



## PRESIDENT'S MESSAGE



**Stanton K. Shernan,  
MD, FAHA, FASE**

President, Society  
of Cardiovascular  
Anesthesiologists

Care  
Knowledge  
Investigation

### Diversity, Equity and Inclusion — a Critical Component of our SCA Mission

Dear Friends,

I hope you and your families are all safe and well. Among all the goals and objectives that the SCA Board of Directors has successfully achieved during this challenging year related to our mission, we have also intentionally highly prioritized initiatives related to diversity, equity, and inclusion (DEI) involving faculty and leadership development and representation. The SCA is also in the process of endorsing a formal multi-society statement related to DEI issues. Furthermore, we are developing our own DEI committee to advise our Board of Directors directly and will very soon be including the following statement on all of our communications:

*"The SCA is committed to upholding the highest standards of inclusivity and diversity in pursuing our mission of being an unbiased and credible source of information, expertise, and leadership. Our collective reverence for mutual respect, shared experience, and mentoring drive what we do, both professionally and personally, every day."*

During my tenure as SCA President, it has been my pleasure to use the President's Message platform to introduce leaders in our society who have expertise in some high-profile regions. I want to introduce Dr. Adam Milam, currently serving as a Fellow in Cardiothoracic Anesthesiology at the Anesthesiology Institute at the Cleveland Clinic Foundation. Dr. Milam has already established a notable reputation addressing important issues related to DEI issues in healthcare and has published significantly in this area. He contacted me recently about his interest in pursuing this topic within the SCA to highlight further its relevance within the national and international community of cardiothoracic and vascular anesthesiologists. Dr. Milam generously provided the following article, which I am honored to include in this month's President's Message.

*Please see following page...*



## Featuring:

### Adam J. Milam MD, PhD, MHS

*Faculty Associate  
Department of  
Mental Health  
Johns Hopkins Bloomberg  
School of Public Health*



About two months ago I was getting ready for a call shift at Cleveland Clinic, where I'm an Adult Cardiothoracic Anesthesiology (ACTA) Fellow. I received a message from a colleague with a screenshot from a Grand Rounds presentation. The screenshot included a table from an article by Brotherton and Etzel (2020) reporting there were four African Americans in ACGME-accredited ACTA Fellowship programs for 2019-2020. These four African Americans represent 2.3% of the ACTA fellows nationally. This dismal representation is even lower than the 5.9% of African Americans pursuing residency

in Anesthesiology. My initial response was "Holy Crap!" How could there only be four African American ACTA fellows in the entire country? Then I thought back to the when I was interviewing for fellowship; I did not encounter a single African American applicant and I met only one African American Cardiothoracic Anesthesiologist. My initial surprise started to drift toward frustration. How could there be this gross underrepresentation? Who was addressing this issue? Will the few African Americans in the field have to bring attention to this problem and find solutions?

I shared my frustration with my network of African American colleagues. This network is generally who I turn to when I encounter issues with diversity and health disparities. This network helped me manage the stress and anger that emerged as we all witnessed the racial disparities in COVID-19 deaths. This network, similar to other 'villages' in the African American community generally depend on each other to bear the weight of all the burdens we constantly encounter. Marissa Evans eloquently described this in her article published in The Atlantic: We retreat into ourselves, into our community, and we take comfort in not having to explain our grief—the dreams deferred, the lost potential of Black legends—to anyone on the outside.

There is at least a triple burden placed on African American physicians. When you are the only African American physician in your department (and one of few in your institution), you have to advocate for minority and poor patients that do not always get the care they deserve. Said plainly, African Americans receive worse care compared to other races—we strive to change that although this often seems insurmountable. We also have to advocate for the students and residents that come behind you that are not offered the same opportunities or considerations of other students in the applicant pool as well as the other minority staff that do not have a voice. These students and residents face micro- and macro-aggressions on a daily basis all while managing the obstacles and stressors associated with becoming a physician. Lastly and equally as important, you have to advocate for yourself, often without the support of mentors and

# PRESIDENT'S MESSAGE

**"Instead of trying to build a brick wall, lay a brick every day. Eventually, you'll look up and have a brick wall."**

~ Ermias Joseph Asghedom

department leadership. African American physicians are pulled in so many directions because the community is so small and the common thread to address the existing health disparities and inequities in our country.

Reflecting on the article and my experiences as an African American Anesthesiologist entering into Cardiothoracic Anesthesiology, I reached out to the Society of Cardiovascular Anesthesiology to learn about efforts to improve diversity within our subspecialty. I could spend pages discussing the benefit of having a diverse physician workforce, but this has been documented elsewhere. I will simply say, improving diversity in Anesthesiology and specifically Cardiothoracic Anesthesiology is necessary, long overdue, and will improve health outcomes among our most vulnerable populations.

I am speaking as an African American, but feel free to replace African American with Hispanic, Native American, female, disabled, LBGT (and the list goes on). As a society and subspecialty, we need to recognize that diversity is a problem. We then need targeted interventions and initiatives to diversify our field. The playing field is not equal; I (and many of my colleagues) have encountered racism, discrimination, and microaggressions while pursuing our training. At a minimum, our subspecialty and society should reflect the diversity of our larger specialty and the ASA. There is no easy fix; this will take time and support from the leadership and membership. I look forward to working with SCA and ASA to address the lack of diversity in our national society leadership and within Cardiothoracic Anesthesiology.

"Instead of trying to build a brick wall, lay a brick every day. Eventually, you'll look up and have a brick wall."

—Ermias Joseph Asghedom

Leaders in the field, it is my firm belief that it is due diligence on behalf of the SCA to promote these critical issues. We are all gatekeepers who are responsible for creating a better world that recognizes the role of mutual respect and opportunity as primary components of professionalism.

Stay safe and be well!

*Stan*



## ECHO WEEK

FEBRUARY 26 - 28, 2021

If you have not registered, now is the time. You do not want to miss out on the first virtual Echo Week!

### Top reasons to register for Echo Week 2021:

- **Core Series** — prerecorded lectures.
- **Interactive Series** — prerecorded lectures with live panel discussion.
- **28.75 hours** of continuing medical education.
- **2021 Echo Attendees will receive a Discount** on the Echo Board Review Course – June 2021.

**Still Time  
to Register  
for the 2021  
Annual Echo  
Week!**

### Missing 2021 Echo Week?

Even if you are unable attend to the 2021 Annual Echo Week, that does not mean you have to miss out on valuable content!

Echo Week will be recorded and provide the opportunity to deepen your understanding of ultrasound and perioperative transesophageal echocardiology with access to nationally recognized experts and content that will enhance your practice. You can access the product anytime, anywhere—all while earning CME credits!

Whether you were unable to attend the virtual meeting or want to revisit sessions you missed at the meeting, Echo Week recorded is just what you need. Watch your email for more information on how to access the recording of 2021 Echo Week.

**To view the Echo Week agenda: visit [Echo Meeting Agenda](#).**

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**TT TOMTEC**



# Calling All Thoracic Anesthesiologists!

The Thoracic Anesthesia Symposium Planning Committee is enthusiastically inviting the world of non-cardiac anesthesiologists to join us for an excellent opportunity to learn what is new in the profession!

The SCA Thoracic Anesthesia Symposium will be a virtual platform held April 23, 2021. During this year's meeting you will experience:

- **Focus on dramas, traumas, experts and controversies** along with everyday challenges in the chest.
- **Thought leaders** provide a deep-dive exploration of new topics in thoracic surgery and anesthetic challenges.
- **Virtual workshop format!** Focus on your clinical interests and explore what is new with interactive experience with the authorities in the field.

## At the SCA Thoracic Anesthesia Virtual Symposium you can:

- Earn more than 8 hours of continuing medical education.
- Choose 3 virtual workshops and register for an optional live PBLD for a conference experience tailored to YOUR educational needs.
- Network with 200 other professionals in anesthesiology to help you gain insight into your practice and career.
- Connect with our exhibitors to learn about new products and programs.



**Virtual  
Meeting**  
**April 23, 2021**

The Society of Cardiovascular Anesthesiologists is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

The Society of Cardiovascular Anesthesiologists designates this activity for a maximum of 8.75 AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

**Register  
for the 2021  
Thoracic  
Anesthesia  
Symposium  
today!**

# Highlights

## Thoracic Anesthesia Virtual Symposium

### Workshops Offered:

- **Lung Isolation Workshop**

*Moderator: Javier Campos, MD*

- Tube Exchangers
- Cohen & Arndt Blockers
- R/L DLTs and Vivasight
- EZ Blocker

- **Thoracic Ultrasound: Diagnosis and Management Workshop**

*Moderator: Massimiliano Meineri, MD, FASE*

- Tube Exchangers
- Cohen & Arndt Blockers
- R/L DLTs and Vivasight
- EZ Blocker

- **Regional Anesthesia Workshop**

*Moderator: Rebecca Klinger, MD, MS*

- Erector Spinae
- PVB
- 3-D Anatomy
- Serratus Plane

- **Critical Procedural Skills Workshop**

*Moderators: Emily Teeter, MD, FASE & Lavinia Kolarczyk, MD, FASA*

- Chest Tube/Pigtail
- Needle Decompression/Thoracentesis
- Cricothyrotomy Station
- RV Monitoring Station

**Register now for this one-day event to maximize your virtual interaction between attendees and faculty!**

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NATIONAL  
BOARD OF  
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VIRTUAL  
2021 —  
REGISTER  
TODAY!

## Your Registration for the 2021 Annual Meeting and Workshops is Waiting!

April is right around the corner and we are excited to see you all soon during the 2021 Virtual Annual Meeting and Workshops from April 24–27.

Join more than 1,200 of your colleagues to learn from subject-matter experts about the latest updates and innovations. During the SCA Annual Meeting, you will be virtually connected with your peers and leaders in the field from around the world and connect with industry partners to learn about the newest products and programs.

### During the SCA Annual Meeting, you will experience:

- **Amazing content delivered by experts** in cardiothoracic anesthesiology, interventional cardiology and cardiothoracic surgery.
- **Experts** will provide didactics, small group breakout teaching, and high-yield discussions.
- **Hybrid approach to virtual learning**, with both on-demand education and live panel discussions.
- **Problem based learning discussions, scientific abstracts, and workshops** are planned to optimal attendee learning and connection on critical cardiothoracic anesthesiology topics.
- **The virtual platform** to allow for attendee networking, idea-sharing, and exhibits.



**SCA2021** ANNUAL MEETING &  
APRIL 24-27, 2021 **WORKSHOPS**

# SCA2021

## ANNUAL MEETING & WORKSHOPS

APRIL 24-27, 2021

### This year, in our virtual platform, you can:

- Earn over 30 hours of continuing medical education that will be on-demand post meeting for up to 60 days.
- Attend live discussion sessions to help you discover up to date practice pathways and innovations in the field.
- Register for Workshops and PBLDs tailored for YOUR educational needs.
- Network with 1,200 other professionals in anesthesiology to help you gain insight into your practice and career.
- Connect with industry and exhibiting companies to learn about new products and programs.

The Society of Cardiovascular Anesthesiologists is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

The Society of Cardiovascular Anesthesiologists designates this activity for a maximum of 34.75 AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

**Don't miss out — Register Today!**

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**SCA2021**  
**ANNUAL MEETING &**  
**WORKSHOPS**  
**APRIL 24-27, 2021**

# Introducing

## The 2021 Keynote Lecturer: Robert M. Califf, MD, MACC

*Using Data Science to Improve CV Surgical Outcomes*

Robert M. Califf, MD, MACC, is the Head of Clinical Policy and Strategy for Verily and Google Health for Verily and Google Health. Prior to this Dr. Califf was the vice chancellor for health data science for the Duke University School of Medicine; director of Duke Forge, Duke's center for health data science; and the Donald F. Fortin, MD, Professor of Cardiology. He served as Deputy Commissioner for Medical Products and Tobacco in the U.S. Food and Drug Administration (FDA) from 2015-2016, and as Commissioner of Food and Drugs from 2016-2017.

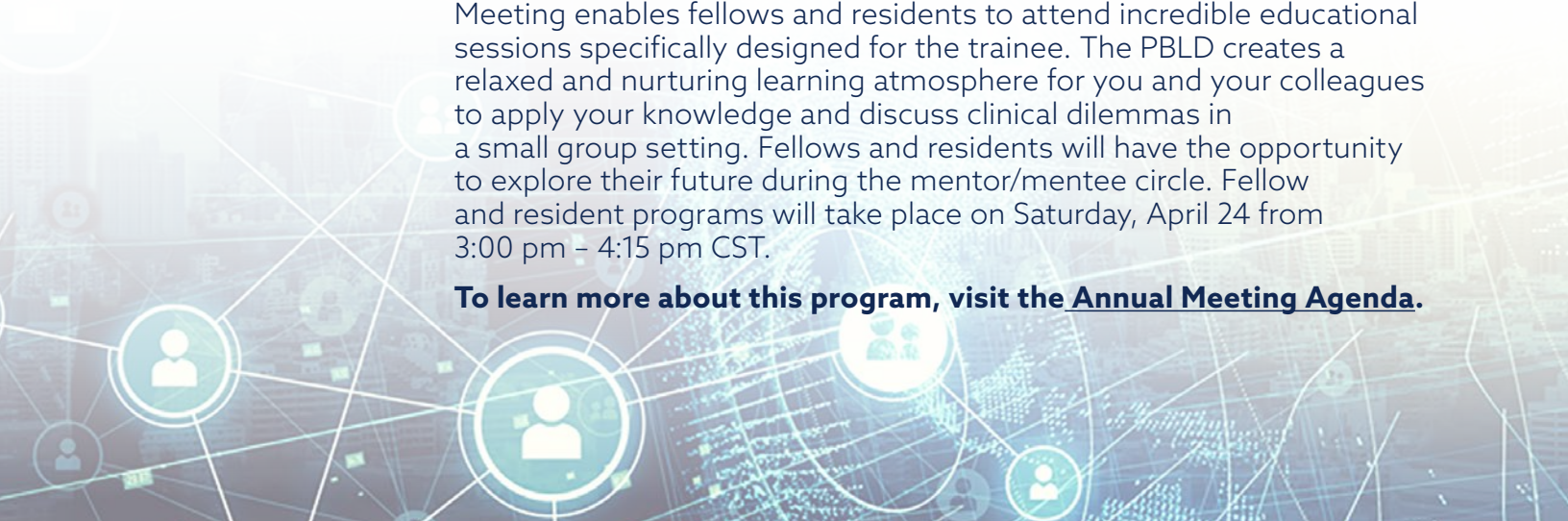
A nationally and internationally recognized leader in cardiovascular medicine, health outcomes research, healthcare quality, and clinical research, Dr. Califf is a graduate of Duke University School of Medicine. Dr. Califf was the founding director of the Duke Clinical Research Institute and is one of the most frequently cited authors in biomedical science.

**View Dr. Califf's lecture on Monday, April 26, 11 am-12 pm CST.**

## Fellow and Resident Program

**The Fellow and Resident Program** at the 2021 Virtual Annual Meeting enables fellows and residents to attend incredible educational sessions specifically designed for the trainee. The PBLD creates a relaxed and nurturing learning atmosphere for you and your colleagues to apply your knowledge and discuss clinical dilemmas in a small group setting. Fellows and residents will have the opportunity to explore their future during the mentor/mentee circle. Fellow and resident programs will take place on Saturday, April 24 from 3:00 pm - 4:15 pm CST.

**To learn more about this program, visit the [Annual Meeting Agenda](#).**





# SCA2021

ANNUAL MEETING &  
WORKSHOPS

APRIL 24-27, 2021

## Highlights

### Workshops Offered

#### 3D TEE WORKSHOP

*Moderators: Michele Sumler, MD and Jiapeng Huang, MD, PhD, FASA, FASE*

**Description:** Applications of 3D echocardiography have advanced greatly in the last few years. This technology offers unique and critical solutions to clinical problems. This virtual workshop provides practical, problem based, and easy to understand sessions to help physicians master necessary 3D skills for daily practice. 3D ventricular function quantification, detailed 3D valvular analysis and 3D procedural guidance will be reviewed with renowned echocardiography experts in the field.

#### ADVANCED TEE WORKSHOP

*Moderators: Jennifer Hargrave, DO and Kimberly Howard-Quijano, MD*

**Description:** Do not let numbers scare you! Learn advanced quantification with the echo experts at this case based, TEE workshop that will discuss advanced methods of quantitative cardiac assessment. Participants will learn to recognize the role of quantitative echocardiography in clinical decision-making and discuss real-world applications of quantitative analysis. Learn today and put these techniques into practice tomorrow.

#### INTERVENTIONAL WORKSHOP

*Moderators: Nadia Hensley, MD and Nelson Thaemert, MD*

**Description:** Come learn from the experts about Percutaneous Procedures, including TAVR, MitraClip and Left Atrial Appendage Occlusion. Led by leaders in the field, physician-instructors will provide all the necessary tips and tricks to learn about these procedures. Special emphasis is placed on procedural steps, communication, TEE image correlation, and collaborative practice.

#### MCS WORKSHOP

*Moderators: Kelly Ural, MD and Jenny Kwak, MD*

**Description:** Get the 2021 view of mechanical circulatory support from a multidisciplinary team: perfusionists, critical care physicians, and anesthesiologists. Learn the nuts and bolts of cardiopulmonary bypass, ECMO, and VADs in an interactive workshop environment with the experts. Critical issues in placement and perioperative management of these devices will be addressed, with special emphasis on ECMO: cannulation strategies, venting, and troubleshooting.

# SCA2021

## ANNUAL MEETING & WORKSHOPS

APRIL 24-27, 2021

### POCUS WORKSHOP

*Moderators: Megan Chacon, MD and Shahzad Sheafi, MD*

**Description:** Practical point of care ultrasonography is becoming more accessible to a growing number of providers. This expert-led workshop is centered on the basics of transthoracic echocardiography (TTE). In addition to cardiac evaluation, the workshop will cover the use of lung ultrasound, vascular access, shock states, as well as the FAST (Focused Assessment with Sonography in Trauma) protocol. Special emphasis is placed on clinical applications of these techniques, as well as tips and tricks for image acquisition of these various modalities of POCUS.

### PROFESSIONAL DEVELOPMENT WORKSHOP

*Moderators: Emily Methangkool, MD and Candice Montzingo, MD, FASE*

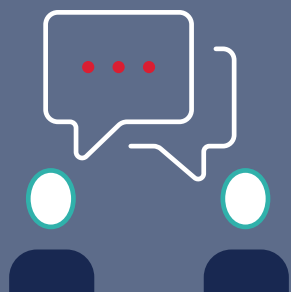
**Description:** Ready for advancement but not sure of your next step? This unique, interactive workshop will integrate expertise from both the academic and business world to help SCA members navigate and succeed in both the academic and private practice landscape, with the goal of fostering future leaders. Specifically, attendees will work on skill development in networking, mentorship, negotiation, and presentation. Take homes include how to perfect the "elevator pitch", cultivate healthy mentor and sponsor relationships, negotiate for time and compensation, and create and deliver an effective presentation.

### ERACS WORKSHOP

*Moderators: Michael Grant, MD and Stephanie Ibekwe, MD*

**Description:** Get ready for Enhanced Recovery after cardiac surgery at your institution. In a virtual workshop format, participants will discuss the ins and outs of a cardiac surgical Enhanced Recovery program with the experts, with a focus on programmatic development. Special emphasis is also placed on strategies for managing key measures, including opioid use, acute kidney injury, and incorporation of regional techniques.





# SCA NEWS

## SCA 2021 Elections — Voting is Now Open!

The 2021 online elections for SCA leadership positions are open through March 10. The candidates are running for the following positions:

- **President-Elect** (1 position available)
- **Secretary/Treasurer** (1 position available)
- **Director-at-Large** (2 positions available)
- **CME Committee** (1 position available)
- **Nominating Committee** (2 positions available)

Voting members received a personalized link for the online election system via email. If you did not receive this email and you believe this to be an error, please contact Denise Herdrich at [dherdrich@veritasamc.com](mailto:dherdrich@veritasamc.com).

The SCA Nominating Committee, chaired by Immediate Past President Dr. Christopher A. Troianos, is pleased to endorse the following candidates for the 2021 election cycle:

### President-Elect Candidates



#### **Kathryn E. Glas, MD MBA FASE**

*Candidate for President-Elect*

After completion of Cardiac Anesthesiology fellowship at Emory, I joined the staff and have been practicing here for 24 years. My first SCA meeting in 1997 was to present a poster as a fellow. I have attended most, if not every, meeting since then. I was elected to Nominating committee, then asked to serve on scientific sessions leadership team, eventually being Chair of Scientific sessions. I am currently completing my second term as an elected member of the Board of Directors. I served on the program committee for Echo week and spoke at the meeting many times. My career in Cardiac Anesthesiology has focused on education related to perioperative echo, including TEE and Epi-aortic ultrasound. My service focus has been advocacy for Cardiac Anesthesiologists and their clinical and leadership skills. I have served on the NBE PTE committee for more than 10 years.





## **Mark A. Taylor, MD FASE**

### *Candidate for President-Elect*

Dr. Taylor is currently Chairman of Enterprise Surgical Operations at the Cleveland Clinic and provides oversight and management of over 230 operating and procedural areas for the Cleveland Clinic. Dr. Taylor is currently a Clinical Assistant Professor at CCLCM at Case Western Reserve University. Previously, Dr. Taylor was a Clinical Associate Professor at Temple University School of Medicine. Dr. Taylor is Board certified in both Anesthesiology/Critical Care Medicine and is certified in Perioperative Transesophageal Echocardiography. Dr. Taylor is recognized expert in Perioperative Transesophageal Echocardiography and is actively involved in education and speaks nationally and internationally at a variety of medical society meetings. He is actively involved in the American Society of Anesthesiologist, the Society of Cardiovascular Anesthesia, National Board of Medical Examiners, and the American Society of Echocardiography. He currently serves as Secretary Treasurer on the Board of Directors for the Society of Cardiovascular Anesthesia.

## **Secretary/Treasurer Candidates**



## **Amanda A. Fox, MD MPH**

### *Candidate for Secretary/Treasurer*

Dr. Amanda Fox has been an SCA member for 17 years and presently serves as a Director-at-Large on the SCA's Board of Directors. She enjoys working with SCA members to advance the SCA's mission of promoting excellence in cardiovascular medicine. Dr. Fox has participated as an attendee and as faculty at the SCA's Annual Meeting and Workshops, Echo Week, and at the International Congress of Cardiothoracic and Vascular Anesthesia. She served on the SCA's Scientific Program Committee for 10 years and was the committee's Chair for the 2017 (Orlando) and 2018 (Phoenix) Annual Meetings. Dr. Fox values the international perspectives of the society's members and served 2 years on the SCA's International Committee from 2018 to 2020. She is also a proponent of interdisciplinary collaboration to advance care of cardiovascular and thoracic surgical patients and is the SCA's liaison to the American Heart Association. Dr. Fox would be honored to serve as the SCA's next Secretary/Treasurer



## **Douglas C. Shook, MD FASE**

*Candidate for Secretary/Treasurer*

I am running for the position of Secretary/Treasurer. I have served two 3-year terms on the Board of Directors, was the Co-Director for Echo Week, and I am currently the Chair of the Fellowship Program Directors Council. In addition, I co-developed the Kaplan Leadership Development Award to create future leaders in our profession. All these roles incorporate my commitment to educating our membership, developing future cardiovascular and thoracic anesthesiologists, and developing future leaders for our profession. It is important our society anticipates the needs of our membership and is part of the changing professional landscape we are all experiencing. Ensuring our financial well being and investing in our future is critical to this mission. As Secretary/Treasurer I will strive to combine education, research, and leadership as a mission for our society, collaborate with other specialties, and represent the needs of our membership.



## **Nikolaos (Nick) J. Skubas, MD DSc FACC FASE**

*Candidate for Secretary/Treasurer*

Dr Nikolaos (Nick) Skubas is Chairman of the Department of Cardiothoracic Anesthesiology at the Anesthesiology Institute, Cleveland Clinic. His clinical duties involve perioperative care of cardiac, thoracic, and vascular patients in cooperation with surgical and cardiology specialists. He is also Professor of Anesthesiology at the Cleveland Clinic Lerner College of Medicine at Case Western Reserve University. Dr Skubas is board-certified in Anesthesiology and Perioperative TEE. He is actively involved in educational collaboration with allied societies, such as IARS, ASA, ASE and NBE. He is lecturing in-person and virtually in national and international meetings. Dr Skubas is the Executive Section Editor for Perioperative Echocardiography and Cardiovascular Education in Anesthesia and Analgesia and Associate Editor in Anesthesiology. He is also a member in the NBE writing committee for Basic TEE. Dr Skubas currently serves as elected member on the Board of Directors for SCA.





## Director-at-Large Candidates



**James (Jake) H. Abernathy III, MD MPH**  
*Candidate for Board of Directors*

James (Jake) Abernathy is completing his first term as a member of the Board of Directors. Dr. Abernathy is an Associate Professor and Division Chief of Cardiac Anesthesiology at Johns Hopkins University. After completing medical school at the University of Alabama at Birmingham he did residency and fellowship at the Brigham Johns and Women's Hospital in Boston, MA. Prior to Hopkins, Jake was Division Chief at the Medical University of South Carolina. Dr Abernathy has served the SCA for 15 years including the Board of Directors, Fellowship Program Directors (Chair), Annual Meeting Program, STS database, Kaplan Leadership (co- Chair), Board Certification Task Force, and FOCUS (Chair). He was the inaugural Chair of the Quality and Safety Steering Committee. Dr. Abernathy has published over 55 peer reviewed publications and delivered over 60 national and international talks. Funded by AHRQ, he is collaborating with human factors engineers to redesign healthcare and improve safety.



**Tara R. Brakke, MD FASE**  
*Candidate for Board of Directors*

For the past sixteen years, I have been faculty at Nebraska Medicine, involved in the education of residents, fellows, and other practicing physicians. I have enjoyed developing echocardiography curriculum. As Chief of Cardiovascular Anesthesiology since 2012, I serve as a leader and a mentor to other cardiac anesthesiologists, giving me insight into the needs and finances related to our specialty. In 2013, I began the ACTA fellowship and served as the Program Director until 2020. This showed me the importance of fellows to our future and the role our society provides for mentorship, education, and career opportunities to cardiac anesthesiologists. My previous SCA involvement included the CME committee, Annual Meeting Program Committee member, moderating and lecturing at multiple sessions including the TTE workshop. Currently I am the co-director of the resident/fellow program. I have enjoyed serving and especially collaborating with my colleagues from around the world.



## **Michael P. Eaton, MD FASE**

*Candidate for Board of Directors*

Dr. Eaton is the Chair of Anesthesiology and Perioperative Medicine at the University of Rochester. He currently serves the SCA on the Online Education Subcommittee. Mike has been an active member of the Society of Cardiovascular Anesthesiologists since 1994, serving on the SCA Electronic Communications Committee (ECC) from 2003 – 2014 and chairing the committee from 2007 to 2011. He also served as a member of the Website Advisory Taskforce, the Web-based Fellowship Education Task Force, and the Task Force on Educational Activities. He chaired the SCA task force on e-commerce in 2011 and has been a member of the CME committee since 2014. He served on the Scientific Program Committee from 2011-2020, chairing the committee for the 2019 and 2020 meetings, serving as the vice-chair for the 2017-18 Annual Meetings, and the PBLD/Workshop Coordinator for 2015 and 2016. Dr. Eaton was a member of the SCA Board of Directors from 2011-14, and 2016-2020. He has been actively engaged in all board activities throughout his tenure.



## **Jacob T. Gutsche, MD**

*Candidate for Board of Directors*

Dr. Gutsche is an Associate Professor of Anesthesiology and Critical Care at Penn. He is dual trained in cardiac anesthesiology and critical care medicine and serves as the clinical director of cardiovascular critical care within the Penn health system and the co-medical director of the Penn Lung Rescue Program. In addition, Dr. Gutsche performs many administrative roles with the University of Pennsylvania health system including associate chief medical officer of critical care for the Penn Health System. Dr. Gutsche has published numerous articles on the care of cardiovascular surgery patients. Dr. Gutsche has been an active and involved member of the Society of Cardiovascular Anesthesiologist (SCA) since 2011 and has served on the SCA Newsletter, CME, and Nominations Committee. Dr. Gutsche is actively involved in SCA meetings including workshops and PBLD's. Dr. Gutsche also serves as the co-chair of the SCA ECMO Working Group.



## **Nanette M. Schwann, MD FAHA**

### *Candidate for Board of Directors*

Nanette Schwann, MD, FAHA is Professor of Anesthesiology at USF College of Medicine and Vice Chair of Education & Research at Lehigh Valley Health Network in Allentown, PA. Dr. Schwann is a nationally known cardiac anesthesiologist and leader in healthcare policy and patient safety. Dr. Schwann has been an active contributor to the SCA since 1995, both as a member and in leadership positions. Currently, she serves as Chair of the SCA's Clinical Practice Improvement (CPI), whose mission is to distill and disseminate evidence-based clinical content for cardiac anesthesiologists that improves patient outcomes & demonstrates provider value. SCA-CPI Advisories examine Perioperative AF, Blood Conservation and AKI in Cardiac Surgery. She is a past member of the Board of Directors of her private practice group. As a member of the SCA BOD, she will continue to support, engage and evolve the needs of the everyday physician in service of his/her patients.

## **Continuing Medical Education (CME) Committee Candidates**



## **Dalia A. Banks, MD FASE**

### *Candidate for Continuing Medical Education (CME) Committee*

Dr. Dalia Banks Professor at the University of California San Diego has been an active member of the SCA since 1998. She finished her anesthesia training at Yale-New Haven Hospital, Cardiac Anesthesia Fellowship at Beth Israel Deaconess in Boston. In October 2005, she joined UCSD. She served as the Cardiothoracic anesthesia fellowship director for the past 11 years, division chief of cardiothoracic anesthesiology for the past 9 years. She is currently serving as the Vice-Chair of Cardiovascular Anesthesia Academic Affairs. She is on the editorial board of the Journal of Cardiovascular Anesthesia where she is a section editor. Additionally, she is a member of the ASA Committee on Cardiovascular Anesthesiology and the ASA Educational Track Sub-Committee on Cardiac Anesthesia. With respect to the SCA, she serves as the chair of the Newsletter subcommittee since 2017. Dr. Banks is committed to education and has established several CME accredited education courses at UCSD.

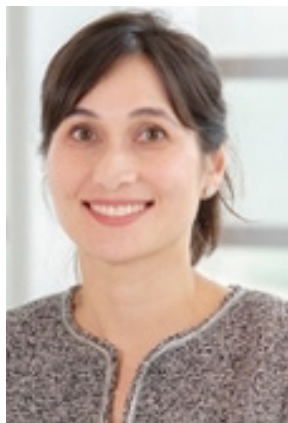


## **Muhammad F. Sarwar, MD, FASE**

*Candidate for Continuing Medical Education (CME) Committee*

After completing my medical education in Pakistan, I arrived in the United States to pursue my training in Anesthesiology. I completed my Anesthesiology residency training at Beth Israel Medical Center in Manhattan. This was followed by a fellowship in Cardiac anesthesiology at SUNY Upstate Medical University in Syracuse, NY. After completion of my fellowship training, I joined the Department of Anesthesiology at SUNY Upstate Medical University as a full-time academic faculty in 2003. Currently, I am working as Associate Professor of Anesthesiology and the Director of Cardiac Anesthesia at SUNY Upstate. In addition, I am also fulfilling my responsibilities as Associate Program Director for Anesthesiology Residency Program.

## **Nominating Committee Candidates**



## **Rebecca A. Aron, MD**

*Candidate for Nominating Committee*

My path to cardiothoracic anesthesia was not traditional. In 2002 I graduated from the University of Michigan with a Bachelor's and Master's in Engineering and worked as an engineer for a medical device company. After two years, I became interested in having a more direct impact on patient care and entered medical school at the University of Michigan, graduating in 2008. I later completed anesthesia residency at the University of California San Francisco in 2012 and a cardiothoracic anesthesia fellowship at Duke University Medical Center in 2013. After fellowship I practiced cardiac anesthesiology at Cedars Sinai Medical Center for five years. During that time, I was Assistant Program Director for Cardiothoracic Anesthesia Fellowship and later Associate Program Director. I was also the director of echo education. In 2018, I joined the University of Nebraska Medical Center and in 2020 became the program director for Cardiothoracic Anesthesia Fellowship.



## **Abimbola (Bola) Faloye, MD FASE FASA**

### *Candidate for Nominating Committee*

Dr. Bola Faloye is a board-certified Anesthesiologist, with subspecialty training Adult Cardiac and Thoracic Anesthesia. Bola completed her residency training at Duke University Medical Center in 2013, and her fellowship training in ACTA at Emory University in 2014. She currently serves as the Division Director of Adult Cardiothoracic Anesthesiology at Grady Memorial Hospital and is an Assistant Professor in the Department of Anesthesiology, Emory School of Medicine. Bola

has been a member of the SCA since 2013 and an active member of the Women in Cardiothoracic Anesthesia Special Interest Group, first serving as an Executive Committee-member at large and currently as Vice-Chair. She is also an active member of the new SCA Mobile App subcommittee. Bola is very active in the American Society of Anesthesiology where she serves on the ASA Educational Track Subcommittee on Cardiac Anesthesia.







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More than 600 SCA members are engaged in the work of the Society by serving on nearly 50 different groups: Committees, Sub-Committees, Working Groups and Task Forces. SCA is seeking volunteers to fill upcoming group openings to support the Society's strategic plan.

### **Please note:**

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- Committee members with terms ending in 2021 are required to submit an application for their committee if they wish to re-apply for the position.

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## AWEsome Woman Interview

**Sharon L. McCartney, MD FASE**

Duke University Medical Center



### **Brief introduction about yourself:**

Dr. Sharon L. McCartney, MD FASE, Assistant Professor of Anesthesiology at Duke University Medical Center. Dr. McCartney is currently a member of the SCA 2021 Echo Week Planning Committee.

### **1. What led you to become a Cardiovascular/Thoracic Anesthesiologist?**

At an institution with so many role models in cardiac anesthesia (Alina Nicoara, Madhav Swaminathan, Mihai Podgoreanu, Joseph Mathew, Mark Stafford-Smith, Mark Newman, to name a few), it was easy to want to emulate these fantastic anesthesiologists

and follow in their footsteps. Additionally, I have always loved complex cardiothoracic procedures and the collegial environment between anesthesia/surgery/nursing that the cardiothoracic ORs hold.

### **2. How did you hear about the SCA?**

I first heard about SCA as a resident and submitted a case presentation to the SCA to present. I subsequently submitted a couple of poster presentations as a fellow but have become increasingly involved with SCA as a faculty member. I am now an invited faculty speaker at SCA Echo Week and the annual meeting.

### **3. What roles have you held for the society?**

I have been on the SCA Echo Week program committee since 2019, and in 2020 joined both the SCA Scientific Program Committee as the Echo Week Committee Representative and the Online Education Subcommittee.

### **4. What is one of your greatest achievements as a cardiovascular anesthesiologist?**

This is hard to answer as we often base our achievements on accolades and merits that we can show. However, I feel that my most outstanding achievement lies within patient care. There is nothing more valuable than life itself, so I can think of a few examples in which I happened to be in the right place at the right time and serendipitously saved someone's life. With that said, recently, I was invited as a consultant on a pre-clinical trial doing cardiac surgery in baboons. The team asked me as the cardiac anesthesiologist and intensivist to do the baboon's anesthesia and recovery. It has been an incredible experience to anesthetize a baboon and even more attractive to wake them up and extubate them. I have learned a lot from this experience, and it will probably be one of the most impressive achievements in my career.



## **5. Do you have any advice for Fellows and Residents?**

Take in everything. You have so many great faculty mentors when you are a resident and fellow – listen to them, soak in their experiences and teaching. Talk to the surgeons – ask them why they chose to do something the way they did or how they do certain things. This will help you develop and give you a deeper understanding of cardiac surgery and cardiac anesthesia.

## **6. Have you experienced any difficulties as a woman in the field?**

Interestingly enough, most difficulties I have had as a woman in medicine have come from patients. My colleagues within cardiac surgery, perfusion, nursing, and consultant services within the ICU all know me, trust me to call on me frequently to help them or take care of their family members – so I have never felt underappreciated or disrespected. This is one of the many reasons I appreciate the institution where I am. Patients, however, have insisted I was their nurse, etc. I inform them I am their doctor and move on – while it can be frustrating, I haven't found it useful to dwell on.

## **7. Do you have any advice for other women in the field?**

Work in an environment where you are respected and treated equally by your surgical (and anesthesia) colleagues. If this is not your current professional environment, it may be time to find a new job because these places exist, especially in this day and age, mistreatment of women should not be occurring in the workplace. Speak up, stand your ground, and demonstrate that you know what you are talking about – this will inspire trust and confidence – even if not immediately, over time with repeated demonstrations, you will earn trust.

## **8. How do you balance work and personal life?**

It is not always easy balancing three kids, a career in cardiothoracic, and critical care anesthesiology. Two things make it work for me: 1) my husband is a stay-at-home-dad so that the kids have constant stability in their lives with my ever-changing schedule. I know that the kids will be dropped off and picked up from school, fed, bathed, and carted off to their numerous activities without a hitch. 2.) when I'm not at work – I try my best to be present for my kids. Sometimes this involves going to a soccer game after a long night on call, no matter how tired I am. I am also a big kid – so I enjoy doing things as a family – like water sports on the boat, fishing, watching movies, board games, puzzles, and even playing Nintendo. It can sometimes be exhausting to be in extreme cases for a long day and then come home to children who cannot wait for you to play with them/talk to them!...but we have to make every effort to continue the energy at home – otherwise the kids will feel like you are always too tired for them and that work is the most important thing to you.

## **9. What is something you enjoy doing outside of work?**

Playing with my kids – we have lots of “family nights” where we watch movies, play games, etc. I also love fishing, boating, water sports, boogie boarding, and anything that has to do with being on the water.



**10. Would you change anything about the path you took to get to where you are now?**

Absolutely not. It has been better than I could have ever imagined!

**11. What was the best piece of advice you received?**

When I became faculty, one of my mentors told me, "when you're home, be home." While this is entirely impossible unless you only have clinical duties, it often resonates in my ears, especially when I catch myself getting too involved with career obligations while at home. I try hard to make it a point to "be home" as much as possible and give my family the attention they deserve.

## Do NOT forget to renew your SCA Membership!

2021 will be an exciting year for SCA, and we hope you will join us for it all! Make sure to check on your membership status for the new year. If you have any questions about your membership dues renewal, please contact 855.658.2828 or [info@scahq.org](mailto:info@scahq.org).

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### Non-transvenous Cardiac Implantable Electronic Devices: Anesthesia and Surgical Implication

Presenter: Adam Dalia, MD, MBA, FASE



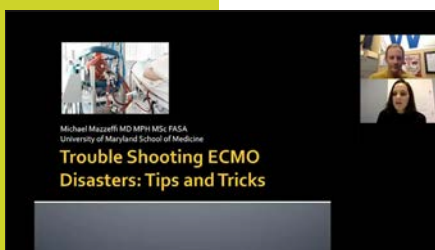
### New Vasopressors – Out of the Blue?

Presenter: Eric de Waal, MD, PhD



### Professional Development: Spreading Your Research – Opportunities for Networking and Education

Presenter: Jiapeng Huang, MD, PhD, FASA, FASE



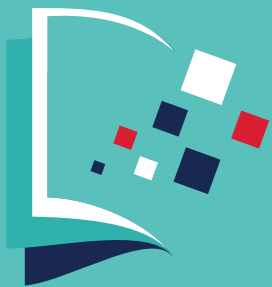
### Troubleshooting ECMO Disasters: Tips and Tricks

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# Efficacy of Bilateral Pectoralis Nerve Block for Ultrafast Tracking and Postoperative Pain Management in Cardiac Surgery

Kumar KN, Kalyane RN, Singh NG, Nagaraja PS, Krishna M, Babu B, et al.  
Annals of Cardiac Anaesthesia. 2018;21:333-8

## Reviewer:

Joshua Junge MD1, Richa Dhawan MD MPH1  
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## Introduction

With emerging focus on early recovery after cardiac surgery, effective postoperative pain management is increasingly relevant. Options for post-operative analgesia include the traditional parenteral medications (NSAIDs and opioids), as well as regional techniques, notably paravertebral nerve blocks and fascial plane blocks. This study investigates the use of ultrasound-guided pectoral nerve blocks (PECS) on patients undergoing cardiac surgery through a midline sternotomy approach. This regional technique involves injecting local anesthetic between the pectoralis major and pectoralis minor muscles (PECS I) and between the pectoralis minor and serratus anterior muscle (PECS II) at the level of the third rib. The hypothesis of the clinical trial was that the PECS blocks would provide superior post-operative analgesia compared to parenteral medication.

## Methods

This is a small (n=40) randomized controlled study in patients undergoing either CABG or valve surgery via a midline sternotomy approach. Twenty patients received a bilateral PECS I and II block postoperatively in the ICU and 20 patients had standard care with postoperative IV fentanyl and/or diclofenac. For the block, 30 ml of 0.25% bupivacaine with 25 mcg of dexmedetomidine was given. All patients received IV paracetamol and tramadol. Primary outcomes were visual analog scale (VAS) pain scores, inspiratory flow rate, and ventilator hours on the first postoperative day. These variables were measured at 0 hours (extubation), 3, 6, 12, 18, and 24 hours, and patients were assessed for pain via VAS scales at rest and with cough. Inspiratory flow rate was measured by the number of balls raised during incentive spirometry (1 ball = 600ml, 2 balls = 900 ml, 3 balls = 1200 ml). Rescue analgesia was administered for VAS pain scores > 4 at rest or by patient demand with IV fentanyl 1 mcg/kg and if needed subsequently, IV diclofenac 75 mg.

## Results

All 40 patients completed the study protocol. Patients receiving PECS blocks had a significantly shorter duration of postoperative ventilator support (108.5 min compared to 206.3 min,  $P < 0.0001$ ) than those not receiving the block. VAS pain scores at rest and with cough were significantly lower in patients receiving PECS blocks at 0, 3, 6, 12, and 18 hours after extubation ( $P < 0.05$ ). However, pain scores were not different at 24 hours between the two groups ( $P=0.6832$ ,  $P=0.4011$ ). Additionally, at 0, 3, 6, 12, 18, and 24 hours, peak inspiratory flow rates were significantly higher in the PECS group than the control group ( $P < 0.05$ ). There were 34 episodes of rescue analgesia in the control group and only 4 episodes in the PECS group.

# LITERATURE REVIEWS



## Discussion

There are several limitations of this study. Some obvious concerns are lack of power analysis, small sample size, not blinded (introducing bias), anesthetic management is not standardized, amount of postoperative IV medication for pain control are not specified, preoperative demographic variables are limited, and the type of surgery (differing pain source) is not statistically adjusted for. Irrespective of these limitations, there are several salient elements that warrant attention. Cardiac anesthesiologists are at the precipice of an era that increasingly relies on multimodal analgesia, of which regional techniques will be focal. This study provides insight about safety, feasibility, and clinical outcomes for a small group of patients. The authors state in the article that some of the limitations of adoption of thoracic epidural and paravertebral blocks into clinical practice are concerns for complications (bleeding (full heparinization), skill of the provider, anticoagulation, etc.). PECS blocks, with their relatively high safety profile and straightforward application, could in theory be the panacea providing adequate postoperative pain relief and resulting in limited opioid consumption in patients with a sternotomy.<sup>1</sup> PECS I (blocks medial/lateral pectoral nerves) and II (blocks lateral cutaneous branches of intercostal nerves along T2-T6) provide analgesia to the anterolateral chest wall.<sup>2</sup> Analgesia provided by PECS blocks may serve to facilitate a more rapid recovery and rehabilitation, allowing for reliable fast-tracking of cardiac surgery patients. There is promising data within this trial to support development of larger randomized controlled clinical trials.

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## Postoperative pain treatment with erector spinae plane block and pectoralis nerve blocks in patients undergoing mitral/tricuspid valve repair — a randomized controlled trial

Gawęda B, Borys M, Belina B, et al. BMC Anesthesiol. 2020;20(1):51

### Reviewer:

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### Introduction

Inadequate pain management after thoracotomy can result in complication like prolonged mechanical ventilation and pulmonary infections (1). Regional techniques including thoracic epidural analgesia (TEA) and paravertebral blocks have shown reduced incidences of such complications (2). Erector spinae plane (ESP) block and pectoralis nerve (PECS) block, have also been used (3). This study compared postoperative pain in cardiac surgical patients with either ESP block or combined ESP and PECS blocks.

### Methods

The study was a randomized, controlled, double-blind trial. Patients who underwent right mini thoracotomy for mitral and tricuspid valve repair and were between 18-80 years were included. Patients with history of coagulation disorders, local anesthetic toxicity, depression, epilepsy, chronic use of analgesics and addiction to alcohol or other recreational drugs were excluded. Patients who required respiratory support for > 2 h postoperatively were also excluded.

Patients were randomly divided in two groups (1:1 ratio) via computer generated randomization, to the ESP or PECS + ESP group. In the ESP group, ultrasound-guided ESP block was performed at the fourth thoracic level before the induction with ropivacaine (0.375%; 0.2 mL/kg, maximum 20 ml). In the PECS + ESP group, in addition to ESP block, ultrasound-guided PECS blocks type I and II were performed. Local anesthetic (6–8 ml) was deposited in the fascial plane between the pectoralis major and minor muscles (PECS I); 12–14 ml was deposited between the pectoralis minor and serratus anterior muscles (PECS II) with a maximum total dose 40 ml.

Anesthetic technique was standardized for all patients. Remifentanyl was used to achieve a target plasma concentration of 4–8 ngml<sup>-1</sup>. All patients had one lung ventilation and sugammadex was used for reversal. An intravenous bolus of oxycodone (0.1 mg kg<sup>-1</sup>) was administered 30 min prior to the completion of surgery. Postoperative ventilation was continued for 60–120 min. After extubation, patient-controlled analgesia (PCA) with oxycodone was used for 24 hours (1 mg per dose, at 7-min intervals, without basal infusion). Intravenous paracetamol, 1 g per 6 h, was also administered. Postoperative pain was evaluated using the visual analogue scale (VAS) at 2, 4, 6, 8, 12, and 24 h. Patients could evaluate their pain severity from 0 (no pain) to 100 mm (maximum pain) on the VAS. If pain intensity exceeding 40 mm on the VAS, up to two extra doses of oxycodone (5 mg each) was administered.

At the time of discharge, patients described their satisfaction with pain

(continued)



management as perfect (5), good (4), moderate (3), poor (2), or very poor (1). Pulmonary function tests were performed by using the SP10W spirometer before surgery, as well as 1 day and 4 days after surgery.

## Results

Overall, 30 patients were included, 15 per group. Patients in the PECS + ESP group used significantly less oxycodone than individuals in the ESP group: 12 [IQR: 6–16] mg vs. 20 [IQR: 18–29] mg or 18 [9–24] vs. 30 [27–43.5] ME ( $p=0.0004$ ). Six patients required rescue dosages of oxycodone, all were in the ESP group.

No difference was found between the ESP and PECS + ESP groups regarding pain severity measured with other pain scales like Prince Henry Hospital Pain Scale (PHHPS). None of the patients reported any pain at the time of admission. In both groups, pain severity was 1 [IQR: 1–1] on the first postoperative day and 1 [IQR: 0–1] on the fourth postoperative day.

Patients in the PECS + ESP group were more satisfied with pain management, compared with patients in the ESP group: 4 [IQR: 4–4] vs. 3 [IQR: 1–4] ( $p=0.0007$ ).

Pulmonary function tests did not differ between the study groups for any of the evaluations and decreased by approximately 30% from baseline.

## Discussion

The results showed that the inclusion of an additional regional anesthesia technique (PECS I + PECS II blocks) with the ESP block significantly reduced oxycodone consumption and alleviated postoperative pain severity measured on the VAS. Moreover, patients in the PECS + ESP group were more satisfied with pain management. However, pain management, as measured using the PHHPS, was good in both groups, and there was no difference in pulmonary function tests between the study groups. The other regional anesthesia method which could be effective after mini-thoracotomy procedures are the intercostal blockade and can be performed at the end of surgery.

## Comments

Though the sample size consists of only 15 patients, this study shows possible role regional blocks can play in postoperative pain management in cardiothoracic patients. The lack of complications could be the result of a low sample size. As the results indicate, PECS blocks may be sufficient as a single regional analgesia technique for pain management in patients undergoing valve repair via right mini thoracotomy or similar procedures. This study may have been more beneficial if the authors included a third group with PECS block only and compare the results.

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## Bilateral Erector Spinae Plane Block for Acute Post-Surgical Pain in Adult Cardiac Surgical Patients: A Randomized Controlled Trial

Journal of Cardiothoracic and Vascular Anesthesia 33 (2019) 368-375

Siva N. Krishna, DNB, Sandeep Chauhan, MD,

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Suruchi Hasija, DM, Tsering Sangdup, Mch, Akshay K Bisoi, Mch

### Reviewers:

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### Background

The erector spinae plane (ESP) block is a relatively novel regional anesthetic technique which involves injection of local anesthetic in the plane between the erector spinae muscle and transverse vertebral process in the posterior chest wall bilaterally and can provide analgesia from the T2 to T9 sensory level if administered at the T6 level, providing relief from both somatic and visceral pain by blocking both dorsal and ventral rami of spinal nerves, including the sympathetic chain. This type of pain relief is hypothesized to be potentially useful for postoperative analgesia in patients undergoing median sternotomy. This article aimed to evaluate the usefulness of bilateral ESP blocks for postoperative pain control in adult cardiac surgery patients, compared to a more conventional regimen of IV analgesia.

### Study Design

This study reported on a single institution, randomized controlled trial comparing 106 patients undergoing cardiac surgery involving median sternotomy whom were randomized into two groups. Group 1 received preinduction bilateral ESP blocks while Group 2 did not. Both groups received intravenous analgesia intraoperatively in the form of fentanyl. After surgery, postop pain was evaluated in both groups using NRS pain scoring at 2-hour intervals from the time of extubation until 12 hours after that point. Patients in the control group not receiving the blocks (Group 2) received acetaminophen in addition to tramadol for pain control. Additionally, IV fentanyl was administered in both study groups for pain scores  $\geq 4$  out of 10 as a method of rescue analgesia. The primary outcome measured was NRS score at rest starting immediately following extubation until 12 hours post extubation. Secondary outcomes were total intraoperative fentanyl usage and rescue analgesia requirement in the form of postoperative fentanyl consumption.

### Noteworthy Results

Overall, the study found that median NRS pain scores were significantly lower in the group receiving ESP blocks compared to the control group at all time points measured during the 12-hour study period explained above. None of the patients in Group 1 required rescue analgesia until at least 10 hours after extubation, compared to the Group 2 patients who required rescue analgesia sooner (as early as 6 hours after extubation). It was also noted that group 1 patients had shorter time to extubation (63.09 minutes compared to 102.62 minutes after surgery), shorter time to oral intake, shorter time to ambulation, and shorter mean total length of ICU stay. No complications related to the ESP blocks were documented.

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## Discussion

These results provide evidence that regional anesthesia, in the form of bilateral ESP blocks done prior to surgical incision, is a safe procedure that can reduce the total amount of narcotic analgesia required for postoperative pain control during the first 12 hours following extubation. In the so called fast-track category of patients undergoing cardiac, ESP blocks can potentially provide effective short term pain control while enhancing patient recovery in the ICU.

Several factors in this study that are notable when considering the utility of ESP blocks in patients undergoing cardiac surgery. These include the patient population for this study; patients excluded from this study included those undergoing emergency surgery, redo surgery, and those with the following conditions: coronary artery disease with left main disease, moderate to severe LV dysfunction, preoperative inotropic support, mitral stenosis with left atrial clot, patients requiring re-exploration, patients with low cardiac output syndrome, patients supported by intra-aortic balloon pump, patients with bleeding disorders or an abnormal coagulation profile, abnormal hepatic and renal parameters, uncontrolled diabetes mellitus, chronic obstructive pulmonary disease, atrial fibrillation on anticoagulation, and allergy to ropivacaine. That is not to say that patients with any of the above conditions may not benefit from an ESP block, but their postoperative course may be longer and more involved, with additional time prior to extubation or longer total ICU stay for recovery. Additional factors should also be examined when considering the utility of implementing regional anesthesia as the standard of care for a patient population at an institution. Availability of skilled personnel able to effectively perform these relatively novel blocks preoperatively on patients is required. Additionally, the effective time frame of the block must be considered, factoring in an institution's expected duration of surgery (for this study, mean duration of surgery was around 142 minutes in both groups), time to extubation in the ICU (63.09 mins in group 1, 102.62 minutes in group 2), and average intraoperative analgesic use (149.43  $\mu$ g in Group 1, 721.98  $\mu$ g in group 2), which all may reduce the window during which the block would provide effective analgesia. In patient populations requiring longer expected surgical times or time to extubation, the utility of performing preoperative regional blocks would likely be lessened.

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## **Efficacy of Ultrasound-Guided Transversus Thoracic Muscle Plane Block on Postoperative Opioid Consumption After Cardiac Surgery: A Prospective, Randomized, Double-Blind Study**

Aydin ME, Ahiskalioglu A, Ates I, Tor IH, Borulu F, Erguney OD, Celik M, Dogan N. *Journal of Cardiothoracic and Vascular Anesthesia* 2020; 34:2996-3003

### **Reviewers:**

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### **Background**

Cardiac surgery with a median sternotomy requires a strategy that addresses the pain from surgery while minimizing side effects. The ERAS society recently released guidelines for perioperative care in cardiac surgery, which included recommendations to minimize opioid consumption when possible and thus potentially reduce the adverse effects associated with their use<sup>1</sup>. While thoracic epidurals and paravertebral blocks are effective in reducing the pain from sternotomy, concerns for neuraxial hematoma formation in the setting of systemic anticoagulation have limited their use in cardiac surgery<sup>2</sup>. Previous studies<sup>3,4,5</sup> have explored the use of ultrasound (US) guided fascial-plane blocks (with their presumed lower risk of hematoma formation) in cardiac surgery. These blocks used to reduce opioids include erector spinae plane blocks (ESPB), parasternal blocks (PSB), pectoralis nerve blocks (PNB), and serratus anterior nerve blocks (SANB). The transversus thoracic muscle plane block (TTMPB) is a fascial plane block that targets T2-T6 nerve roots<sup>6</sup>, the same nerve roots that supply the intercostals which innervate the sternum<sup>7</sup>. The clinical efficacy of the TTMPB in cardiac surgery, however, has not previously been well studied. The authors hypothesize the use of US-guided TTMPB can reduce opioid use in cardiac surgery.

### **Study Design**

The authors conducted a randomized, double-blind, placebo-controlled trial including 48 ASA II-III patients aged 18-65 years undergoing sternotomy for cardiac surgery. Exclusion criteria included patients with an allergic reaction to drugs used in the study, patients with severe systemic disease (kidney, liver, pulmonary, or endocrine), substance abuse history, chronic pain history, psychiatric problems, communication difficulties, patients who died during or shortly after the operation, patients who required postoperative re-exploration, and patients with prolonged ventilation. The patients either received 20 ml 0.9% saline or 20 ml 0.25% bupivacaine. All patients had general anesthesia induced with 0.5 mg/kg of midazolam, 5mg/kg of thiopental sodium, remifentanyl 0.5mcg/kg, and 0.6 mg/kg of rocuronium. Maintenance anesthesia and paralysis was provided with 5-6% desflurane, remifentanyl infusion of 0.15-0.35 mcg/kg and intermittent rocuronium.

The TTMPB was then performed prior to surgical incision with either placebo or treatment. Additionally, local anesthetic was provided by the surgeon at the end of surgery at pleural chest tube sites with 10ml of 0.25% bupivacaine in both groups.

After arrival in the ICU, IV fentanyl PCA was administered to all patients with the

(continued)



following settings: a 10mcg/hr basal infusion rate and a 10mcg PRN bolus every 20 minutes. Opioid consumption and postoperative pain were assessed using the Visual Analogue Scale (VAS) at 0, 1, 2, 4, 8, 12, and 24 hours post-operatively. Rescue analgesia was provided with 1mg/kg of tramadol to patients with a VAS  $\geq 4$ . The time of first rescue analgesic use after the block (when VAS score was  $\geq 4$ ) was recorded, as were side effects related to opioid use. Opioid measurements included total amount administered 0-4 hrs, 4-8 hrs, 8-12 hrs, 12-24 hrs, and 0-24 hrs, rescue analgesia use, and time to first rescue analgesia.

## Noteworthy Results

Demographic and intraoperative characteristic analyses compared age, weight, height, ASA status, ejection fraction, type of surgery, sternal retraction distance, total surgery time, aortic cross-clamp time, cardiopulmonary bypass time, extubation time, and ICU discharge time. No statistically significant ( $p > 0.05$ ) differences were found between demographic and intraoperative group characteristics.

The authors found a statistically significant difference ( $p < 0.001$ ) between groups regarding median (interquartile range) dose of 24-hour fentanyl; the TTMP group received 255 mcg of fentanyl (235-305) and the control group 465 mcg (415-585). When comparing fentanyl administered at all interval time intervals, the TTMP group had significantly lower amounts ( $p < 0.001$ ). Rescue tramadol use was significantly higher in the control group than in TTMP group ( $p < 0.001$ ). The time to first rescue analgesia was significantly greater in the TTMP group ( $19 \pm 9$  h) than in the control group ( $7 \pm 10$  ;  $p < 0.001$ ). Median VAS scores, both at rest and active movement were significantly lower in the TTMP group up to 12 hr after surgery ( $p < 0.05$ ).

When comparing the control versus treatment group side effect profile, the authors found significantly higher rates of nausea and pruritis in the control group ( $p = 0.04$  and  $p = 0.03$ , respectively). They did not, however, find significant differences between groups when comparing vomiting or urinary retention.

## Discussion

The authors demonstrated reduced postoperative opioid use in the TTMPB group, as well as fewer opioid-related side effects. In addition, they reported no serious side effects directly related to the block. This is encouraging data that supports consideration of the TTMPB as part of a multimodal approach to perioperative pain management in the cardiac surgical population. Given that TTMPB blocks the anterior cutaneous branch of the intercostals which supply the sternum, there is sound rationale for its efficacy in cardiac surgery. It may in fact better target the pain of sternotomy than other fascial plane blocks like ESPB or SANB, as these may spare these branches. While these results are promising there are still questions and concerns regarding the widespread application of TTMPB.

The small size and single-centered nature of this investigation certainly leave clinicians eager to see larger studies with similar results. Another concern is the potential for injury to the internal mammary artery (IMA) with injection as it lies along the transversus thoracic muscle, although no such injuries occurred in this limited study. Damage to the IMA may be problematic when it is planned for arterial revascularization and this may give pause to many surgeons and anesthesiologists who might consider placing this block. In addition, the local anesthetic is held in contact with the intercostal nerves by the endothoracic fascia which may be disrupted with IMA harvest possibly limiting local anesthetic contact. For this reason, the authors suggested that TTMPB be performed before the conduct of the surgical procedure. While one may make the case for the benefits of preemptive

(continued)





analgesia with early block administration given that the benefit of fascial plane blocks is time-limited, performing the block prior to a potentially prolonged procedure may be suboptimal.

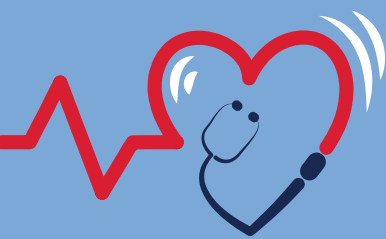
It is also worth noting that the block was compared to placebo and at least in this study seemed to convey some benefit to those who received the local anesthetic, but as Byrne and Cutts<sup>8</sup> point out in an editorial that accompanies the article, perhaps it would be interesting to compare TTMPB to local infiltration by the surgeon. They suggest that it is conceivable that some benefit could be secondary to systemic effects of the local anesthetic, a question which cannot be addressed by the design of this study. Also given that local infiltration could be performed at the end of the surgery this option might provide an actual comparison. Furthermore, direct assessment of TTMPB with other fascial plane blocks would also be interesting and potentially clinically beneficial.

Another concern with the study design is that half of the cardiac surgical patients in the study were listed as ASA II. The ASA defines a Class II as "a patient with mild systemic disease<sup>9</sup>." Given that these guidelines classify coronary artery disease as a minimum of ASA III and severe valve dysfunction as an ASA IV, it leaves the reader wondering if the patients in the study were misclassified or not truly representative of most cardiac surgical patients.

In summary, the authors provide an encouraging starting point for the efficacy of the TTMPB in clinical practice and they are to be applauded for their efforts. Physicians involved in the care of cardiac surgical patients will watch with great interest as more data on TTMPB become available.

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## Could it be true?

### Thoracic Paravertebral Block Achieves Better Pain Control than Erector Spinae Plane Block and Intercostal Nerve Block in Thoracoscopic Surgery: A Randomized Study

Thurhan O, Sivrikoz N, Sungur Z, et al. Journal of Cardiothoracic and Vascular Anesthesia (2020), doi: <https://doi.org/10.1053/j.jvca.2020.11.034>.

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#### Background

Recently, enhanced recovery after surgery (ERAS) has become a focus in perioperative care for thoracic surgery patients. In 2019 the European Society of Thoracic Surgeons (ESTS) and the ERAS society released guidelines for enhanced recovery after lung surgery. The use of regional anesthesia during thoracic and lung surgery for pain relief and reduction of postoperative opioid use received a strong recommendation with high level of evidence in these guidelines.<sup>1</sup> Unfortunately there continues to be a paucity of data supporting the optimal regional anesthetic technique to provide adequate analgesia, reduction in the consumption of postoperative opioids, and minimization of side effects. In this study the authors aimed to compare the efficacy of thoracic paravertebral block (PVB), erector spinae plane (ESPB) block, and intercostal nerve block (ICNB) in pain control and analgesia of patients undergoing video assisted thoracoscopic surgery (VATS) while also assessing other secondary outcomes.<sup>2</sup>

#### Methods

This is a single center, prospective, single blinded, randomized study conducted between January 2019 and March 2020, on adult patients in Istanbul, Turkey. Patients were referred for operation due to primary oncological or metastatic disease. 111 patients were randomly enrolled in the study, 4 were excluded due to conversion to open surgery and 106 were assigned to one of three treatment groups, PVB (n=35), ESPB (n=35), and ICNB (n=36). Both the ESPB and PVB were performed by an experienced anesthesiologist with ultrasound guidance and for confirmation after placement of local anesthetic. ICNB were all placed by the same surgeon under direct visualization utilizing thoracoscope. Patients were started intraoperatively on a analgesia protocol of morphine PCA pump programmed for a 1mg bolus followed by 0.03 mg/kg/h infusion dose (limited to two doses per hour), 1gram of paracetamol given three times per day, and 20 mg tenoxicam daily. Patient pain was assessed using a visual analog scale (VAS) from 1-10 (mild-extreme). VAS higher than a 4 resulted in a rescue analgesia plan of weight based tramadol.



## Results

The study's primary outcomes included evaluation of static and dynamic VAS for pain. Secondary outcomes included morphine consumption, milligrams of morphine equivalents (MME), need for rescue analgesic, postoperative mobilization and feeding times, as well as length of stay (LOS). Assessment of data demonstrated statistically significant higher static VAS in ESPB than ICNB and PVB patients at 0-24 hours, during the same time frame the VAS in ICNB patients were also statistically higher than PVB patients. Dynamic pain scores were similar at the first hour for all groups 5, 4, and 4, in ESPB, PVB, and ICNB patients respectively. However, at 24 hours dynamic pain scores were lower in PVB (2) compared to both ESPB (3) and ICNB (3) patients, and this was statistically significant ( $p < .017$ ). At the 36th and 48th hours VAS for both static and dynamic pain were similar ( $p > .05$ ). Morphine consumption and MME overall did not provide substantial insight, in the first 24 hours there was a statistically significant decrease in consumption ( $p < .05$ ) in the PVB patients however in the second 24 hours postoperatively there was no statistical significance in decreased consumption. Comparison of rescue analgesia utilization, postoperative mobilization and feeding times, and LOS were all similar with no statistically significant difference. Of note, the authors state that there were a few PVB patients who sustained hypotension intraoperatively requiring vasopressor treatment.

## Discussion

The current literature is limited in large scale randomized control trails focusing on outcomes of regional anesthetic techniques in thoracic surgical patients. The authors aimed to compare the efficacy in pain control of ESPB, PVB, ICNB in postoperative thoracic surgical patients. The authors demonstrated that patients receiving PVB had statistically significant lower static and dynamic VAS scores at 24 hours. However, the clinical significance of a VAS score difference between 5 or 4 is difficult to quantify. In addition, the authors did not assess the effectiveness of dermatomal analgesia achieved by each block postoperatively<sup>2</sup>, thus it is difficult to establish proper block placement. Further studies with larger patient population, a control group, and better assessment of block placement should be investigated to ascertain if a superior regional technique exists for thoracic surgical procedures.

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**In this issue of the SCA Newsletter, we present the first Pro/Con Debate on using regional analgesia techniques for sternotomy for cardiac surgical patients.**

The presentation is extremely pertinent in the era of Enhanced Recovery After Cardiac Surgery (ERACS), the foundation which emphasizes improved analgesia without excess sedation to permit early extubation, early mobilization, reduced stress, and delirium. Indeed, these goals will help improve patient outcomes and satisfaction.

Although regional anesthesia is not new for cardiac surgery and sternotomy, the increased use of ultrasound-guided regional analgesia techniques has broadened horizons and expanded options. While neuraxial techniques (spinal and epidural) have been known for at least 20 years, the concerns for neuraxial complications have prompted a search for alternatives, including Erector Spinae Blocks and Transverse Thoracic Muscle Plane Blocks (Parasternal Blocks).

However, there remain unresolved issues such as whether to perform catheter-based regional analgesia techniques (epidural or erector spinae block) or single injection fascial plane block such as Transverse Thoracic Muscle Plane Block.

Alternatively, 'fast track' or Enhanced Recovery protocols do not necessarily dictate that regional analgesia be included at all. But more simply refers to a mindset in which clinicians direct care toward early mobilization with multi-modal or 'multi-receptor' analgesics, which eliminates the risk of regional analgesia associated complications.

We will benefit from the following discussions regarding each approach to perioperative/postoperative analgesia.

## PRO

### **Parasternal Fascial Plane Block (TTMPB)**

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Inadequate perioperative pain management following sternotomy can have significant postoperative implications. An increased stress response provoked by poorly controlled pain can lead to cardiac and pulmonary complications as well as decreased patient satisfaction and increased length of hospitalization (1). Furthermore, 30-50% of patients report developing chronic pain, with a key risk factor being significant acute pain (2,3).

Although many practices employ a multimodal analgesic regimen that commonly relies on opioids and rarely involves the use of regional anesthesia, this practice appears to be falling out of favor for a very simple reason – the superior efficacy and side effect profile of local anesthetics compared to intravenous opioid-based analgesia.

The armamentarium of available regional anesthetic techniques for post sternotomy pain includes neuraxial analgesia and fascial plane blocks, including the erector spine plane block (ESP) and the anterior chest wall pectointercostal

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fascial (PIF) and transversus thoracic plane (TTMP) blocks.

While epidural analgesia is the most established technique with proven efficacy, it has greatly fallen out of favor in cardiac surgery, mostly because of the related hypotension, and the risk of an epidural hematoma in the setting off full anticoagulation (4). Fascial plane blocks are gaining popularity in part because they are devoid of these complications. These blocks are also easily performed under ultrasound guidance, and in experienced hands, are associated with minimal side effects.

Excellent knowledge of sonoanatomy and chest wall innervation is imperative to achieve optimal efficacy and safety. The sternum is innervated by the anterior cutaneous branches of the intercostal nerves T2-T6. The respective intercostal nerves travel between the transverse thoracic and internal intercostal muscles anteriorly, then pierce the internal intercostal muscle and the external intercostal membrane and divide into the medial and lateral cutaneous branches. Ultrasound-guided parasternal interfascial plane blocks, including the PIF and the TTMP, specifically target these anterior branches which directly innervate the sternum and therefore should be routinely used in post sternotomy pain management.

The concept of a parasternal block for post sternotomy pain is not new, and the first description of a block targeting the anterior cutaneous branches of the intercostal nerves dates back to 2005. McDonald and colleagues published a small randomized, placebo-controlled double-blinded study (N=20) comparing the effect of parasternal infiltration with 0.25% levobupivacaine with 1:400,000 epinephrine on postoperative analgesia requirements, respiratory function, and extubation times. In this study, surgeons infiltrated local anesthetic bilaterally at 5 intercostal spaces, above the periosteum, as well as surrounding the mediastinal chest tubes just before sternal wire placement. The authors observed a significant reduction in opioid consumption, rescue analgesic requirement, and improved gas exchange before extubation (5). Given the increased utilization and availability of ultrasound, the anterior chest wall fascial plane blocks have since been further explored and developed. The ultrasound guided PIF block was first described by de la Torre and colleagues in 2014 as an adjunct for providing breast analgesia and has since found applications in managing sternal pain both pre-emptively and as a rescue (6-9). Local anesthetic is deposited 2-3 cm lateral to the sternal bone in the interfascial plane between the pectoralis major and the intercostal muscles and can block several levels of anterior cutaneous branches of the intercostal nerves (6). Performing at least three needle insertions on each side of the sternum will ensure maximal block coverage (9).

The greatest advantages offered by the PIF block as opposed to other regional techniques are its simplicity and safety. The block is easily performed with the patient intubated and sedated, either before incision or following closure, and does not require a complicated setup, additional positioning, or significant time to perform. PIF with bilateral catheters has been performed in 11 minutes and can be completed during central venous catheter placement, causing no significant increase in pre incision anesthesia time (8). Further, the superficial target makes the optimization of the ultrasound image and needle manipulation extremely straightforward and could be easily achieved by providers without significant background in regional anesthesia.

One disadvantage that can be easily overcome is the potential difficulty in separating the fascial plane overlying the ribs in the craniocaudal direction.



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Therefore, we propose a multilevel, bilateral injection to achieve the greatest coverage. Another pitfall is the potential for incomplete coverage of the T5-6 anterior cutaneous branches, which provide sensation to the lower sternum as a result of a limited caudal spread due to a more cranial attachment of the pectoralis major muscle. An additional source of patient discomfort are mediastinal chest tubes, which usually exit just below the xiphoid process and through the rectus muscle. Providing full analgesia covering both sternal, and the pain caused by the mediastinal chest tubes could potentially be accomplished by adding local anesthetic injections in the most cranial part of the rectus sheath to supplement the PIF block.

The deeper TTMP block, first described in 2015 by Ueshima and Kitamura, involves injecting local anesthetic between the internal intercostal and the transversus thoracic muscles (TTM) between the 3rd and 4th or 4th and 5th ribs adjacent to the sternum (10). A single injection of 15-20 mL of local anesthetic is thought to provide a unilateral multidermatomal block, covering T2-T6 (10). The plane can be poorly visualized using ultrasound and a useful landmark is the short axis view of the internal thoracic artery and vein, which lie superficial to the TTM (11). Although spread of the local anesthetic is easier in the craniocaudal direction as opposed to the PIF block, the TTM is underdeveloped cranially, and has mirroring caudal attachments as the pectoralis major, limiting T5-6 coverage. This can again be supplemented as described above. We do however believe that TTMP should be avoided in cases where internal mammary arteries are harvested because the plane is surgically disrupted and the distribution of the injectate may be unpredictable. The risk of pleural puncture or damage to venous structures, most notably the internal mammary artery, can be avoided by using color Doppler to identify vascular structures and by employing a lateral to medial in-plane approach with needle advancement under direct visualization (11).

The direct targeting of the anterior cutaneous branches of intercostal nerves originating from the T2-T6 thoracic nerve roots reduces perioperative opioid consumption and improves hemodynamic stability during incision and sternotomy (12, 13). Given the novel nature of both the PIF and TTMP use in cardiac surgery, published literature has mainly focused on case reports with very little data available in the form of interventional studies. In a randomized controlled trial published this year involving 40 participants, Kumar and colleagues found that in patients undergoing cardiac surgery, performing a total of six bilateral PIF single-shot injections with 0.25% ropivacaine before transfer to the intensive care unit resulted in a significantly lower pain score and lower fentanyl requirements when compared to those only receiving multimodal pain medications (7). Another recently published trial (N=48) looking at the efficacy of pre-incision bilateral single shot TTMP with 0.25% bupivacaine demonstrated lower pain scores, decreased 24-hour opioid consumption, and significantly lower need for rescue analgesia in comparison to the placebo control group that was injected with 0.9% saline solution (14). Given the promise of these blocks, multiple clinical trials are ongoing, which will add to the limited data currently available and ideally further highlight their utility in cardiac surgery.

Of the available options, employing a multimodal analgesia approach that includes the use of PIF or TTMP has its clear advantages. The anterior chest wall blocks are simple, superficial blocks that can be performed quickly in the operating room, and most importantly, seem effective in managing post sternotomy pain.

The gold standard, the epidural, requires postoperative management, can lead

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to hemodynamic instability, and is associated with the potentially catastrophic complication of an epidural hematoma. Although the incidence of epidural hematoma is calculated as 1:3552 in cardiac surgical patients, why expose patients to this risk when there are much safer alternatives (4)? The ESP block serves as another promising regional technique in treating post sternotomy pain. When compared to the PIF and TTMP blocks, the ESP block requires additional positioning for posterior access, which can lead to increased intraoperative time. Compared to PIF and TTMP block, the ESP fascial plane is deeper and can sometimes be difficult to visualize on ultrasound, especially in obese patients. An alternative multimodal opioid-sparing approach is one that avoids the use of regional techniques altogether. The use of adjuncts including nonsteroidal anti-inflammatory agents, dexmedetomidine, ketamine, and methadone have been employed but this strategy is limited by each drug's side effect profile. In comparison, with appropriate use, local anesthetics are considered generally safe.

PIF and TTMP can successfully mitigate post sternotomy pain using the safest and simplest approach when compared to the above-mentioned alternatives. Although novel, given their potential, formal studies are underway to further outline their efficacy in treating post sternotomy pain in cardiac surgery.

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### PRO

#### **Erector Spinae Block**

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With the emergence of ultrasound in the field of anesthesia, regional anesthesia techniques using local anesthetics have become the cornerstone for managing analgesia in all types of surgeries including cardiac surgery. Therefore, implementing these techniques and reducing the liberal use of opioids has shown to improve patient outcomes. Also, with new care models involving enhanced recovery after surgery (ERAS), the use of multimodal analgesic techniques can provide improved patient satisfaction, quicker recovery, and lower overall practice costs compared to established care models. Thus, the use of regional anesthesia is increasingly becoming a topic of interest in the cardiothoracic surgical realm.<sup>1</sup> Thoracic wall regional anesthesia has been shown to be a safe and effective adjuvant to the current standard of care for pain control during and following cardiac and thoracic surgery.<sup>2,3</sup> Epidural or spinal anesthesia provides reliable pain control, but is associated with risks in cardiac surgical patients. Myofascial plane blocks using ultrasound guided technique allows us to perform the blocks safely under direct visualization.

Pain after cardiac surgery is largely related to an inflammatory response triggered by incision, retraction and chest tube sites. Pain is worst in the first few days, with major risk factors being younger age, and longer surgery. After sternotomy, 30-50% of patients report chronic pain, with 5-10% being severe. Neuropathic pain, post-pericardiotomy syndrome, and chronic pain are significant issues in the long-term quality of life for patients. Pre-emptive analgesia can have a major impact on mitigating the stress response due to the pain in cardiac surgery.<sup>3,4</sup>

For assessing the utility of regional anesthesia in cardiac patients, many factors need to be considered in order to weigh the risks and potential benefits. These

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include the setting, resources, surgical approach, coagulopathy, and anticipated postoperative complications. In addition, safety, efficacy, ease of performance, and the anesthesiologist's skills must be considered.

Erector spinae plane block (ESPB) is a simple, easy to perform procedure, originally described for thoracic neuropathic pain. Local anesthetic is injected deep into the erector spinae muscle at the T5 level, adjacent to the tip of the transverse process, which results in a somatic and visceral analgesia from T2-T9,5,6 and provides analgesia for sternotomy (T2-T6).<sup>6</sup> It ultimately leads to spread through the costotransverse foramen and intertransverse connective tissues to the origins of the dorsal and ventral rami of the intercostal nerves. This block has a milder impact on the sympathetic chain. ESPB has been studied in adults for cardiac surgery and has been shown by multiple centers to be a useful adjunct for pain relief.<sup>1</sup>

## Safety

As a regional block, ESPB is considered a peripheral fascial plane block, and follows the ASRA anticoagulation guidelines. There are risks associated with regional techniques that are similar across all procedures, including bleeding, inadvertent vascular injection, nerve injury, and pneumo or hemothorax in the thoracic region. ESPB is associated with minimal to no risk of hematoma, nerve damage, or severe morbidity related to the block. Therefore, ESPB is safe to perform, even with the use of full heparinization for cardiopulmonary bypass.<sup>6-8</sup> The block can be performed using multiple modalities including a single shot with traditional local anesthetic, liposomal local anesthetic, or catheter-based using continuous or intermittent bolus technique. All techniques have been shown to be safe in the setting of anticoagulation prior to sternotomy and full heparinization. Cardiac surgery patients fall under a higher ASA class, have significant co-morbid disease, and are more vulnerable to hemodynamic instability. ESPB has been shown to produce non-clinically significant hemodynamic shifts.<sup>4</sup>

## Efficacy

The efficacy of a regional technique can involve multiple outcome measures including pain, length of stay, time to ambulation, respiratory parameters, and hemodynamic stability. Studies have shown that as a regional anesthetic, ESPB is non-inferior to the use of thoracic epidural analgesia (TEA).<sup>1</sup> When compared to control groups involving non-regional technique for pain control, ESPB has been shown to improve postoperative recovery, including time to extubation, cumulative narcotics used perioperatively, time to ambulation, pain scores, need for rescue analgesia, incentive spirometry volumes, and length of stay in the ICU.<sup>1</sup> Nagajara et al, compared ESPB with thoracic epidural analgesia, and the ESPB group had significantly improved pain scores, reduced rescue analgesic doses. The peak inspiratory flow rates were similar in both groups.<sup>1</sup> Overall, ESPB has been clinically proven as effective when compared to TEA, and ultimately improved outcomes as described when compared to no regional method for pain control.

## Technique

ESPB is a simple technique and is easy to learn. After the patient's consent, the block can be done by using bony landmarks or by ultrasound guided technique. Patient can be in lateral decubitus, prone, or a sitting position with standard ASA monitoring, and mild sedation. Bilateral ESPB blocks can be performed pre-induction or in the pre-operative area. Under aseptic precautions, ESPB can be performed as a single-shot or a catheter-based technique using sterile gloves. A single-shot technique uses a non-liposomal or liposomal local anesthetic for

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injection. Adding dexamethasone (5-10 mg) to the anesthetic provides analgesia for longer duration.

The goal is to inject local anesthetic (typically 20-10 mL of 0.5 % Ropivacaine) in the plane deep to the erector spinae muscles and superficial to the transverse processes (see figure, right image). For single shot injections, a 22g, 5-10 cm short bevel nerve block needle can be used. To perform the block using in-plane approach, a linear or curvilinear ultrasound probe needs to be placed in a paramedian sagittal orientation, about 2-3 cm lateral to the T5 spinous process. The nerve block needle should be inserted from a cranial to caudad direction, and the tip should contact the T5 transverse process prior to injection. Specifically, the local anesthetic is deposited closer to the costotransverse foramina at the origin of dorsal and ventral rami.<sup>5</sup>

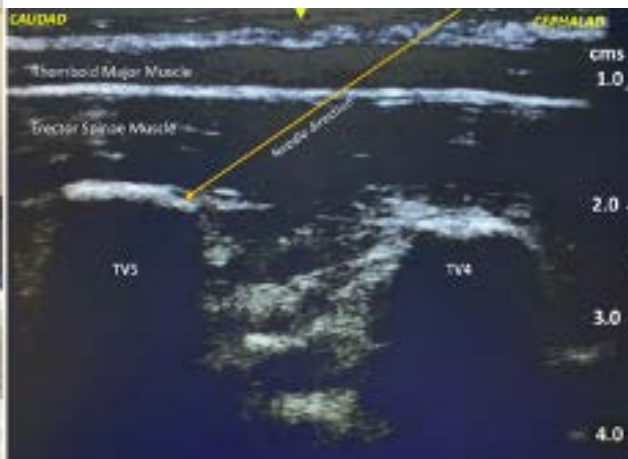
A catheter-based technique can be used for continuous local anesthetic infusion, or intermittent ephalon providing analgesia for up to 48-72 hours using a similar technique. Single-shot technique provides faster completion time, and depending on the local anesthetic used, it can provide effective analgesia for varying durations in the perioperative period. Catheter-based techniques although time consuming, can provide more prolonged analgesia postoperatively. A study on bilateral single injection blocks has shown to take less than 10 minutes, whereas insertion of catheters adds another 15 minutes per side.<sup>7,8</sup> Lastly, timing of catheter removal is not an issue since it is a myofascial block.

## Conclusion

Regional anesthesia as part of an ERAS for cardiac surgery initiative provides superior analgesia. It can reduce opioid consumption, length of stay, hospital burden, and a more attenuated hemodynamic and inflammatory response in critically ill patients. ESPB is a good starting point for a cardiac anesthesiologist as it can be easily incorporated in the workflow with a low risk, and a superior benefit profile.

**Figure:** Patient in sitting position (left image), and the operator standing to the right of the patient. The ultrasound probe is held 2 cm left to the midline, and in a cephalon-caudal direction between left thumb and index finger of the anesthesiologist, and the needle is held in the right-hand (in a right-handed person). The needle is advanced in an in-plane direction visualizing the needle on the ultrasound screen (right image). The ultrasound image displays the needle

direction (yellow line with arrow tip). The needle traverses through skin, superficial and deep fascia, rhomboid major muscle, erector spinae muscle and its fascial plane to touch the transverse process of thoracic vertebra-5 (TV5). The needle is slightly withdrawn from there and local anesthetic is injected below the erector spinae muscle fascial plane at 2.0 cms depth, (in this image). TV4= transverse process of thoracic vertebra<sup>4</sup>





# PRO/ CON

## 3

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### PRO

#### **Epidural Analgesia**

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Although recent excitement about enhanced recovery after cardiac surgery (ERACS) has been noted, the same principles were published in two articles in 1993 and 1996 by Drs. Chong and Cheng who described 'Fast Tracking' a 'facilitated recovery process' after cardiac surgery. At the center of 'Fast Tracking' was early extubation within 6 hours, early mobilization, and early ICU and then hospital discharge<sup>1,2</sup>. The anesthetic management was a narcotic based with both administering 10-15 ug/kg Fentanyl followed by 1-4 mg/hr morphine infusions<sup>1,2</sup>.

Over the next two decades the escalating 'opioid crisis' has increased the interest in regional analgesia techniques for median sternotomy with some clinicians seeking to completely eliminate narcotics from the anesthetic technique<sup>3,4,5</sup>. Interestingly, is that the narcotics are being replaced by infusions/injections of dexmedetomidine, ketamine, lidocaine, and magnesium<sup>3,4,5</sup>. ERACS and Fast-

# PRO/ CON

Tracking are designed to extubate and mobilize early, employ a multi-modal analgesia technique, and reduce/prevent delirium, the latter by reducing the use and need for sedation especially long-acting medications<sup>5</sup>.

Respiratory complications are the common non-cardiac complication after cardiac surgery including atelectasis, pneumonia, and respiratory failure<sup>6</sup>. This is followed by neurocognitive dysfunction i.e. delirium and stroke<sup>5,7</sup>. Although risk factors for complications have been described all patients undergoing cardiac surgery are considered at risk. Excellent analgesia while avoiding excess and long-acting centrally sedating medications are at the center of ERACS and Fast Track Perioperative management to facilitate earlier extubation and reduce pulmonary complications and delirium<sup>5,7</sup>.

While many patients can be managed with multimodal analgesic regimens which includes a balance between narcotic and non-narcotic medications<sup>5</sup>, there is sound evidence that regional analgesia improves pain control and facilitates extubation, both of which are key components to ERACS. Three regional analgesia techniques are the focus of this discussion:

## **Epidural Catheter**

### **Transversus Thoracis Muscle Plain Block (TTMPB) Erector Spinae Block (ESB) or Paravertebral Block (PVB)**

Of these, only neuraxial analgesia, or more specifically, thoracic epidural analgesia with general anesthesia (GA/TEA) has a long history of safety over thousands of patients while providing excellent analgesia associated with improved outcome compared to general anesthesia and endotracheal intubation alone (GAETT)<sup>8,9</sup>. In a retrospective review of 1280 patients, of which 932 received GA/TEA and 348 did not, those in the GA/TEA group, despite having more significant baseline respiratory dysfunction, had shorter mechanical ventilation times, and shorter hospital stays<sup>8</sup>. Analgesia and sedation requirements were less in the GA/TEA group by 20-40%. Based on blood gas analysis, post-extubation ventilation was better, and the need for supplemental oxygen was lower in the GA/TEA group it was concluded that GA/TEA was associated with superior respiratory function<sup>8</sup>. Thirty-three randomized controlled trials analyzing data from 2366 patients cared for with either GAETT vs GA/TEA reported less renal impairment, shorter duration of mechanical ventilation, and reduced composite outcome (death and MI)<sup>9</sup>.

Perioperative neuraxial anesthesia using Bupivacaine in cardiac surgical patients reduces the stress response<sup>10</sup>. There was less beta-receptor dysfunction<sup>10,11</sup>. There was no increase vasopressor needs<sup>10</sup>. Improved cardiac performance associated with GA/TEA was described by a higher cardiac index, greater central venous oxygenation and lower NT-proBNP<sup>11</sup>.

High thoracic epidural analgesia have been reported to be beneficial for patients with severe coronary artery ischemia as an anti-anginal therapy that can be used at home<sup>12,13</sup>. Over time, the authors reported fewer injections and less angina<sup>12,13</sup>.

Investigators analyzed 1016 patients, matching 508 GA/TEA with 508 GAETT alone reported shorter ventilation time (1.8 vs 5.5 hours), and ICU time in the GA/TEA group<sup>14</sup>. The GA/TEA group required less dialysis, had less myocardial injury, lower 30 day and 6 month mortality, and better long-term survival at three years after surgery<sup>14</sup>.

A review of 57 randomized and case-matched studies including 6383 patients

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reported a significant reduction in all-cause mortality in the epidural group (1.9%) vs the control arm (3.3%)<sup>10</sup>.

Based on review of the literature 25 hematomas were reported out of 88,820 epidurals resulting in an epidural hematoma risk of 1:3552<sup>15</sup>. The safety of epidural catheters was also found in a review of 2,113 cases at a single institution, which included 4 cases (0.18%) of temporary neurologic deficits, 3 of which included one upper extremity<sup>16</sup>.

What better proof that a regional technique is superior then to demonstrate that the surgical procedure can be performed under regional anesthesia alone. Eleven patients underwent repair of atrial septal defect, valve surgery, and coronary artery bypass grafting under thoracic epidural anesthesia alone i.e. no general anesthesia<sup>17</sup>.

Although the three regional techniques can improve analgesia, only the TEA is supported by thousands of patients and an excellent safety profile. Furthermore, TEA is a single procedure/single catheter technique initiated with a 4-6 ml injection of 0.1 to 0.2% bupivacaine followed by an infusion of 4-8 ml/hr. Excellent analgesia can be provided for as long as necessary. ESB/PVB can be performed as either a single injection technique or a continuous infusion using two catheters placed on either side of the spine compared to the single centrally placed epidural catheter. By comparison, the ESB/PVB infusions are initiated with a 20 ml injection of 0.1 to 0.2% bupivacaine followed by an infusion of 10 ml/hr via each of the two catheters. ESB/PVB blocks are associated a 1% risk of pneumothorax, up to 6% hypotension, and a success rate < 80% when used as a unilateral technique for patients undergoing thoracotomy (18,19). Single shot fascial plane injections provide benefit that is less likely to last more than 24-36 hours, which is time enough to wean from mechanical ventilation, but might not help with deep breathing and mobilization. This might suffice since the pain scores and requirement for pain medications both decline significantly after 36-48 hours (20). By comparison, TEA provides long duration of pain relief using the least amount of medication, when compared to ESB/PVB and TTMPB<sup>19</sup>.

If the goal is to provide excellent analgesia via a regional analgesia technique, then the epidural catheter approach is the superior choice based on thousands of cases, multiple studies, and outcome benefits involving multiple organ systems with resultant reductions in short and long-term mortality.

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## CON

### **No Regional is Needed**

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Erector Spinae Plane (ESP) and Transversus Thoracic Muscle Plane (TTMP) blocks for sternotomy currently have limited evidence supporting their use. Although recent studies have demonstrated statistically significant decreases in pain scores and opioid consumption, the clinical significance of these findings is questionable. A 2019 study looking at pain score differences randomized 110 patients to either ESP with acetaminophen and tramadol or just acetaminophen and tramadol alone, with both groups receiving fentanyl rescue. The results demonstrated 0/10 VAS pain scores in the ESP group and only mild pain, (1-4) in the control group for the first six post-operative hours. VAS pain scores were only reduced by 1-2 points in the 6-12-hour period and opioid rescue requirements only differed by only 130 micrograms over the 12 hours<sup>1</sup>. Taken as a whole, this is a very modest improvement particularly in that the control group did not receive many adjuvants routinely utilized including dexmedetomidine, lidocaine and ketamine<sup>1</sup>. A controlled before-and-after study in 2019 investigating ESP blocks showed a difference of 40mg of morphine over 48 hours between groups however the control group was placed on a continuous infusion of morphine upon arrival to the ICU<sup>2</sup>. Additionally, the control group only received paracetamol and nefopam as non-opioid adjuncts<sup>2</sup>.

TTMP blocks also showed only modest benefit. In a recent double blinded randomized controlled trial of forty-eight patients who received TTMP blocks with acetaminophen 1g every 6 hours and fentanyl PCA versus acetaminophen and fentanyl PCA alone, only a 240-microgram difference in fentanyl consumption in the first 24 hours was observed. VAS pain scores differed <3 points throughout the first 12 hours<sup>3</sup>. Again, the control group did not receive many of the usual medications associated with modern cardiac anesthesia.

Regional anesthesia is still an unproven therapy for post-sternotomy chronic pain. Elevated VAS pain score > 4 is a risk factor for chronic thoracic pain syndrome after cardiac surgery, however, this is only true for elevated VAS scores three days postoperatively<sup>4</sup>. Most studies and those referenced here primarily investigated



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VAS score reductions in the first 12 to 24 hours postoperatively, the clinical significance of which is unknown<sup>1-3</sup>.

Thoracic epidural analgesia (TEA) has been used in the past as a method for intraoperative and postoperative analgesia during cardiac surgery but has fallen out of favor in the US due to its known increased risk of neurologic complications in the setting of full heparinization for cardiopulmonary bypass<sup>5</sup>. TEA has been shown to reduce sympathetic tone, but outcome studies have not reliably shown cardiovascular benefit<sup>6-8</sup>. A recent large meta-analysis showed that although postoperative pain scores improved with TEA combined with general anesthesia (GA), there was no significant decrease in mortality compared with GA alone<sup>9</sup>. A randomized controlled trial of 654 patients failed to show any difference in 30-day free survival from stroke, MI, renal failure, and pulmonary complications in patients receiving TEA with GA versus GA alone<sup>6</sup>. A Cochrane review from 2013 also failed to show a mortality benefit for TEA with GA versus GA alone, despite some evidence for reduction of arrhythmias and pulmonary complications in the TEA group<sup>10</sup>. Although risk of epidural hematoma following epidural blockade is thought to be low, estimated between 1:1500 and 1:150000 using statistical modeling, the resulting neurologic complications would be devastating for a post-cardiac surgery patient<sup>5</sup>. Due to the potential of life-threatening complications as well lack of consistent mortality benefit, the future role of TEA for cardiac surgery patients should be limited.

Enhanced recovery after surgery (ERAS) without the use of regional techniques has been shown to be beneficial in various surgical populations<sup>11</sup>. ERAS-Cardiac is a recent adaptation of ERAS thus prospective randomized controlled trials (RCT) are still largely lacking. However, there are consistent findings including decreased ICU LOS in as well as decreased morphine milligram equivalents (MMEs) by 50%<sup>11-12</sup>. The adverse effects of intraoperative use of high dose narcotics are still in question. A recently published post-hoc analysis of an ERAS-Cardiac protocol for compared high dose (>50MME) and low dose ( $\leq$  50MMEs) opioid administration. They found that while regional anesthesia was associated with decreased intraoperative opioids, there were no differences in postoperative outcomes in a secondary propensity-matched analysis between the high and low dose groups<sup>13</sup>. Gabapentin and Tylenol within an ERAS-Cardiac protocol has shown to increase early extubation, decrease opioid usage and decrease LOS<sup>14</sup>. When randomized and used independently from an ERAS protocol; a single dose of Gabapentin 600mg can decrease pain scores but also increased postoperative over-sedation and duration of mechanical ventilation<sup>15</sup>.

The most widely studied intraoperative infusion is dexmedetomidine. A 2020 meta-analysis of 1308 patients from nine studies showed decreases in AKI, prolonged ventilation, respiratory complications, delirium and overall mortality<sup>16</sup>. An RCT using a ketamine infusion intra and post-operatively showed a decrease in opioid consumption but no significant decrease pain scores<sup>17</sup>. The recent PATHFINDER pilot study showed low dose infusions of remifentanyl, ketamine, and dexmedetomidine titrated according to EEG was a viable anesthetic strategy for cardiac surgery patients that lead to stable hemodynamics, earlier postoperative extubation and less postoperative cognitive dysfunction<sup>18</sup>. Postoperatively, the continuation of dexmedetomidine showed a reduction in all-cause mortality and lower incidence of postoperative delirium<sup>19</sup>. Ketorolac post op has been found to be safe and possibly decrease LOS<sup>20</sup>.

Taken collectively, regional anesthetics for sternotomy as well as ERAS-Cardiac are new domains of practice and there appears to be significant benefits to both.

# PRO/ CON

Regional blocks for cardiac surgery are not universally available however and do require an elevated level of ability. They must be performed in the context of a time-sensitive operating room environment. While the American College of Graduate Medical Education has a total minimum requirement of 40 peripheral nerve blocks, more than a dozen distinct block procedures are commonly utilized by anesthesiologists. Simulation shows that it takes 28 performances of a specific nerve block procedure, with immediate feedback, to reach competency<sup>21</sup>. Few anesthesiology residency programs can offer this level of exposure for specific procedures such as the ESP and TTMP block. Therefore, fellowship-trained regional anesthesiologists may be necessary to provide the most effective and consistent service. This kind of subspecialty ability is not available in many hospitals.

As with any procedure, there is also the potential for complications. If fact, increasing complexity in already complex systems makes errors inevitable<sup>22-23</sup>. This fact must be accounted for when evaluating the value of regional anesthesia for sternotomy. Administration of local anesthetics in doses which if infused intravascularly could be harmful, the potential for excessive procedural sedation in a cohort of patients with already compromised cardiovascular function, and the potential for hematoma formation are all potential adverse outcomes.

In conclusion, addition of regional anesthesia for sternotomy has minimal value. From current literature review, the quality gained by addition of regional blocks when compared to a well-executed ERAS-Cardiac is minimal; but the costs (training, monitoring, time, increased complexity) are large.

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# Echo Corner

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## Case History

A 59-year-old female with a history of inferior sinus venosus ASD with prior closure using bovine pericardial patch, and interrupted IVC presents for pulmonic valve replacement due to severe pulmonary valve stenosis, as well as repeat ASD closure. Intra-operative TEE at the time of cannulation revealed the following:

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### QUESTION 1

**What explains the findings in Figure 1?**

- A. Aortic dissection
- B. Contained aortic rupture
- C. Normal IVC
- D. Dilated azygous vein

### QUESTION 2

**What explains the findings in Figure 2?**

- A. SVC and IVC joining the right atrium
- B. Azygous vein draining into right atrium
- C. Hepatic veins draining into right atrium
- D. Anomalous pulmonary vein return to the right atrium

**>> Please Note: Answers & Explanations on Second Page**



# Echo Corner

## Answers/Explanations

### QUESTION 1: ANSWER D

The intraoperative TEE reveals the presence of the descending aorta with an adjacent, echo-lucent structure which is the dilated azygous vein. Interruption of the IVC is a rare, often asymptomatic condition, where the intrahepatic section of the IVC fails to form. The incidence is reported to be less than 1%. It can be associated with other forms of congenital heart disease. Interruption of the IVC begins superior to the renal veins joining the distal IVC; therefore, venous return from the lower body is directed towards the azygous and/or hemiazygous veins and subsequently drains into the SVC or brachiocephalic veins. While IVC interruption can be an incidental finding, the reduction in blood flow accompanied by IVC narrowing and extension via the azygous vein has been reported to raise the likelihood of lower extremity DVTs. Case reports of DVTs and pulmonary thromboembolic disease has been identified in patients exhibiting an interrupted IVC with azygous extension. Given the level of dilation, the azygous vein may be mistaken for different aortic pathologies. The use of TEE can help to verify the identification of the azygous vein using a variety of methods such as color doppler and pulse wave doppler indicating alternate directions of flow, as well as pulsatility. Additionally, injection of agitated saline into a lower extremity vein should demonstrate return to the right atrium via the azygous vein and the SVC. In this patient, the interrupted IVC was known prior to surgery, but given its asymptomatic nature many patients may be unaware of this condition until it is incidentally noted on cross-sectional imaging/TEE. Given the unique venous drainage in cases of IVC anomalies, alternate cardiopulmonary bypass cannulation strategies may be necessary.

### QUESTION 2: ANSWER C

Intra-operative TEE reveals the hepatic veins draining into the right atrium. Interruption of the IVC leads to absence of the hepatic segment of the IVC, and venous drainage of the liver occurs via direct connection of the hepatic veins to the right atrium. With such venous drainage it is important to consider alternate venous cannulation strategies for cardiopulmonary bypass, as cannulation of a hepatic vein is likely to not provide adequate drainage.

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(continued)



# Echo Corner



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