SCA NEWS

PRESIDENT'S MESSAGE

Volume 21, Number 5 | October 2020

SCA's 2021 Educational Meetings Update

Stanton K. Shernan, MD, FAHA, FASE

Dear Friends and Colleagues,

I hope you all continue to be safe and well. As we move forward through these challenging times, I wanted you to know that your SCA leadership is proactively moving forward to make sure that we are doing our best to pursue our Society's mission to benefit our membership. Despite the unprecedented challenges our Society has faced in 2020, I am proud to inform you that we are not only fiscally stable but are making significant progress in our plans for 2021.

As leaders in our Society, our most important objective remains to deliver high-quality education through our annual meetings. We were fortunate to provide outstanding learning opportunities this year with our 3rd PoCUS and 23rd Echo Week meetings.

Unfortunately, due to restrictions imposed upon us by the pandemic, we had to make the difficult decision to cancel our 2020 9th Thoracic Anesthesia Symposium (TAS) and 42nd Scientific Annual Meeting & Workshops.

As we look ahead into the near future, we are currently planning and adapting accordingly to what is expected to be a continuation of travel restrictions and associated limitations that would otherwise make it difficult to conduct a conventional, on-site format for next year's 2021 meetings. We strongly considered the practical aspects of providing all necessary measures to assure social distancing and our membership's safety during

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FEB 26-28
Echo Week

APRIL 23
Thoracic Anesthesia Symposiums

APRIL 24-27
Annual Meeting & Workshop

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our meetings, which have historically attracted up to 1,500 attendees annually. SCA's 2021 PoCUS and Echo Week meetings were initially scheduled in Atlanta from February 7-12, 2021. After the Board of Directors consulted with Veritas, SCA's management company and the 2021 Echo Week program directors, it was decided it would be in the faculty and membership's best interest to provide the entire Echo Week meeting in a virtual remote format.

Due to concerns over our ability to enable a safe environment, the SCA Board of Directors accepted the PoCUS program directors' recommendation not to provide a PoCUS meeting in 2021 because of its strict dependency for a hands-on and close contact format, which would not enable significant social distancing.

Please be assured that we fully intend to maintain the high-quality content associated with the Echo Week. The three-day format, to be held February 26-28, will consist of prerecorded lectures while maintaining the faculty's live availability to permit dynamic discussions and a Q&A session immediately following each session. The meeting's traditional fundamentals content will be made available to the attendees before Echo Week and extended time after completing the meeting. While there will not be a mock exam provided during the meeting, there are plans to deliver a "test yourself" module later. Continuing medical education credits will be available for all the appropriate content.

The 2021 Thoracic Anesthesia Symposium (TAS) and the SCA Annual Meeting and Workshop programs were scheduled in Montreal, Canada. Currently, travel restrictions to Canada remain a significant challenge for the international community. After the Board of Directors consulted Veritas - SCA's management company, TAS and the Scientific Annual Meeting Planning Committee program directors, they agreed that it is in the faculty's best interest and the SCA membership that the meetings be held virtually for 2021.

A curriculum developed by experts in cardiothoracic anesthesiology, interventional cardiology, and cardiothoracic surgery will provide didactics, small group breakout teaching, and high-yield discussions virtually for attendees. The format of the meeting will include both on-demand education and live panel discussions with the experts.

Problem-Based Learning Discussions (PBLDs), scientific abstracts, and various workshops are being planned to optimize attendee learning and connection with critical cardiothoracic anesthesiology topics.

The format of TAS will parallel the SCA Annual Meeting and Workshops as well as Echo Week by including the incorporation of both live and some recorded lectures, as well as allowing time for live Q&A sessions. PBLDs will be live and limited to a small number of participants to facilitate interaction. Workshops are being planned along with live presentations of the top research abstracts and the top three complicated cases, with the remaining submissions being prerecorded or available for viewing. The virtual platform will

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allow novel opportunities for attendee networking, idea-sharing, and exhibits. Continuing medical education credits will be available for all the appropriate content.

While we understand that some changes can be stressful, perhaps we should consider our plans for 2021 as a novel opportunity to introduce creativity and innovation into the way we educate ourselves as an academic community. We are all currently missing the loss of social interaction, face-to-face meetings, and both personal and professional networking opportunities that we have come so used to having with conventional on-site meetings over the years. However virtual and remote education will enable novel platforms for dynamic learning, allow us to target a broader audience at a lower cost to our membership, and to avoid some of the inconveniences of traveling domestically and internationally. We certainly hope that soon, we will all be able to return to some sense of the old norms where we will meet again in person. In the meantime, we should look forward to the excitement that the future has to offer as we adapt to new challenges.

We hope you will all join us in 2021 for SCA's Echo Week, TAS, and Annual Scientific Meetings. I am exceptionally confident that our program directors, and faculty who all have significant experience in providing virtual education, will be extraordinarily successful in the organization of our 2021 meetings and that you will all appreciate the outstanding value.

Our management company has organized virtual meetings for over 10,000 attendees – **let's make 2021 be the most successful year ever for SCA meeting attendance!**

Please stay tuned to the SCA website for further details over the next several weeks. We certainly hope that you will share our enthusiasm and look forward to seeing you soon.

Best regards,

Stan

SCA ECHO WEEK

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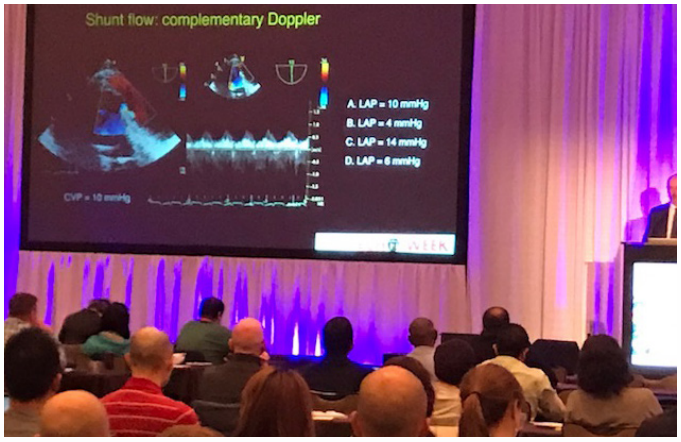
Echo Week 2021 will be going VIRTUAL!

February will be here before you know it, which means it's almost time to register for the 2021 Virtual Echo Week! **Join us February 26-28, 2021.**

Comprehensive Review & Advanced Applications of Perioperative Echo. Top reasons to register for Echo Week in 2021:

- **Core Series** – Prerecorded lectures.
- **Interactive Series** – Prerecorded lectures with live panel discussion.
- **Receive Discount on Test Yourself Modules** – will be available in April/May 2021.
- **Earn more than 40 hours** of continuing medical education (CME).

Registration opens in November. Visit www.scahq.org/Echo Week to view more meeting details.



SCA THORACIC ANESTHESIA SYMPOSIUM

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SCA Thoracic Anesthesia Symposium will be going VIRTUAL!

Join SCA for the 2021 Virtual TAS

Planning is well under way for the 2021 Virtual Thoracic Anesthesia Symposium and we hope you will join us! **The meeting will take place April 23, 2021, immediately preceding the 2021 virtual Annual Meeting & Workshops.**

The Thoracic Anesthesia Symposium focuses entirely on thoracic anesthesia for academic and private practitioners. Continue your education with small group discussions on the hottest topics in thoracic surgery, top submitted case and research presentations, a pro-con debate, and more!

SAVE THE DATE APRIL 23 2021!

SCA THORACIC ANESTHESIA SYMPOSIUM

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Submit Your Thoracic Abstract Today

> > Call for submissions closes November 25, 2020, 5:00 PM CST

SCA invites you to submit an abstract or challenging case for presentation at the 2021 Virtual Annual Thoracic Anesthesia Symposium. The following categories will be accepted:

- Basic and Clinical Research
- Difficult Case
- Resident & Fellow Submission

For more information, visit www.scahq.org/Submissions.

SCA ANNUAL MEETING

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SAVE THE DATE!
The 2021 Annual Meeting & Workshops will be going VIRTUAL!

Join SCA April 24-27 for the 2021 Virtual Annual Meeting & Workshops

Plans are underway to bring you another year of premier educational events. 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 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.

Check out the Annual Meeting webpage for more meeting details.

SCA ANNUAL MEETING

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2021 Annual Meeting Call for Submissions

> > Deadline: Wednesday, November 25, 2020, 5:00 PM CST

The time is **NOW** to submit an abstract or case report for a chance to present at the upcoming virtual Annual Meeting. Submissions will be accepted in the following categories:

- Scientific Program
- Fellow and Resident Complex Case
- Super Echo

Visit www.scahq.org/Submissions for more details.

SUBMIT YOUR ABSTRACT TODAY!

2021 PoCUS Hands-On Workshop has been CANCELLED

In the effort to slow the spread of COVID-19, the 2021 PoCUS Hands-On Workshop meeting that was originally planned for February 6, 2021 been cancelled. SCA looks forward to seeing everyone in 2022 at the PoCUS Hands-On Workshop in Atlanta, Georgia.

Coming Soon!

Free Online Educational Content Didactic Recorded Sessions

These sessions are from the original session tracks offered for the 2020 Annual Meeting and Workshops:

- Non-transvenous CIEDs: Anesthesia and Surgical Implications
- New Vasopressors, Out of the Blue?
- Aortic Surgery Updated: Aneurysms: Endo vs Open
- Optimizing Outcomes in Emergency Surgery on the Descending
- Professional Development: Spreading Your Research – Opportunities for Networking and Education
- Thoracic Corner: Cardiovascular Complications During Thoracic Surgery
- Echocardiography Refresher: 2D/3D Imaging of the Repaired Mitral Valve
- Troubleshooting ECMO Disasters: Tips and Tricks

SESSIONS AVAILABLE NOVEMBER 2020!

The recorded sessions will be available in November 2020 and free of charge to the membership.

This format will give members the ability to access the content at their leisure and claim CME credits.

Interested in Funding for Your Research Efforts?

The 2021 Research Grant applications opened on October 14, 2020. SCA Members are eligible to apply for 1 of 3 types of grants offered in 2021:

- **SCA/IARS Starter Grant** – up to $25,000 a year for 2 years
- **SCA/IARS Mid-Career Grant** – up to $50,000 a year for 2 years
- **Diversity and Inclusion Grant** – up to $25,000 a year for 2 years

Award recipients will be announced during the SCA 2021 Virtual 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 January 11, 2021. Visit www.scahq.org/researchgrants for more information about these funding opportunities.

SCA's NEW Diversity and Inclusion Grant

APPLY FOR YOUR GRANT

The SCA Research Committee and the Women in Cardiothoracic Anesthesia Special Interest Group would like to present the Diversity and Inclusion Grant.

The Diversity and Inclusion Grant is to promote the diversity of the SCA research community by offering a dedicated grant for those who are underrepresented in the cardiothoracic anesthesia research field. The grant provides research funds and protected academic time (2-year grant for $25,000 per year with 40% protected time) to promote the career of an anesthesiologist who is a woman or a minority race or ethnicity.

Due to unique barriers and challenges that some members may face, the grant encompasses both early to mid-career candidates who have an interest in jumpstarting their academic career, but who have not yet had significant research funding. Women and minorities are underrepresented especially at the higher promotional ranks and this grant will provide academic currency (funding, publications) for promotion.

New MICoR Grant – Letter of Intent Due by November 1, 2020

The Society of Cardiovascular Anesthesiologists (SCA) Multi-Institutional Collaborative Clinical/Translational Research (MICoR) Grant

The purpose of this funding opportunity announcement is to solicit applications that support a multi-institutional investigation addressing a key clinical and translational research question that aims to advance the care for perioperative patients with cardiovascular and thoracic disease.

Background and Statement of Need

SCA funding of this project will:

- Offer an opportunity for larger scale investigation directly relevant to care for our specific patient population and to the mission of the SCA.
- Support a multi-center investigation that could not be otherwise accomplished through the work of investigators at a single institution, and studies that include larger and more diverse patient populations to promote robustness and broad applicability of study findings.
- Provide a steppingstone to federal funding for academic-clinician SCA members in an increasingly competitive funding environment.
- Foster inter-institutional collaboration, exchange of ideas, and sharing of resources between SCA members.
- Raise the profile of the SCA through the support of higher visibility and more impactful large research projects.

Research Objectives

To foster innovative collaborative approaches to research projects. ***The proposal must focus on the collaborative relationship,*** such that the scientific objectives could not be achieved without the efforts of the co-principal investigators.

Priorities

- Clinical trials, translational studies, and those including associated mechanistic studies are prioritized.
- Proposals should include a clearly outlined path to and plan for application for federal funding (NIH program project or other equivalent funding) to further support the collaborative work.
- Studies incorporating innovative applications of data science techniques or machine learning methods are encouraged.
- Studies leveraging the SCA/STS database as one resource are encouraged.
- SCA MICoR funding is not meant as bridge funding or as supplementary funding for projects with concurrent external funding, but may be used by investigators with existing funding to explore new areas of interest.

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Investigators:

- Co-Primary Investigators (Co-PIs) must be from two (or more) separate institutions.
- One of the co-PIs must be underrepresented in medicine includes women or the following racial and ethnic groups that have been shown to be underrepresented in biomedical research: Blacks or African Americans, Hispanics or Latinos, American Indians or Alaska Natives, Native Hawaiians, and other Pacific Islanders.
- Co-PIs with unique intellectual contributions/resources from each site are encouraged.
- Inter-institutional mentor/mentee co-investigator relationships are encouraged, particularly where appropriate mentorship is not present at the mentee's own institution.
- Co-PIs must convey that they will have an equal level of contribution to the project; otherwise, the applicants should classify additional personnel as collaborating investigators.
- Co-PIs must each hold faculty/staff appointments at their institutions at the time of application.
- A minimum 20% non-clinical commitment is required.
- Institutional commitment to support 20% non-clinical time for each co-PI investigator, in addition to that for which award funding is allocated, is required.
- Investigators at secondary sites proposed, mainly to strengthen patient recruitment or surgical case mix for clinical studies, are not to be considered co-PIs for the purpose of this application.
- The co-PI at the primary sponsoring department site must have been a member of the SCA for 3 years or longer prior to the time of application; all co-PIs must be members of the SCA throughout the award period.

The letter of intent should include:

- The letter of intent should not be more than two pages.
- Detail the proposed study, including background, specific aims, the study design, and target patient population or disease process, along with a description of any translational/mechanistic components.
- The LOI should describe the roles of the co-PIs, their backgrounds/connection to the topic area, the key personnel, and the unique skills or resources they and their institutions bring to the project.
- Include a biosketch in NIH format for each co-PI.

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Award details:

- Total award amount: $200,000 x 3 for a total of $600,000, including up to 10% allowed institutional indirect costs.
- Award duration: Three years.
- **Letter of intent (required) deadline: November 1, 2020.**
- Notification of invitation for full application: November 15, 2020.
- Application Portal Opens: Mid-January 2021.
- Application deadline for invited applicants: February 1, 2021.
- Award recipients announced: SCA Annual Meeting.
- Earliest award dates: July 1, 2021.

The SCA MICoR funding opportunity will NOT support research involving:

- Industry sponsored studies, or studies of investigational medical devices supplied by or paid for by manufacturers.
- Studies in which any investigator, collaborator, study personnel or other sponsor have a conflict of interest.

The MICoR Grant is essential for us as a society, and to ensure SCA's first year of success, please circulate within your network.

Please submit your letter of intent to grants@scahq.org by November 1, 2020.

The Kaplan Leadership Development Award

The 2021 Kaplan Leadership Development Award application submission opens December 13, 2020. 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 award granted is $10,000: $5,000 from the SCA Endowment with $5,000 match from the applicant's institution to fund a leadership education strategy.

Check out www.scahq.org/kaplanaward for more information on this award and how to apply.

AWARDS AND MATCHES

Award Opportunity for Fellows and Residents

Applications are now being accepted for the 2021 Early Career Investigator Award. This award is designed to motivate physicians early in their training to pursue their interest in research that investigates topics in cardiac, thoracic, and vascular anesthesia and disease.

Applicants must first submit an abstract to the Scientific Program Call for Abstracts, open now through November 25, 2020. Award applications are to be email to education@scahq.org by **December 7, 2020.**

Find more details on the award at www.scahq.org/EarlyCareerInvestigatorAward.

Support Your Society Through the SCA Endowment

SCA is the preeminent international educational organization for this sub-specialty, leading the way in treatment innovations through care, investigation, and knowledge. By donating to the SCA Endowment, the funds help support SCA professionals to further their education, research, and professional development and to achieve their goals.

The SCA Endowment Fund online donation page is available. Making an online donation is quick, easy, and secure. To complete the online donation form, visit www.scahq.org/Endowment.

For more details on the endowment, please email donation@scahq.org.

SCA MEMBER CORNER

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Announcing the NEW SCA Mobile App

Now available on the Apple and Android app store for FREE! SCA has released an official app that gives you easy access to everything SCA offers, including:

- SCA Guidelines
- Educational Content
- Timely Webinars
- Social Media Channels
- And the SCA Website!

Available on the App Store

GET IT ON Google Play

Free Fellowship Job Postings for ACTA Fellowship Program Directors

SCA's Career Center provides access to qualified fellows who specialize in the fields of cardiovascular and thoracic specialists, research and more.SCA members can post open fellowship positions for FREE on the SCA Job Board!

Here's how:

- Visit the ***Career Center*** and create or sign into your employer's account.
- Select ***Post a Job.***
- Include ***Fellowship*** in the job title.
- Select ***Fellowship*** as the job level.

During the check out process, the job posting order will be processed at no charge.

Easily find the Skilled Candidates You Need

- Target the exact skill set and experience level you need.
- Reach a large pool of experienced leaders in the field.
- Opt for job-posting enhancements for an additional rate to further your recruiting reach.

Ready to find new talent? Click here for more Career Center details.

Stay Social with SCA

Make sure to stay up to date on all things SCA by following us on social media!
Connect with SCA and fellow members by liking us on **Facebook (@Society of Cardiovascular Anesthesiologists) and following us on twitter (@scahq) and Instagram (@sca.hq). Tag us in your posts and make sure to use the SCA hashtags for all upcoming webinars and meetings!**

#SCA2021

Member Spotlight — AWEsome Woman: Alessia Pedoto, MD, FASA

SCA's AWEsome Women (Anesthesiology Women of Excellence) initiative recognizes prominent women in the field of cardiovascular anesthesiology who exhibit the Society's organizational values.

Our AWEsome Woman for October is Alessia Pedoto, MD, FASA. Dr. Pedoto, is a board-certified anesthesiologist at Memorial Sloan Ketttering Cancer Center. Dr. Pedoto expertise is in thoracic anesthesia. She supervises and teaches residents rotating through MSKCC. She also provides anesthesia for general procedures in adult and pediatric patients. Dr. Pedoto has been an active SCA member since 2000. She currently serves as the chair for the Thoracic Anesthesia Symposium Planning Committee.

1. What led you to become a Thoracic Anesthesiologist?
It was the combination of several factors. I always had a special interest in respiratory physiology. My physiology professor in medical school was a very passionate and creative man, who made us build alveoli out of balloons placed in stockings, to demonstrate the change in compliance with insufflation. I still remember blowing the balloons to the plateau of the pressure-volume curve. This was 30 years ago.

This passion was groomed at the end of medical school while I was working on my thesis in Milano with Prof Gattinoni. I witnessed his creativity and genius at every odd hour of the day and evening, when we would transport patients from the ICU to the CT scan to look at changes in ventilation and compliance while supine and prone. He was the person who gave me the chance to come to the US to work on my first research project.

2. How did you hear about the SCA?
The first time I heard about the SCA was during my fellowship at Brigham and Women Hospital. All my co fellows and a lot of my teachers were members, so I became a member too. This was 17 years ago. With time, I followed the example given by Drs Stan Shernan, Doug Shook, Amanda Fox, Annette Mizuguchi, and became more active in the society. I never would have thought I was going to become the Chair of the Thoracic Anesthesia Symposium. During the first TAS meeting, Dr Slinger asked me to fill in for Dr Amar, our chief of thoracic anesthesia at Memorial Sloan Kettering Cancer Center. That was my first talk given at a major conference, and it was a very memorable one. After that, he invited me to join the organizing committee. And that was how it all started.

3. What roles have you held for the society?
I started as a member, then I was invited to be part of the TAS planning committee; I became the abstract coordinator, followed by the Vice Chair, and in 2020 the Chair.

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4. What is one of your greatest achievements as a cardiovascular anesthesiologist?
The greatest achievement of all is being recognized as an expert in the field of thoracic anesthesia.

I came to this country in 1996 from Italy, without speaking English, few dollars in my pocket and a piece of luggage filled with the wrong clothing.

During the past 25 years, I have been given a lot of opportunities and met many mentors who shaped me into who I have become. It was challenging, but all the sacrifices were worth it. Starting from Dave, one of the technicians in the lab at SUNY in Syracuse, who wanted to hide me in his basement until the next amnesty; to Dr Enrico Camporesi, who gave me the scholarship to come to his lab; Apostolos Tassiopolous, who taught me how to catch a rat and set up the experiments; Tawfic Hakim, my first research mentor, who gave me the chance to present my work and be the first author for my research; Phil Hartigan (also known as "Filippo"), the man who transferred to me his knowledge in thoracic anesthesia, and all my Brigham and Women "consultants", who taught me asking for advice is a sign of maturity, not weakness.

However, it all started 25 years ago, in a small room outside the ICU at the Ospedale Policlinico in Milano, when Luciano Gattoni offered me a scholarship to come to the United States to learn how pulmonary vascular resistance works in an ARDS rat model. Without that offer, I would not be who I am now.

5. Do you have any advice for Fellows and Residents?
These are my few pearls of wisdom:

- Work hard to become the best, an expert in the field you choose. Be the consultant your colleagues come to ask for advice.
- Treat your patients as you would want to be treated if you were the patient. Your standards will be very high.
- Don't lose the passion and enthusiasm that made you choose this field. Without passion, enthusiasm and scientific curiosity, we become technician of anesthesia rather than consultants.
- Don't forget how it felt when you started. We all have been given the opportunity to learn. We ought to do the same with the young generation. Without good teachers and mentors, our profession will die.
- Cultivate your relationship with your mentors. Don't be passive. As I was told by the Dean of The Medical School at Columbia University, mentorship is a 2 ways street. Don't wait until the mentor reaches out, because it may never happen. Be proactive and start the first move. And don't be afraid of having several mentors, in and out the department, as well outside the hospital. Diversity is key for being open minded.

6. Have you experienced any difficulties as a woman in the field?
I am not sure if the professional difficulties I encountered were gender related, or if they were just the "side effects" of proposing something different to what was done in the institution for years. I think everyone has experienced the phrase "This is not how we do it here" when discussing a plan with the surgical colleagues.

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New faces, especially at the beginning of the career, may be associated with substandard performance in some surgeon's eyes. It's much easier to blend in by adopting what has been done for many years in the department. There is no discussion or arguments, and no risks are taken. But is this what we learn during training?

I strongly believe that change is good. Without it, we would provide anesthesia in the same way we did 50 or more years ago. I am a proponent of doing a fellowship in a different institution from the one of residency to broaden the horizons. Giving up one year of life to continue training should lead to the most gain. The goal is to be exposed to different cases, different people and different teaching styles. I wondered if I was making a mistake when I signed up for a one-year thoracic anesthesia fellowship at Brigham and Women Hospital. I had doubts about my mental capacities up to the moment I got off the train at South Station. I am glad I did not turn around and went back to New York. Seventeen years later, I wish I moved to a different neighborhood and gave Boston a second chance instead of coming back here. There is no place like Brigham and Women. I like to joke and say I left a piece of my right ventricle there. Sometimes I wonder if it is a joke. The leadership and the camaraderie I found there are very rare to find anywhere else. Anyone takes the role of teacher and mentor very seriously at any time of the day and night. Evidence based medicine is practiced at its fullest. There must be a rationale for any decision made about an anesthetic. The same case can be done in different ways and lead to different outcomes. If anyone can defend their decision, there is no right or wrong way of doing it. There is no "This is how we do it here".

Finally, like anything in life, "repetita juvant". Working often with the same people helps to get to know each other and eliminate the preconception that different is bad. It takes a lot of work and persistence, but once you see the results and the changes, it is something to be proud of.

My post fellowship contribution to MSKCC Thoracic Anesthesia was to extubate the esophagectomies at the end of the case in the OR and making thoracic epidural analgesia standard of practice for thoracotomies. It was not easy. There was a lot of resistance among the surgeons and my colleagues, but eventually we changed practice. In 2020, we are still making changes, but it is not as hard as in 2005.

More women are becoming anesthesiologists, and more are choosing cardiothoracic as a specialty. An example close to home is the faculty roster of the education committee for both SCA and TAS. There are several women who are leaders in the field who are actively contributing to the education and the development of the society. Both chairs of the SCA annual conference and TAS are women. This trend is only meant to continue.

7. Do you have any advice for other women in the field?
Don't let gender hold you back in what you want to do. This is valid for clinical decisions, life decisions and career opportunities. As someone told me once, women overanalyze and do not apply for opportunities unless they feel everything is perfect. At that point the position may not be available any longer. Man act more impulsively and maybe this is the reason a lot of the leadership positions are occupied by men. We should be a bit more adventurous and less analytic. The woman who gave me this piece of advice is now the Dean of the Medical School in her city. I followed that advice, and this is how I became involved in TAS.

Don't be afraid to ask. If you never ask, you will never know. In the worst-case scenario, "no" is the

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answer. Rejection builds character and probably this is why I have a lot of it. Most rejections come with very good and constructive feedbacks that help improvement.

Be patient, especially with trainees. When I started practicing medicine in this country, I had a lot of "catching up" to do. I trained in Italy, and in Italian, so I was linguistically and technically challenged. I met really patients and kind co- interns. They took the time to teach me the secrets of "SOAP" and bedside manners and all what was needed to survive the whole internship year. When I asked how I could pay them back, the answer was to do the same with the new generation. I am trying my best to pay back any time I have the opportunity.

8. How do you balance work and personal life?
It is hard to keep work and personal life separate, to the point I am often reminded to leave work at work. I am constantly working on this. My husband is a good coach. He is not in medicine, so the rule we have is that we can talk about people but not cases. It seems to be working for most of the time.

9. What is something you enjoy doing outside of work?
I love long distance running. It clears my head and helps me to find inner peace. This activity though has been curtailed by injuries, forcing me to add other forms of exercise such as yoga, Pilates and some pathetic attempts to weightlifting to cope with life and aging.

I love cooking but not eating, so I still bring my "products" at work for the residents. They are very kind and eat all what is offered. The baking is a bit "creative", to the point that one of our fellows gave me a book to make the substitutions more scientific and less random. COVID 19 introduced me to the art of sourdough bread, like 80% of the American population stranded at home with no dry yeast in sight and no bakeries. I am perfecting the technique. The process of making a loaf of bread is very therapeutic for the mind. However, the production is exceedingly higher than the consumption. Thank goodness for the same residents!

10. Would you change anything about the path you took to get to where you are now?
Yes. I would add a cardiac fellowship to my thoracic one. When I trained, thoracic was separated from cardiac. I have no regrets about my fellowship. It was the best academic year of my life. I am not sure there is another place that offers what Brigham had. I still have very fond memories of the time I spent in Boston to the point I consider Brigham my home. When I have hard time here at MSKCC, I toy with the thought of going back. However, without cardiac training, a thoracic anesthesiologist is not as marketable, especially in an academic place.

11. What was the best piece of advice you received?
Dr Chris Edmonds at HSS told me when I was a first week resident that "Residency is a three-year job interview. Your attitude and behavior will shape how people are going to perceive you. And anesthesia is a very small world, where everyone knows each other". I still quote him to my residents.

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Intraoperative Implications of the Recipients' Disease for Double-Lung Transplantation

Fessler J, Davignon M, Sage E *et al. Journal of Cardiothoracic and Vascular Anesthesia.* 2020 Jul 17;S1053-0770(20)30710-2.

Reviewers: Ashley Virginia Fritz, DO[1], Archer Kilbourne Martin, MD[2]

1) Division of Cardiovascular and Thoracic Anesthesiology, Mayo Clinic School of Medicine, Rochester, Minnesota
2) Division of Cardiovascular and Thoracic Anesthesiology, Mayo Clinic School of Medicine, Jacksonville, Florida

Background

Advancements in lung transplantation have transformed the field from the very first human lung transplant performed in 1963 by James Hardy[1] to the evolution of over 4,000 transplants performed globally per year.[2] Etiology specific considerations in the management of lung transplantation and their impact on perioperative outcomes have been a recent focus in lung transplantation literature.[3,4] Unfortunately, there is a paucity of data on the effect of the recipient's presenting etiology of end-stage lung disease (ESLD) on the intraoperative management and even fewer clinical studies relating to same.[5,6] The authors at Foch Hospital in France report developing an original, center-specific protocol utilizing inhaled nitric oxide, selected use of extracorporeal membrane oxygenation (ECMO), and stringent evaluation maximizing extubation of recipients in the operating room.[4] In this setting the authors aimed to compare etiology specific disease processes in double lung transplant with intraoperative outcomes.[4]

Methods

The authors conducted a retrospective analysis of a single center, prospectively maintained database containing donor, recipient, and intraoperative statistics. This study enrolled 510 patients from 2012-2019, who underwent double lung transplantation for cystic fibrosis (CF), pulmonary fibrosis (PF), or emphysema/chronic obstructive pulmonary disease (CE). Patients who presented with a diagnosis of primary pulmonary arterial hypertension, underwent multi-organ transplantation, re-do transplantation, or transplantation with cardiopulmonary bypass were excluded from this study. After exclusions, 429 patients were included; 246 patients in the CF cohort, 117 patients in the CE cohort, and 66 patients in the PF cohort. The primary outcomes of this study were comparison of blood transfusion, ECMO management, and intraoperative extubation in disease specific cohorts.

Results

The authors concluded that while estimated blood loss was not statistically significant across all three cohorts ($p=0.21$) the products transfused between the cohorts differed. When compared to the CE cohort, the CF cohort was transfused an increased amount of both packed red blood cells ($p<.0001$) and fresh frozen plasma ($p=0.004$). They noted that PF patients required intraoperative ECMO more often than other etiologies (39.4%, $p<0.001$), and that both CF and CE patients presented with the highest rates of intraoperative extubation (37.4% and 50.4%, $p <0.001$).

Discussion

The impact of anesthetic management on outcomes in lung transplantation has been an emerging and growing theme within the literature in recent years. Martin ***et al*** recently noted in the ***Journal of Cardiothoracic and Vascular Anesthesia*** that the two primary categories that should be targeted for attenuation through anesthetic management are those of primary graft dysfunction (PGD) and technical

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complications. PGD is a perioperative syndrome arising from a wide variety of etiologies that impacts both perioperative and long-term mortality. Technical complications have been defined in the literature as injuries involving the implanted graft, wound healing, or vascular complications. Technical complications have been noted to be responsible for nearly 12% of all 0-30 day mortalities reported to the International Society for Heart and Lung Transplantation (ISHLT) Registry since 1990.[5]

The primary outcomes studied by Fessler ***et al*** can have potential impacts on the development of both PGD and technical complications. Their study represents the first effort to study specific intraoperative outcomes as related to underlying etiology of presenting lung disease, building upon previous work by other colleagues describing the impact of underlying etiology of lung disease on anesthetic management. The applicability of their findings of ECMO use as a primary outcome related to etiology may be limited as more high-volume centers are pre-emptively using veno-arterial ECMO due to reported benefits of decreased mortality and PGD development secondary to an attenuation of the ischemic-reperfusion injury. However, their findings regarding intraoperative blood transfusions and extubation rates as related to underlying etiology are applicable to programs regardless of intraoperative cardiopulmonary support approach.

While the negative impact of intraoperative blood transfusion on the development of PGD has been shown in both retrospective and prospective studies, the authors note that the impact of their intraoperative extubation strategy remains to be seen. One of the biggest benefits of this current study is that it provides the reader information for identification of potential candidates for fast-tracking, allowing for not only study of the impact of this approach on PGD or technical complications, but also providing insight to colleagues who are developing early recovery protocols based on etiology of lung disease.

As our specialty continues to engage with other disciplines as part of the lung transplantation team, our unique yet complementary perspective can add significant value to the entire perioperative care plan for lung transplantation patients. The examination of the impact of presenting disease on intraoperative outcomes by Fessler ***et al*** is a foundational and important contribution to the existing body of lung transplantation anesthesia literature, providing data and perspective that should be considered by anesthesiologists as they develop perioperative management protocols of care.

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Effect of Intraoperative Low Tidal Volume vs Conventional Tidal Volume on Postoperative Pulmonary Complications in Patients Undergoing Major Surgery: A Randomized Clinical Trial

Karalapillai D, Weinberg L, Peyton P, et al. JAMA. 2020 Sep 1; 324(9):848-58.

Reviewers:

Maurice F. Joyce, MD, EdM
Assistant Professor of Anesthesiology
The Warren Alpert Medical School of Brown University
Providence, RI

Andrew Maslow, MD
Professor of Anesthesiology
The Warren Alpert Medical School of Brown University
Providence, RI

Introduction

Protective lung ventilation (PLV) strategies were proposed for the management of patients with severe lung failure or Acute Respiratory Distress Syndrome (ARDS).[1,2] Mortality benefits of low tidal volume/low airway pressure mechanical ventilation were reported for patients with severe lung failure or Acute Respiratory Distress Syndrome (ARDS).[1,2] PLV is geared to the prevention of barotrauma, volutrauma, and atelectrauma, which in turn is thought to cause biotrauma.[1,2]

The adoption of these ICU management strategies in the OR environment, despite the lack of strong evidence to support this practice, has led to much discussion and debate over what is the best mechanical ventilation strategy for the surgical patient.[(3,4,5)]

The aim of the investigation by Karalapillai et al was to compare the incidence of immediate (within 7 days) postoperative pulmonary complications in a group who received a low tidal volume ventilation strategy during major surgery versus a group who received a "conventional" tidal volume ventilation strategy.[6]

Methods

This study is a single-center randomized controlled trial at a tertiary care center in Australia. It includes a total of 1236 patients (1206 included in the final analysis) over age 40 who were undergoing major surgery (non-cardiothoracic, non-intracranial) under general anesthesia that was at least 2 hours in duration. Patients were randomized to receive either a low tidal volume regimen (6 mL/kg of predicted body weight with positive end-expiratory pressure of 5 cm H2O) or a conventional tidal volume regimen (10 mL/kg of predicted body weight with positive end-expiratory pressure of 5 cm H2O). The measured primary outcome was postoperative pulmonary complications within 7 days of surgery, including pneumonia, bronchospasm, atelectasis, pulmonary congestion, respiratory failure, pleural effusion, pneumothorax, and unplanned ventilation. Measured secondary outcomes included: pulmonary embolism, acute respiratory distress syndrome, systemic inflammatory response syndrome, sepsis, acute kidney injury, wound infection, intraoperative need for vasoactive medications, unplanned ICU admission, need for rapid response call, ICU length of stay, hospital length of stay, and in-house mortality.

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Results

The two groups were comparable at baseline. Intraoperative differences included a slightly higher minute ventilation (by calculation), and less hypercarbia and acidosis for the higher TV group. While the low TV group had a lower peak airway pressure (22.7+/-6.2 vs 25.1+/-6.3cm H2O) neither group seemed to exhibit pressures considered to be barotrauma. The rate of postoperative pulmonary complications within 7 days of surgery was 38% among those patients randomized to the low tidal volume ventilation regimen and 39% among those patients randomized to the conventional tidal volume ventilation regimen (p=0.64). Atelectasis was the most common complication (24.7 vs 24.9% p=0.93). There were no differences between any of the other primary or secondary outcome measures. There were no reported significant differences in the secondary outcomes.

Discussion

Ventilator-induced lung injury (VILI), due to barotrauma, volutrauma and atelectrauma, and results in endothelial dysfunction, protein-rich pulmonary edema, hemorrhage, and inflammation, the latter which is biotrauma.[7,8] The data from **Karralapillai et al** did not find an outcome difference between tidal volumes of 6 and 10 ml/kg[6].This is consistent with two prior investigations concluding that barotrauma is more significant than volutrauma.[4,5,9] Broccard et al, using animals, compared 6 vs 18 ml/kg TV and reported less hemorrhage and tissue edema with a higher TV when mean airway pressure was low (13 vs 22 cmH2O).[5] A meta-analysis of ARDs studies reported that higher tidal volumes (10-15 ml/kg) did not affect long-term outcome when the airway plateau pressures were less than 31 cmH2O.[4] These findings are consistent with a shifting emphasis to airway pressures to reduce strain injury.[10]

Ventilator induced lung injury (VILI) was first described, experimentally, in 1974 in an animal model in which animals, ventilated with 15-50 ml/kg tidal volumes, developed perivascular edema, pulmonary infiltrates, and reduced pulmonary compliance after being subjected to high peak airway pressures (> 30 cmH2O).[11,12] Both alveolar and perivascular edema occurred with mean airway pressures > 45 cmH2O.[11] The addition of 10 cmH2O of PEEP (peak airway pressures 35 cmH2O) caused focal hemorrhages.[12] Further look at the studies' details reveal that very high respiratory rates (25-100/min) were employed.[11,12] The phasic opening and closing of alveoli requires greater pressure to reopen alveoli causing tissue distension, stress, injury, inflammation, and bacterial growth, independently contributing to VILI.[12,14,15] "Lung-protective ventilation strategy should .....consider ventilation frequency and inflation rate."[15]

Protective lung ventilation (PLV) includes low or 'physiologic' tidal volume (< 6-8 ml/kg) and low pressure (mean < 30 cmH2O, peak < 30-40 cmH2O; plateau or peak end-inspiratory < 30-35 cm H2O;) ventilation to reduce volutrauma and barotrauma.[1,2] To prevent hypercarbia and atelectasis, higher respiratory rates, application of positive end-expiratory pressure (PEEP) and lung recruitment maneuvers are included.[1,2,6] Enthusiasm for PLV increased after reporting 28 day mortality benefits in ARDS patients in two studies administering low (6-7 ml/kg) tidal volume/low pressure ventilation[1,2] In both studies, 'PLV' settings were compared to a TV of 12 ml/kg.[1,2] Although **Amato et al** reported a large mortality benefit of PLV at 28 days (38 vs 71%), 7 patients in the higher TV group died within 24-36 hours of the study, and there was no difference in survival at hospital discharge.[1] In the ARDSNet study, where the mortality of both PLV (31%) and high TV (39%) ventilation groups were similar to that PLV group reported by **Amato et al**, airway plateau pressures were specifically kept between 45 and 50 cmH2O in the higher TV group, which are known harmful airway pressures.[2] While these two studies reported lower mortality in the PLV groups, three others did not.[16] The latter three studies compared TV of 7 ml/kg to 10 ml/kg.[16] The meta-analysis showed a parabolic effect of plateau airway pressures with lowest and highest pressures associated with

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adverse outcome, while PLV per se was not associated with improved outcome.[16] Despite the enthusiastic adoption of PLV, mortality for patients with ARDS has not declined over the last 20 years and remains at 30-40%.[12,14]

In contrast to the elective surgical patient without lung disease, acute lung injury (ALI) or acute respiratory distress syndrome (ARDS) typically includes a mix of poorly functioning consolidated lung, bullae, and relatively normal lung, the latter of which is at risk for over-distention and injury during positive pressure ventilation (PPV).[17] The lung of the elective surgical patient is relatively homogenous. In the study by **Karalapillai et al,** pulmonary complications occurred in 38-39% of the patients with atelectasis being the most common complication. Atelectasis occurs in up to or more than 75% of patients and is a major cause of pulmonary complications, cardiopulmonary dysfunction, and adverse outcome.[18,19,20,21]

Atelectasis or collapse of alveoli and lung parenchyma reduces pulmonary compliance and oxygenation, the latter causing hypoxia-related inflammation.[18,19,21,22] The collapse of alveoli results in endothelial and junctional cell injury, reduction in surfactant, inflammation, bacterial growth and translocation of bacteria and inflammatory markers.[13,14,22,23]

In 1963 **Bendixen and Hedley-Whyte** described progressive pulmonary dysfunction during general anesthesia, characterized by atelectasis, decreases in oxygenation (i.e. shunt), and decreases in pulmonary compliance.[18] These dysfunctions were reversible by performing 'periodic deep breaths capable of providing effective expansion of the lungs' or 'hyperinflation'.[18] Although specific tidal volumes were not reported, others have extrapolation the study's data and reference it as the source 12-15 ml/kg tidal volumes and the benefits of 'hyperinflation'.[13,21,24,25] Interestingly, the source or reference for 'normal' resting tidal volume ventilation is equally non-specific and ranged from 6 to >10 ml/kg (26). In this study there was weak to poor correlation between resting tidal volume and height.[26]

Although **Karalapillai et al** did not show an outcome impact between the two TVs it doesn't negate the importance of PLV.[6] First, TV between 6 and 10 ml/kg may represent 'normal' TV ventilation.[26] Second, low levels of PEEP were administered, and third, airway pressures were low in both groups. Tidal volumes ranging from 6-10 ml/kg are safe as long as plateau pressures (< 30-35cmH2O) are controlled and atelectasis is prevented. Recent trends in ventilator management includes a shift toward airway pressure management and personalized PEEP to prevent atelectasis and stress injury.[3,10,27,28,29]

SOCIETY OF CARDIOVASCULAR ANESTHESIOLOGISTS
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Meta-analysis of Effectiveness of Statins in Patients with Severe COVID-19

Chia Siang Kow MPharm, Syed Shahzad Hasan PhD
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Reviewer:
Antonio Hernandez Conte MD, MBA, FASA
Kaiser Permanente Los Angeles Medical Center

Background

The Coronavirus-19 pandemic (COVID-19) has disrupted the entire healthcare landscape for the majority of 2020. While the impact of COVID remains to be fully understood, the virus has the potential to impact multiple organs, including the cardiovascular system, and create a significant inflammatory response.

In an effort to treat the systems affected by COVID-19, physicians have been evaluating the use of existing drugs for novel uses or indications. Statins have identified as a drug class which may offer potential treatment uses, however, there are two opposing views on the effects of statins upon COVID-19. Statins may possibly inhibit the dysregulation of myeloid primary response protein 88 and could stabilize the inflammatory response, however, this is not conclusively proven Additionally, statins up-regulate ACE2 expression, and might be protective towards COVID-19 induced lung injury. However, statins definitely induce up regulation of LDL receptors, which in turn results in formation of lipids "rafts" that may enhance COVID-19 attachment to cell membranes. Some researchers have also argues that statins might promote pro-inflammatory interleukin 18 ad subsequent cytokine storm.

Study Design

This study was a meta-analysis of existing literature to assess the impact of statins upon the course of COVID-19 disease. Databases included PubMed, Google Scholar, and medRxiv and were searched through July 27, 2020 for studies related to COVID-19+statin+HMG-CoA reductase. Studies were included if they were of cohort or case-control design. Each article was evaluated by two authors who extracted pertinent study data and measures of effect. Quality of observational studies was assessed using the Newcastle-Ottawa Scale.

Results

The PubMed search yielded 274 potential studies. After review for inclusion and exclusion parameters, only four studies were evaluated for meta-analysis and included a total of 8,990 COVID-19 patients.

Discussion

This meta-analysis focused upon four large scale studies; the overall size of the subject database allows for meaningful interpretation of the findings. The meta-analysis suggested a reduction in fatal or severe disease by 30% and discredited the suggestion of harms with the use of statins in COVID-19 patients. Much is yet to be determined regarding a specific regimen of statin for the treatment of COVID-19 alhough available evidence suggests that statin therapy of moderate-to-high intensity could be effective. Further studies are needed in order to substantiate the preliminary results of these studies. Future well-designed randomized controlled trials are also needed to confirm the benefits of statins in COVID-19 patients.

(continued)

Related Reading:

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Transesophageal Echocardiography, Mortality, and Length of Hospitalization After Cardiac Valve Surgery

MacKay EJ, Neuman MD, Fleischer LA, et al.
J Am Soc Echocardiogr 2020;33:756-62

Reviewer:
Sohail K. Mahboobi, MD, FASA

Introduction

Transesophageal echocardiography (TEE) is being used in cardiac anesthesia for examination of valve pathology, and surgical repair or replacement, and post bypass cardiac function as well as for detection of aortic atheromas.[1] Two class I recommendations for use of TEE are mitral valve surgery and infective endocarditis.[2] This study investigates 30-day mortality and length of hospitalization for patients undergoing open cardiac valve repair or replacement surgery with and without TEE use. The hypothesis is that monitoring would be associated with a lower 30-day mortality and shorter length of hospitalization.

Methods

The study included all Medicare beneficiaries' claims for cardiac valve surgery including tricuspid, pulmonic, aortic, mitral, or unspecified valve repair or replacement surgery over a period of five years. Exclusion criteria was: (1) <6 months of enrollment in Medicare before the admission for cardiac valve surgery; (2) age < 65 years; and (3) non–cardiac surgery. The primary outcome was all-cause 30-day mortality. The secondary outcome was length of hospitalization. Chi-square and t tests were used to evaluate baseline covariate associations between the two groups (TEE vs. no TEE). As TEE is class I indication for mitral valve surgery, specified subgroup analyses were also performed after excluding mitral valve repair surgery. A propensity score match and sub analysis was performed to test the primary analysis.

Results

The study included 219,238 patients undergoing cardiac valve repair or replacement procedures. Among these patients 85% underwent perioperative TEE, and 15% did not. Patients undergoing TEE were older and had higher prevalence rates of other comorbidities.

Among the study population, 9,730 patients died within 30 days (4.4%; 95% CI, 4.4%–4.5%). The mean length of hospitalization was 10.9 days (95% CI, 10.9–10.7 days). Surgeries performed with TEE was associated with lower 30-day mortality (4.3% [95% CI, 4.2%–4.4%] vs. 5.2% [95% CI, 5.0%–5.5%]; P < .001) but a longer length of hospitalization (11.0 days [95% CI, 10.9–11.0 days] vs 10.6 days [95% CI, 10.5–10.7 days] P < .001).

Following adjustment, among the overall cohort of 219,238 patients undergoing cardiac valve surgery, the TEE group demonstrated lower adjusted odds for 30-day mortality (odds ratio [OR], 0.77; 95% CI, 0.73 to 0.82; P < .001). The TEE group did not demonstrate a significant increase in the length of hospitalization, with an absolute percentage increase of <0.01% (95% CI, 0.61% to 0.62%; P = .99).

The results among the 191,999 patients with cardiac valve surgery excluding the 27,239 patients who had mitral valve repair were consistent with those of the overall analysis. The results of the propensity score-matched analysis were consistent with those of both the primary analysis and the analysis excluding mitral valve repair.

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Discussion

This meta-analysis focused upon four large scale studies; the overall size of the subject database allows This study shows lower 30-day mortality among patients who underwent TEE, without a difference in length of hospitalization. These findings were consistent including a propensity score matched analysis. TEE is a class II recommendation in all non-mitral and endocarditic cardiac procedures because its benefits remain unconfirmed. The possible explanations for this mortality benefit may be the immediate identification of significant paravalvular regurgitation after surgical valve implantation, early identification of right or left ventricular dysfunction, accurate assessment of volume status, appropriate selection and titration of inotropic or vasopressor medications, and identification of systolic anterior motion with left ventricular outflow tract obstruction. Some of the limitations are that the observational, nonrandomized study design does not prove a causal link between TEE and outcomes. The study may have included patients who have TEE done at some point in the stay as the sample is based on billing codes.

Comments

TEE has proven being a beneficial tool for cardiac procedures but still considered class II indication other than for mitral and endocarditic surgeries. This study has shown a benefit of TEE monitoring for valve replacement/repair cardiac procedures in the form of reduced 30 day mortality without effect of length of hospitalization. The authors pointed out limitations of the study by acknowledging that there may be over enrollment of the patients and that the study includes mostly the patients >65 as the sample size was selected from Medicare claims. For that more trials may be required to study beneficial effect of TEE in all age groups and wide range of procedures not limiting to valve repair/replacements.

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Comparing the Effects of Ketorolac and Paracetamol on Postoperative Pain Relief After Coronary Artery Bypass Graft Surgery — A Randomized Clinical Trial.

Javaherforooshzadeh F, Abdalbeygi H, Janatmakan F, Gholizadeh B.
Journal of Cardiothoracic Surgery. 2020; 15:80

Reviewers:
Kirill Gelfenbeyn, DO; Brett Cronin, MD; Dalia Banks, MD
University of California San Diego

Background

Pain control is typically achieved with intravenous and oral opioids in the patients undergoing coronary artery bypass graft (CABG) surgery. Poor pain control can result in myocardial ischemia, bleeding, and stroke. On the other hand, opioids are associated with significant side effects and development of persistent use.[1] Multimodal approach to pain control is often utilized in order to reduce opioid consumption, while maintaining adequate pain control. Paracetamol is particularly useful in surgical setting because it does not interfere with platelet function. NSAIDs such as ketorolac are associated with increased risk of bleeding, renal dysfunction, gastrointestinal ulcers, and carry the FDA issued boxed warning against use in patients undergoing CABG, however the use of NSAIDs continues and has been reported to be safe.[2,3]

The purpose of this study was to compare analgesic effects of Paracetamol and ketorolac in patients undergoing CABG. The primary end points were visual analog scale (VAS) scores ranging from 0 to 10 at extubation and 6, 12, 24, and 48 hours and total dose of morphine consumption. The secondary end points were: hemodynamic variables, weaning times, postoperative bleeding, MI, CVA, TIA, in-hospital mortality and postoperative serum creatinine.

Methods

The study was a single-center, randomized, double-blind clinical trial. A total of 100 patients undergoing elective on-pump CABG were identified and 60 met the following inclusion criteria: elective CABG, age 30-70 years, ASA III, male or female, and ejection fraction > 30%. Patients were assigned to either the ketorolac or Paracetamol group, using a computer-generated random algorithm. Intraoperatively anesthesia was administered using a standardized weight-based protocol. Postoperatively patients were admitted to the ICU with the standardized sedation protocol (Propofol 0.5 mg/kg/h and morphine sulfate 0.1 mg/kg/h). Intervention was administered immediately upon arrival to the ICU. In the ketorolac group patients received 0.5 mg/kg dose diluted in 100 ml of normal saline every 6 hours for 24 hours. The Paracetamol group patients received 10 mg/kg dose diluted in saline for total volume of 100 ml and administered over 30 minutes every 6 hours for 24 hours. Prior to extubation, nursing staff were able to administer 2 mg of IV morphine if needed. Following extubation, patients had access to PCA with 2mg bolus dose q15 minutes and an additional breakthrough dose of 2 mg was available upon request if VAS score was above 3. Total morphine consumption and VAS scores were recorded over 48 hours.

Results

Analysis of primary end points revealed statistically significant differences between the two groups. The Paracetamol group had higher VAS scores at 24 and 48 hours compared to the ketorolac group. At 24

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hours morphine consumption was significantly lower in the Paracetamol group, compared to the ketorolac group (0.29 ± 0.41 mg versus 1.71 ± 0.53 mg; p = 0.027). Similarly at 48 hours, patients in the Paracetamol group had significantly lower consumption (0.22 ± 0.15 mg in Paracetamol versus 2.18 ± 0.52 mg in ketorolac group p = 0.007). Analysis of VAS scores demonstrated a general downward trend during the recorded period.

Analysis of secondary end points did not demonstrate statistically significant differences with the exception of one variable. Weaning time was significantly lower in Paracetamol group compared to ketorolac. The was no statistically significant differences when comparing for demographic factors (age, sex, height, weight, antiplatelet use, Euro Score II).

Discussion

Selecting an ideal adjunct to opioids for post-operative control in cardiac surgery remains challenging. This study compared effects of Paracetamol and ketorolac on post-operative pain scores (VAS) and morphine consumption. The authors concluded that efficacy of ketorolac is comparable to that of Paracetamol and safe in post-operative CABG patients.

The study design has several limitations: small sample size, single center, and the lack of control arm (opioids alone). Additionally, the treatments are not truly blind: Paracetamol is administered strictly over 30 minutes, therefore whoever administered the solution would easily know which group it is. The findings for the primary end points are contradictory. The authors reported significantly lower morphine consumption in Paracetamol group however VAS scores were significantly higher in Paracetamol group at the same time points (24 and 48 hours). Additionally, the morphine consumption is not reported at 6- and 12-hour time points while VAS scores are. Another difficult to understand point is that Paracetamol group on average had less then 2mg of morphine total, implying that some patients received no morphine, this is concerning since VAS scores on average are much higher then 3. Overall pain control appears to be poor in the first 12 hours according to the VAS scores figure, although according to the study design patients should have received additional morphine if VAS scores were above 3. Lack of the control arm in this study design (i.e. patients without Paracetamol or ketorolac) makes it difficult to draw conclusions regarding efficacy of these interventions on pain control. The secondary outcomes regarding adverse events of the interventions, specifically ketorolac, confirmed previously reported findings by Howard, M et al. that ketorolac may be safely administered in CABG patients if selected appropriately.[3]

Based on the issues stated above it is difficult to draw any conclusions from this study.

Specifically, we do not agree with the conclusion stated in the abstract that efficacy of ketorolac is comparable to Paracetamol based on the data in this study, and given that the FDA boxed warning remains in place further studies are needed before it can be considered for broader use for post-operative pain controls in patients undergoing CABG.

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SOCIETY OF CARDIOVASCULAR ANESTHESIOLOGISTS
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Early Versus Delayed Stroke After Cardiac Surgery: A Systematic Review and Meta-Analysis

Gaudino M, Rahouma M, Di Mauro M, Yanagawa B, Abouarab A, Demetres M, Di Franco A, Arisha MJ, Ibrahim DA, Baudo M, Girardi LN, Fremes S:
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Reviewers:
Andrew Maslow MD, Maurice Frankie Joyce MD
Department of Anesthesiology
Lifespan Medical Center
Warren Alpert Medical School at Brown University

Background

Perioperative stroke is a devastating complication after cardiac surgery and is associated with increased morbidity and mortality. Despite years of data collection and analysis the incidence remains relatively constant between 1 and 3%.[1,2,3] Neurologic injury can be grouped into Type 1 (stroke) and Type 2 (neurocognitive dysfunction, delirium, seizures), both being associated with increased morbidity and mortality.[4] An important goal is to define the incidence, risk factors/predictors, and associated outcomes, to identify modifiable variables to reduce and/or prevent injury. Risk factors and predictors can be divided into preop-, intraop-, and postoperative.[3,5]

The timing of stroke has been described as intraop- or early and postoperative or delayed/late. Early stroke is defined as a new neurologic deficit that was apparent 'upon wakening' from anesthesia or in the first 24 hours from the start of anesthesia. Delayed or late stroke is defined as a new neurologic deficit occurring after a 'normal wakeup from anesthesia'or after the first 24 hours.

Methods / Results

Gaudino et al performed a meta-analysis to analyze the occurrence of stroke, and incidence of early, delayed stroke, and its related mortality.[1] Additional data included age, sex, diabetes mellitus, preoperative atrial fibrillation, preoperative carotid disease, preoperative history of neurologic events, peripheral vascular disease, chronic renal failure, urgency of surgery, and prior heart surgery.

36 manuscripts from 1991 to 2018, reporting on 174,969 patients, were included in the meta-analysis. Between the studies, there was significant variability among the data collected and not all studies reported the same complement of data. 3421 (2%) had a perioperative stroke. Half were recorded as an early stroke and half were recorded as a late or delayed stroke. Total operative mortality for patients with perioperative stroke was 21.5% vs 2.4% without a stroke. The operative mortality associated with early and late strokes were 28.8% and 17.9% respectively. Mean late follow-up was 8.25 years. Long term mortalities for early, late, and no stroke were 11.7%, 9.4%, and 3.4% respectively. Kaplan-Meier survival curves clearly demonstrated the continued year after year increasing mortality for patients with a perioperative stroke. Predictors for early stroke was the use of cardiopulmonary bypass (i.e. including aortic cross clamping), while the predictor of late stroke was a history of prior stroke.

Discussion

The meta-analysis by **Gaudino et al** shows that perioperative stroke is associated with greater mortality and that early stroke carried a greater mortality.[1] Although the meta-analysis defined early and delayed

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stroke based on the detection of a new neurologic deficit upon awakening vs after a normal awakening this not the definition used by all the studies cited in this paper.[1] **Lisle et al** differentiated early and delayed stroke by a 24 hour window i.e. early stroke was < 24 hours and delayed stroke was > 24 hours after surgery.[6] Furthermore, the included studies span a wide span of time from 1991 to 2018 during which anesthetic techniques changed dramatically and directed toward earlier wake ups, extubation, and mobilization, all of which was associated with improved outcomes.[7,8,9,10] Although outcome data vary, extubation past 12 hours has been associated with greater neurologic complications.[8,9,10] The meta-analysis by **Gaudino et al** didn't't include anesthetic techniques, ICU sedation protocols, or extubation times to know when patients awoke.[1] Considering the change in anesthetic care since 1991 using a 24 hour time frame might provide more consistent grouping to differentiate between early and delayed stroke. Nevertheless, these same changes in anesthetic care and earlier awakening has helped to recognize that not all neurologic events occur during surgery. According to **Gaudino et al,** they occur equally during surgery and after.[1]

Although equal in occurrence, greater mortality was seen with early stroke.[1] **Lisle et al,** an included study, reported on 202 strokes among 7201 (2.8%) patients, of which 23% were diagnosed within 24 hours and 77% after 24 hours.[6] Early stroke was associated a 67% mortality and greater rehabilitation needs for survivors compared to a 17.3% mortality for delayed stroke.[6]

Preoperative predictors or variables associated with delayed stroke include atrial arrhythmias, prior stroke, carotid disease, peripheral vascular disease, renal insufficiency, redo sternotomy, age, and male sex.[3,5] In the meta-analysis of **Gaudino et al** only a history of a prior stroke was associated with delayed stroke.[1] Atrial arrhythmias have been identified as a risk factor/cause of postoperative embolic stroke, however, conclusions vary.[3,5,11] Atrial arrhythmias occur between 15 and > 60% being greater with age, and open cardiac procedures. They mostly occur between 24 and 72 hours after surgery. Investigations have been inconclusive as to the risk of atrial fibrillation or the benefits of prophylactic therapies. In the absence of reduced cardiac output, atrial fibrillation, alone, was not found to be a predictor of adverse neurologic outcome.[3]

Intraoperative causes of stroke are thought to be related to embolic events (gaseous, thromboembolic, or atheromatous emboli) and reduced cerebral perfusion. Causes of emboli include the use cardiopulmonary bypass and aortic cross clamp time, valve surgery, intracardiac masses, endocarditis, aortic atheroma, and arrhythmias.[3,5] Identification of embolic sources during either transesophageal or epiaortic echocardiographic assessment are considered beneficial to reduce neurologic injury.[12,13,14] **Gaudino et al** reported a lower stroke incidence with off-bypass surgery, however, only five of the 36 studies included analysis of off-pump CABG and outcome.[1] Although off-bypass cardiac surgery reduces manipulation and trauma to the aorta during cross clamping, outcome data are mixed. A meta-analysis of 37 randomized off pump CABG did not reveal a significant difference in neurologic outcome with on-pump CABG.[7] However, preoperative finding of severe aortic atheroma might prompt a change in the surgical procedure to reduce aortic manipulation.

Modern anesthetic techniques are geared toward early extubation, improvements in pain control, and early mobilization, all of which are thought to improve neurologic outcome.[8,9,10] Additional intraoperative monitoring of anesthetic depth to guide anesthetic drug administration, and regional cerebral oximetry (rSO2) to detect early cerebral oxygen imbalances have been proposed to improve neurologic outcome.[4,15,16] Although a systematic review of multiple reports conclude that reductions in rSO2 'might'

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have an association with neurologic complications, statistically significant data stating that correction of reduced rSO2 is beneficial are lacking.[4] Even while more than 90% of reduced rSO2 can be 'corrected' to within 80% of baseline, there was no difference in outcomev.[15] There are, however, a number of case reports describing the use of rSO2 to improve aortic and/or carotid perfusion issues and cannula placement.[16] While intraoperative rSO2 did not predict neurologic outcome, a preop or baseline rSO2 < 50% was associated with a 71% incidence of postoperative neurocognitive (delirium) dysfunction compared to 18% for those with rSO2 > 50%.[16,17] Although the occurrence of stroke was no different[17], declines in rSO2 of > 20%, or reductions to < 50% are considered significant and prompt therapies to improve cerebral oxygen balance.[16]

Monitoring anesthetic depth with electroencephalogram-derived bispectral index (BIS) to titrate anesthetic agents may improve neurocognitive outcome.[18,19] In one report of patients undergoing major aortic surgery, a reduction in BIS > 30% from baseline was associated with a 79% stroke occurrence compared to an 18% for a reduction in between 25 and 30%.[19] A preliminary reports show reduction in delirium.[18] However, a large study including 6041 cardiac surgical patients reported a greater number of cases with awareness in the BIS group.[20]

The meta-analysis by **Gaudino et al** identifies two times in which stroke may occur, each with its associated with risk factors.[1] Given the increased mortality associated with any neurocognitive dysfunction/injury, defining etiology of injury, risk factors, and modifiable variables will help prevent injury and improve short and long term outcome. Given the greater adverse outcome seen with early stroke, continued investigation to discover beneficial modifications in anesthetic care is important.

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Echo Corner

Echo Corner Case #1

Luca La Colla, MD
Joshua Knight, MD
Department of Anesthesiology
University of Pittsburgh Medical Center,Pittsburgh, PA

CASE HISTORY

The patient is a 63-year old male with a history of presumed alcoholic cirrhosis presenting with worsening abdominal distention. A CT scan was obtained and pericardial inflammation was incidentally noted. After ruling out other etiologies, hepatology was concerned for hepatic venous outflow tract obstruction secondary to a constrictive pericardial process and the patient was scheduled for pericardial biopsy and possible pericardiectomy.

In the operating room, invasive lines were placed awake and the patient tolerated induction of general anesthesia well. Upon placement of the transesophageal echo probe, the following images were obtained (Video 1, Images 1a-b).

Following sternotomy, a thickened pericardium was immediately visible. Upon pericardiotomy, the patient's cardiac function immediately changed (Video 2, Images 2a-b). Cardiac index per pulmonary arterial catheter increased two-fold. The remainder of the pericardium was excised between the phrenic nerves and sternotomy was closed. The patient was extubated and brought to the intensive care unit for recovery.

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Echo Corner

QUESTION 1

What is the physiologic basis of the phenomenon shown in images 1a and 1b?

A. More mobility of septal tissue relative to lateral annular tissue
B. Less mobility of septal tissue relative to lateral annular tissue
C. Decreased mobility of both septal tissue and lateral annular tissue
D. Globally increased intra-pericardial pressure

QUESTION 2

If this were an infiltrative process instead of a constrictive process, which of the following would be present?

A. Color M-mode propagation velocity of 55cm/s
B. Lateral annulus peak tissue doppler e' velocity 7cm/s
C. Hepatic vein diastolic flow reversal during spontaneous expiration
D. Normal longitudinal strain of interventricular septum

QUESTION 3

Transthoracic spectral doppler image (Image 3) was obtained preoperatively in this patient. The pattern of mitral valve inflow shown is best explained by:

A. Decreased transmitral diastolic blood flow to left heart during inspiration
B. Increased transmitral diastolic blood flow to left heart during inspiration
C. Loss of respiratory effect on diastolic blood flow
D. Right heart dysfunction from constriction

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

VIEW ECHO CORNER WITH VIDEOS

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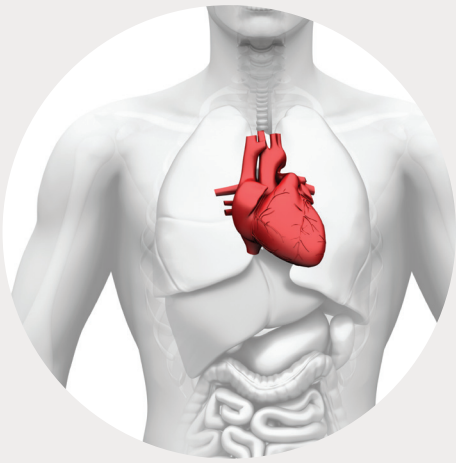
Echo Corner



ANSWERS/EXPLANATIONS

Question 1: Answer A

The phenomenon shown here is known as annulus reversus. It is unique to constrictive pericardial processes and is noted when the tissue Doppler velocity at the interventricular septum exceeds the velocity at the lateral mitral annulus. It is thought that this is caused by tethering of the pericardium to the myocardial wall adjacent to the lateral mitral annulus, thus reducing its ability to relax relative to the interventricular septum[1].

Question 2: Answer B

There are many ways to differentiate constrictive pericardial processes from restrictive infiltrative processes using echo and spectral doppler. Restrictive processes overall tend to have poorer tissue relaxation and therefore a lower peak e′ velocity at both the interventricular septum and the lateral mitral annulus relative to a normal heart[1] and tend to not follow the pattern of annulus reversus seen in constrictive processes. Propagation velocity across the mitral valve in restrictive diseases also tends to be decreased but can be substantially elevated (at times approaching 100cm/s) in constrictive processes[2]. Hepatic vein flow reversal in a spontaneously breathing patient tends to occur during inspiration in restrictive cardiomyopathy but occurs during expiration in constrictive pericarditis[3]. Longitudinal strain is usually normal in constrictive pericarditis but reduced in restrictive cardiomyopathy; the opposite pattern is noted with circumferential strain[4].

Question 3: Answer A

In constrictive pericarditis, diastolic blood flow to the left heart can be greatly decreased during inspiration. This is due to the high gradient between the very negative intrathoracic pressure and the positive constricted intracardiac pressure. In a spontaneously breathing patient, this results in significant respiratory variation in left ventricular filling, which can be detected by a >25% change in the mitral inflow E velocity as seen here on pulse wave doppler. In patients with chronically high left atrial pressures, this variation may not be as marked or may not be noted at all[5].

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Echo Corner

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Echo Corner Case #2

Brian Turchioe, MD, Laura Webb, MD, Mark Nelson, MD,
Nirvik Pal, MBBS, Patricia Nicolato, DO

CASE HISTORY

A 48 year-old female with past medical history of IV drug abuse complicated by prior tricuspid valve replacement presents to the hospital with shortness of breath and symptomatic right heart failure. The patient also has history of Hepatitis C and liver cirrhosis. Preoperative transthoracic echocardiography revealed significant findings (videos 1-3 and image 1).

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QUESTION 1

The appropriate management for this patient would be:

A. Tricuspid valve replacement
B. Antibiotics and continued inpatient monitoring
C. Tricuspid valve replacement with PFO closure
D. Temporary RV mechanical circulatory support

QUESTION 2

Following medical optimization, the patient is taken to the operating room. Intraoperative pre-procedure echocardiography findings are shown in video 4 and 5 and image 2. Based on that you would now

A. Advise the surgeon the tricuspid valve does not need repair or replacement
B. Advise tricuspid valve replacement due to tricuspid stenosis
C. Consider pulmonary embolectomy
D. TVR and exploration of pulmonary artery for embolism removal.

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

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Echo Corner

ANSWERS/EXPLANATIONS

Question 1: Answer C

Preoperative echocardiography revealed obstructive lesion of the tricuspid valve and a patent foramen ovale diagnosed by bubble study. The mean pressure gradient for hemodynamically significant tricuspid stenosis as defined by the American Society of Echocardiography guidelines is greater than or equal to 5 mmHg[1]. In this patient, mean pressure gradient was 8 mmHg by preoperative TTE. Surgery is indicated in prosthetic valve endocarditis as they are more difficult to treat with antibiotics. In addition, she presented in acute right sided heart failure, necessitating urgent surgical intervention. Although the evidence is limited, it is generally recommended and accepted that a PFO closure should occur in heart surgeries involving an atriotomy, such as a mitral valve replacement or tricuspid valve replacement[2].

Question 2: Answer D

Intraoperative TEE confirmed tricuspid valve obstructive lesion with spontaneous echocardiography contrast in the right atrium. In addition, the deep transgastric view revealed embolic lesion in the right ventricle. For infective endocarditis, a left-sided vegetation greater than or equal to 10mm is associated with significantly increased risk of embolization while right-sided vegetations greater than or equal to 20mm are associated with a significantly increased risk of morbidity and mortality[3]. The patient demonstrated significant right ventricular dysfunction on the preoperative imaging and pulmonary embolectomy has been shown to decrease right ventricular diameter and systolic pulmonary artery pressures[4]. The patient also independently required surgery for the significant tricuspid dysfunction and as such would be in a favorable position to have the embolectomy performed simultaneously with the valve replacement.

It appeared the obstructive lesion (thrombus/vegetation) causing the tricuspid stenosis on admission had been displaced as demonstrated by the intraoperative TEE. Intraoperatively it was determined under direct visualization that the tricuspid valve was in the fixed open position. Thus, caution must be maintained when evaluating the presence of tricuspid regurgitation in the patient using color flow doppler as it is known to be ineffective in the presence of a large regurgitant area where flow acceleration is minimal[5]. Visualizing the coaptation of the leaflets may be helpful in this scenario. PFO closure is justified in the presence of acute pulmonary thromboembolism as the presence of a PFO may also allow for right to left shunting with increased pulmonary vascular resistance, thereby worsening clinical hypoxemia[s].

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