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

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. 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. 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. 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® 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.

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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. Within cardiac surgery the data is even more sparse, though what exists is also encouraging. 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.


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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

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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, 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 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?

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 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

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.

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. Cardiothoracic surgical site complications (SSCs) can have devastating effects on patients 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. These complications can also cause large increases in healthcare costs related to longer hospital stays and infection treatments. 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 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 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.

Table 1: Surgical site complication reduction measures. Methods are selected based on patient-specific and surgery-specific needs.
IMPROVED INCISION MANAGEMENT IN HIGH-RISK CARDIAC SURGERY PATIENTS

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.


TEAM MEMBER EDUCATION IS ESSENTIAL FOR A SUCCESSFUL ENHANCED RECOVERY PROGRAM

Having a robust ERAS program can be dependent upon many things but having well-educated team members has been a crucial component for successful centers. Thorough, effective education is difficult work but will pay dividends for implementing and sustaining optimal Enhanced Recovery.
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

RECENT PUBLICATIONS:

Cardiac Surgery-Enhanced Recovery Programs Modified for COVID-19: Key Steps to Preserve Resources, Manage Caseload, Backlog, and Improve Patient Outcomes.
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Predictors of new persistent opioid use after coronary artery bypass grafting.
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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.

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.

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To learn more about our organization, including our board members and upcoming meetings: www.erascardiac.org

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