

## THE “ESP”

### WHAT IS “ESP” AND HOW CAN IT HELP CARDIAC SURGICAL PATIENTS?

*Alexander J. Gregory MD FRCPC, University of Calgary, Alberta, CA*

Over the past few years there has been rapid growth in enthusiasm and the clinical applications of a variety of fascial plane chest wall regional blocks, including for cardiac surgical patients.<sup>1,2</sup> In general, these are technically easier to perform and have a potentially lower risk of complications than more traditional regional anesthesia techniques. One chest wall technique that is gaining increasing use in cardiac surgery is the Erector Spinae Plane block, or “ESP.” But what is the ESP, how is it performed, and what benefits does it provide to patients?

The ESP block was initially described by Dr. Mauricio Forero and colleagues in 2016,

using this technique to provide analgesia to two cancer patients with rib pathology.<sup>3</sup> Cardiac surgical chest wall incisions are primarily innervated by the segmental levels of intercostal nerves and their branches the lateral (thoracotomy) and anterior (sternotomy) cutaneous branches. The intercostal nerve is itself a branch of the ventral ramus which, along with the dorsal ramus, is a division of the spinal nerve after it exits the intervertebral foramen [Fig 1]. The anatomic plane where the erector spinae muscle lies across the transverse processes of the thoracic vertebrae provides a potential space to deposit local anesthetic.<sup>1,2</sup> This plane has two intriguing

characteristics that make it an attractive option for cardiac surgery patients.

#### Benefits

First, it is both superficial and marked by easy/consistent anatomical landmarks, making it amenable to ultrasound guided needle and/or catheter placement without requiring sub-specialty training in regional anesthesia. Second, its location away from the pleura, blood vessels, major branches of the spinal nerves, epidural space, and spinal cord offer a potentially more favorable risk profile than other regional techniques such as epidural, paravertebral, or intercostal blocks.

>> continued on page 2

## ERAS<sup>®</sup> CARDIAC SOCIETY VIRTUAL CONFERENCE

### JOIN US MARCH 5-6 FOR A VIRTUAL EXPERIENCE FOCUSED ON OPTIMIZING PERIOPERATIVE CARE IN CARDIAC SURGERY

We are bringing the experts and thought leaders to YOU, from around the world, for 2 days of interactive sessions. The ERAS Cardiac Society will be broadcasting LIVE from the Methodist Hospital DeBakey Center in Houston, TX. We will cover topics such as: reducing perioperative blood transfusions, prehabilitation, the value proposition of an Enhance Recovery Program in cardiac surgery, rigid sternal

fixation, perfusion strategies, novel opioid reduction approaches, regional anesthesia, atrial fibrillation prevention, eliminating acute kidney injury and many more! Expert panels will discuss the latest advances. We will highlight a multidisciplinary, collaborative approach to improved perioperative care of the cardiac surgical patient. We know from experience that this approach will improve short and long-term patient outcomes.

We are offering a disruptive experience where attendees can also claim up to 14.75 CME/CEUs for less than \$100.00. Continuing education credits are specific to Physicians, CRNAs, PAs, NPs, RNs, Perfusionists, Dietitians, and Pharmacists.

View the full agenda, register, and submit an abstract by visiting <https://erasvirtual2021.com>. You do not want to miss this! REGISTER TODAY!

## MORE INSIDE

- **Anesthesia:** How “ESP” Can Help Cardiac Patients
- **Education:** How Team Member Education is Essential for ERAS
- **Incisions:** Improved Incision Management for High-Risk Patients
- **Recent Publications**
- **Upcoming Conferences**



## ANESTHESIA:

# THE “ESP”: WHAT IS IT AND HOW CAN IT HELP CARDIAC SURGICAL PATIENTS?

Alexander J. Gregory MD FRCPC, University of Calgary, Alberta, CA

>> continued from page 1

Technically, the transverse body of one of the thoracic vertebrae (usually T4-T6) and the overlying erector spinae muscle is identified by ultrasound. The needle is then imaged as it passes through the superficial tissues, the rhomboid and trapezius muscles, and then the erector spinae muscle itself. At this point the needle tip usually abuts the transverse process [Fig 2]. Instillation of local anesthetic will then spread the deep erector spinae fascia from the transverse process and inter-transverse ligaments, creating a large pocket which will spread and cover additional intercostal segments, and possibly track anteriorly to the ventral ramus itself. At this point, if desired, a catheter can also be placed to provide continuous delivery of local anesthetic. For unilateral incisions, such as minimally-invasive valve surgery or open TAAA, an ipsilateral ESP block will suffice. For coverage of procedures through sternotomy, bilateral ESP blocks will be required. The ESP can be performed before or after surgery, or even as a rescue strategy for poor post-operative analgesia in the

intensive care unit or hospital ward. The patient can be awake or asleep, sitting upright or in the lateral position. This versatility only adds to the potential value of the block as a component to consider as part of a multi-modal opioid-sparing analgesic bundle. Additional technical details can be found on the ERAS Cardiac website “How To Do It” page.

As a newer block, our understanding on its clinical effectiveness continues to evolve, but early evidence in non-cardiac surgery demonstrates effective analgesia and opioid-sparing results.<sup>4</sup> Within cardiac surgery the data is even more sparse, though what exists is also encouraging.<sup>5-8</sup> It is still to soon to know the exact value of the ESP block for cardiac surgery patients. Does it add enough incremental benefit if a non-regional comprehensive multi-modal approach is already being applied? How will it impact the economics of hospital workflow, equipment needs, and human resources? What is the safety profile? Finally, does it positively impact the surgical experience of patients?

Future research will need to be completed before we are able to fully assess the role that ESP, and other chest wall fascial plane blocks, should play within an enhanced recovery program.

1. Kelava M. Regional Anesthesia in Cardiac Surgery: An Overview of Fascial Plane Chest Wall Blocks. *Anesth Analg.* 2020;131(1):127-135.

2. Mitnacht AJC. Regional Techniques for Cardiac and Cardiac-Related Procedures. *Journal of Cardiothoracic and Vascular Anesthesia.* 2019;33(2):532-546.

3. Forero M. The Erector Spinae Plane Block: A Novel Analgesic Technique in Thoracic Neuropathic Pain. *Reg Anesth Pain Med.* 2016;41(5):621-627.

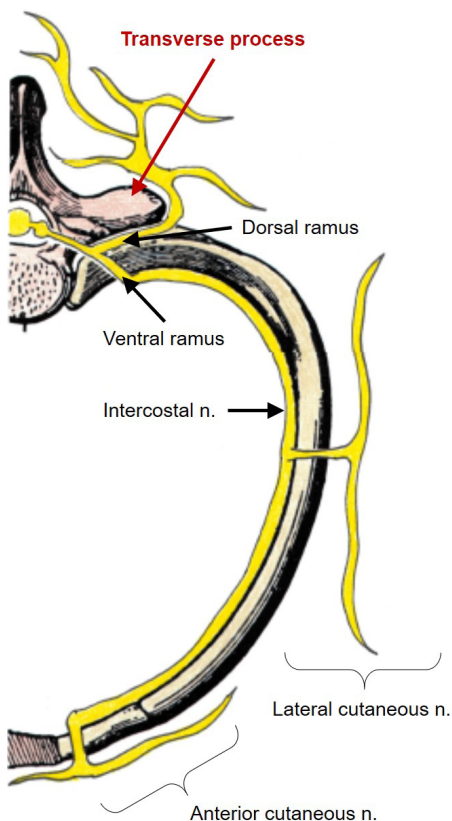
4. Kendall MC. The effect of ultrasound-guided erector spinae plane block on postsurgical pain: a meta-analysis of randomized controlled trials. *BMC Anesthesiol.* 2020;20(1):99.

5. Gawęda B. Postoperative pain treatment with erector spinae plane block and pectoralis nerve blocks in patients undergoing mitral/tricuspid valve repair - a randomized controlled trial. *BMC Anesthesiol.* 2020;20(1):51.

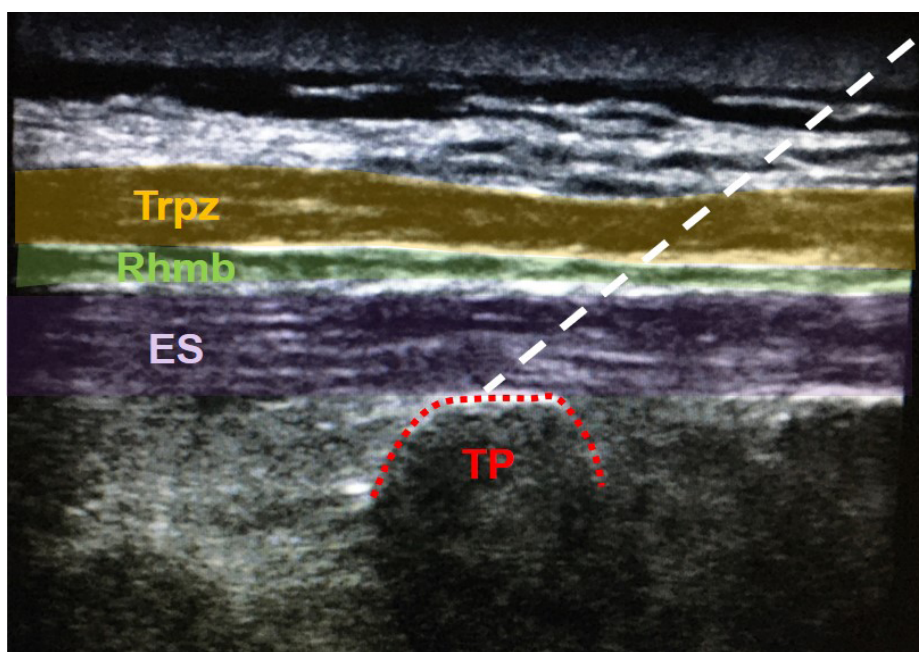
6. Krishna SN. Bilateral Erector Spinae Plane Block for Acute Post-Surgical Pain in Adult Cardiac Surgical Patients: A Randomized Controlled Trial. *J Cardiothorac Vasc Anesth.* 2019;33(2):368-375.

7. Macaire P. Ultrasound-Guided Continuous Thoracic Erector Spinae Plane Block Within an Enhanced Recovery Program Is Associated with Decreased Opioid Consumption and Improved Patient Postoperative Rehabilitation After Open Cardiac Surgery-A Patient-Matched, Controlled Before-and-After Study. *J Cardiothorac Vasc Anesth.* 2019;33(6):1659-1667.

8. Nagaraja PS. Comparison of continuous thoracic epidural analgesia with bilateral erector spinae plane block for perioperative pain management in cardiac surgery. *Ann Card Anaesth.* 2018;21(3):323-327.



**Figure 1:** Neuroanatomy of the chest wall. Note the relative location of the vertebral transverse process to dorsal and ventral rami.



**Figure 2:** Ultrasound image of relevant anatomy for performing an ESP block. After passing through the trapezius (Trpz; orange) and rhomboid (Rhmb; green) muscles, the regional needle (white dashed line) will be placed underneath the erector spinae muscle (ES; purple) where it lays on the transverse process (TP; red).

## EDUCATION:

## TEAM MEMBER EDUCATION IS ESSENTIAL FOR A SUCCESSFUL ENHANCED RECOVERY PROGRAM

### EXPERIENCES FROM 34 ERAS COORDINATORS ACROSS THE UNITED STATES

*Vicki Morton-Bailey, DNP, MSN, AGNP-BC, Director, Clinical and Quality Outcomes, Providence Anesthesiology Associates, Charlotte, NC*  
*Michelle Ruth, MBA, MSN, RN, NE-BC, Manager of Aligned Clinical Projects, Clinical Effectiveness, Advocate Aurora Health*  
*Tracy Donaldson, MSN, RN, ERAS Care Coordinator, University of Rochester Medical Center, Rochester, NY*

Enhanced Recovery After Surgery (ERAS) is becoming more widely implemented in hospital systems across the country since its introduction in the late 1990's. ERAS programs have been shown to reduce length of stay, complications, readmission rates, and opioid consumption among other benefits. While ERAS started in colorectal surgery,

content and frequent staff turnover, yet this is one of the most important factors for a successful ERAS program. To better understand the various team member education approaches, a survey was sent to 50 ERAS Coordinators across the United States with the following questions:

1. What are your current responsibilities as an ERAS Coordinator?
2. Does your hospital system have a corporate clinical education department?
3. Currently, how do you provide education to team members?
4. Currently, who provides ERAS education to team members?
5. Is your team member education standardized?
6. What modes of team member education are currently working well? Why?
7. What modes of team member education are currently NOT working well? Why?
8. When do you hold ERAS education for team members?
9. How do you determine if/when re-education needs to occur?

staff meetings, 45% held mandatory, structured mandatory staff education classes, 33% held CE events, 44% educated during annual competency training, 22% utilized "road shows" and 33% added fliers to support their education. When asked who delivers the team member education, 100% delivered all ERAS education and 22% of those also enlisted the aid of Advance Practice Providers to disseminate education. The ERAS Coordinators provided standardized education 67% of the time, varying based on initial versus re-education.

During the COVID-19 pandemic, delivering team member education has created further challenges due to additional workload, being short-staffed, and the inability to hold large, in-person classes. Perhaps now, more than ever, implementing and sustaining a successful ERAS program has been of paramount importance. This survey was completed prior to the pandemic. When ERAS Coordinators were asked about modes of education, 90% found success by providing in-person education, both in small and large groups, and one on one. The remaining 10% were still struggling to find a successful mode of engagement and education. In person education was the preferred approach because of the opportunity for feedback and discussion. This also allowed team members to put a face to the ERAS program; to know who their "go to" person was for questions. When asked what modes of education had

#### KEY TAKE-AWAYS:

1. Use your staff/department meetings wisely by adding ERAS to every agenda for a quick 2-3-minute update
2. Standardize your education – makes for less confusion for staff and patients
3. Over communication is better than no communication
4. Update Bulletin boards with ERAS updates and data – transparency is crucial

the aforementioned benefits are inclusive of any surgical service line. The success of an ERAS program is dependent upon a combination of factors: cohesive multidisciplinary team involvement, support from hospital leadership, surgeon and anesthesia champions, a well-communicated plan, patient education, and thorough team member education. Team member education can be challenging due to the large scope of

Of the 50 ERAS Coordinators who received the survey, the response rate was 65% (34/50). Although there were various responsibilities listed by the respondents, 100% of them have the responsibility of providing staff education even though 89% responded "yes" to their institution having a corporate clinical education department. When asked how ERAS education was being delivered to team members, 90% said

>> continued on page 5



*Cardiac ERAS team at University of Maryland Saint Joseph Medical Center Towson MD including patient representative (seated)*



**INCISIONS:****IMPROVED INCISION MANAGEMENT IN HIGH-RISK CARDIAC SURGERY PATIENTS**

V. Seenu Reddy, MD, MBA, FACS

Centennial Heart and Vascular Center, Nashville, TN

Surgery for the cardiac patient is an “organized injury” that exerts metabolic, immunological and nutritional challenges. These changes comprise a well-described postoperative insulin resistance driven by the stimulated secretion of counter-regulatory hormones (growth hormone, glucocorticoids, catecholamines and glucagon). Moreover, surgery is associated with an inflammatory response that results in an “arginine depletion syndrome” which extends for days to weeks postoperatively.

with increased patient morbidity and even mortality. Events such as surgical site infection can have implications such as heart failure, renal failure, or stroke, and can lead to patient death.<sup>1</sup> These complications can also cause large increases in healthcare costs related to longer hospital stays and infection treatments.<sup>1</sup> Increased healthcare costs and improved reporting of wound healing and SSC measures have led to a focus on rigorous pre-operative preparation and post-operative care pathways as well as an expansion

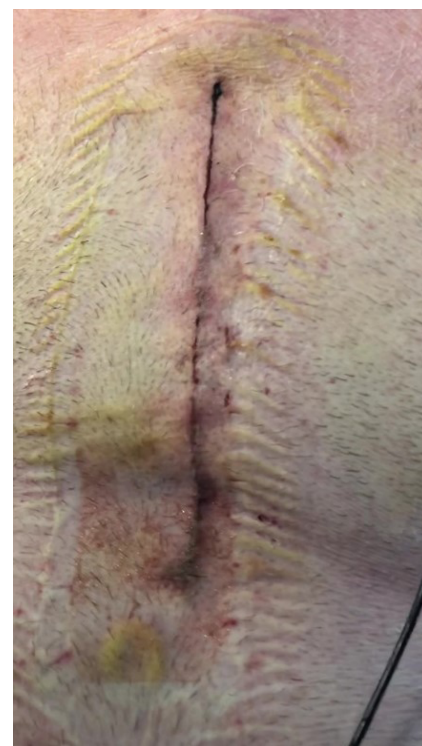
**A KEY COMPONENT IN HELPING WITH THE REDUCTION OF SSCS IN MY PRACTICE HAS BEEN THE ADOPTION OF ALGORITHM-BASED INCISION MANAGEMENT.**

A multi-pronged approach to optimizing perioperative nutrition has been shown to be beneficial in addressing many of the changes associated with surgery.

The recently published ERAS®-Cardiac Surgery guidelines highlight the need for preoperative nutritional optimization; continued consumption of clear liquids until 2 to 4h before general anesthesia and preoperative oral carbohydrate (CHO) loading<sup>1</sup>. Cardiothoracic surgical site complications (SSCs) can have devastating effects on patients

of commercially available products to help reduce the development of SSCs.

At my prior and current institutions and in my own surgical practice, I have seen a reduction in SSCs following the adoption of methodically pre-, intra-, and post-operative measures (Table 1). Prior to surgery, the patient's risk for developing SSCs is assessed. The SSC reduction measures are then selected with the patient-specific and surgery-specific risk factors in mind. Optimizing glucose management and nutrition status



**Figure 1:** Cardiothoracic incision after 5 days of closed incision negative pressure therapy use (B).

whenever possible is paramount. Patient temperature management and pre-operative prophylactic antibiotics at the optimal time intervals are required for all patients. However, longer term tobacco use cessation and blood glucose optimization is only possible for a subset of patients due to the acuity of their cardiovascular condition.

A key component in helping with the reduction of SSCs in my practice has been the adoption of algorithm-based incision management. This can occur intra-operatively with reducing the tension on deep dermal incisions, if indicated, or with the post-operative application of silver impregnated dressings or closed incision negative pressure therapy (ciNPT). Figure 1 shows representative healing of closed incisions in my patients following the addition of ciNPT to our surgical bundle, particularly in high-risk patients.

Closed incision negative pressure therapy is intended to manage closed surgical incisions and the surrounding intact skin in pa-

Pre-operative	Intra-operative	Post-operative
Patient tobacco use cessation	Reducing tension on deep dermal incisions (if indicated)	Silver impregnated dressings
Patient blood glucose management (<180 mg/dL)	Monofilament bolster sutures	Closed incision negative pressure therapy
Appropriate dose and timing of prophylactic antibiotics	Skin adhesives	Nutritional support including micronutrients specific to wound healing
Antiseptic skin and nasal colonization treatment	Patient temperature management	Minimization of steroids
Patient temperature management	Meticulous tissue management	Guideline usage of antibiotics
Nutritional optimization	Minimization of electrocautery close to skin	
	Appropriate antibiotic redosing	

**Table 1:** Surgical site complication reduction measures. Methods are selected based on patient-specific and surgery-specific needs.

>> continued on page 5

## IMPROVED INCISION MANAGEMENT IN HIGH-RISK CARDIAC SURGERY PATIENTS

>> continued from page 4

tients at risk for developing post-operative complications. It works by helping to hold the incision edges together, acting as a barrier against external contamination, decreasing lateral tension, reducing edema, and removing fluid, exudate, and infectious materials from the incision site. A majority of published literature also supports the use of ciNPT for incision management in cardiothoracic surgery.<sup>2-7</sup> These published studies assessed the use of ciNPT in sternotomy based operations including coronary artery bypass, especially with bilateral internal thoracic artery grafting. Patient comorbidities included diabetes, obesity, active tobacco use, congestive heart failure, hypertension, and peripheral vascular disease. Overall, these studies found reduced rates of SSCs in patients that received ciNPT as compared to traditional post-operative dressings.<sup>2-7</sup>

Surgical site complications following cardiothoracic surgery are associated with increased patient morbidity and mortality and healthcare costs. However, there is a variety of products on the market that can help mitigate the risk of SSC development. In my particular practice, appropriate dose and timing of pre-operative antibiotics, patient blood glucose and temperature management, and use of ciNPT for incision management have reduced rates of surgical site complications resulting in improved patient satisfaction and outcomes.

(1) Mehaffey JH, Hawkins RB, Byler M et al. Cost of individual complications following coronary artery bypass grafting. *J Thorac Cardiovasc Surg* 2018;155(3):875-882. doi:10.1016/j.jtcvs.2017.08.144.

(2) Ruggieri VG, Olivier ME, Aludaat C et al. Negative Pressure versus Conventional Sternal Wound Dressing in Coronary Surgery Using Bilateral Internal Mammmary Artery Grafts. *Heart Surgery Forum* 2019;22(2):E092-E096. doi:10.1532/

hsf.2269.

(3) Gatti G, Ledwon M, Gazdag L et al. Management of closed sternal incision after bilateral internal thoracic artery grafting with a single-use negative pressure system. *Updates in Surgery* 2018;70(4):545-552. doi:10.1007/s13304-018-0515-7.

(4) Reddy VS. Use of Closed Incision Management with Negative Pressure Therapy for Complex Cardiac Patients. *Cureus* 2016;8(2):e506. doi:10.7759/cureus.506.

(5) Grauhan O, Navasardyan A, Tutkun B et al. Effect of surgical incision management on wound infections in a poststernotomy patient population. *Int Wound J* 2014;11(Suppl 1):6-9. doi:10.1111/iwj.12294.

(6) Grauhan O, Navasardyan A, Hofmann M, Muller P, Stein J, Hetzer R. Prevention of poststernotomy wound infections in obese patients by negative pressure wound therapy. *J Thorac Cardiovasc Surg* 2013;145(5):1387-1392.

(7) Colli A. First experience with a new negative pressure incision management system on surgical incisions after cardiac surgery in high risk patients. *Journal of Cardiothoracic Surgery* 2011;6(1):160.

## TEAM MEMBER EDUCATION IS ESSENTIAL FOR A SUCCESSFUL ENHANCED RECOVERY PROGRAM

>> continued from page 3

not worked well, 100% listed either online or written education as not being effective. This was an important finding since many of us are currently forced to forego in-person team member education and resort to online learning modules.

When asked about the timing of ERAS education, Coordinators had a mixed response. Prior to implementation and new hire training had equal responses of 67%. Other choices were yearly (56%), twice yearly (11%) and as needed (44%). The Coordinators could select more than one response. Lastly, determining when re-education for team members needed to occur was evaluated. Quality reports determined the need for re-education 100% of the time. Additional determinants included patient feedback and feedback from the multidisciplinary group (22%).

Outside of the survey, ERAS Coordinators also reported that having frequent interactions with staff and providing outcome data had been beneficial in provoking informational conversations with team members. This interaction with frontline staff afforded ERAS Coordinators the opportunity to hear feedback and suggestions from team members, thereby further engaging them.

Having a robust ERAS program can be dependent upon many things but having well-educated team members has been a crucial component for successful cen-

ters. Thorough, effective education is difficult work but will pay dividends for implementing and sustaining optimal Enhanced Recovery.



Cardiac ERAS team Max Rady College of Medicine University of Manitoba



Cardiac ERAS team at University of Massachusetts Baystate Medical Center Springfield MA



## RECENT PUBLICATIONS:

&gt;&gt; Click titles for online links

**Cardiac Surgery-Enhanced Recovery Programs Modified for COVID-19: Key Steps to Preserve Resources, Manage Caseload Backlog, and Improve Patient Outcomes.**

Gregory AJ, Grant MC, Boyle E, Arora RC, Williams JB, Salenger R, Chatterjee S, Lobdell KW, Jahangiri M, Engelman DT.  
*J Cardiothorac Vasc Anesth.* 2020 Dec

**Predictors of new persistent opioid use after coronary artery bypass grafting.**

Clement KC, Canner JK, Lawton JS, Whitman GJR, Grant MC, Sussman MS.  
*J Thorac Cardiovasc Surg.* 2020 Oct

**Opioid-Sparing Cardiac Anesthesia: Secondary Analysis of an Enhanced Recovery Program for Cardiac Surgery.**

Grant MC, Isada T, Ruzankin P, Gottschalk A, Whitman G, Lawton JS, Dodd-O J, Barodka V.  
*Anesth Analg.* 2020 Dec

**Frailty and the failing heart do not travel alone.**

Kehler DS, Arora RC.  
*Eur J Heart Fail.* 2020 Nov

**The Association of a Frailty Index and Incident Delirium in Older Hospitalized Patients: An Observational Cohort Study.**

Sillner AY, McConeghy RO, Madrigal C, Culley DJ, Arora RC, Rudolph JL.  
*Clin Interv Aging.* 2020 Nov 2

**Using urinary biomarkers to reduce acute kidney injury following cardiac surgery.**

Engelman DT, Crisafi C, Germain M, Greco B, Nathanson BH, Engelman RM, Schwann TA.  
*J Thorac Cardiovasc Surg.* 2020 Nov

**Treatment With Angiotensin II Is Associated With Rapid Blood Pressure Response and Vasopressor Sparing in Patients With Vasoplegia After Cardiac Surgery: A Post-Hoc Analysis of Angiotensin II for the Treatment of High-Output Shock (ATHOS-3) Study.**

Klijian A, Khanna AK, Reddy VS, Friedman B, Ortoleva J, Evans AS, Panwar R, Kroll S, Greenfeld CR, Chatterjee S.  
*J Cardiothorac Vasc Anesth.* 2021 Jan

**Retrograde Autologous Priming in Cardiac Surgery: Results From a Systematic Review and Meta-analysis.**

Hensley NB, Gyi R, Zorrilla-Vaca A, Choi CW, Lawton JS, Brown CH 4th, Frank SM, Grant MC, Cho BC.  
*Anesth Analg.* 2021 Jan

**New Persistent Opioid Use After Aortic and Mitral Valve Surgery in Commercially Insured Patients.**

Clement KC, Canner JK, Whitman GJR, Lawton JS, Grant MC, Sussman MS.  
*Ann Thorac Surg.* 2020 Sep

**Poor Cost Awareness Among Anesthesia Providers for Medications, Supplies, and Blood Products.**

Qin CX, Merkel KR, Yesantharao LV, Lau EK, Phelps MA, Kajstura TJ, Grant MC, Frank SM, Cho BC.  
*Jt Comm J Qual Patient Saf.* 2020 Sep

**Longitudinal Outcomes in Octogenarian Critically Ill Patients with a Focus on Frailty and Cardiac Surgery.**

Hill, A, Heyland, Dk, Rossaint, R, Arora, RC, Engelman, DT, Day, AG, Stoppe C.  
*J Clin Med.* 2021, 10, 12

**Stress Biomarkers Do Not Correlate with Risk Factors for Kidney Injury Following Cardiac Surgery.**

Engelman DT, Crisafi C, Germain, Greco B, Nathanson BH, Engelman RM, Schwann TA.  
*Ann Thorac Surg.* 2020

**Commentary: The Need for Better Identification of Postoperative Delirium.**

Chatterjee S, Engelman DT.  
*J Thorac Cardiovasc Surg.* 2020

**Effect of Skeletonization of Bilateral Internal Thoracic Arteries on Deep Sternal Wound Infections.**

Schwann TA, Gaudino MFL, Engelman DT, Sedrakyan A, Li D, Tranbaugh RF, Habib RH.  
*Ann Thorac Surg.* 2020

## CONFERENCES:



March 5-6, virtual  
[ERAS Cardiac](#)



January 28, virtual  
[Evidence Based Perioperative Medicine: The Value Proposition of Perioperative Care](#)



January 29-31, virtual  
[The Society of Thoracic Surgeons](#)



April 7-9, virtual  
[American Society for Enhanced Recovery](#)



April 24-27, virtual  
[Society of Cardiovascular Anesthesiologists](#)



May 1-4, Seattle, WA  
[American Association for Thoracic Surgery](#)



June 29 – July 1, London, England  
[Evidence Based Perioperative Medicine](#)



July 7–9, New Orleans, LA  
[Joint 8th ERAS World Congress / ERAS USA](#)

# Optimizing Outcomes Through Global Collaboration

THE ERAS® CARDIAC SOCIETY EXPERIENCE

- Join our interactive virtual conference, with multi-disciplinary experts from around the world discussing the latest in optimizing outcomes and cardiac surgery treatment innovations.
- Don't miss this unique experience, with live debates and engaging panel discussions, broadcasting Live from Methodist Hospital DeBakey Center in Houston, Texas

**REGISTER NOW**

# ERAS®-Cardiac Society Members

## EXECUTIVE BOARD

Daniel Engelman, MD  
President, Cardiac Surgeon  
Baystate Medical Center, Springfield MA, USA

Michael Grant, MD  
Vice President  
Cardiac Anesthesia and Critical Care Medicine  
Johns Hopkins, Baltimore, MD, USA

Alex Gregory, MD  
Secretary, Cardiac Anesthesia  
University of Calgary, Canada

Kevin Lobdell, MD  
Treasurer  
Cardiac Surgeon  
Atrium Health, North Carolina, USA

Rakesh Arora, MD, PhD  
Cardiac Surgeon  
University of Manitoba, Winnipeg, Canada

V. Seenu Reddy, MD, MBA, FACS  
Cardiac Surgeon  
Centennial Heart & Vascular Center,  
Nashville, TN, USA

Marjan Jahangiri, MBBS, MS, FRCS, FRCS (CTH)  
Cardiac Surgeon  
St. Georges University of London

Rawn Salenger, MD  
Cardiac Surgeon  
University of Maryland, Baltimore, MD, USA

Subhasis Chatterjee, MD  
Cardiac Surgeon  
Baylor College of Medicine, Houston, TX USA

Vicki Morton-Bailey, DNP, MSN, AGNP-BC  
Director of Clinical and Quality Outcomes  
Providence Anesthesiology Associates  
Charlotte, North Carolina, USA

## ADVISORY BOARD

Ed Boyle, MD  
Cardiac Surgeon  
St. Charles Medical Center, Bend Oregon, USA

Albert Cheung, MD  
Cardiac Anesthesia  
Stanford University Medical Center,  
Stanford, CA, USA

Joerg Ender, MD  
Cardiac Anesthesia  
University of Leipzig, Leipzig, Germany

Richard Engelman, MD  
Cardiac Surgeon  
Baystate Medical Center, Springfield, MA, USA

Marc W. Gerdisch, MD  
Cardiac Surgeon  
Franciscan Health Heart Center,  
Indianapolis, IN, USA

Karim Jabr, CCP, LP, CSSBB  
Cardiovascular Perfusion  
Navicent Health Medical Center  
Macon, GA, USA

Ali Khoynenezhad, MD  
Cardiac Surgeon  
Long Beach Memorial Heart & Vascular  
Institute, Long Beach, CA, USA

Jerrold H Levy, MD, FAHA, FCCM  
Cardiac Anesthesia  
Duke University Medical Center  
Durham, North Carolina, USA

Louis Perrault, MD  
Cardiac Surgeon  
Montreal Heart Institute,  
Montreal, Quebec, Canada

John Pirris, MD  
Cardiac Surgeon  
University of Florida Health, Gainesville, FL USA

Eric Roselli, MD  
Cardiac Surgeon  
Cleveland Clinic, Cleveland, OH, USA

Vinod Thourani, MD  
Cardiac Surgeon  
Piedmont Heart Institute, Atlanta, GA USA

Judson Williams, MD, MHS  
Cardiac Surgeon  
WakeMed Heart & Vascular  
Raleigh, North Carolina, USA

Alex Zarbock  
Cardiac Anesthesia  
University of Munster, Munster, Germany

Mary Zellinger, : APRN-CCNS, MN, ANP-BC,  
CCRN-CSC, FCCM, FAAN  
Critical Care Nursing  
Emory University Hospital  
Atlanta, Georgia, USA

## SUBJECT MATTER EXPERTS

Keith Allen, MD  
Cardiac Surgeon  
Mid America Heart and Lung Surgeons  
Kansas City, MO, USA

Ramon Arreola-Torres  
Cardiac Surgeon  
West National Medical Center, Mexico

John Augoustides, MD  
Cardiac Surgeon  
Penn Medicine Clinical Care,  
Philadelphia, PA, USA

Daniel Beckles, MD  
Cardiac Surgeon  
Baylor, Scott, and White Health, Temple, TX USA

Walid Ben Ali, MD  
Cardiac Surgeon  
Montreal Heart, Montreal, Quebec, Canada

Jessica Brown, MD  
Cardiac Anesthesia  
Southern Methodist, Houston, TX, USA

Andre Denault, MD  
Cardiac Anesthesia  
Montreal Heart, Montreal Quebec, Canada

Jill Engel, RN  
Cardiac Nursing  
Duke University Medical Center  
Durham, North Carolina, USA

Nick Fletcher, MBBS, FRCA, FFICM  
Cardiac Anesthesia  
St. Georges University of London  
London SW17 ORE, UK

Bram Geller, MD  
Critical Care, Cardiology  
Penn Medicine Clinical Care  
Philadelphia, PA, USA

Kamrouz Ghadimi, MD  
Cardiac Anesthesia  
Duke University School of Medicine  
Durham, North Carolina, USA

Hilary P. Grocott, MD, FRCPC, FASE  
Cardiac Anesthesia  
University of Manitoba, Winnipeg, Canada

Jacob T Gutsche, MD, FASE, FCCM  
Cardiovascular Critical Care  
University of Pennsylvania  
Philadelphia, PA, USA

Matthias Kirsch, MD  
Cardiac Surgeon  
Centre Hospitalo Universitaire Vaudois  
Lausanne, Switzerland

Gudrun Kunst, MD PhD, FRCA, FFICM  
Cardiac Anesthesia  
King's College Hospital, Denmark Hill, UK

Michael Manning, MD, PhD  
Cardiac Anesthesia  
Duke University, Durham, NC, USA

Alison Nelson, RN  
ERAS Provincial Manager  
Alberta Health Services, Alberta CA

Gregg Nelson, MD, PhD  
Secretary of the ERAS® Society  
University of Calgary  
Calgary, Alberta, Canada

Tom Nguyen, MD  
Cardiac Anesthesia  
Memorial Hermann Texas Medical Center,  
Houston, TX, USA

Prakash A. Patel, MD, FASE  
Cardiac Anesthesia  
University of Pennsylvania  
Philadelphia, PA, USA

Nathalie Roy, MD, FRCSC  
Cardiac Surgeon  
Boston Children's Hospital, Boston, MA, USA

Michael Sander, MD  
Cardiac Anesthesia  
University of Giessen und Marburg, Germany

Andrew Shaw, MD  
Cardiac Anesthesia  
University of Alberta, Alberta, CA

Christian Stoppe, MD  
Cardiac Anesthesia  
Aachen University, Aachen, Germany

Vinod Thourani, MD  
Cardiac Surgeon  
Medstar Heart and Vascular Institute  
Washington, DC, USA

Keenan Yount, MD  
Cardiac Surgeon  
University Virginia, Charlottesville, VA, USA

## OUR MISSION

*The mission of the ERAS® Cardiac Society is to develop protocols to improve recovery through research, education, audit and implementation of evidence-based practice.*

## Who we are

ERAS® stands for Enhanced Recovery after Surgery, and we improve surgical care and recovery through research, education, audit, and implementation of evidence-based practices. In early 2017, a group of cardiac surgeons, anesthesiologists, and intensivists first met to establish the Enhanced Recovery After Cardiac Surgery (ERACS®) Society to achieve these goals for patients undergoing heart surgery. This initial organization's work led to the publication of the first-ever expert consensus recommendations for a cardiac surgical enhanced recovery protocol. We have since joined with the ERAS® Society and have established an organization of multinational experts representing all aspects of healthcare delivery. ERAS® Cardiac is a non-profit organization with the mission to develop evidence-based expert consensus statements promoting best practice recovery practices. The goal is to provide hospitals with better guidance for developing local protocols that are part of a continuous quality improvement process for better patient care, and reduce postoperative complications and costs after heart surgery.

## ERAS® Society

The ERAS® Society is an international organization with enhanced recovery guidelines for several surgical sub-specialties. Beginning as the ERAS® Study Group in 2001, team leaders Professor Ken Fearon (University of Edinburgh) and Professor Olle Ljungqvist (Karolinska Institutet) spearheaded the developments made in multimodal surgical care. The ERAS® Study Group soon discovered that there were a variety of local traditions in practice, as well as an inconsistent application of evidence-based best practices. This prompted the group to examine the process of change from tradition to best-practice. Since its inception, the ERAS® Society has expanded to include several subspecialties, emphasized the benefits of standardized best-practices across the continuum of the perioperative period, highlighted the importance of data-driven self-evaluation, and promoted the improvement of patient care.

## Our Organizational Structure

Our ERAS® Cardiac Society is made up of experts from around the world, including participation from all members of the healthcare team. Our members strive to implement enhanced recovery principals at their local institutions while advancing improved patient care internationally through collaboration, education, and dissemination of up-to-date knowledge regarding optimal perioperative care. Our organization is divided into an Executive Board, Advisory Board, and a pool of Subject Matter Experts.

## FOR MORE INFORMATION:



To learn more about our organization, including our board members and upcoming meetings:

[www.erascardiac.org](http://www.erascardiac.org)



Edwards



Corporate financial support will be used to promote the mission of the ERAS® Cardiac Society. We are committed to standardizing best practice surrounding the preoperative and perioperative care of cardiac surgical patients through expert consensus, review of the literature and open communication. This unrestricted support does not represent the ERAS® Cardiac Society's support or agreement to promote any pharmaceutical, device, or technology related to the sponsors.

For more information and to become a sponsor please contact:  
Bonnie Engelman, MA, Director of Sponsor Relations, ERAS® Cardiac Society by mail at [bengelma@erascardiac.org](mailto:bengelma@erascardiac.org)

Cheryl Crisafi MSN, RN, CNL [Cherylerasc@gmail.com](mailto:Cherylerasc@gmail.com)  
Nurse Coordinator ERAS® Cardiac Society

Donna Frankel [donnaerasc@gmail.com](mailto:donnaerasc@gmail.com)  
Office Manager ERAS® Cardiac Society

Bonnie Engelman, MA [bengelma@erascardiac.org](mailto:bengelma@erascardiac.org)  
Director of Sponsor Relations ERAS® Cardiac Society