Abstracts for **11th Annual Update on Cardiopulmonary Bypass** will be accepted online through the SCA website at www.scahq.org. No paper or disk submissions will be accepted. **All Abstracts must be received by January 26, 2006.** Submitting abstracts for the Update on Cardiopulmonary Bypass Meeting does not preclude you from submitting and presenting at the SCA, IARS or ASA Annual Meetings.

**11th Annual Update on Cardiopulmonary Bypass**
The Fairmont Chateau Whistler
Whistler, British Columbia, Canada
March 12-17, 2006
What’s Online (www.scahq.org)

December 2005 Newsletter

• Calendar of Future Meetings (Web Only)
• President’s Message

• Literature Reviews
  – Cardioprotective effects of acute isovolemic hemodilution in a rat model of transient coronary occlusion.
  – Intraoperative effects of the Coapsys annuloplasty system in a randomized evaluation (RESTOR-MV) of functional ischemic mitral regurgitation.

• Drug and Innovation Updates
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  – Do women fare worse than men following cardiac surgery?
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• Order the SCA Echo DVD Monograph online
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Call for Nominations

Dr. Glenn Gravlee, Chair of the Nominating Committee, has announced that nominations are being sought for the following positions:

✔ Board of Directors (2 positions) 3-year term

In order to nominate a member, please forward to Dr. Gravlee, P.O. Box 11086, Richmond, VA 23230-1086, the following:

• A letter of nomination
• Two letters from Society members seconding the nomination
• A “willingness to serve” statement from the nominee

The deadline for nominations is January 10, 2006. The slate of candidates for Board of Directors will appear on the SCA’s website (www.scahq.org). Eligible SCA members will have 45 days to cast their online votes.

Applications must be submitted electronically no later than March 3, 2006. The award will be announced at the Annual Meeting. The grant period of 12 or 24 consecutive months can begin on any date from July 1 to July 1 of the next year. See complete instructions for grant applications on SCA’s website.

Email applications to: sca@societyhq.com

The National Board of Echocardiography announces the 2006 administration of the

PTEeXAM

Examination of Special Competence in Perioperative Transesophageal Echocardiography

Sunday, May 21, 2006 • Dallas, TX

NBE, 1500 Sunday Drive, Suite 102, Raleigh, NC 27607
Phone: (919) 861-5582 / Fax: (919) 787-4916
Email: info@echoboards.org

Applications will automatically be sent to SCA members, excluding residents. Visit NBE’s Web site at www.echoboards.org to request or download an application.
Some weeks ago, the SCA sent an email message to all members (with email addresses) announcing the proposal by the Accreditation Council for Graduate Medical Education (ACGME) regarding training program requirements for cardiothoracic anesthesiology. By the time you read this message, the comment period will have closed (November 18); I hope many of you made use of this important opportunity. If you do not have an up-to-date email address on file at SCA headquarters please contact Heather Spiess NOW (heather@societyhq.com) before reading further!

“The mission of the ACGME is to improve the quality of health care in the United States by ensuring and improving the quality of graduate medical education for physicians in training” (from the ACGME website). This private, nonprofit council works closely with the Residency Review Committees (RRCs) of the medical specialties, as well as the major specialty groups such as ASA. The proposal on the ACGME website was for separate one year fellowships for pediatric and adult cardiothoracic anesthesiology.

For those of you who may not have been following this process, the appearance of the training program proposal by the ACGME is a very important step towards the recognition of cardiothoracic anesthesiology as a subspecialty in the United States. Once the proposal has been accepted, this will lead to ACGME accreditation of training programs, placing the subspecialty of cardiothoracic anesthesiology on the same educational foundation as cardiothoracic surgery and cardiology.

At the ACGME website, when you access the program requirements you can also access the “criteria document.” The latter is the very persuasive and complete argument made by the SCA task force, appointed by the SCA Board many years ago and headed by past president Alan Jay Schwartz. While one can quibble about some details, these documents indicate the broad range of experience, as well as the type of environment required, for the creation of a subspecialist. In addition, we expect a year of training in adult cardiothoracic anesthesiology to provide adequate exposure and training in transesophageal echocardiography (TEE) to enable the fellow to be eligible for certification by the National Board of Echocardiography (NBE).

One of the issues surrounding the creation of a new subspecialty is: what happens to the old guys like me? I need to be very clear on this point: creation of a subspecialty with program requirements and ACGME accreditation of training programs does NOT mean certification of individuals. My practice of cardiothoracic anesthesiology will continue as in the past, and I will continue to call myself a cardiothoracic anesthesiologist. In addition to staying abreast of new procedures and developments in our field, I need to continue to develop my knowledge of TEE, as during my “fellowship” year in 1983, (my final year of training in anesthesiology in Canada), TEE was in its infancy. Like many of you, I am working on the “practice experience pathway” towards eventual certification in TEE, according to the criteria defined by the NBE. With recognition of the subspecialty of cardiothoracic anesthesiology and accreditation of training programs, the professional prestige for those of us currently in practice will be enhanced, as we will be recognized as the pioneers and mentors of the new breed of subspecialists.

The process of creating the new subspecialty of cardiothoracic anesthesiology appears to be “on track” to become a reality under my watch (ie, within the next two years or so). I can only take credit for being one of many individuals at the SCA who has strongly supported the cause. The real credit goes to the vision of past president Richard Davis who put the subject on the table and created the task force, and of course to Alan Jay Schwartz and his task force who have guided the process to date.
Drug and Innovation Updates

What’s new with alpha-stat versus pH-stat?

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When hypothermic cardiopulmonary bypass (HCBP) or deep hypothermic circulatory arrest (DHCA) is used during cardiac surgery, anesthesiologists and perfusionists are faced with an important question: Should one temperature correct blood gases to patient temperature (pH-stat) or not (α-stat)? With pH-stat management, turning down CPB gas sweep rate or adding CO2 to the oxygenator counteracts increased gas solubility, lower PaCO2, and alkaline pH that would otherwise occur naturally with cooler temperatures. Thus, pH-stat requires an increased total body CO2 content to maintain neutrality at cooler temperatures. pH-stat causes cerebral vasodilatation above metabolic demands (loss of autoregulation) and possibly faster, more homogenous cooling. Proponents argue that pH-stat also improves oxygen delivery by counteracting the pH- and hypothermia-associated leftward shift in the oxyhemoglobin dissociation curve. α-stat (not temperature correcting) requires that neutrality is maintained only at 37°C, and permits the hypothermic alkaline drift. Thus, additional CO2 is not needed and cerebral autoregulation is maintained. Proponents of α-stat cite that cellular transmembrane pH gradients, protein functioning, and enzyme activity are more normal when the pH is allowed to drift alkaline in parallel with the temperature dependent pKa’s of proteins and the neutral pH of water. They also argue that a relatively alkaline pH is beneficial before the ischemic insult of circulatory arrest. Despite considerable laboratory and animal research into these mechanisms, substantial controversy remains over which strategy produces the best clinical outcomes. Recent animal, pediatric, and adult investigations, however, have advanced our understanding of the competing benefits of each technique.

Considerable recent animal data suggest pH-stat management confers cerebral protection during DHCA when compared with α-stat.1-4 For example, experiments involving a porcine DHCA model and intracranial monitoring of temperature, oxygen tension, and cerebral metabolites (via a microdialysis catheter), revealed pH-stat management was associated with fewer metabolic derangements and improved survival after 75 minutes of DHCA at 18°C, when compared with α-stat.1 In a study involving DHCA in piglets, improved cerebral oxygenation by near infrared spectroscopy, improved short term neurological performance, and improved brain histopathology was associated with pH-stat when compared with α-stat.3 Similarly, in a piglet model involving DHCA and intravital microscopy through a cranial window, improved cerebral oxygenation at the end of cooling, and faster recovery of cerebral oxygenation upon rewarming, was associated with pH-stat when compared with α-stat.4 Other recent data have suggested that pH-stat antegrade cerebral perfusion improves cerebral oxygenation and reduces lactate formation in dogs with cerebral infarcts when compared to α-stat.2 Proposed mechanisms for the benefits of pH-stat include a relative rightward shift of the oxyhemoglobin dissociation curve aiding oxygen delivery, increased cerebral blood flow and volume providing a greater depot of oxygen stores during circulatory arrest, more complete cooling, and greater suppression of cerebral metabolic rate.

The pediatric literature also generally supports the use of pH-stat management during HCBP and DHCA for providing both cerebral and myocardial protection. Clinical studies suggest that pH-stat is particularly beneficial in cyanotic neonates and infants because it shifts more CPB flow away from the aortopulmonary collateral circulation and towards the cerebral circulation, both improving cerebral cooling and oxygen supply.6 Recent studies have also revealed a decrease in peak postoperative troponin levels, reduced ventilator dependence, and reduced ICU stays with pH-stat versus α-stat.1 Despite such evidence, however, conflicting clinical outcome data persist. For example, a randomized controlled trial of over 100 neonates and infants revealed that neither strategy was consistently associated with improved neurodevelopmental outcome.8-10 The data are even less conclusive for adults, unfortunately. Recent studies favoring pH-stat revealed significantly fewer episodes of jugular venous desaturation upon rewarming and a reduction in cerebral arteriovenous glucose and oxygen gradients when compared with with α-stat.9-10 Studies such as these supporting pH-stat management without evaluating long term follow-up, however, hardly challenge the widely-cited evidence Murkin and colleagues presented in 1995 showing poorer neurological outcomes with pH-stat HCPB.11 Many speculate that, in adults, any potential benefits of excessive cerebral blood flow during HCBP are outweighed by an increased cerebral embolic load (microemboli and macroemboli).12 Interestingly, this putative mechanism has been recently challenged by a study involving a controlled microembolic load and DHCA in pigs that revealed that pH-stat was still associated with improved outcomes when compared with α-stat.13 Clinical applicability of these results are limited, however, and these results alone should not impact current clinical practice.

In summary, the debate over optimal blood gas management during HCBP and DHCA...
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Percutaneous valve surgery

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Percutaneous valve surgery has received tremendous interest as a direct result of advancements in endovascular techniques. A minimally invasive percutaneous system that allows consistently accurate positioning and rapid deployment (<5 min) of a collapsible/expandable stent-valve system has become a realistic expectation. The success of any such system depends, in part, on the nature and extent of valve dysfunction and the severity of comorbidities. Although feasible, long-term outcomes are not yet available.

Percutaneous approaches to repair and replace the semilunar and atrioventricular valves have been reported. Repair includes balloon valvuloplasty for stenotic lesions, and, for mitral regurgitation, annular reduction (via the coronary sinus) or performance of an Alfieri procedure using a 'clip' placed on the tips of the anterior and posterior leaflets. Although feasible, percutaneous repair of the mitral valve has not yet enjoyed the success of open repair techniques, and long-term outcome data are not available. For patients with rheumatic mitral stenosis, for which leaflet mobility is preserved and minimal calcification is noted on the valve apparatus, balloon valvuloplasty has been associated with good long-term results, however, progression of disease is the norm and these patients will eventually present for valve replacement. Similar data has been reported in the pediatric literature for valvuloplasty or angioplasty of the right ventricular outflow tract and/or pulmonic valve, and aortic valve. Balloon valvuloplasty for aortic valve stenosis in the elderly, however, has not enjoyed long-term success and has been complicated by embolization during the procedure and early restenosis. Although valvuloplasty, for some, has delayed the need for open-heart surgery and the complications associated with valve replacement, most, if not all, demonstrate progression of the underlying pathology.

Valve replacement still remains the definitive treatment for valvular dysfunction. While open-heart procedures report short and long term successes, major morbidity is associated with sternotomy, thoracotomy, and excision of cardiac tissues. In addition, reoperation for prosthetic valve dysfunction, complications of thromboembolism and anticoagulation, and risks of endocarditis have prompted clinicians from the available data, must be studied further to explain the perceived differences between men and women, to identify gender-specific risk factors, and to correct any disparities in treatment when found.

References are continued on page 9

Do women fare worse than men following cardiac surgery?

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Coronary artery disease is the leading cause of death for women in the United States, accounting for almost 250,000 deaths annually. Despite advances in cardiopulmonary bypass and postoperative care that appear to have reduced perioperative mortality in men, the perioperative mortality after coronary artery bypass grafting (CABG) in women remains twice that of men. The questions of whether and why women have higher probabilities of poor outcomes after CABG have been recently and repeatedly asked.

Numerous studies have demonstrated an increased hospital mortality after CABG in women when compared to men. The Coronary Artery Surgery Study (CASS) Registry showed that women had an operative mortality of 5.3% compared with 2.5% for men. The Society of Thoracic Surgeons National Cardiac Surgery Database, which retrospectively examined 334,913 patients undergoing CABG surgery since 1994, showed that women had an operative mortality of 4.5% compared with 2.6% for men (P<0.0001). Although the mortality rate remained significantly higher for women when each of the multiple risk factors were examined univariately, multivariate analysis revealed that women continued to have higher mortality than equally matched men in low and medium risk spectrums. Only among very high-risk patients was there a sex-neutral mortality risk. The National Cardiovascular Network Database (1993-1999) also showed that women had higher hospital mortality rates than men, and women younger than age 50 years were three times more likely to die than their male counterparts. This database also showed that women had a greater occurrence of perioperative complications (most importantly, renal failure, neurologic complications, and acute myocardial infarction), and these complications were more marked at younger ages.

In contrast, a report from the Bypass Angioplasty Revascularization Investigation (BARI) showed comparable unadjusted 5-year mortality rates for women and men. Koch and associates also suggested that in well-matched patients, female gender was not a risk factor for in-hospital mortality and had minimal impact on postoperative morbidity. In a study by Brandrup-Wognsen and associates, the unadjusted mortality rate was significantly higher in women than men two years after CABG; once the researchers adjusted for baseline comorbid diseases, however, there was no sex-related difference in mortality at either two or five years.

While the majority of studies seem to indicate that women are at increased risk, there is still much debate regarding whether the difference in mortality between men and women after CABG is due to female sex per se or to a higher prevalence of unfavorable risk factors in women by the time they present for cardiac surgery. Women appear to have more urgent or emergent presentations, tend to be older on presentation, and have multiple comorbidities (diabetes, hypertension, obesity, depression) when compared with men. Diabetic patients for CABG surgery have been shown to have longer intensive care and hospital stays, greater need for inotropic agents, hemotransfusion, and dialysis, and more frequent renal failure, stroke, mediastinitis, and wound infection. O'Connor and associates showed that greater than 97% of the excess mortality among women reflected those with diabetes or urgent or emergent presentation. The more frequent urgent and emergent presentation of women for CABG, as well as the fact that women with acute myocardial infarction are significantly less likely than men to have undergone cardiac catheterization before their myocardial infarction, suggests that, in some cases, women with significant coronary artery disease may not be appropriately identified and referred for more invasive studies. Other recovery comorbidity factors for women include an excessive decline in physical functional level and an increase in depressive symptoms. Certain technical factors, such as small coronary arteries in women, use of fewer grafts, and underuse of the internal mammary artery in women may also be associated with a greater incidence of postoperative angina and higher graft occlusion rates.

Although numerous investigations have shown increased mortality in women after cardiac surgery, many questions remain unanswered. Is this increased operative mortality early perioperative mortality, or mortality, during the remainder of the hospital stay? Does perioperative control of risk factors, particularly diabetes, hypertension, and hyperlipidemia, exert an effect? Does early diagnosis and referral or change in surgical technique have any role in improving outcome in women? An excess of bleeding complications has been described for women with all interventional procedures. Does this play a role in mortality? What is the role of preoperative anemia in women? Are there pathophysiologic differences in coronary plaque and in coronary vasoactivity and/or endothelial function that may contribute to the adverse outcome? These, and multiple other questions...
and researchers to explore a variety of less invasive techniques including valve repairs, minimally invasive surgical approaches, and, more recently, percutaneous approaches toward valve replacement.

A number of basic features are required for percutaneous valve replacement. These include accurate and continuous imaging of the targeted valve, development of a safe ablation technique of the native valve, a non-invasive flexible delivery system, a collapsible/expandable stent-valve apparatus, and the ability to retract the expanded valve if positioning is not ideal.

Percutaneous valve replacement has been successfully performed under experimental conditions using a variety of designs including bovine and porcine tissues (jugular venous valves, or cardiac valves). These are sutured into a self-expanding metal (nitinol) scaffold, which is advanced toward the desired location guided by a host of imaging technologies. Limitations include the suturing technique of the valve to the scaffold, the expandability of narrowed and/or calcified tissue, and proper sizing in both the diameter of the valve and the length; the latter, perhaps more important for aortic valve procedures to avoid obstruction to coronary ostial flow. The preoperative assessment is crucial to guide selection and preparation of the stent-valve prosthesis.

While the feasibility of placing a prosthesis using percutaneous approach has been demonstrated in the ascending aorta, replacing the native aortic valve is more complicated. A number of different approaches including retrograde approach via the axillary and subclavian arteries, the ilio-femoral arterial tree, and antegrade via the left ventricular apex have been studied. Decisions regarding these approaches depend on the extent and severity of aortic atheroma and the size of the arterial tree. Although successful, percutaneous aortic valve replacement has been complicated by myocardial tears and perforations, ventricular arrhythmias, coronary ostial occlusion, stent valve migration, and stent-valve twisting. Autopsy reports of the explanted prosthesis have demonstrated significant degrees of valve thrombosis, emphasizing the importance of imaging and evaluation as well as imaging and guidance prior to and during the procedure. In addition, proper sizing of the stent-valve is important to avoid both patient-prosthesis size mismatch, and residual regurgitation. Procedural imaging may include fluoroscopy, intravascular ultrasound, intracardiac ultrasound, and surface and transesophageal echocardiography. Echocardiographic monitoring and evaluation has an advantage in that it is not only able to provide guidance and evaluation of the percutaneous technique, but also allows a comprehensive evaluation of both heart function and of the new valve. To date, once in place, these valves have demonstrated excellent hemodynamic profiles.

Experimental animal data and early human experience shows that significant work remains required for all components of the procedure. While the stent-valve apparatus can be successfully placed, perforations of cardiac tissues, improper positioning, arrhythmia and residual insufficiency occur. While one group reported successful placement and function of percutaneously placed aortic valve in five patients, a second group reported a high complication rate for 12 patients, which included cardiac perforation, arrhythmias, perivalvular regurgitation, and need for urgent conversion to sternotomy and open cardiac valve replacement. Furthermore, the need to ablate native tissue would cause transient aortic insufficiency until a new valve is placed, and also increases the risk of distal embolization of native valve fragments requiring a ‘catching’ device. Assessment during this time reports significant increases in heart rate and decreases in diastolic blood pressure. Long-term data regarding valve function and the difficulties associated with future explantation should open heart replacement be required are not known. However, percutaneous valve replacement, especially for high-risk patients, has great potential to significantly reduce procedural morbidity of an open-heart procedure.

Percutaneous approach for pulmonary valve replacement has also received great interest for both pediatric patients and for the adult survivors of congenital heart disease and previous surgery. The latter may address the need for pulmonary valve surgery after previous repair of Tetralogy of Fallot to prevent worsening of right heart dilatation and failure. These patients present with either right ventricular outflow tract narrowing and obstruction, pulmonic valve insufficiency, or a combination of both. Surgical therapy depends on the pre-procedure evaluation of the right ventricular outflow and pulmonary artery diameter to determine whether or not enlargement of the RVOT is necessary to place an adequately sized prosthetic valve to prevent increases in afterload to the already dysfunctional RV. While open-heart procedures for the RVOT are reported, percutaneous approaches have been studied, and in small numbers of humans, have been successfully utilized with excellent hemodynamic profiles after implantation. Although feasible, similar complications are reported for percutaneous placement of the pulmonary valve as during replacement of the aortic valve, reemphasizing the importance of pre-procedural evaluation and planning, and continuous monitoring and imaging during the procedure.

Finally, percutaneous replacement of the tricuspid valve has been studied using an animal model. Although feasible, these procedures have been complicated, in some, by difficult positioning, trapping within the chordae, and residual regurgitation. Nevertheless, successful percutaneous valve replacement for atrio-ventricular (AV) valves will continue to advance and, with greater experience, become a therapeutic option for patients with AV valve dysfunction.

Although widespread acceptance is premature, the future of percutaneous valve procedures is of great interest and will likely be embraced. Obvious benefits are avoidance of a major surgical procedure, improved and more rapid recovery, and a faster return to daily activities. However, issues regarding proper valve sizing, and native tissue ablation require further attention. Operator experience will likely contribute to procedural morbidity. Finally, the longevity of such techniques and ability to repair or replace failed percutaneously placed valves is not known.

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Cardioprotective effects of acute isovolemic hemodilution in a rat model of transient coronary occlusion


Reviewer: Michael H. Wall, MD
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Dallas, TX

Abstract: The authors hypothesized that acute normovolemic isodilution (AIH) would have cardioprotective effects in acute coronary ischemia and infarction. Male Sprague-Dawley rats were anesthetized with isoflurane and fentanyl. The AIH group was hemodiluted to a target hematocrit of 28% using 6% hydroxyethyl starch in a 1:1 ratio over 10 minutes. The AIH (Hct 26%) and control groups (Hct 42%) underwent 30 minutes of acute occlusion of the left anterior descending (LAD) coronary artery. Flow was restored to the LAD, the animals emerged from anesthesia and followed for 48 hours before they were sacrificed. Fatal arrhythmias were less common in the AIH group than in the control group (13% vs 47%, p < 0.05) and 48 hour survival was higher in the AIH group (83% vs 42%, p < 0.05). Cardiac troponin release was significantly lower in the AIH group, and although the myocardial area-at-risk was the same in both groups, the myocardial infarct size was significantly smaller in the AIH group. There was no difference in myocardial neutrophil infiltration between groups. Because there were no differences in hemodynamics or neutrophil infiltration, the mechanism of myocardial protection was probably not due to a metabolic sparing or anti-inflammatory effect.

The authors hypothesize that AIH may provide cardioprotection by several mechanisms including: 1) erythropoietin-triggered activation of receptors that inhibit apoptosis, 2) an AIH-induced increased collateral blood flow resulting in decreased infarct size despite similar area-at-risk in the AIH group, 3) improved myocardial blood flow in the presence of hemodilution, 4) improved red blood cell velocity and decreased blood viscosity; both improving microcirculatory oxygen delivery and, 5) possibly a lower systemic vascular resistance due to AIH, thus decreasing oxygen requirements. The authors point out that these findings of single coronary occlusion may not be applicable to patients with chronic diffuse multivessel coronary artery disease and chronic endothelial dysfunction. However, these findings are consistent with a study of pre-bypass AIH (to Hct of 28%) in humans that showed fewer arrhythmias, lower release of biomarkers and lower inotrope requirements in the AIH group.1

Comments: The “transfusion trigger” in patients with coronary artery disease or undergoing cardiac surgery is controversial. However, it is known that there are risks associated with transfusion including immunosuppression, bacterial and viral infection and transfusion-related acute lung injury. It has clearly been shown that there is no difference in outcomes between a liberal (Hb 10-12 g/dL) vs restrictive (Hb 7-9 g/dL) transfusion strategy in critically ill patients or a sub-group of critically ill patients with coronary artery disease.2 However, studies of Jehovah’s Witness patients with coronary artery disease have shown an association with increased mortality with a Hb < 8 g/dL.3 Also, the authors of this paper found that AIH in a Hct of 25% (Hb 8.3 g/dL) resulted in unstable hemodynamics and bleeding complications.

Two recent large retrospective studies have shown different results regarding transfusion in patients with acute myocardial infarction. One showed an association with improved outcome with a transfusion trigger of ≤11 gm/dL.4 Another study showed no impact of transfusion with a trigger between 7-8 gm/dL, but a worse outcome was associated with a trigger of > 10 gm/dL.4 This paper also emphasizes the anti-apoptotic role of erythropoietin in ischemia and reperfusion. More studies of erythropoietin, evaluating its effects on other organ systems, need to be done in critically ill patients and patients undergoing cardiac surgery. Finally, the authors used 6% hydroxyethyl starch for AIH. Studies on other fluids should also be done to determine if 6% hydroxyethyl starch is the optimum fluid for AIH.

There is growing evidence that a Hb of 8-10 g/dL is safe in normovolemic patients with coronary artery disease without acute coronary syndromes. Further animal and clinical trials will need to be done to determine the optimal Hb in patients with coronary artery disease and acute coronary syndromes and to determine the optimum Hb before, during, and after cardiac surgery. It may be lower than we think!
The Coapsys device provides an opportunity for a novel off-pump treatment of functional ischemic MR. It has the potential to both correct annular dilatation and restore ventricular geometry. This device is currently being evaluated as part of a U.S. Food and Drug Administration—regulated Investigational Device Exemption, randomized, pivotal study with efficacy and safety end-points comparing it with standard mitral valve repair. These investigators document the intraoperative experience of the initial phase of this study, which involved implantation of the device in 19 patients.

The Coapsys device consists of two epicardial pads connected by a flexible suture cord between the papillary muscles that bisects the ventricle. Under epicardial echocardiographic guidance, the cord is passed through the left ventricle and then sequentially tightened to improve leaflet coaptation and stabilize the ventricular wall. Sizing is conducted under real-time color flow Doppler imaging to quantify MR. The suture length is shortened, and the final length is determined by elimination of MR or a maximum shortening of 35%. The procedure is performed without the use of cardiopulmonary bypass.

The treatment of functional ischemic MR remains challenging, with traditional approaches (undersized annuloplasty) yielding mediocre midterm and long-term results. The concept of the Coapsys device is intriguing because it not only treats the annular abnormality but also attempts to directly restore the subannular ventricular geometry. This report confirms the immediate efficacy of the device, with significant ventricular dimensional reduction at both the annular and subvalvular levels. Further randomized evaluation will assess long-term stability and compare it with standard annuloplasty techniques.
What's new with alpha-stat versus pH-stat?


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Literature Review References

Cardioprotective effects of acute isovolemic hemodilution in a rat model of transient coronary occlusion.


Reviewer: Michael H. Wall, MD
University of Texas Southwestern Medical Center at Dallas
Dallas, TX

Abstract: The authors hypothesized that acute normovolemic isodilution (AIH) would have cardioprotective effects in acute coronary ischemia and infarction. Male Sprague-Dawley rats were anesthetized with isoflurane and fentanyl. The AIH group was hemodiluted to a target hematocrit of 28% using 6% hydroxyethyl starch in a 1:1 ratio over 10 minutes. The AIH (Hct 26%) and control groups (Hct 42%) underwent 30 minutes of acute occlusion of the left anterior descending (LAD) coronary artery. Flow was restored to the LAD, the animals emerged from anesthesia and followed for 48 hours before they were sacrificed. Fatal arrhythmias were less common in the AIH group than in the control group (13% vs 47%, p <0.05) and 48 hour survival was higher in the AIH group (83% vs 42%, p <0.05). Cardiac troponin release was significantly lower in the AIH group, and although the