SCA NEWS

SOCIETY OF CARDIOVASCULAR ANESTHESIOLOGISTS
Knowledge • Care • Investigation

PRESIDENT'S MESSAGE

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Kathryn E. Glas
MD, MBA, FASE

President
Society of
Cardiovascular
Anesthesiologists

Greetings All and Happy Fall

The SCA volunteers continue to take member feedback to develop educational opportunities for you. The ARC team has once again outdone themselves by creating a Question Bank to help you prepare for the ABA cardiac exam. This is in addition to the member benefit of ARC education on SCA University. The SCA Echo team has prepared another excellent meeting, and registration is now open. The thoracic and annual meeting teams have once again created excellent content, and we look forward to your participation in these meetings in Montreal in April.

We would not be the amazing society we are without our volunteers. Join us in advancing the practice of CVT Anesthesiology by volunteering your time and expertise on a committee, council or task force. We encourage everyone to participate, and volunteering is a great way to pay forward our knowledge and expertise for future generations.

Sincerely,

Kathryn E. Glas, MD, MBA, FASE

Educational Activities

Introducing the SCA ARC Question Bank!

ARC Question Bank: You asked, we answered! This question bank of 400+ questions will help you prepare for the ABA's Adult Cardiac Anesthesia Board Examination. All questions were written by cardiac anesthesiologists.

Price:
- Member: $200
- Non-member: $350

CLICK HERE TO PURCHASE

Once purchased, you will receive an access email within the hour during normal business hours and up to 48 hours outside of normal business hours (evenings and weekends).

Join the Society of Cardiovascular Anesthesiologists and SAVE on the question bank and receive **ARC: A Review Course for the ABA's Adult Cardiac Anesthesia Board Examination for FREE!**

ARC: A Review Course for the ABA's Adult Cardiac Anesthesia Board Examination

SCA's ARC: A Review Course focuses on the Adult Cardiac Anesthesia Board Examination that will be administered by the American Board of Anesthesiology in December 2024.

Our review course embraces the intersection of technology and education and hosts a series of 48 interactive modules that will walk you through the content outline of the ACA exam. These modules contain images, videos, tables, and text from a variety of sources, but have been arranged for members in easy-to-navigate modules. Work through our modules that are rigorously cited and peer-reviewed.

This course is for **FREE** to all SCA members within their SCA University account! If you have not created an account, you will need to do so before you can access. If log in assistance is required, please contact info@scahq.org. For non-members, **you can join** and have access to these interactive modules!

Registration Is Now Open for SCA Echo 2025! February 20 – 23

Loews Atlanta Hotel
1065 Peachtree St. NE
Atlanta, Georgia 30309

Register for SCA Echo Today!

The four-day SCA Echo conference will showcase multidisciplinary panels delving into the pivotal role of echocardiography in surgical decision-making concerning valvular disease and mechanical circulatory support. Below are a few of the topics that will be covered:

- **3D Assessment of the Mitral Valve**
- **Case-based Presentations - Clinical Application of 3D Imaging**
- **Tricuspid Valve - Understanding a Complex and Dynamic Structure**
- **ECMO 101 - Making Sense of the Alphabet Soup**
- **Clinical Dilemmas - Adult Congenital Heart Disease**

View Full Agenda

Register Now

2025 Thoracic Anesthesia Symposium & Workshops

April 25, 2025
Montreal, Canada

Deadline: Monday, December 2 11:59 PM CT

Save *the* Date

Submit Your Abstract by December 2

IMPORTANT REMINDERS

- Abstract Submission system closes at 11:59 PM CT on December 2, 2024.
- Additional submissions will not be accepted after the submission system closes.
- Co-Authors must complete their disclosure forms by December 2, 2024.
- The submission will not be reviewed unless all listed authors complete their disclosure form by the deadline.
- Notifications regarding abstract selection will be sent in January 2025.

Instructions for Abstract Submission can be found **here**

2025 Annual Meeting and Workshops

April 26-29, 2025
Montreal, Canada

Deadline: Monday, December 2
11:59 PM CT

The Society of Cardiovascular Anesthesiologists invites the submission of abstracts for presentation at the SCA 2025 Annual Meeting & Workshops on April 26-29 in Montreal, Canada.

Submit Your Abstract by December 2

Scientific Abstracts

- To view instructions and submit an abstract, **click here**.
- Co-authors must complete their bio and disclosure forms by December 2, 2024.
- The submission will not be reviewed unless all listed authors complete a bio and disclosure form by the deadline.
- Notifications will be sent in January 2025.

SCA Fellow and Resident Complex Cases

If you are a fellow or resident, please consider submitting to the SCA Fellow and Resident Complex Case.

- To view instructions and submit a Fellow and Resident Complex Case, **click here**.
- Co-authors must complete their bio and disclosure forms by December 2, 2024.
- The submission will not be reviewed unless all listed authors complete a bio and disclosure form by the deadline.
- Notifications will be sent in January 2025.

Super Echo Call

- Submissions must be made by a fellow or a junior attending who is less than five (5) years from training. All fellow submissions must have an attending named on the submission who will participate in the session with you.
- To view instructions and submit an abstract, **click here**.
- Co-authors must complete their bio and disclosure forms by December 2, 2024.
- The submission will not be reviewed unless all listed authors complete a bio and disclosure form by the deadline.
- An abstract or case may be submitted for consideration to multiple calls; however, the submission will not be accepted for presentation to more than one call. The author must indicate submission to multiple calls at the time of submission.
- Notifications will be sent in January 2025.

SCA NEWS

Announcing the Artificial Intelligence in Cardiovascular Anesthesia Taskforce

Mission Statement:

The Artificial Intelligence in Cardiovascular Anesthesia Taskforce is committed to advancing the practice of thoracic and cardiovascular anesthesiology through the strategic integration of artificial intelligence. Our mission is to enhance patient outcomes, personalize treatment, and support clinical decision-making by developing and implementing AI-driven tools that are grounded in robust data, ethical considerations, and clinical expertise. We aim to bridge the gap between emerging AI technologies and their practical application in anesthesia, ensuring that these innovations enhance, rather than replace, the critical judgment of healthcare professionals. Through collaboration, education, and ongoing research, we strive to overcome the challenges of AI in anesthesiology and pave the way for a future where technology and human expertise work in harmony to deliver superior patient care.

APPLY TODAY

Qualifications and Criteria for Task-Force Applicants:

1. Clinical Expertise

- Board-Certified Cardiovascular Anesthesiologist: Candidates should be board-certified in anesthesiology with subspecialty expertise in cardiovascular anesthesia.
- Experience in Perioperative Medicine: Extensive experience in managing perioperative care, with a focus on high-risk cardiovascular patients.
- Knowledge of Clinical Workflow: Deep understanding of the clinical workflows in cardiovascular anesthesia, including decision-making processes and patient management.

2. Research and Innovation

- Experience in AI/ML Research: Involvement in research related to artificial intelligence or machine learning desirable, particularly in healthcare applications.
- Publication Record: A record of peer-reviewed publications in relevant fields, such as anesthesiology, AI in healthcare, or biomedical engineering.
- Grant Funding: Previous success in obtaining research funding would be an asset but not required, particularly for projects involving AI or technology in medicine.

3. Technical Proficiency

- Understanding of AI/ML Concepts: Knowledge of AI/ML concepts, data analysis, and statistical methods, with the ability to engage in technical discussions with data scientists.
- Experience with Clinical Decision Support Systems: Familiarity with the development, implementation, or use of AI-driven clinical decision support tools.
- Data Management Skills: Knowledge of data collection, management, and interpretation, particularly in the context of electronic health records (EHRs) and large datasets.

4. Ethical and Regulatory Knowledge

- Familiarity with Healthcare Regulations: Understanding of healthcare regulations, including those related to data privacy, security, and the ethical use of AI in clinical settings.
- Ethical Considerations: Awareness of the ethical implications of AI in healthcare, particularly issues related to bias, transparency, and the physician-patient relationship.

5. Educational and Training Experience

- Teaching Experience: Experience in teaching or training others, particularly in the areas of AI, technology in healthcare, or advanced anesthesiology practices.
- Commitment to Ongoing Education: Commitment to staying updated on the latest advancements in AI and healthcare technology, and to disseminating this knowledge within the task force.

6. Vision and Innovation

- Forward-Thinking Attitude: A vision for the future of AI in cardiovascular anesthesia and a passion for driving innovation in this field.
- Problem-Solving Skills: Strong analytical and problem-solving skills, with the ability to identify and address potential challenges in the integration of AI into clinical practice.

Applications for the task force will be accepted October 1-31, 2024. To apply, click here!

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Opening Soon

2025 SCA DEI Junior Resident Scholarship

Applications will be accepted November 1, 2024 - January 19, 2025

The Society of Cardiovascular Anesthesiologists Diversity, Equity, and Inclusion Committee (DEI) Junior Resident Scholar Program provides selected underrepresented minority (URM) anesthesiology residents (CA1) early exposure to cardiovascular anesthesiology by attending the SCA Annual Meeting, presenting a poster and interacting with SCA members and leaders. Applications will be accepted November 1, 2024, through January 19, 2025. Watch your in box for details!

The goals of this scholarship are:

- To expose URM residents to the clinical practice of cardiothoracic anesthesiology by attending the SCA annual meeting.
- To give URM resident scholars early involvement in the SCA through interactions with and mentorship by leaders of the sub-specialty and other cardiothoracic anesthesiologists.

SCHOLARSHIP INFORMATION

Ten scholarships will be awarded in 2025!

REQUIREMENTS

- Nomination of URM resident by the program director or cardiothoracic faculty.
- The nominee must be an academically promising URM CA1 resident in good standing in an ACGME-accredited residency program.
- Each nominee must submit an essay addressing the following (maximum 500 words):
  - Diverse background of the nominee
  - Nominee's understanding of the issues of DEI in Cardiovascular medicine
  - Nominee's interest in CV anesthesia
- A letter of support from the program director and one additional letter of recommendation from a faculty member.
- The CV of the nominee.
- Recipients must be members of the SCA, or agree to become one, to accept the scholarship. Non-members will receive a complimentary, one-year resident/fellow membership to meet this requirement.

FUNDING

$1,000 travel stipend; complimentary basic registration to the 2025 SCA Annual Meeting.

EVALUATION AND SELECTION

Scholarship applications will be reviewed and selected by the Scholarship Review & Selection Sub-Group of the DEI Committee at the SCA. Up to 10 scholarships will be awarded yearly.

Questions? Please write to us at dei-cmte@scahq.org

Application will be accepted November 1, 2024, through January 19, 2025. Click here for details.

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2025 Kaplan Leadership Development Award

Accepting Applications through January 13, 2025

Applications for the 2025 Kaplan Leadership Development Award will be accepted September 13, 2024 - January 13, 2025. The award is designed to assist cardiothoracic and vascular anesthesiologists in their career by granting funding to further their leadership development through coursework and leadership-specific studies.

The Kaplan Leadership Award will be adjusted accordingly to offer an aggregate of $5,000 to either one recipient or divided among two.

$5,000/$2,500 from the SCA Endowment, with a $5,000/$2,500 match from the applicant's institution to fund a leadership education strategy

Click here **Kaplan Leadership Development Award** for more information on this award and how to apply.

Questions about the grant and grant application may be emailed to **operations@scahq.org.**

Opening Soon!

The Call for the 2025 Research Grants

SCA Members are eligible to apply for 1 of 4 types of grants offered in 2025:

- **SCA In-Training Grant** – $15,000 for one year.
- **SCA Starter Grant** – up to $25,000 a year for 2 years
- **SCA Diversity and Inclusion Grant –** up to $25,000 a year for 2 years
- **SCA Mid-Career Grant –** up to $50,000 a year for 2 years

Award recipients will be announced during the SCA 2025 Annual Meeting & Workshops. The grant period of 24 months can begin any time from July 1 to December 31 of the year granted.

Applications will close on February 2025. More information about these funding opportunities will be posted on the SCA website.

2026 SF Match Opens November 4

In-order to provide more consistency and predictability to the ACTA fellowship application process, the ACTA programs participate in a common application and match process provided by SF Match for recruitment. The schedule for the 2026 training year is as follows:

November 6, 2024	Applicant Registration Began
March 5, 2025	Central Application Service Target / Deadline Date
June 5, 2025	Program Rank List Submission Deadline (12 PM PT)
June 5, 2025	Application Rank List Submission Deadline (12 PM PT)
June 19, 2025	Match Results
June 20, 2025	**Post**-Match Vacancies Posted
July 2026	Training Position Starts

SF MATCH

Applicants and programs participate by registering with SF Match and applicants applying to the programs of their choice. Both programs and applicants submit a rank list based on their preferences. Notably, only programs where an applicant has interviewed can be ranked in the match.

Critical to the match process, programs and applicants can make an Exception Agreement prior to submitting their rank list to SF Match. Exceptions Agreements allow an applicant and program to agree to match each other prior to submitting their respective rank lists. Importantly, all ACTA positions must be included in the match, including all Exception Agreement positions.

Exceptions to the standard match process have been agreed upon by the ACTA Fellowship Program Directors Council in the following situations:

1. Applicants who are in active military service at the time of application.
2. Internal candidates, i.e., applicants who are currently in the anesthesiology residency program at the same institution as the ACTA fellowship.
3. Applicants who are making a commitment to come to the institution of the ACTA fellowship for more than one year.
4. Applicants who are enrolled in an anesthesiology residency outside of the USA at the time of application.
5. Applicants who reside outside the USA at the time of application or who are not eligible for ABA certification due to non-US training.
6. Applicants whose spouse or partner is applying for a GME-approved post graduate training program in a medical specialty in the same region as the ACTA fellowship.

Please Note: Eligible applicants and programs who wish to take advantage of an exception rule are still required to participate in the match ranking process and must complete an exception agreement found on the SCA website via the link below. This year exception agreements will be posted on the SCA website for transparency to programs and applicants. Any match irregularities will be referred to the ACTA Fellowship Program Directors Council of the SCA.

Any match irregularities will be referred to the ACTA Fellowship Program Directors Council of SCA.

Program Directors – watch your in-box for details and submission link!

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2025-2027 Term Selection

VOLUNTEER

Serve Your Society – Volunteer Today!

Apply Now Through October 31st

Support your Society's strategic goals and initiatives by serving on one of its 40-plus committees and sub-committees! The Call for Volunteers will be open October 1 – 31, 2024 for the 2025-2027 term.

SUBMIT AN APPLICATION

The following committees have openings for the 2025-2027 Term:

- Abstract Review Committee
- Acute Kidney Injury (AKI) Sub-Committee
- Atrial Fibrillation Sub-Committee
- Artificial Intelligence in Cardiovascular Anesthesia Task Force
- Blood Management Sub-Committee
- Bylaws Committee
- Clinical Practice Improvement Committee
- Diversity, Equity, and Inclusion Committee
- SCA Echo Program Planning Committee
- Economics and Gov. Affairs Sub-Committee
- Enhanced Recovery After Cardiac Surgery (ERACS) Sub-Committee
- Enhanced Recovery After Thoracic Surgery (ERATS) Sub-Committee
- Ethics Committee
- Guidelines and Standards Sub-Committee
- Kaplan Leadership Development Award Sub-Committee
- Mechanical Circulatory Support Sub-Committee
- Member Engagement Committee
- SCA Mobile App Sub-Committee
- Newsletter Sub-Committee
- Online Education Sub-committee
- Quality, Safety and Value Committee (formerly QSL Committee)
- Research Committee
- Scientific Program Planning Committee (SCA Annual Meeting and Workshops)
- Social Media Sub-Committee
- Thoracic Anesthesia Symposium and Workshops (TAS) Program Planning Committee

For questions related to the Call for Volunteers, please email committees@scahq.org

Taking a Closer Look!

The mission of the **ERATS SUB-COMMITTEE** is to help guide the successful establishment of Enhanced Recovery after Thoracic Surgery programs. And its purpose is to collect and disseminate expert opinion on principles necessary to implement an Enhanced Recovery after Thoracic Surgery (ERATS) program across a wide range of practice settings, from community-based hospitals to large academic centers.

The mission of the **ECONOMICS AND GOVERNMENTAL AFFAIRS SUB-COMMITTEE** is to monitor state and national policy actions which may impact the Society's interests and to ensure the interests and objects of the Society are represented.

The mission of the **ONLINE EDUCATION SUB-COMMITTEE** is to develop an online content strategy for CME and non-CME education offerings that align with member needs and align with the Boards strategic priorities.

The committee provides physicians and healthcare professionals the highest quality, evidence-based education, advancing their knowledge, competence, performance in practice, and patient outcomes in order to improve the health of the public. Specific duties include to provide an oversight group for online education ensuring that there is a clear plan, submission review process, measurement/evaluation process, and addresses member needs by recruiting appropriate content.

The mission of the **QUALITY, SAFETY, AND VALUE COMMITTEE** is to identify and create synergy between the SCA and other professional/affiliate societies to engage in Quality Improvement development in the Perioperative Arena of Cardiac and Thoracic Surgery.

Interested in learning more about a particular committee? Click Here

SOCIETY OF CARDIOVASCULAR ANESTHESIOLOGISTS
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ENDOWMENT

Support Your Society Through the SCA Endowment

The role of cardiovascular anesthesiologists is crucial in treating complex heart conditions and patients who are critically ill due to cardiovascular disease, especially as surgeries become more advanced and the population ages. The Society of Cardiovascular Anesthesiologists (SCA) leads globally in this field, advancing treatment through research, care, and knowledge. Your support helps fund critical research and education to improve patient care in cardiovascular disease.

MAKE A GIFT

Support the advancement of cardiovascular anesthesiology with your donation. Your gift funds critical research and education, helping improve care for cardiovascular disease patients.
Donate Now

PLANNED GIVING

Support the future of cardiovascular anesthesiology through planned giving or by exploring a variety of donation options. By contributing to the SCA Endowment, making a legacy gift, or choosing from diverse options like stock gifts and IRA contributions, you ensure sustained support for our long-term mission. Discover the giving path that best suits your capability to contribute and make a lasting impact in the field of cardiovascular care.
Learn More

RESTRICTED – Established Endowment Fund (Deed of Gift)

The SCA Foundation Endowment Fund "the Fund" is a restricted fund created by the former SCA Foundation upon its dissolution. This fund was established to bestow to the SCA, in a Deed of Gift, the assets of the Foundation. Gifts to this fund are restricted and may only be used in accordance with the intent of the original Deed of Gift.

UNRESTRICTED – New SCA Endowment Fund

The SCA Endowment Fund was created by the Board of Directors to accept gifts of all sizes directed towards funding programs offered by the organization. These funds are unrestricted and may be used by the SCA to fund programs, projects, and services in advancing the mission of the organization.

The SCA Endowment continues to support SCA members in the achievement of these goals.

SOCIETY OF CARDIOVASCULAR ANESTHESIOLOGISTS
Knowledge • Care • Investigation

DEI COMMITTEE

Highlights from SCA Plenary

Providing Care to Vulnerable Populations

Bantayehu Sileshi, Adam Milam, Ashley P. Oliver

At the 2024 SCA Annual Meeting in Toronto, the plenary session titled ***"Providing Care to Vulnerable Populations"*** addressed critical issues of healthcare disparities in anesthesiology and surgical care, particularly for marginalized and underserved communities. Sponsored by the SCA Diversity, Equity, and Inclusion (DEI) committee, this session explored the unique challenges faced by vulnerable groups, including those in low-resource settings and historically marginalized populations in the United States. Through expert presentations, the session emphasized the need for educational initiatives, health services research, and a more diverse healthcare workforce to improve care outcomes and equity. This article summarizes key highlights from the session: the role of international partnerships; research in perioperative care; and the role of physician identity in addressing systemic inequities in outcomes and quality.

Dr. Bantayehu Sileshi's presentation, titled ***"Improving Anesthesia Care Quality in Low Resource Centers – Building International Anesthesiology Capacity Through Education,"*** highlighted the significant challenges in delivering safe and high-quality anesthesia care in low-resource settings. Dr. Sileshi outlined several educational tools and methods that can help mitigate these challenges. Globally, approximately 5 billion people lack access to essential surgical care, including cardiac surgery.[1] For example, a tertiary hospital in Ethiopia has a waitlist of over 10,000 patients in need of heart valve replacement surgery, with the majority of patients dying before they can receive care. Among the many factors contributing to this lack of access is the shortage of skilled healthcare providers.[1,2] Dr. Sileshi emphasized that healthcare professionals in high-resource settings have the opportunity to partner with low-resource institutions to expand their training programs without compromising the quality of care. Dr. Sileshi introduced the Improving Anesthesia Training and Care in Africa (ImPACT Africa) program, which offers a scalable model to address this issue. The ImPACT program takes a multifaceted approach to building educational capacity, including developing a learning management system, revising curricula with the integration of simulation, implementing a train-the-trainer program for educators, and establishing mentorship and leadership initiatives. Additionally, the program focuses on creating a perioperative outcomes infrastructure to monitor and improve patient outcomes.[3,4,5] ImPACT Africa has already been implemented in seven East African institutions, showing great promise in bridging the gap in skilled provider availability. Dr. Sileshi also discussed the unique challenges of capacity building for cardiac surgery, which requires a multidisciplinary team—including interventional cardiologists, cardiac surgeons, perfusionists, cardiac anesthesiologists, and intensivists—as well as specialized infrastructure, such as operating rooms, echocardiography equipment, ICUs, perfusion equipment, and costly consumables. While these challenges may seem insurmountable, Dr. Sileshi emphasized that with the right partnerships and focused efforts, progress can be made to enhance safe surgical and anesthetic care in these settings. He concluded by urging and empowering the audience to take part in narrowing this gap.

Dr. Adam Milam's presentation was titled, ***"Health Services Research—What Does this Mean and Why Might it be helpful in Perioperative Cardiovascular Medicine?"*** During the presentation, Dr. Milam described health services research (HSR), provided examples in perioperative cardiovascular medicine, and shared strategies for the audience to engage in HSR to improve the delivery of care to vulnerable populations. The Institute of Medicine (1994) defines health services research as "a multidisciplinary field of inquiry, both basic and applied, that examines access to, and the use, costs, quality, delivery, organization, financing, and outcomes of health care services to produce new knowledge about the structure, processes, and effects of health services for individuals and populations".[6] While there is a dearth of HSR focused on perioperative cardiovascular care, there are examples in perioperative medicine

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broadly.[7,8,9] HSR requires reliable and quality data and fortunately, our specialty has the Multicenter Perioperative Outcomes Group (MPOG) as well as the National Anesthesia Clinic Outcomes Registry (NACOR) for national data sources. These databases have been used for HSR, finding disparities in the administration of antiemetics by race and ethnicity[10] as well as socioeconomic status[11] after controlling for relevant covariates. The articles identifying differences in antiemetic administration and similar studies do suffer from limitations including the data available (ondansetron and dexamethasone were the only available antiemetic for the NACOR study;[11]) the quality of the data, and the translation of the findings into clinical practice. Despite these limitations, there are opportunities for HSR to improve the delivery of care to vulnerable populations. For example, Peek and colleagues, identified opportunities to advance health equity through social care interventions[12] and an article published in Circulation discussed leveraging implementation science for cardiovascular health equity, developing and equitably implementing interventions and strategies to advance health equity.[13] There are many opportunities for anesthesiologists to engage in HSR to advance health equity, but we need to ensure we have good data, anesthesiologists engaged in HSR, and resources to translate research findings into clinical practice.

Dr. Ashley P. Oliver's presentation, ***"Understanding the Perspectives of Vulnerable Populations: How and Why Physician Identity and the Clinical Encounter is Critical,"*** provided a review of the care of vulnerable populations in perioperative cardiovascular medicine in the United States. Dr. Oliver's two learning objectives were: a) to review how distinct domestic populations may experience the healthcare system differently and evaluate the evidence that subjective patient experiences contribute to healthcare outcomes and b) to analyze the evidence that physician identity shapes patient-provider exchanges in the healthcare system. Dr. Oliver began by defining what characteristics render a patient more vulnerable in perioperative cardiovascular medicine.[14,15] Vulnerable groups are at high risk of disparate health access and outcomes even when given access to treatment. These populations may be defined by their absence in registries and trials, and they may belong to groups underrepresented or exploited by scientific research activities. They may belong to a particular race, ethnicity, gender socioeconomic status and they may carry incarceration history or the label of a stigmatized medical disease or social category. The Black American community is one of many vulnerable populations, all with unique histories and orientations to healthcare. There is conflicting evidence regarding the role of patient-provider concordance along identity lines in health equity, and many trials taken together show a mixed picture.[16,17,18,19] In examining the Black American population, there is sociological evidence to show that patient care can affected by subconscious biases and structural forces like inadequate presence in trials and registries. This contributes to ongoing mistrust of a medical system that historically has not always been well-intentioned regarding the health of Black American communities.[20, 21] Having racial patient-provider concordance in for this group has shown to improve adherence to cardiovascular medication regimens and acceptance of surgery for coronary revascularization.[22, 23] While provider identity is not the sole avenue to address health disparities for this population at increased perioperative risk, increasing provider diversity – irrespective of directly measured effects on the patient-provider dyad—appears to lessen the effects of structural biases that may disadvantage certain groups.[24] This may be because more diverse medical teams have been shown to deliver better care to complex high risk patients.[25] To improve equity and outcomes for vulnerable populations, the aim is not to ensure that every patient has a provider who mirrors their identity, but that the future of care be driven by a diverse group of practitioners equipped to navigate challenging clinical questions despite differences.[26,27]

Our profession has made significant strides in ensuring patient safety during surgery. Organizations like the Anesthesia Patient Safety Foundation and many others have prioritized patient safety in anesthesia care for decades, positioning our field as a leader in the healthcare industry. However, during this panel presentation, the speakers reminded us that vulnerable populations still require additional attention to ensure safe anesthesia for all patients. Whether it is patients from low-income countries, individuals in the U.S. from low socioeconomic backgrounds, or those historically marginalized who have lost trust in the healthcare system, these groups demand our focused efforts.

DEI COMMITTEE

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SOCIETY OF CARDIOVASCULAR ANESTHESIOLOGISTS
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SPOTLIGHT

AWEsome Woman Interview

Reginna Linganna, MD

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I am an assistant professor at the Hospital of the University of Pennsylvania. In additional to providing clinical care, my primary non-clinical interests are in graduate and continuing medical education. I am the assistant program director for the residency program and course director for the anesthesia sub-internship at Penn. Currently, I serve as the Vice Chair of the Online Education Subcommittee for the SCA where I created ARC: A Review Course, which is the board review course for the cardiac anesthesia board exam. I also recently created, with Hesham Ezz and a plethora of volunteers, the ARC question bank. Additionally, I serve as an Early Career Member on the Board of Directors for the SCA and am excited about contributing to the Society on a larger scale.

1. What led you to become a Cardiovascular/Thoracic Anesthesiologist?
What fascinated me the most in medical school was cardiovascular physiology. As I continued in my training, I was in awe of how cardiac anesthesiologists manipulated that physiology in real time. I was additionally inspired by how cardiac anesthesiologists were critical in patient outcomes in the cardiac operating rooms. These were also the anesthesiologists that I most aspired to be like. The culmination of all these feelings led me to the natural decision of cardiac anesthesia.

2. How did you hear about the SCA?
I first heard about the SCA when I was in training as a resident physician when I was asked to submit one of my cases for the Annual Meeting. However, it was while interviewing for my first attending physician position when I learned about all the SCA had to offer. At the time I was interested in how mobile applications could further medical education and learned that the SCA was interested in creating an app for its members. This shared interested is when I realized that a relationship with the SCA could be mutually beneficial.

3. What roles have you held for the society?
I have held many roles for the Society. I first served on the Member Engagement Committee when I was a fellow physician. I then became vice chair and ultimately chair of that committee. I was the inaugural chair of the Mobile App subcommittee. I currently serve on the Online Education Subcommittee where I was recently named vice chair. Most recently, I was elected to the Board of Directors for the Society as an Early Career Director.

4. What is one of your greatest achievements as a Cardiovascular/Thoracic Anesthesiologist?
My greatest achievement as the cardiac anesthesiologist is the creation of ARC: A Review Course. This started as a pilot study through a grant I received while at Thomas Jefferson University Hospital. We investigated the utilization of a multimodal asynchronous platform to create modules that would teach learners advanced topics in cardiac anesthesia. Coincidentally, at the same time it was announced that there would be a board certification exam in cardiac anesthesia. As the pilot study was successful, I approached the SCA about expanding our pilot into a board review course for the exam that would be endorsed by the SCA. With the help of many volunteers, we were able to create a board review course that was free for SCA members.

5. Do you have any advice for fellows and residents?
Career-wise: Do something that you're passionate about. As you pursue your passions, opportunities will come. You simply need to be persistent. When I hit roadblocks in

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getting my educational app out there, I sought out mentors who were successful in a similar endeavor and that's the advice they gave me. I persisted and was rewarded with opportunities.

6. Have you experienced any difficulties as a woman in the field?
The biggest difficulty that I have faced in the field is when communicating directly with others, I, as a woman, am seen as aggressive, while male colleagues are seen as assertive. My tone is critiqued while male colleagues are considered authoritative. It is something that as I have grown in my career happens less frequently but occurred as recently as this week.

7. Do you have any advice for other women in the field?
Continue to be awesome. Continue to pave the way for other women. As we continue to excel, our environment will change, through slowly; hopefully as more women enter the field, they will face less obstacles than we faced. They will not be critiqued for their tone when they are direct. They will be called assertive and not aggressive.

8. How do you balance work and personal life?
I have reduced my FTE from 1.0 to 0.9. This has allowed me to spend more time at home with my 3 year old. Additionally, I read an article about work-life balance during COVID and how to separate the two while working from home. It spoke about having a location (a room, a desk etc.) for work and a location for home. It is something that has stuck with me and I do work either in my office at work or in my office at home. I don't do work on the couch or while doing other things with my family. Physically separating the two has significantly improved my work-life balance.

9. What is something you enjoy doing outside of work?
I love spending time with my family. I have a wonderful husband, a spunky 3-year-old, and a loving golden retriever. We are often playing outside, dancing to music on the porch, or trotting off to whatever local festival is happening that weekend..

10. Would you change anything about the path you took to get to where you are now?
While I am happy where I ended up, I think I would have taken more advantage of mentors outside my institution. They often provide a different lens through which to view the situation and will not be involved in the hierarchy at your institution, creating an additional layer of psychological safety.

11. What was the best piece of advice you received?
Negotiate like a toddler – Daryl Oakes, MD

ECHO REVIEW

Echocardiographic Detection of Regional Wall Motion Abnormalities Using Artificial Intelligence Compared to Human Readers

The article titled ***"Echocardiographic Detection of Regional Wall Motion Abnormalities Using Artificial Intelligence Compared to Human Readers"*** presents a study comparing the effectiveness of a deep learning (DL) model in detecting regional wall motion abnormalities (RWMA) during transthoracic echocardiography with both expert and novice human readers.

Reviewer:

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Background

RWMA detection is a vital component in assessing ischemic heart disease through echocardiography. Traditional methods are prone to high interobserver variability, with experts sometimes disagreeing on the diagnosis. This study aims to compare a DL-based model's accuracy against both novice and expert human readers.

Methodology

The study used 15,746 echocardiographic studies (25,529 apical videos) from patients to develop and test the DL model. The dataset was split into training, validation, and test cohorts.

The AI model used apical 2-, 3-, and 4-chamber videos to predict RWMA in seven regions based on coronary perfusion territories. These predictions were compared with clinical ground truth derived from expert readings.

Performance was evaluated using F1 scores, a measure that balances precision and recall, with significance tests comparing the AI's performance to that of six expert and three novice readers.

Results

The DL model demonstrated high accuracy (Area Under the Curve of 0.96) in detecting RWMA. Its performance was comparable to expert readers in six of the seven myocardial regions, with a small difference in the anteroseptal region where experts outperformed the model.

The DL model outperformed novice readers in detecting any RWMA, with statistically significant differences for novices 1 and 2 ($P = .002$ and .02, respectively).

For specific regions like the anterolateral and anteroseptal, the DL model had lower accuracy, potentially due to issues like endocardial dropout in non-contrast images.

Conclusion

The DL model provides accurate detection of RWMAs, comparable to experts and outperforming novices, indicating its potential to improve diagnostic accuracy and serve as a teaching tool. It might also reduce variability between readers, a key limitation in traditional visual assessments of RWMA.

Limitations

The study used a dataset from a single center and ultrasound vendor, which may affect generalizability. Future research should validate the findings across multiple centers and vendors.

The study used expert visual assessments as the ground truth, but this might not always be perfectly accurate compared to objective measures like coronary angiography.

Potential Applications

A Prospective Cohort Study of Acute Pain and In-Hospital Opioid Consumption After Cardiac Surgery: Associations with Psychological and Medical Factors and Chronic Postsurgical Pain

M Gabrielle Pagé, Praveen Ganty, Dorothy Wong, Vivek Rao, James Khan, Karim Ladha, John Hanlon, Sarah Miles, Rita Katznelson, Duminda Wijeysundera, Joel Katz, Hance Clarke

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Background

A significant number of patients may experience chronic postsurgical pain (CPSP) after cardiac surgery, with 29-43% of patents reporting pain at 3 months postoperatively.[1] Identifying risk factors for CPSP, and understanding predictors of long-term pain outcomes, may lead to timely and effective interventions in cardiac surgery patients.

In the present study, Pagé and colleagues explored pain intensity trajectories after cardiac surgery and evaluated the association between early postoperative pain, early patterns of opioid consumption, and the development of CPSP at 12 months.

Methods

A significant number of patients may experience chronic postsurgical pain (CPSP) after cardiac surgery, with 29-43% of patents reporting pain at 3 months postoperatively.1 Identifying risk factors for CPSP, and understanding predictors of long-term pain outcomes, may lead to timely and effective interventions in cardiac surgery patients.

In the present study, Pagé and colleagues explored pain intensity trajectories after cardiac surgery and evaluated the association between early postoperative pain, early patterns of opioid consumption, and the development of CPSP at 12 months.

Results

Of the 1115 patients initially recruited, 959 patients had sufficient data for trajectory analysis, and 573 patients completed 12-month follow up. Notably, majority of patients were male (76%).

The authors identified three patterns of trajectories for patients' acute post-operative pain intensities: "initially moderate pain intensity remaining moderate" (12%), "initially mild pain intensity remaining mild" (41%), and "initially moderate pain intensity decreasing to mild" (47%) (henceforth "moderate to moderate," "mild to mild," and "moderate to mild," respectively). Compared to female patients, male patients were less likely to be classified in the "moderate to moderate" class than the "moderate to mild" trajectory, (OR [95% CI], 0.43 [0.19–0.99]. In contrast, higher SCL90R_SOM and SPTS scores were associated increased risk of "moderate to moderate" pain classification compared to "moderate to mild" (OR [95% CI]: 1.11 [1.04– 1.16] and 1.06 [1.01–1.13], respectively.) Every one year increase in age was also associated with increased odds of classification in the "mild to mild" compared to the "moderate to mild" pain trajectory group (OR [95% CI]: 1.06 [1.03–1.09]). Higher baseline SCL90R_SOM scores were associated with lower likelihood of "mild to mild" versus "moderate to mild" classification (OR [95% CI], 0.94 [0.90–0.99].

Additionally, the study yielded three distinct patterns of trajectories for patients' post-operative MME/day opioid consumption: "initially high level of MME/day gradually decreasing (17%)", "initially

low level of MME/day remaining low (21%)", "and initially moderate level of MME/day decreasing to low (62%)" (henceforth "high MME then decreasing", "low MME to low", and "moderate MME to low"). Increasing age was associated with lower odds of "high MME then decreasing" trajectory relative to "moderate MME to low" trajectory (OR [95% CI], 0.96 [0.94–0.99]. Higher SCL90R_SOM scores were associated higher odds of "high MME then decreasing" compared to "moderate MME to low" (OR [95% CI], 1.05 [1.01–1.09]). Increasing age was also independently associated with higher odds of a "low MME to low" trajectory than "moderate MME to low" trajectory (OR [95% CI], 1.09 [1.06–1.14]). Individuals in the "moderate to moderate" pain intensity trajectory were more likely than those in the "moderate to mild" trajectory to belong in the "high MME then decreasing" opioid consumption trajectory than the "moderate MME to low" trajectory (OR [95% CI], 7.07 [2.91–17.19]).

The prevalence of CPSP was 6% (35/573) at one year after surgery. The "mild to mild" pain trajectory cohort was less likely than the "moderate to moderate" pain trajectory to report CPSP. The authors found no significant association between opioid consumption trajectory class and CPSP status.

Discussion

The present investigation by Pagé et al sheds a novel light on patterns of postoperative pain, opioid consumption, and CPSP development after cardiac surgery. The study found increased age to be a protective factor for early pain and opioid consumption trajectories, in agreement with previously published study in cardiac surgery population.4 Male sex was also associated with lower levels of postoperative pain and greater likelihood of pain improvement over time. Higher baseline scores on the SCL90R Somatization Subscale and Sensitivity to Pain Traumatization Scale (SPTS) were associated with likelihood of inferior pain resolution. In addition, pain trajectories were closely associated with opioid consumption trajectories, meaning that patients with poorly controlled pain may be at increased risk of higher opioid consumption in the early postoperative period. Trajectory groupings of early postoperative pain, but not opioid consumption, was associated with development of CPSP.

The reported prevalence of persistent pain 3 months after a cardiac surgery in the literature is approximately 29% to 43%.[1,3] With such a large proportion of patients impacted, early identification of risk factors leading to effective interventions could improve patients' perioperative experiences and also reduce long term pain-related disease burden and costs. In particular, the current study identified male gender and increasing age as potentially protective against greater pain and opioid use trajectories immediately following cardiac surgery. Somatization tendency, or emotional distress in response to bodily sensations, was the only modifiable risk factor consistently associated with increased pain and opioid use trajectories in the early post-cardiac surgery period. This may indicate a target for pre-operative interventions to reduce susceptibility to postoperative pain in these patient groups.

Strengths of the current study include the collection of robust baseline data regarding pain, anxiety, depression and somatization, as well a 12-month period of longitudinal follow-up. Limitations include a significant (48.6%) rate of drop-out at the 12-month mark, which was disproportionately higher among younger patients and may confer bias.5 In addition, leg pain at the graft site was not used to determine CPSP, although 12% of patients did report leg pain at the one-year timepoint. Furthermore, no data was collected regarding ongoing opioid or analgesic use beyond POD6, even though chronic opioid use and dependence, in the context of the "opioid epidemic," is a major public health concern. In addition, while the authors excluded patients with psychotic disorders from the study, a significant association has been demonstrated between pain and psychosis,[6,7] which may itself increase cardiometabolic risk factors.[8] Finally, the study included relatively few younger patients who, in light of the study's findings, may be at particular risk of high postoperative pain scores and opioid requirements; this group warrants further investigation in the future.

Conclusion

In this prospective cohort study of 553 cardiac surgery patients, Pagé et al found that male gender, decreased age and increased baseline somatization scores were associated with pain intensity trajectories and/or daily mg morphine equivalent trajectories in the early postoperative period. Trajectories of acute pain intensity, but not opioid consumption, were associated with chronic postoperative pain at 12 months.

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Development and Validation of a Nomogram for Predicting Heparin Resistance in Neonates and Young Infants Undergoing Cardiac Surgery: A Retrospective Study

Peng Gao, MD, Yang Zhang, MD, Yu Jin, MD, Peiyao Zhang, MD, Wenting Wang, MD, and Jinping Liu, MD, PhD

Anesth Analg 2024;138:1233–41

Reviewer:
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Baylor Scott and White Health

Background

The most used anticoagulant, to prevent thrombosis from exposure to cardiopulmonary bypass (CPB) is heparin. Antithrombin is a protein produced by the liver and inhibits thrombin formation. Binding heparin with antithrombin can increase the anticoagulant effect of antithrombin by up to 2000-fold.[1] Neonates do not reach adult levels of circulating antithrombin until after 6 months of life,[5] which is why the low activity of antithrombin is the most common cause of heparin resistance (HR).[2,3] Heparin resistance, the inability to reach target ACT after adequate anticoagulation has been documented in 4%-26% of adults[4] and 31% of children[2] undergoing cardiac surgery. However, in adult literature, failure to achieve adequate activated clotting time (ACT), despite adequate heparin anticoagulation and normal antithrombin activity, has been described,[6,7] which suggests that HR is likely multifactorial.

In this retrospective review, the goal was to identify other risk factors predisposing to HR than antithrombin activity, and to develop a prediction moder for HR in neonates and young infants requiring cardiac surgery.

Methods

This is a retrospective cohort study conducted in a single center (Fuwai Hospital, Beijing, China), from 1/2020 to 8/2022.

Inclusion criteria: Neonates (0-28 days) and young infants (29-180 days) who underwent initial cardiac surgery during the study period.

Exclusion criteria: patients on extracorporeal membrane oxygenation (ECMO), genetic disease, familial hematologic disorder, and records with missing data related to ACT, intraoperative heparin dosing and preoperative AT activity.

The patients were managed in a standardized approach regarding preoperative assessment and lab work, including blood measurement of AT activity (HemosIL liquid antithrombin) the day before surgery, as well as general anesthesia, hemodynamic, temperature and anticoagulation management and monitoring the day of surgery. Intravenous (iv) heparin was used for anticoagulation, 400 U/kg initial bolus with an additional 100 U/kg until the target ACT was reached. The Hemochron Jr. ACT+ instrument (Accriva Diagnostics, San Diego,CA), used for the ACT measurements, requires 15 µL of blood. However, Hemochron Jr. ACT values are 10-15% shorter compared to the standard Celite ACT; Hemochron Jr. ACT of 410-440 seconds (target ACT) corresponds to a Celite Hemochron ACT of 480. During cardiopulmonary bypass (CPB), ACT was measured 5 minutes after initiation and every hour thereafter.

HR was defined as failure to reach the target ACT after a single bolus of 400 U/kg iv heparin.

Data collection was performed retrospectively, from the electronic medical record and included: demographics, preoperative laboratory tests and clinical characteristics (type of cardiac surgery, preoperative heparin therapy, heparin dosage, and ACT values).

The cohort was randomly divided in a 70/30 fashion, wheres 70% of the patients were used for the development of the nomogram and 30% for validation.

After identification of predictors with univariable regression analysis, the variables were further assessed with LASSO, and those with non-zero coefficients were then used in the multivariable logistic regression analysis for development of the prediction model and nomogram. The model was evaluated with appropriate assessment tests for goodness of fit, discrimination, calibration, clinical usefulness, net benefit, and prediction accuracy and conformity, in separate subgroups for neonates and young infants (to account for age related difference in AT activity).

Results

From the 348 patients screened 52 were excluded.

Of the 296 patients included, 70% (207) comprised the development cohort and 30% (89) the validation cohort. The incidence of HR was 39.2%, 116 patients, of which 81 and 35 were in the development and validation cohorts respectively (39.2% and 39.1% respectively).

After multivariable regression analysis 3 factors were identified predictive of HR:

AT (OR 0.932; 95% CI, 0.905–0.957; P < .001),
PLT count (OR, 1.014%; 95% CI, 1.009–1.019; P < .001), and
FIB (OR, 2.098; 95% CI, 1.126–4.061; P = .023).

In the nomogram developed, each value of the above parameters corresponded to points and the sum of the points corresponded to % prediction of HR risk for each patient.

In the predictive performance analysis, the calibration curves between the predicted and observed probabilities of HR were concordant. The decision curve analysis (DCA) showed potential clinical utility of the nomogram. The HR prediction model curve showed more benefit than the "treat non" or "treat all" management curves.

In both the development and validation cohorts, sensitivity, specificity, accuracy, PPV and NPV were similar.

In the subgroup analysis between neonates (96) and infants (200) the incidence of HR was significantly higher in the neonates (61.5% vs 28.5%). Neonates had lower AT and higher fibrinogen compared to the infants and the PLT count was similar between groups. Good discrimination of the nomogram was shown between groups and the clinical value was similar.

Discussion

HR is common among neonates and young infants, most likely because circulating AT does not reached adult levels until the 6th month of life.[5] Corrective treatment options include fresh frozen plasma and AT supplementation.[2,4,6,9] However, increasing AT does not always predictably correct the heparin dose response and heparin sensitivity appears variable among patients.[6,7] Some advocate that higher heparin concentration may be needed in this age group.[10] However, excess heparin can lead to heparin rebound and postoperative bleeding.[4] In this single center retrospective cohort of neonates and young infants, 3 factors; low AT activity, high fibrinogen and high PLT count, were associated with increased incidence of HR. A nomogram for the prediction of HR, utilizing a scoring system (for the values of AT, fibrinogen and PLT count), was developed and validated within the same cohort. High platelet concentration has been found in patients with HR[11,12] but a potential mechanism (increased release of platelet factor 4 or possibly direct binding and sequestration) has not been studied. Fibrinogen level correlates with clot strength. The catalytic action of thrombin leads to conversion of fibrinogen to fibrin which binds with platelets firming the clot. An association and possible mechanism of fibrinogen leading to HR, has not been studied. The current study, along with additional research, may aid in better understanding of HR, and in the development of treatment protocols for HR.

Study limitations

The retrospective nature of the study and relatively small study size. Additional validation of the prediction model is needed.

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Progression of Mild Mitral Annulus Calcification to Mitral Valve Dysfunction and Impact on Mortality

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Reviewer:

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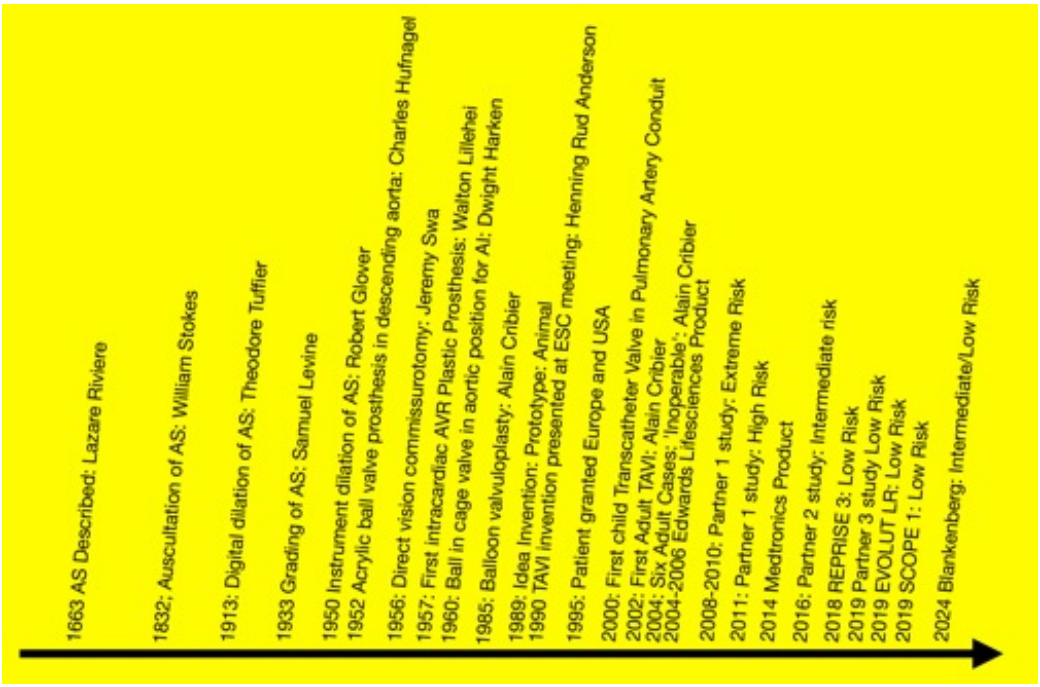
Currently, there are two options to manage patients with severe aortic valve stenosis: Medical and Surgical. Transcatheter aortic valve implantation (TAVI) has its roots in the development of percutaneous transluminal angioplasty by Dr Charles Dotter.[1] From these developments, in 1989, Dr Henry Rud Anderson conceptualized the percutaneous placement of heart valves, or more specifically the aortic valve.[1] Following in vitro and in vivo experiments and implantations, Dr Anderson presented their data and submitted their manuscript in the early 1990s.[1] After being overshadowed by the development of surgical implanted valves, the first percutaneous transcatheter valve was placed in a 12-year-old via the right heart into a pulmonary-artery prosthetic conduit with valve dysfunction.[2] In 2002 the first TAVI was performed in an adult with severely calcified aortic valve stenosis.[3] With the first Transcatheter Aortic Valve Implantation (TAVI) performed, a third non-surgical option has become available.[1] Since 2000 the application of surgical and transcatheter aortic valve placement has risen.[4] Within the data, the rise in TAVI has continued while SAVR numbers are stable or even declining.[4] Overall, the application of aortic valve procedures has risen.[4] Despite the availability of SAVR and TAVI, a little more than 50% of patients with an indication for AVR still do not receive either SAVR or TAVI.[4] Between 2008 and 2011 the Partner 1 studies showed improved outcome, compared to medical management, when TAVI was performed in high-risk patients. Since 2010, Partner 2 and Partner 3 studies reported the safety and success of TAVI in intermediate and low risk patients, followed by the FDA extension of TAVI to these populations. Since 2018 multiple studies have reported noninferiority data for TAVI in low-risk patients. Consistent among these data is the early benefits of the less invasive TAVI procedure over SAVR.



The study by Blankenberg et al is another installment reporting 1 year outcome of TAVI in intermediate and low risk patients with aortic valve stenosis (Blankenberg et al). The authors present a large, randomized study to compare Transcatheter-Aortic-Valve-Implantation conducted among 38 centers in Germany.[5] 1414 patients were randomized, ultimately yielding 701 TAVI and 713 SAVR patients. Patients > 65 years of age were included. Based on the Society of Thoracic Surgeons–Procedural Risk of Mortality (STS-PROM) score all patients were considered low or intermediate risk (0-4%). Patients with significant coronary artery disease, prior heart surgery, or who had bicuspid valve or other disease that warranted additional procedures were excluded.

TAVI procedures were preferentially performed via a transfemoral approach and surgical procedures were performed either by median sternotomy or a minimally invasive approach.

Primary and secondary outcomes were determined with a year of randomization. Primary outcomes included death or stroke within a year of randomization. Secondary outcomes included kidney injury, arrhythmias, need for pacemaker, bleeding, myocardial infarction, prosthetic valve dysfunction, rehospitalization, and vascular complications.

The TAVI patients experienced shorter ICU stays (1 vs 2 days) and hospital stays (5 vs 9 days). Death or stroke within the first year was significantly lower for the TAVI group: 5.4% vs 10% ($p < 0.001$). One year death rates were 2.6 and 6.2% for TAVI and SAVR respectively. Stroke was lower for the TAVI group (2.9 vs 4.7%).

Atrial fibrillation was lower for TAVI (12.4%) compared to SAVR (30.8%). Major life-threatening bleeding was higher for SAVR vs TAVI (17.2% vs 4.3). However, other complications were higher for the TAVI group and related to the procedure including pacemaker implantation (11.8% vs 6.7%), and vascular access complications (7.9% vs 0.7%). Of the TAVI patients 2.8% had paravalvular leaks and 1.6% had prosthetic valve dysfunction compared to 1.0% and 0.6% for SAVR respectively.

Other measures were similar between the two groups. These included rehospitalization (12% vs 13.3%), and prosthetic valve hemodynamics. Ultimately more TAVI patients were discharged home (vs rehabilitation) for TAVI cases (74.7%) compared to SAVR (40.4%).

This was a non-inferiority study among low to intermediate-risk patients with severe, symptomatic aortic stenosis who are eligible for both transcatheter aortic-valve implantation (TAVI) and surgical aortic-valve replacement (SAVR). It is interesting that the authors introduce this paper by discussing the application of TAVI (TAVR) for younger and lower-risk patients but then limit inclusion criteria to those > 65 years old. There are now multiple investigations evaluating the performance of TAVI in low-risk patients. In 2019 the Partner 3 study evaluated 1000 low risk patients from 71 hospital centers.[6] In this study the primary outcome was a composite of death, stroke, and rehospitalization. The authors reported a reduced outcome in TAVI (8.5%) vs SAVR (15.1%; $p < 0.001$). TAVI patients has lower rates of stroke, atrial fibrillation, ICU and hospital stays.[6] In 2016 the FDA approved TAVI for intermediate risk patients. Based on these more recent data, the FDA has expanded the indication for TAVI to include low risk patients.

It is of interest that the FDA recommendations were based on one year outcome and without considering the rate of prosthetic valve degeneration after TAVI and SAVR. The presented data are not surprising given the different degrees of invasiveness for TAVI and SAVR. The results are akin to that reported for endovascular and open abdominal aortic aneurysm. Early, up to four years, outcomes were better for endovascular procedures, however, after four years outcomes were no different with the exception of leaks in and around the graft.[7] Regarding TAVI procedures the results of the present study would be expected likening the reduced invasiveness of the TAVI procedure.[5] However, procedural related complications of TAVI included a slightly greater need for a pacemaker and access site vascular injury are still significant concerns for TAVI procedures.[5]

The extension granted by the FDA follows the principle that long term outcomes remained favorable for the low-risk group as it does for intermediate and high-risk groups. Long

term outcome data includes 10 years composite outcome for all-cause mortality, stroke or myocardial infarction in the NOTION trial.[8] While composite outcomes were similar between the two groups, structural valve deterioration were, surprisingly, lower for the TAVI valves.[8]

The management has aortic valve stenosis has advanced beginning with commissurotomy and valvuloplasty to surgical replacement and now via a percutaneous approach. With the advancement in technology and improvement in valve design it is anticipated that the application of TAVI will continue to expand.[4] The long term (> 10 years) outcomes of TAVI are still being evaluated. In addition, there is only preliminary data regarding its application in the younger (< 65 years) population with concerns that younger patients will have greater valve deterioration and dysfunction requiring more frequent reoperations.[9]

Durability of surgically placed bioprosthetic valves are reported in 15- and 20-year outcome data, while TAVI data is still limited to 10 years.[10,11] Premature deterioration is considered when valve dysfunction occurs within 10 years. For younger patients the decision to have a one-time surgery with a mechanical valve being placed and then requiring anticoagulation is balanced with a bioprosthetic valve, no anticoagulation, but the need for reoperation.[12,13] Nitsche et al did not report a greater deterioration of bioprosthetic valve dysfunction for patients under the age of 70 after a median duration of 112 months.[14] While outcomes after SAVR with bioprosthetic valves are reported to be good for patients < 65 years old for five years, durability past 10 years is not well described.[15] The durability of bioprosthetic valve is still in question for patients under 60 years of age.[9,16,17,18] If TAVI valves are less durable than SAVR valves then placement in younger patients may be even less ideal due to the need for additional procedures.[10,11] By contrast, Corona et al reported favorable 10-15 outcome data for younger patients receiving SAVR bioprosthetic valve.[19]

With the exception of the younger population, a review of the past decade and a half of data supports TAVI for all patients with severe aortic valve stenosis.[20,21] As the technology improves and longer term data is collected, TAVI for patients younger than 60 years of age may also show benefits.[20,21]

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ECHO CASE

Stress Cardiomyopathy After Delayed Protamine Reaction

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CASE REPORT

81-year-old male presents with bacterial aortic root abscess and aortic valve endocarditis. Other notable history was newly diagnosed hypothyroidism with a TSH of 25. He underwent pericardial patch of the aortic root and aortic valve replacement with a 23 mm bioprosthetic valve prosthesis. Wean from cardiopulmonary bypass was uneventful on minimal pharmacologic support.

WATCH VIDEO 1 WATCH VIDEO 2

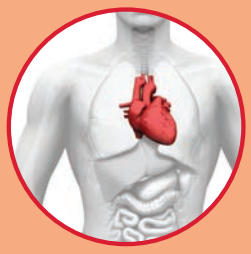
Question 1

The patient described above will require antibiotic prophylaxis for bacterial endocarditis for a dental extraction in the future.

a. True
b. False

Approximately 15 to 20 minutes after administration of protamine and while slowly transfusing one pool of platelets the patient became profoundly hypotensive with MAPs in the 30s. The hypotension was resistant to boluses of vasopressin, phenylephrine, ephedrine, methylene blue and increasing titrations of epinephrine, vasopressin, and norepinephrine infusions. There was no evidence of hives or skin rash. There was no evidence of bronchospasm or elevated peak airway pressures. Mean PAP and CVP were both unchanged. The patient was afebrile. There was no evidence of ST changes, PVCs, or arrhythmias. Quick TEE examination demonstrated profound biventricular failure and unchanged prosthetic valve function. The decision was made to re-heparinize and resume cardiopulmonary bypass. Epicardial coronary assessment demonstrated patent coronary arteries with intact flow. Levothyroxine, hydrocortisone, and diphenhydramine was administered. After coming off bypass the following TEE images were observed.

WATCH VIDEO 3 WATCH VIDEO 4 WATCH VIDEO 5



Echocardiographic assessment demonstrated diffuse hypokinesis at the midpapillary level and apical ballooning with akinesis. Coronaries were assessed again by epicardial ultrasound and again were noted to be patent with intact flow. Protamine was administered slowly, and the sternum was reapproximated. Tryptase was negative in the operating room and was again negative 6-12 hours later in the intensive care unit.

Question 2

The echocardiographic findings are consistent with which of the following?

a. Ischemic cardiomyopathy
b. Stress induced cardiomyopathy (Takotsubo cardiomyopathy)
c. Restrictive cardiomyopathy
d. Dilated cardiomyopathy

Question 3

Which of the following is NOT a criterion in the diagnosis of stress induced cardiomyopathy?

a. Transient hypokinesis, akinesis, or dyskinesis of the left ventricle mid segments with or without apical involvement
b. Absence of obstructive coronary artery disease
c. New EKG abnormalities or positive troponin
d. Wall motion abnormalities associated with a single coronary artery distribution

Question 4

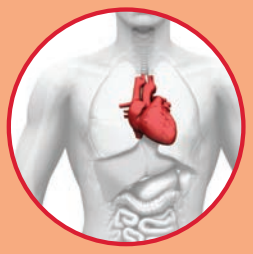
Stress cardiomyopathy is a relatively benign condition.

a. True
b. False

Question 5

Type 3 protamine reactions are mediated by which of the following?

a. Histamine
b. IgE
c. Thromboxane
d. IL-6



ANSWERS

Answer 1

A. True. Indications for antibiotic prophylaxis to prevent infective endocarditis include high risk patient features and high-risk procedures. High risk patient characteristics include patients with a prosthetic valve or prior valve repair with prosthetic material (including percutaneous repair and replacement), patients with prior endocarditis, and patients with congenital heart disease who are cyanotic, have had palliative shunts/conduits or other prosthetic material, or who are within 6 months of a complete repair.[1]

Answer 2

B. Stress induced cardiomyopathy most consistent with Takotsubo cardiomyopathy. The key characteristics include apical ballooning with apical akinesis and transient regional systolic dysfunction of the left ventricle which could be falsely perceived as an acute myocardial infarction. Regional wall motion abnormality usually extends beyond myocardium perfused by a single coronary artery.[2] Risk factors for stress induced cardiomyopathy include inflammation, autoimmune conditions (SLE, Sjogren's, etc), post-menopausal women, microvascular dysfunction, and stress.

Answer 3

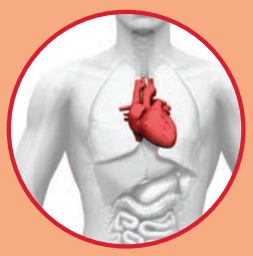
D. Stress cardiomyopathy is often associated with regional wall motion abnormalities associated with multiple coronary distribution.[2] An identifiable stressful trigger is not necessary for the diagnosis of stress cardiomyopathy.

Answer 4

B. False. Recent data demonstrates comparable rates of cardiogenic shock and mortality when compared with patients with acute coronary syndrome. Risk factors for poor outcomes include acute neurologic disease, admission left ventricular ejection fraction less than 45%, and troponin 10x above the upper reference limit. Male patients have a threefold increase in rate of death.[3]

Answer 5

C. Type 3 protamine reactions are characterized by hemodynamic collapse. It is mediated by thromboxane and can result in profound elevations in pulmonary artery pressure with profound vascular damage. Some studies suggest catastrophic pulmonary hypertension can be prevented by continuing aspirin intake prior to surgery. This is thought to be due to suppression of thromboxane production by inactivation of cyclooxygenase.[3] Premedication with antihistamines and corticosteroids have been described to reduce protamine reactions, however no clinical trials have been conducted to demonstrate such.[4]



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