-arrest lung function. It makes sense that the mechanism of improved lung function is positive-pressure ventilation, which tethers open the alveoli and decreases pulmonary edema and V/Q mismatch.

For in-hospital cardiac arrests, the 2010 AHA guidelines recommend 30:2 with 2 breaths occurring during a rhythm/pulse check to minimize the amount of time without chest compressions and maintain coronary perfusion pressure. When an advanced airway is obtained, one may proceed giving 8-10 breaths per minute with continuous chest compressions and stops only for rhythm/pulse check. For out-of-hospital arrests, 2 people performing CPR should do 30:2 where the rescue breaths coincide with rhythm/pulse check. However, 1 person performing CPR should do continuous chest compressions without rescue breathing because it is thought to be too much time to switch between compressions and airway when only 1 rescuer is involved.

This research is important because there is still controversy about the added benefit of rescue breathing in various arrest circumstances. There are certainly limitations to a pig model of cardiac arrest. However, it probably simulates human physiology as closely as possible without actually doing a clinical trial.

While clinical outcomes were similar between the two groups, improved lung function certainly may be beneficial if we assessed more long-term outcomes. This may be especially true in patients who arrest from coronary ischemia and need to be intubated for a prolonged period of time after revascularization. Additionally, when a patient is undergoing CABG and has V/VT when coming off pump, this study endorses the importance of positive pressure ventilation to tether alveoli open and prevent post-op pulmonary edema.

**Goal-Directed Therapy In Cardiac Surgery: A systematic review and meta-analysis**


**Reviewers:** Lawrence Ong, MD, and Hong Liu, MD.
University of California Davis Health System, Sacramento, CA

**Background**
Perioperative mortality after cardiac surgery has decreased in recent years although postoperative morbidity is still significant. Although there is evidence that perioperative goal-directed hemodynamic therapy (GDT) may reduce surgical mortality and morbidity in non-cardiac surgical patients, the data are less clear after cardiac surgery. The objective of this review is to perform a meta-analysis on the effects of perioperative GDT on mortality, morbidity, and length of hospital stay in cardiac surgical patients.

**Methods**
We conducted a systematic review using Medline, EMBASE, and the Cochrane Controlled Clinical Trials Register. Additional sources were sought from experts. The inclusion criteria were randomized controlled trials, mortality reported as an outcome, pre-emptive hemodynamic intervention, and cardiac surgical population. Included studies were examined in full and subjected to quantifiable analysis, subgroup analysis, and sensitivity analysis where possible. Data synthesis was obtained by using odds ratio (OR) and mean difference (MD) for continuous data with 95% confidence interval (CI) utilizing a random-effects model.

**Results**
From 4986 potential studies, five met all the inclusion criteria (699 patients). The quantitative analysis showed that the use of GDT reduced the postoperative complication rate (OR 0.33, 95% CI 0.15-0.73; P=0.006) and hospital length of stay (MD -2.44, 95% CI -4.03 to -0.84; P=0.003). There was no significant reduction in mortality.

**Conclusion**
The use of pre-emptive GDT in cardiac surgery reduces morbidity and hospital length of stay.

**Comments**
There are approximately seven million invasive cardiovascular procedures performed worldwide each year. The major complication rates for valve and coronary artery bypass graft procedures are as high as 30.1% in Society of Thoracic Surgeons reports. The use of early goal-directed hemodynamic therapy to improve outcomes in non-cardiac surgery has been demonstrated in several randomized controlled trials and in a recent meta-analysis. Hemodynamic monitoring and GDT in cardiac surgery have not been investigated to the same extent. Although the authors did not find any improvement in mortality with GDT, this may be related to the relatively low mortality in cardiac surgery compared with high-risk non-cardiac surgery and to the relatively small number of studies and therefore patients. However, the authors did find goal-directed hemodynamic therapy is an effective tool to reducing the incidence of postoperative complications after cardiac surgery and shortening hospital length of stay in this meta-analysis with the limited five studies. Importantly, in a relatively small sample size for this meta-analysis, GDT was found to reduce morbidity and hospital stay. Further work will be required to determine the effects of GDT on mortality in this group of patients.
Remifentanil During Cardiac Surgery Is Associated With Chronic Thoracic Pain One Year After Sternotomy


Introduction
The development of chronic thoracic pain following cardiac surgery is a serious complication with reported incidence varying from 11–56%. Though conducted on different patient populations, prior studies have shown several characteristics associated with the development of chronic thoracic pain after cardiac surgery, including younger age, increased BMI, female gender, severe immediate postoperative pain, non-elective surgery, and redo sternotomy early in the postoperative period (1.2). The authors of this study sought to identify predictors for development of chronic thoracic pain after cardiac surgery by analyzing patient and perioperative characteristics as well as anesthetic techniques and administration of remifentanil.

Methods
This study was a follow-up study to a prospective, double blind randomized trial that examined analgesia in the ICU after sternotomy for cardiac surgery in 131 patients. The initial study collected vast data including patient characteristics and comorbidities, preoperative pain assessment, and as well as post-operative measures of mechanical ventilatory time, ICU stay, and immediate post-operative pain scores. Intra-operative anesthetic management was standardized except for optional use of nitrous oxide and remifentanil. For this study, questionnaires were sent to the 120 surviving patients one year after surgery to evaluate for the presence of thoracic pain (used in a previous study based on the McGill Pain Questionnaire), with 90 patients adequately completing the survey. Inclusion criteria was the same as the initial trial: patient undergoing CABG alone received remifentanil more often than valve, aortic, or combined procedures. The authors acknowledged that because of this, the possible use of the left internal mammary artery for bypass could confound the data, as it has been previously implicated in chronic thoracic pain. While this retrospective survey following a prospective study could have some degree of inherent selection bias in the survey responders, the observation of a dose-dependent link between remifentanil and chronic thoracic pain is striking. This finding, while novel in the cardiac surgery patient population, mirrors findings by Salengros et al in patients after thoracotomy (3). Randomized studies designed to evaluate the influence of intraoperative remifentanil on the incidence of chronic thoracic pain are needed to confirm these results.

Results
One year after surgery 18 (20%) patients reported chronic thoracic pain. Using multivariate logistic regression analysis, anesthesia that included remifentanil [odds ratios 8.9 [95% confidence interval (CI) 1.6–49.0]], age younger than 69 yr [OR 7.0 (95% CI 1.6–31.7), and a BMI above 28 kg/m2 [9.1 (95% CI 2.1–39.1)] all appeared to be independent predictors for chronic thoracic pain. Preoperative pain score, chronic use of analgesics before surgery, and EuroSCORE were not statistically significantly associated with chronic thoracic pain in the multivariate analysis. When examining remifentanil therapy more closely there were no significant differences in the characteristics of patients receiving remifentanil vs. those that did not, other than it was used more frequently for CABG alone. The amount of remifentanil administered was also associated with the development of chronic thoracic pain in a dose dependent manner, both for total dose and for dose corrected for kilogram lean body mass and duration of surgery. Those receiving less than 1.7 mg total dose [OR 3.7 (95% CI 0.8–16.4)] vs. no remifentanil and those receiving more than 1.7 mg total dose [OR 5.8 (95% CI 1.4–24.5)].

Comments
van Gulik et al found remifentanil during cardiac surgery, age below 69 yr, and a body mass index above 28 kg/m2 to be independent predictors for development of chronic thoracic pain after sternotomy for cardiac surgery. Interestingly, despite being on a remifentanil infusion since induction, there was no significant difference in the amount of propofol, or fentanyl administered vs. those patients who did not receive remifentanil. There was also no significant difference in the length of mechanical ventilation, length of stay in the ICU, or pain scores within 24h. These findings are curious given the fact that remifentanil was presumably administered in an attempt to expedite the “fast-track” course of healthier patients. This is perhaps supported by the fact that patients undergoing CABG alone received remifentanil more often than valve, aortic, or combined procedures. The authors acknowledged that because of this, the possible use of the left internal mammary artery for bypass could confound the data, as it has been previously implicated in chronic thoracic pain. While this retrospective survey following a prospective study could have some degree of inherent selection bias in the survey responders, the observation of a dose-dependent link between remifentanil and chronic thoracic pain is striking. This finding, while novel in the cardiac surgery patient population, mirrors findings by Salengros et al in patients after thoracotomy (3). Randomized studies designed to evaluate the influence of intraoperative remifentanil on the incidence of chronic thoracic pain are needed to confirm these results.

References

Blood Product Conservation Is Associated With Improved Outcomes And Reduced Costs After Cardiac Surgery


Reviewers: Eric H. Busch M.D., Ryan F. Durkin M.D. Ochsner Health System, New Orleans, Louisiana

Background
The role of perioperative blood product transfusion in cardiac surgical patients has been the subject of increased scrutiny in both the literature and clinical practice. Conflicting data exists to demonstrate both the benefits of transfusion, and the cumulative complications of transfusion. These include
infection, immunosuppression, transfusion-related acute lung injury, and reduction in both short term and long term survival. It has also been postulated that reducing blood product utilization could decrease health care costs. To explore these issues, the Virginia Cardiac Surgery Quality Initiative (VCSQI), which consists of 17 cardiac surgical centers in the Commonwealth of Virginia, undertook this study. Its purpose was to determine whether a multi-institutional reduction in transfusion could be achieved, and to assess the impact of such a reduction on a variety of patient outcomes and the cost of patient care.

Methods

Retrospective data was gathered from the VCSQI data-base from the four year period between 2006 and 2010. Approximately 14,000 patients undergoing nonemergency primary coronary artery bypass grafting operations were studied. These included both on-pump and off-pump procedures. Patients were divided into two groups of roughly 7,000 patients: 2006-2008 (pre-guideline) and 2008-2010 (post-guideline.) The transfusion guideline established a transfusion trigger for both the intraoperative and postoperative periods. The intraoperative level was a hemoglobin less than 6.0 g/dL accompanied by either a low oxygen saturation (less than 60 percent) or evidence of acidosis. The postoperative transfusion trigger was a hemoglobin level less than 7.0 g/dL with one of the following: systemic hypotension, end-organ dysfunction, persistent bleeding, or elevated oxygen requirement.

The primary outcomes studied were death during hospitalization and death within 30 days of surgery. Secondary outcomes were: sternal infection, postoperative stroke, renal failure, prolonged ventilation, pneumonia and re-operation. The final secondary outcome was total in-hospital cost of care.

Results

During the pre-guideline period 24% of patients had an intraoperative blood product transfusion which decreased to 18% after the implementation of the guideline. The rate of post-operative transfusion was decreased from 39% to 33% post-guideline. The total operative mortality in the pre and post-guideline periods were 1.8% and 1.0% respectively. The rates of major complications were 15.1% and 13.2% for the corresponding time periods. Of note, most of the difference in major complications was accounted for by renal failure and pneumonia. Hospital costs decreased after implementation of the guideline from 261 million dollars to 212 million dollars, representing a savings of approximately $4,000 per patient.

Based on the data, the authors concluded that implementation of their statewide transfusion guideline resulted in a “significant decrease in patient morbidity, mortality, and healthcare costs.” They emphasized that the reduction in the rate of transfusion after the adoption of the blood product conservation guideline pointed to the cooperation of the VCSQI participants in this initiative.

Reviewer’s Comments

We found this paper intriguing. The reductions in morbidity, mortality and cost of care after introduction of the blood product conservation protocol are impressive and the cooperation of the 17 institutions in the VCSQI demonstrates that it is possible to implement quality improvement projects on a large scale.

However, we are not convinced that the conclusion of the investigators, that these various improvements were the direct result of the transfusion initiative, is supported by the data and study design. We would agree that the reduction in transfusion was the result of the guideline. However, linking the improvements in mortality, major complications, and cost to transfusion is, to us, an error in logic. That is, it may be true that there is a cause and effect relation-

Coronary Artery Bypass Surgery With or Without Mitral Valve Annuloplasty in Moderate Functional Ischemic Mitral Regurgitation: Final Results of the Randomized Ischemic Mitral Evaluation (RIME) Trial


Reviewers: Evelyne Goné¹, Omair Shakil², MD, Feroze Mahmood², MD
¹Harvard Medical School, Boston, MA
²Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA

Introduction

Most patients with three-vessel coronary artery disease (CAD) can benefit from coronary artery bypass grafting (CABG); however, the long-term prognosis of revascularization alone remains poor. Up to 40% of patients undergoing CABG also suffer from concomitant functional ischemic mitral regurgitation (IMR), which often goes unaddressed during surgery. Currently, there is no data to suggest if there is any added benefit of adding mitral valve repair (MVR) to CABG in terms of improvement in functional capacity. This study assessed improvements in functional capacity and left ventricular (LV) reverse remodeling in patients with functional IMR who underwent MVR plus CABG compared to patients undergoing CABG alone.

Material and Methods

This was a multicenter, single-blinded, randomized controlled trial that enrolled a total of 73 patients from six centers in the United Kingdom and one in Poland over a span of four years. Inclusion criteria were: need for CABG and presence of moderate functional IMR. Patients with severe LV dysfunction, structural disease of the aortic/mitral valves or history of endocarditis and/or prior cardiac surgeries were excluded. Patients were randomized to receive CABG plus MVR or CABG alone. The MVR utilized either a complete rigid or semi-rigid annuloplasty ring so that a leaflet coaptation length of at least 8mm was achieved. Unless contraindicated, all patients received optimal medical therapy following their surgery, including an angiotensin-converting enzyme inhibitor.
inhibitor, aspirin, a statin, and a beta-blocker. A one year follow up visit was conducted, during which study end points were measured. The primary end point was change in peak oxygen consumption at one year; the secondary end points were left ventricular end systolic volume index (LVESVI) as measured by cardiovascular magnetic resonance (CMR), MR volume quantified by both echocardiography and CMR, and plasma BNP levels. Due to the nature of the interventions studied, only the physiologist assessing peak oxygen consumption was blinded, as neither patients nor surgeons could be blinded.

Results
No significant difference in survival at one year was found between the two groups (95% in CABG alone vs. 91% in the CABG+MVR group, P=0.66). The addition of MVR to CABG required a longer cardiopulmonary bypass time (147 minutes vs. 84 minutes, P <0.001), increased blood transfusion (900ml vs. 153ml, P=0.016), and longer intubation times (28 hrs. vs. 17 hrs., P=0.004). There was, however, significantly greater improvement in functional capacity and LV reverse remodeling at one-year follow-up in patients who underwent CABG+MVR. This group also had a higher peak oxygen consumption and lower LVESVI.

Conclusion
The addition of MVR to CABG improves functional capacity and reverses LV remodeling at one year. This data favors a combined procedure in suitable candidates.

Comments
This study sought to determine whether simultaneous repair of the MV in patients with moderate functional IMR undergoing CABG is of any added benefit. Previous observational studies have been limited by lack of randomization and recurrence of MR due to suboptimal surgical techniques, as well as by the use of flexible or inappropriately sized annuloplasty rings. This study establishes itself as the first to utilize peak oxygen consumption, a key prognostic indicator in heart failure, as well as complete rigid or semi-rigid annuloplasty rings to demonstrate the impact of MVR on functional capacity and survival. These results encourage the combined procedure so long as perioperative morbidities remain reasonable. A major limitation of this study is the need for longer follow-up time to reliably assess long-term clinical outcome. MR recurrence after one year remains a possibility. Also, as data indicates that LV reverse remodeling can persist up to two years, greater reverse remodeling may be observed in the CABG alone group with time. The next step would be to address these concerns as well as look at long-term outcomes.
Colleagues:

It’s time to celebrate! Join us in Miami as we team with the SCA Foundation to observe 35 outstanding years of service by the Society of Cardiovascular Anesthesiologists. The SCA was created in 1978 in New Orleans, and since our humble beginnings, the Society has grown to become the only organization completely dedicated to education and research in the field of cardiovascular anesthesiology.

Much has been accomplished in the past 35 years and we want you to join the party at the SCA 35th Anniversary Celebration event on **Sunday, April 7, 2013** during the SCA Annual meeting in Miami. We will catalogue some of the important events in our history and have some fun with an original roast video.

You will have a grand time, great food, and a trip down memory lane – all at a spectacular, convenient location!

The SCA, Nonin and the SCA Foundation are sponsors of this event. All net proceeds will benefit YOUR SCA Foundation and the work they are doing to support research, education and patient safety in the cardiac operating room.

Please visit the SCA Foundation website for more information at [www.scahqgive.org](http://www.scahqgive.org).

We are looking forward to your participation and seeing you at our birthday celebration!

Sincerely,

Jerry Reves, MD; Co-Chair
Professor of Anesthesia and Perioperative Medicine
Distinguished University Professor
Emeritus Dean

Jerrold Levy, MD, FAHA, FCCM; Co-Chair
Professor of Anesthesiology, Duke University School of Medicine