AATS

AATS DAILY NEWS

Official newspaper of the AATS 104th Annual Meeting

Issue 1 Sunday April 28, 2024

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Saturday's Institutional Leadership Panel. (From left) Lars G. Svensson, Tomislav Mihaljevic, Colleen Koch, Geoffrey Martha, and Robert Ford.

Leadership abounds in first Plenary Session

Saturday morning's program at the AATS 104th Annual Meeting featured a thrilling session focused on leadership, with distilled wisdom, expertise and life-long lessons from esteemed speakers and panel members taking center stage.

Led by AATS President Lars G. Svensson, the Plenary Session featured Guy David (Chair, Health Care Management, Wharton School), Former Governor of California Arnold Schwarzenegger, and Beri Ridgeway (Chief of Staff, Cleveland Clinic), who shared their perspectives to a packed auditorium.

An Institutional Leadership Panel (pictured) was also featured, where Tomislav Mihaljevic (CEO and President, Cleveland Clinic), Colleen Koch (Group Senior Vice President, Chief Operating Officer of New York Presbyterian's Columbia Division), Geoffrey Martha (CEO, Medtronic), and Robert Ford (CEO, Abbott), all described their journeys and insights from decades of healthcare excellence.

Leadership Plenary Session Exhibit Hall FG *Saturday 9:45 AM*

Agility is the key to uncertainty

How health leaders can deal effectively with the challenges facing the American healthcare system was discussed on Saturday morning by guest lecturer Guy David, the Alan B. Miller Professor of Health Care Management at the Wharton School and the Perelman School of Medicine at the University of Pennsylvania (PA, USA).

An economist whose endeavors include study at the National Bureau of Economic Research, and the editor-in-chief of the *International Journal of Health Economics and Management*, Professor David has spent many years researching health economics issues related to cardiothoracic interventions such as transcatheter aortic valve replacement. He has published papers on topics including competition in healthcare markets, policies toward nonprofit providers, the economics

> "We tend to stick with trends we understand and just ignore uncertainty, but you should be prepared for everything."
>
> **Guy David**

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and organization of emergency medical services, the division of labor along the care continuum, nursing turnover, patient-centered medical care, and retainer-based medicine.

"For the past 12 years or so, I've been very much engaged with physician leadership and clinician leadership in general," Professor David told *AATS Daily News* in advance of his lecture. "In addition, I had the good fortune to interact with Lars G. Svensson, president of the AATS, at a special leadership program that we ran for the Cleveland Clinic."

Professor David focused on managing healthcare systems in the US, and in particular, health leaders' approaches. "There are many challenges that they're facing," he said. "It is enough to create paralysis."

A common complaint Professor David has come across from health leaders is that things are in disarray. Certainly, he agrees the health situation is getting more challenging. "It does feel 'messier'. Technologies are getting more expensive, treatment is getting more personalized, yet resources remain the same," he explained. "As such, we're working with similar constraints as we did before, but we're trying to achieve much more. That's a challenge."

A shift in approach may make these challenges more palatable, continued Professor David, re-framing the mess as more of a complex system. Professor David divided these challenges into several dimensions, including rising costs, market interactions (whether mergers or acquisitions), and workforce challenges. "If you're a healthcare leader, you're going to have to deal with regulation too," he said.

"There are technologies in various formats – such as clinical technologies, artificial intelligence and changes in digital presence – and there are changes in emphasis on health equity that also have to be incorporated."

Understandably, there is a reticence toward dealing with so many issues at the same time, said Professor David: "You have to navigate all those things – and they're very interrelated. Instead, one tends to go with, 'Okay, what did we do yesterday? That worked – let's do it again today'."

As a result, Professor David underlined the importance of agility, i.e. the capacity to make decisions under uncertainty, as well as understanding that not doing so is in itself a big decision to make.

Indeed, any of these dimensions can be overwhelming when they involve uncertainty, thus Professor David laid out a framework for how to deal with different levels of uncertainty. "Note there is a difference between 'trend' and 'uncertainty'," he stressed. "You can go from trend to near trend to near uncertainty, all the way to uncertainty.

"We tend to stick with trends we understand and just ignore uncertainty, but you should be prepared for everything. We can experiment with alternate realities – whether regulatory realities or actual reimbursement realities – and start to create real sandboxes to understand what may and may not work."

> "We're working with similar constraints as we did before, but we're trying to achieve much more. That's a challenge."
>
> **Guy David**

The idea is to learn lessons way ahead of time, continued Professor David. "The fear is that when changes appear on the horizon, they're going to be suddenly and broadly implemented," said Professor David. "When I'm negotiating, I want to come in and I want to be able to share experience from those sandboxes."

One example is the idea of shifting payment models. Today, at least in the US, healthcare is predominantly paid per volume, but there is a lot of discussion about moving to more value-based models. While there may be reticence toward trying out different payment models, agility means embracing and experimenting with such concepts, explained Professor David. "I would think about creating a sandbox, let's say a certain procedure, in a certain domain, in a certain hospital where we can experiment with paying for services in a different way."

The sandbox approach can be problematic, however, as the culture of experimentation is so wound up with the idea of success and failure. That is, if someone comes up with an idea, and the experiment fails, it's unlikely that person will be listened to again because they are seen to have failed," noted Professor David. "We should stop thinking about success and failure, and think more about learning."

Ideally, it's about finding a place where experimentation is well-practiced and curious, yet safe. That is, failures (or even successes) are not pinned to an individual, and definitely not weighted against their future aspirations. "You really want to create an environment where people are bought into this notion of learning, and they're not afraid to make bold moves. It's not all about you as a leader – you have to create a structure underneath you in the organization where people can come up with ideas, and want to try different things.

"If they want to experiment, that's really what moves things forward, and it really helps an organization grow and tackle the challenges ahead."

An important point to reiterate is that health leaders do have to make decisions on things that feel very uncertain. "You need to help create a culture of experimentation so you can be a bit savvier about the kind of decisions you're making," said Professor David in closing.

Structural Heart Scientific Session: LAA and Atrial Fibrillation Room 715 *Sunday 7:30 AM*

Patients without AF: could they benefit from an LAAE?

A provocative set of trial results on four-year ischemic stroke and mortality benefit will be given this morning by Patrick M. McCarthy, Vice President of Northwestern Medical Group at Northwestern hospitals (IL, USA), who runs the Bluhm Cardiovascular Institute.

Dr. McCarthy, who has been involved in surgery for atrial fibrillation (AF) since its very beginning in the 1990s, will talk about a study of 61,000 patients based on the Real World Data Insights database, which covers 80% of the insured population in the US. His team looked at the impact of a surgical left atrial appendage exclusion (LAAE) device on ischemic stroke in patients undergoing open cardiac procedures.

Importantly, the patients had no history of AF, Dr. McCarthy told *AATS Daily News*, but their average age of 74 meant a risk for developing AF, and therefore stroke.

Landmark studies have pinpointed that LAAE reduces the risk of stroke, but those have been in patients with existing AF prior to heart surgery. That is why Dr. McCarthy's study is important. "We're looking at patients who didn't have a history of AF, but, because of their age and other factors, we knew they were at risk to develop it," he explained.

"We know that some people treat non-AF patients with an LAAE clip, but there hasn't been very good evidence to support that approach. Intuitively, however, it does make some sense."

His study utilized the Real World Data Insights database to focus on non-AF patients aged 65 and above who underwent coronary artery bypass, valve procedures, or both with concomitant surgical epicardial LAAE between 2015 and 2020, with a minimum of two-year follow-up.

To balance confounders between the groups, the researchers employed inverse probability treatment weighting and utilized logistic regression for comparisons of 30-day perioperative outcomes. "The good news is that there was no particular increased risk, increased mortality, bleeding or other strokes," he revealed. There was more AF with LAAE, he added, but that was not too surprising. "People that have never had AF a day in their life can develop AF after surgery, and LAAE may increase that risk temporarily," he explained.

> "If it takes less than two minutes to put the clip on and it leads to a reduction in stroke by 33%, why would you not do that?"
>
> **Patrick M. McCarthy**


Patrick M. McCarthy

Longer-term outcomes were the most important data, said Dr. McCarthy. Looking at a four-year follow-up his team discovered interesting results. "There was a 28% reduction in stroke over that time. That's ischemic stroke in particular," said Dr. McCarthy. There was also a 34% reduction in mortality. "We were happy to see there was the reduction in stroke, and I am surprised that there was such an important reduction in mortality," he added.

Of course, as this is a database study, the research can't be granular, noted Dr. McCarthy. For example, the exact cause of death – be it from a stroke, cancer or any other cause is unclear. "We just know that there was a mortality difference," he said. "But even this evidence, I would say, is good."

Importantly, the study is a precursor to a much larger randomized trial called LeAAPS (Left Atrial Appendage Exclusion for Prophylactic Stroke Reduction), which is currently recruiting. "The study I am presenting is potentially a little preview of what LeAAPS might find," he said. "That's going to be a huge trial."

Dr. McCarthy deliberately designed his study in a way that was similar to the LeAAPS trial, of which he is also a principal investigator. "If it has similar results, we'll be elated," said Dr. McCarthy. "That would be important because it would have a really big impact on our practice and how we treat patients."

LeAAPS is a 6,500-patient randomized trial which will test if closing off the LAA with the AtriClip (AtriCure) reduces stroke occurrence. LeAAPS includes patients who do not have AF, but who have one or more risk factors for developing AF in the next five years.

Many of the co-authors of the study Dr. McCarthy is presenting today are also working on LeAAPS. Co-author Richard Whitlock, for example, is the global principal investigator for LeAAPS, and was also the first author on the LAAOS III trial.[1] LAAOS III looked at whether surgical occlusion of the LAA can reduce stroke and other complications. A landmark paper from that trial has already changed guidelines in this area, noted Dr. McCarthy, with Class 1 (level of evidence A) in support of closing the appendage of any patient with a history of AF going through cardiac surgery. "LAAOS had a monumental impact," he said.

That is why it is important to raise awareness of LAAOS III. "Everybody should be heeding this strategy in patients with AF," said Dr. McCarthy. "If it takes less than two minutes to put the clip on, and it leads to a reduction in stroke by 33%, why would you not do that?"

Finally, Dr McCarthy would like there to be more recognition that the LeAAPS trial is ongoing. "Today's study is a little snapshot. We don't know what the results of the trial will be, but it is encouraging, and maybe this is going to change practice when we have also finished the LeAAPS trial."

References

1. Whitlock RP, Belley-Cote EP, Paparella D et al. Left Atrial Appendage Occlusion during Cardiac Surgery to Prevent Stroke. N Engl J Med. 2021 Jun 3;384(22):2081–2091.

ERAS for Cardiac Surgery: Next Steps in Perioperative Management Room 714 *Saturday 7:30 AM*

MICS vs. ERAS: the chicken or the egg?

Re-framing of our understanding of minimally invasive cardiac surgery (MICS) based on goals for patient experience was the order of business yesterday when Marc Gerdisch, Chief of Cardiothoracic Surgery at Franciscan Health (Indianapolis, IN, USA) took to the podium to present during an interesting debate. A founding board member of the Enhanced Recovery After Surgery (ERAS) Cardiac Society, Dr. Gerdisch was well-equipped to compare MICS with ERAS in front of the audience. "I was chosen because our program is advanced in both MICS and ERAS, and continues to evolve," he told *AATS Daily News*.

Dr. Gerdisch chose to name his contribution 'Schrodinger's Chicken.' "In the context of this vision, a given institution is the box, and the chicken/egg lives in superposition within," he said. "When someone chooses to observe the contents, they may encounter either chicken or egg, as they are in fact actively the same."

When a paper in 1994 first outlined simple steps that could be taken with respect to rapid extubation and patient mobility,[1] arriving at a substantially shorter length of stay, the reception from the cardiac surgical community was at most modest, according to Dr. Gerdisch. Interestingly, that paper was authored by Richard Engelman, father of the current president of the ERAS Cardiac Society, along with several other surgeons from Bay State Medical Center and Hartford Hospital.

"I suppose at the time, simply having good outcomes and without any understanding of what technological advancements would be on the horizon with respect to transcatheter interventions, there wasn't a great deal of impetus for already busy surgeons," said Dr. Gerdisch. Furthermore, the dovetail between quality outcomes and cost reduction had not yet become as important as it in this era of value-based care. "The notion that we should be scrutinizing every step of the process to optimize the opportunity for patients to rapidly resume all of the rigors of their lives had not at that point evolved," he added.

"One might think of minimally invasive as minimally disruptive."

Marc W. Gerdisch

The explosive growth of transcatheter interventions more recently has transformed the evidence base. This has been reflected in cost savings and a better quality of life observed for patients who were followed long enough to discern the difference, he said. Concurrently, surgeons have been refining their minimally invasive skills. "While the sternotomy approach remained essentially unchanged for decades, we aspired to take sequential steps to deliver the same operations through smaller incisions with less trauma and less socioeconomic impact for the patient," he said.

"The obvious advantages of minimally invasive surgery are largely in recuperation. Putting patients back to their full lives as soon as possible is the primary target. This of course must come without compromising the operation."

Dr. Gerdisch has participated in the Mini-Mitral International Registry, which comprises nearly 8,000 patients. Among the 17 contributing centers are some of the busiest minimally invasive programs in the world, and the results from a series of publications from the database are unequivocal. "Minimally invasive valve surgery can be performed with excellent outcomes for various risk stratifications, with a low incidence of mortality and neurologic complications," he underlined. "Of course, challenges are similar to the sternotomy approach – for example risk to cross-clamp time the risks for pacemakers in the setting of tricuspid valve repair."

At the same time as transcatheter interventions have expanded, MICS has adjusted, he explained. MICS has addressed difficult scenarios that might arise, as demonstrated by a minimally invasive series to treat failed transcatheter interventions, published by Dr. Gerdisch and others. "Also, a recent meta-analysis with propensity score matching distinctly favors minimally invasive surgical aortic valve replacement over transcatheter," he added.

For surgeons, the most important advancement added to minimally invasive procedures has been the ability to definitively address discomfort around the time of surgery, said Dr. Gerdisch. "Through a combination of regional block and cryo-analgesia, we have been able to create a consistent rapid recovery experience for our minimally invasive patients," he said. "This became most evident when narcotic use was eliminated in the entirety of the

perioperative course."

There is an obvious caveat though, said Dr. Gerdisch, linked to the approach to patients who are best served through a sternotomy. "To be genuinely successful, we must achieve the same experience for all our patients," he said. "This is where the distinction between MICS and the more global ERAS concepts must disappear." The approach taken for the operation should be in superposition, therefore. "We should not be able to distinguish what was performed without opening the box, or in this case, examining the skin."

A randomized control multicenter study comparing sternotomy closure with rigid plate fixation to wire cerclage in 2017 demonstrated statistically significant improvements in sternal healing, fewer sternal complications, and no additional cost compared to wire cerclage at six months following surgery.[2] Follow-up showed significantly reduced sternal pain and improved upper extremity function with no difference in 90-day cost. "Oddly enough, the response from the surgical community was again nearly unidentifiable," added Dr. Gerdisch. Despite that, his program followed the data and added rigid plate fixation of the sternum to every sternotomy case, and witnessed the benefits described in the randomized control studies. "It only fueled our aspiration to achieve a singular better pathway for all our patients."

> "MICS and ERAS exist in superposition, and the beginning of one is the beginning of the other. You could say the chicken and the egg arrived together."
>
> **Marc W. Gerdisch**

While participating in writing the guidelines for perioperative care and cardiac surgery in 2019, Dr. Gerdisch learned much from the experienced leaders in the ERAS Cardiac Society. "We implemented the entirety of the guidelines, while also removing all sternal precautions following cardiac surgery," he said. The results have been stark. "There was a distillation of the patient pathway to a single corridor where small incision and sternotomy approach became nearly indistinguishable during recovery."

Over a period of seven years, Dr. Gerdisch said patients have experienced a significant decline in postoperative pain scores for both small incision and sternotomy approaches while simultaneously eliminating the use of narcotics. During the same time, discharge to any type of extended care facility fell by two-thirds. "This was in the setting of significant reductions in length of stay for both small incision and sternotomy patients, while keeping 30- and 90-day readmissions consistently at 10% or less," he added.

Ultimately, there may not be any real or important distinction between small incisions and sternotomy. "One might think of minimally invasive as minimally disruptive," said Dr. Gerdisch. "Beyond perfect heart surgery – and striving to make infrequent complications rare – we should continue our dedication to lessening tissue and systemic trauma, lowering the psychological impact of surgery, and combating any physical limitations patients might experience for any period following the operation."

Dr. Gerdisch concluded: "In this sense, MICS and ERAS exist in superposition, and the beginning of one is the beginning of the other. You could say the chicken and the egg arrived together."

References

1. Engelman RM, Rousou JA, Flack JE 3rd, et al. Fast-track recovery of the coronary bypass patient. Ann Thorac Surg. 1994;58(6):1742–1746.
2. Allen KB, Thourani VH, Naka Y, et al. Randomized, multicenter trial comparing sternotomy closure with rigid plate fixation to wire cerclage. J Thorac Cardiovasc Surg. 2017;153(4):888–896.e1.

Cardiothoracic Surgery in Low and Middle-Income Countries Room 802 *Sunday 7:30 AM*

How to build cardiothoracic surgery programs in low- and middle-income countries

Lessons learned in establishing sustainable cardiothoracic surgery programs in under-resourced countries will be addressed this morning by Jay Pal, sharing his experience in global surgery efforts, perspectives on improved access to cardiac surgical care in rural communities, and continuing education for providers. "I have seen how different programs work in different countries," said Dr. Pal, who is LeRoss Professor in the Division of Cardiothoracic Surgery, and Adjunct Professor of Global Health at the University of Washington (WA, USA). "Working in this space for some time, I've been fortunate to learn some of the features that lead to successful and self-sustaining programs."

Similar needs in one part of the world can often translate to others, according to Dr. Pal. Recently a patient needed an operation in one sub-Saharan country, but the equipment was not available. "In the end, it was couriered from a neighboring country that was also working on developing a program, so a young patient got treated in a timely fashion," he said. "Sometimes resource-sharing is feasible." This patient-centered collaboration was due to the relationships between neighboring programs.

> "Establishing a reliable supply of equipment and drugs in low- and middle-income countries is an order of magnitude more challenging than in the US."
>
> **Jay Pal**

The scenario is an example of the pragmatic way programs in resource-poor nations are being developed today, and how things have changed. Over the last couple of decades, there has been a move away from the mission-type, fly-in-fly-out surgery programs, said Dr. Pal. "That was the press-release type of work." Indeed, these programs tended to start via individuals in the Western world, but there was no thought of getting buy-

in from the target country, he added.

"There has to be a local champion – someone who understands the importance of the project, someone with the influence within government or some other agency who enables the development of that program in that country." Such local support, ideally governmental, is critical because ultimately that's where the bulk of the money comes from, Dr. Pal underlined. Of course, many programs do run off grants and foundations, but these are difficult to sustain, especially when the principals from early efforts/phases move on to other things. The Edwards Foundation, which supports numerous programs in LMICs through their Every Heartbeat Matters program,[1] emphasizes the need to develop sustainable practices and local collaboration.

There is also more recognition now that addressing heart disease is critically important. After all, noncommunicable diseases such as heart disease, cancer, chronic respiratory disease, and diabetes disproportionately affect people in low- and middle-income countries (LMICs).[2] "One of the things I heard early on as I started working in this space was that you could spend the same amount of money and treat thousands of patients with penicillin, or you can treat a few patients with heart surgery," said Dr. Pal.

More progressive approaches suggest the importance of treating noncommunicable diseases at all stages, particularly when considering specifics group of people suffering from heart disease – predominantly those who would otherwise be in the workforce, and are of reproductive age. "For a variety of reasons, if you neglect this group – young to middle-aged adults – it has a very significant impact on the community," he explained.

Managing logistics within programs is highly complex too, said Dr. Pal. "I think establishing a reliable supply of equipment and drugs in LMICs is an order of magnitude more challenging than in the US," he said. "Transport, middlemen, local organization, procurement, and other factors all need to be considered. It is much more complicated than I first thought when I learned about the process of ensuring a sustainable supply chain."

Specialized equipment for cardiac surgery is often used in much smaller quantities in LMICs. With less economy of scale, and without pooled procurement, it can be prohibitively expensive. Similarly, anticipating requirements for the foreseeable future is challenging. "You don't want to order too much, because these things expire," warned Dr. Pal. "If a program is relatively low volume, or in its infancy, they may not be using up the supplies consistently."

Caseloads may be very episodic, peaking when certain experts or teams from other parts of the world come, and then laying dormant for perhaps months at a time. "On the one hand, you don't want to hold on to that much inventory and pay that much cost, but it's also really hard to order things just-in-time in sub-Saharan Africa or Southeast Asia," noted Dr. Pal.

Sustainability in the overall rollout of programs is also a concern. For example, the programs in Nepal where Dr. Pal has worked have grown substantially in the past 20 years. "Tribhuvan University Teaching Hospital and Shahid Gangalal National Heart Hospital in Kathmandu handle very high volumes with excellent outcomes," he said. Yet, despite the program's success in treating a population in the city center, large parts of the country, especially in the rural communities, do not. "There is little infrastructure for these patients to even be diagnosed, let alone travel to a hospital that can do these operations."

Various programs have tried developing a cardiac center in a place away from a population center to see if they can treat patients in that group, but that exacerbates the problem of a low-volume, low-expertise program in an area that may not be consistently busy. Cardiac surgery is one of those specialties where the more cases that are performed, the better the outcomes, so this does compound the issue: "It's really hard to justify developing a new program in a specific area for an unknown number of patients," reasoned Dr. Pal. "It may be much more sustainable to simply develop a mechanism to transport patients to a place that is busy, does good work, and has demonstrable quality."

What is clear is that there are many commonalities in programs developed in different LMICs globally, according to Dr. Pal. "While there are differences, there are many lessons that can be helpful. For every program that has been successful in one part of the world, I'm sure there's a translatable lesson that helps another program develop too."

> "For every program that has been successful in one part of the world, I'm sure there's a translatable lesson that helps another program develop too."
>
> **Jay Pal**

References

1 Edwards. Every Heartbeat Matters. Available at: https://www.edwards.com/about-us/every-heart-beat-matters; accessed April 2024

2 Global Noncommunicable Diseases. Centers for Disease Control and Prevention. Available at: https://www.cdc.gov/globalhealth/healthprotection/ncd/index.html; accessed April 2024.

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C. Walton Lillehei Resident Forum: Clinical Room 718A *Sunday 12:00 PM*

The time is now to consider donors with hepatitis C

Heart transplants from donors with hepatitis C virus (HCV D+) have excellent outcomes, but many candidates are unwilling to even consider HCV D+ offers. So says Jessica Ruck, a general surgery resident at Johns Hopkins University School of Medicine, who obtained her PhD from the Johns Hopkins Bloomberg School of Public Health (MD, USA). For the past decade, Dr. Ruck has been interested in solid organ transplantation – particularly in improving access to transplantation and outcomes for heart transplant candidates. She will be talking about research to evaluate whether listing as willing to consider HCV D+ offers in heart transplantation is associated with mortality.

Currently, when potential candidates for organ transplantation are put on a waitlist, they and their providers fill in a form that stipulates donor acceptance criteria. Importantly, candidates (but predominantly their providers) can indicate whether they wish to hear about offers of organs if the donor has HCV. "In the past, most people would have said no, unless their candidate had HCV already," said Dr. Ruck.

> "What I hope everyone takes away from this talk is that one of the easiest ways to increase your transplant candidates' access to very safe, very effective transplants, is to just consider these organs."
>
> **Jessica Ruck**

However, with the approval of direct-acting antivirals (DAAs) by the US Food and Drug Administration (FDA), 95–100% cure rates have been seen with HCV. "There is now a possibility of using all these organs that previously would have been thrown out just because the person had HCV – even if donors were otherwise incredibly healthy," said Dr. Ruck.

This is important in light of the opioid epidemic, she added, which unfortunately presented a rising number of otherwise ideal donors. "There is an opportunity out of this incredible tragedy of their deaths to give others – possibly up to seven people – life," she added.

Subsequent trials have established that recipients of livers, kidneys, hearts, and lungs from HCV D+ who also receive DAAs do very well, said Dr. Ruck. "As a result, this practice has been taking off, with a big uptick in interest," she added.

Jessica Ruck

Despite this, many providers are still unwilling to accept HCV D+. Qualitative studies have established that the strongest predictor is the provider's competence and recommendation, added Dr. Ruck.

The fact is, donor acceptance criteria do not mean the organ offer must be accepted. "People don't have to say, 'If you offer me an organ with HCV, I have to take it.' All they need to do is say they will think about it. So, it gives people more opportunities without being bound in any way," she explained.

Despite this, 12–15% of heart centers have still never listed a single person willing to consider these offers from HCV D+, continued Dr. Ruck. Even those who have listed recipients as willing to consider organs from HCV D+ have done so on an extremely limited basis. "Most of them are only including a portion of their list," she said. "Even though the data we have now (and it's been a few years), show that it is incredibly effective and safe."

Dr. Ruck's talk in Toronto will consider heart transplant candidates in particular. Using the Scientific Registry of Transplant Recipients, Dr. Ruck's team looked at 12,887 adult heart transplant candidates prevalent on the waitlist from October 2018 to July 2022. "We compared waitlist mortality and likelihood of receiving a heart transplant between candidates listed as willing vs. not willing to consider HCV D+ offers," she said.

"We showed that candidates who were willing to consider these organs – and they heard about other offers as well – were 21% more likely to get a transplant," she said. "They were also 37% less likely to either die on the waitlist or to be removed from the waitlist because their health was deteriorating.

"Of the people who end up getting a transplant, about 16–17% of those transplants were from donors with HCV. That's a huge proportion."

Dr. Ruck's study is the fourth in a series her group has carried out. They have looked at other organs (such as the lungs), comparing the mortality rates of people with transplants from HCV D+ or not. "We have really good data out to three years now," she said. "We feel like we have analyzed a large enough group of people that we can be confident in what we are saying."

Additionally, using national registry data means they have a good view of every transplant in the US. "It's amazing because we get to see everyone, and it's completely generalizable," she said. "There's no population that this doesn't apply to."

Dr. Ruck emphasizes the effectiveness of considering offers from HCV D+. "What I hope everyone takes away from this talk is that one of the easiest ways to increase your transplant candidates' access to very safe, very effective transplants, is to just consider these organs," she said. "It's literally one click in the system to list them, and a simple conversation to the would-be recipient."

All-told, while HCV D+ is increasing, it is still relatively rare, so there is still work to be done. "My hope is that people understand how powerful this is as a tool to increase access to transplants, and that we move toward so that HCV D+ becomes the norm," Dr. Ruck said in closing.

Member for a Day Session Room 803 *Sunday 4:00 PM*

'What the AATS means to me'

This afternoon plays host to a Member for a Day session that will dive into many topics including diversity, wellbeing, application preparation, work-life balance, and a 'Day in the Life' in different surgical sub-specialties and medical school. Opening the session will be Rosemary Kelly, AATS Secretary and C. Walton and Richard C. Lillehei Professor and Executive Vice-Chair of Cardiovascular and Thoracic Surgery at the University of Minnesota, Minneapolis, MN, USA.

Dr. Kelly spoke to *AATS Daily News* to share her unique perspectives on what the AATS means to her as Secretary, walking through the insights she has gathered, the important work and reach the AATS is synonymous with, and the exciting times ahead.

> "Challenging our colleagues and our work is a critical aspect of quality patient care and the advancement of science. Every cardiothoracic surgeon needs to be a part of this process."
>
> **Rosemary Kelly**

Let's start with your own journey within the AATS! How has your involvement from a member to Secretary impacted your own research interests, career and professional development?

As a member, the AATS has always inspired me to be more innovative in my research and my clinical endeavors. It has connected me with leaders in the field and like-minded scientists. My first real interaction with leaders of the AATS was through the Leadership Academy as a new member. The commitment to the next generation of cardiothoracic academic surgeons was so impressive and helpful. Similarly, the Biology Club supported basic science research by cardiothoracic surgeons and encouraged me to pursue my work in regenerative therapies for the ischemic myocardium.

Now, as AATS Secretary, I have the opportunity to interact with the top leaders in our specialty from around the world. The energy and commitment of the leaders to provide outstanding patient care, innovative discovery and lifelong education is extraordinary. Being Secretary is an honor and an opportunity to advance this work. The office allows me to serve my colleagues by supporting educational grants, new publications, and the professional development of the academic cardiothoracic surgeons around the world. It keeps me excited

about my own professional interests, and challenges me to do even more.

What are some of the key initiatives or priorities of the AATS that you are most passionate about?
I am most passionate about bringing innovation to patient care, and professional development for academic surgeons. As such, initiatives such as the AATS Quality Gateway (AQG), AATS Digital Library and Foundation Scholarships are of vital importance to me. The AATS has been promoting scholarship, innovation, and leadership in thoracic and cardiovascular surgery since 1917. To carry this legacy forward using state-of-the-art tools is exciting. We can educate surgeons from around the world, and inspire the creation of novel therapies that will cure the most devastating diseases.

AATS members clearly share this passion because they engage and support such transformative initiatives. My passion is to support our members to achieve even more by providing better data analytics, quality publications, research funding and access to the most innovative science.

"The AATS has been promoting scholarship, innovation, and leadership in thoracic and cardiovascular surgery since 1917. To carry this legacy forward using state-of-the-art tools is exciting."

Rosemary Kelly

Can you tell us about your work on initiatives such as the AATS Foundation Board, the Leadership Academy Board, Publications Committee and Cardiothoracic Residents Committee? Particularly how you have striven to improve educational experiences and professional opportunities for the next generations of cardiothoracic surgeons?
The AATS is committed to developing the next generation of cardiothoracic surgeons through educational opportunities, research scholarships, community building, and leadership development. As Program Director for the Thoracic Surgery Residency Program at the University of Minnesota, I care deeply about the next generation of cardiothoracic surgeons. Their perspective helps me make informed decisions about how the AATS can provide the best education and professional development opportunities.

For this reason, I am part of the Cardiothoracic Resident Committee which focuses on providing events and topics that are critical to those just starting their careers. For the Annual Meeting, this committee planned specific programs focused on students and residents. There is a poster competition, the C. Walton Lillehei Resident Forum in clinical and basic science, a Resident Lounge, 'Meet with a Mentor' sessions, a Mentor for a Day program, and the Training Village with hands-on surgical training.

We recognize that our trainees are deeply committed to their patients, and work extraordinarily hard. The AATS helps them to connect with their peers and surgeon leaders at the Annual Meeting and provides free, peer-reviewed educational opportunities through the AATS.org Digital Universe. In addition, the AATS Foundation has multiple grants to support mentorship and research opportunities for students and residents. The AATS clearly recognizes the need to attract and retain talented young surgeons who will be the next generation of leaders in our specialty.

For our members, the AATS supports academic and innovative endeavors over the course of a surgeon's career. As a member of the Publications Committee, I engage in strategic planning which ensures that our journals lead surgeon education and innovation. Our publications provide a global platform for surgeons engaged in clinical and basic science research, and new journals serve our specialty through unique publications.

It is exciting to develop new mechanisms to share ideas, techniques, and devices. AATS journals provide a surgeon-focused platform for individuals to submit their original work, provide commentary, and participate in the review process. Challenging our colleagues and our work is a critical aspect of quality patient care and the advancement of science. Every cardiothoracic surgeon needs to be a part of this process.

As for personal development, the Leadership Academy is a program designed to encourage and develop cardiothoracic surgeon leaders. A one-day, intensive course connects aspiring cardiothoracic surgery leaders with the best in our field. I enjoy being part of this committee to bring to surgeon leaders the most relevant new ideas for managing the complexity of academic organizations. Curriculum development focuses on administrative and financial topics pertinent to academic surgeons stepping into division-chief or department-chair roles. The Academy creates a community of peers and mentors for ongoing support as participants enter a complex and challenging aspect of their careers.

It sounds like there is a lot of very important and fascinating work in progress. With that in mind, in your role as Secretary, how do you help advance the overall missions and goals of the Association?
As Secretary, I am intimately involved in oversight of multiple programs that serve our members. Through the AATS Foundation and Publications Committee, I work to support our mission of leadership, research, and education. I serve to connect the AATS with other professional societies, engage with industry, encourage philanthropy, and promote the AATS programs. The role of Secretary is to ensure that the AATS upholds its commitments to the members while also looking to future innovations and opportunities.

One of the best experiences has been interacting with leaders of other international societies such as ASCVS, EACTS, ESTS, and JATS. We have collaborated on guidelines and expert consensus documents that are meaningful to our members and patients by providing a thoughtful,

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surgical perspective for complex diseases. We have also collaborated on how to create guidelines to the highest standard through a webinar (created last year) and manuscript. Dr. Faisal Bakaeen will present this paper this morning [7:57 AM, Room 718B]. The opportunity to work with international leaders to advance our specialty in academic and clinical pursuits has been extraordinary. AATS is an organization that I am proud to represent as we strive for scholarship, innovation, and leadership in thoracic and cardiovascular surgery.

Can you expand on that, i.e. how does the AATS support and empower its members, both professionally and personally?

Membership in AATS demonstrates a dedication to education, mentorship, and advancing patient care. The Association provides a platform for leaders in the field to share their knowledge and expertise with the surgical community. Our specialty is rapidly changing, so it is imperative that we share information with our colleagues from around the world to ensure that our patients suffering from cardiovascular and thoracic disease have the best possible care. With AATS being comprised of global leaders in the field, we are in a unique position to help disseminate best practices, teach, and mentor the future generation of surgeons.

> "The AQG is a game-changer for cardiothoracic surgeons. Using a specially designed machine-learning algorithm, the AQG can provide risk adjustment in real time, and outcomes for nearly every cardiac procedure."
>
> **Rosemary Kelly**

What's next? Are there exciting, innovative or particularly resonating initiatives that you are looking forward to seeing realized in the coming years for the AATS?

I believe that the AQG is the most innovative initiative within the AATS. This has been a work in process for many years, and it is so exciting to see it officially launched at this meeting. Several pilot sites are already using AQG, and will talk about their experience at the Annual Meeting during a couple sessions.

The AQG is a game-changer for cardiothoracic surgeons. Using a specially designed machine-learning algorithm, the AQG can provide risk adjustment in real time, and outcomes for nearly every cardiac procedure. This isn't something we've had before. It is such a critical improvement for our patient care. It can provide center-level and physician-level risk calculation. The AQG team is working diligently to launch the thoracic and congenital modules, which will be a completely new tool for those specialties. If anyone wants to learn more about the AQG, I encourage them to visit the AQG booth in the Exhibit Hall (#120) where staff are giving official demonstrations of the product.

Any final thoughts for the *AATS Daily News* audience?

I want to welcome everyone to this exciting Annual Meeting – one which will showcase innovation, technical advances and novel science in our field, and with important interactions with our cardiovascular anesthesia colleagues across many sessions. It is a time to connect with friends and colleagues and challenge ourselves with new ideas. I hope it inspires our students and residents to become cardiothoracic surgeons.

It is such an exciting field, and the Annual Meeting is our premier showcase. Enjoy!

Perioperative Care Scientific Session: What Happened to TEAMSTEPPS? Room 714 *Sunday 1:30 PM*

CSU-ALS training has value across a wide spectrum of institutional experience

Cardiac surgical unit advanced life support (CSU-ALS) training's effect on mortality-related outcomes before now has been limited, even though is an incredibly important topic. That will be the opening message of Matthew Weber (University of Virginia, Charlottesville, VA, USA), who takes to the podium to discuss new data on the effectiveness of CSU-ALS on failure to rescue (FTR) after cardiac arrest.

Over the past decade, there has been significant emphasis on enhancing team structures and refining processes within institutions to better serve the post-cardiac surgery patient population. Dr. Weber's talk will outline the history of standardized resuscitation protocols after cardiac arrest initiated in European cardiac surgery centers, followed by the STS expert consensus statement in 2017, and how CSU-ALS certification aligns with these practices. "A key area of focus is the resuscitation process for patients experiencing cardiac arrest after surgery," he said. CSU-ALS certification is a targeted intervention adopted by these institutions to improve outcomes. "Despite its importance, there remains a gap in the literature regarding comprehensive outcome analysis of CSU-ALS certification," he said.

> "Despite its importance, there remains a gap in the literature regarding comprehensive outcome analysis of CSU-ALS certification."
>
> **Matthew Weber**

Dr. Weber explained that CSU-ALS certification represents a comprehensive training program for the entire cardiac care team, encompassing surgeons, intensivists, fellows, residents, advanced practice providers, and nursing staff. "This certification process is specialized for the unique challenges of cardiac arrest in cardiac surgery patients, involving specific protocols such as stacked defibrillations, urgent re-sternotomy, and nuanced medication management," he said.

"The program is designed to build a cohesive, highly proficient team by formalizing the learning of these critical steps, and reinforcing them with both traditional educational methods and ongoing simulation exercises to maintain and hone clinical skills."

The original hypothesis behind the study was that CSU-ALS centers would have reduced odds of FTR after cardiac arrest, because of the known and evidenced practices that are put into place. Dr. Weber's institution is part of a rich database uniquely capable of examining intricate peri-operative care variations, such as those seen with CSU-ALS practices. To carry out the study on mortality figures after certification, his group looked at participating centers affiliated with the Virginia Cardiac Services Quality Initiative (VCSQI) consortium, to which his institution belongs.

The network pools cardiac surgical data from multiple institutions, thereby creating a comprehensive database. "Such a resource is invaluable for conducting extensive multi-institutional research projects like ours," he explained. The strength of this group is the diversity in center size and practice, he added. This allows for a much better level of generalizability outside of Virginia.

During the session, Dr. Weber will discuss evidence from the research indicating that CSU-ALS certification and the operative volume of a center are each independently linked to a decrease in the likelihood of FTR following cardiac arrest. "That is, our data suggests that patients are more likely to survive both in-hospital and within 30 days post-operation after a cardiac-arrest event," he said. "It seems CSU-ALS certification has a positive impact on outcomes after cardiac arrest.

"There was a thought that perhaps CSU-ALS status would be a surrogate for high-volume, more experienced centers. However, what we found was that CSU-ALS status made an impact across the spectrum of institutional operative volume."

This is an important finding, noted Dr. Weber. "It suggests that if you are a high clinical-volume institution, you may have reduced mortality after cardiac arrest, independent of your CSU-ALS status (due to factors including clinical experience or resources)," he said. "Obtaining that certification can only improve your outcomes as a large center. However, if you are a smaller institution, these results suggest that CSU-ALS certification can have an impact on your patient population as well."

Future work will be to conduct an in-depth analysis of internal, single-institution data. To that end, Dr. Weber noted a study that underscores the necessity of including cardiac arrest in the definition of FTR within thoracic surgery practices.[1] Additionally, an early analysis of CSU-ALS training examined changes in clinical practices post-training, although it did not address the outcomes of such interventions.[2]

> "CSU-ALS status made an impact across the spectrum of institutional operative volume."
>
> **Matthew Weber**

Dr. Weber's research suggests that CSU-ALS certification could significantly benefit teams across a spectrum of operative volumes that aim to enhance or broaden their protocols for post-cardiac arrest resuscitation. "Embracing CSU-ALS certification can be an effective component of a comprehensive multi-disciplinary care team, and in supporting quality improvement initiatives within these teams," he said.

"Our research supports the idea that there are various avenues to achieve better post-cardiac arrest outcomes in the patient population. CSU-ALS training is a significant contributor to a multitude of effective strategies," he added.

However, the essence of CSU-ALS certification is to foster a highly integrated and proficient care team. The true reward lies in the seamless collaboration of a well-trained team, which is crucial – particularly in managing high-risk scenarios such as cardiac arrest following cardiac surgery, noted Dr. Weber.

One significant hurdle in the study was ensuring appropriate risk adjustment for the varied patient groups. "We employed a sophisticated statistical model for analysis, yet, as with any retrospective cohort study, some degree of unmeasured confounding is inevitable." Other limitations to the study include the granularity of data regarding the timing of cardiac arrest.

That data, as well as other information regarding the specifics of each arrest and the treatments involved, are very important to understand the most specific impact CSU-ALS has on outcomes. "This is not available in our current dataset," he said. "Future efforts to look at more institutional-specific data with that level of detail would be the next step."

Finally, a key takeaway from this research is that both CSU-ALS and institutional volume are independently associated with reduced risk of FTR after cardiac arrest. "From our perspective, this suggests that highly effective, efficient teams are important in improving outcomes in this context," said Dr. Weber. "This may happen through internal quality improvement efforts coupled with experience from high operative-volume centers, or through implementing CSU-ALS protocols irrespective of institutional size."

References

1. Strobel RJ, Kaplan EF, Young AM, et al. The Society of Thoracic Surgeons Definition of Failure to Rescue Should Consider Including Cardiac Arrest. Ann Thorac Surg. 2023;116(6):1301–1308.
2. Dunning J, Nandi J, Ariffin S, et al. The Cardiac Surgery Advanced Life Support Course (CALS): delivering significant improvements in emergency cardiothoracic care. Ann Thorac Surg. 2006;81(5):1767–1772.

SESSION HIGHLIGHT

Member for a Day Session

Sunday, 4:00 PM, Room 803

MODERATORS

Christopher Seder Rush University Medical Center

Bradley Taylor University of Maryland Medical System

PRESENTATIONS

Welcome by Co-Chairs

- Speakers: Christopher Seder, Rush University Medical Center; Bradley Taylor, University of Maryland Medical System

What the AATS Means to Me

- Speaker: Rosemary Kelly, University of Minnesota

Diversity in CT Surgery and Being a Woman/Minority in the Field

- Speaker: Joanna Chikwe, Cedars-Sinai Medical Center

A Day in the Life of a Congenital Surgeon/ Why I love Congenital Surgery

- Speaker: Stephanie Fuller, The University of Pennsylvania

A Day in the Life of a Thoracic Surgeon/ Why I Love Thoracic Surgery

- Speaker: Betty Tong, Duke University

A Day in the Life of a Cardiac Surgeon/ Why I Love Cardiac Surgery

- Speaker: Duke Cameron, Johns Hopkins Hospital

A Day in the Life of a CT Surgery Resident / How I Evolve in my Residency Training

- Speaker: Aakash Shah

Christopher Seder

Bradley Taylor

Medical Student Perspective/Preparing for Match Day

- Speaker: John Treffalls, University Hospital

Well-Being, Work-life Balance in CT Surgery: A Panel Discussion

- Speaker: Bradley Taylor, University of Maryland Medical System

How to Prepare to be an Outstanding Applicant for an I6 Program: Program Directors' Perspectives: A Panel Discussion

- Speaker: Eric Roselli, Cleveland Clinic

How to Prepare to be an Outstanding Applicant for an I6 Program: Residents' Perspectives: A Panel Discussion

- Speakers: Alexander Brescia, Washington University in St Louis; Aakash Shah

Closing Remarks

- Speakers: Christopher Seder, Rush University Medical Center; Bradley Taylor, University of Maryland Medical System

Final Q&A and Networking

Adult Cardiac Rapid Fire Orals Room 718A *Sunday 9:30 AM*

Rise of the robots in TECAB with a new generation of surgical trainees

Work focusing on a decade of robotic beating-heart totally endoscopic coronary bypass (TECAB) at a single institution will be outlined today, with data laid bare from Sarah Nisivaco and Husam H. Balkhy at the University of Chicago Robotic Heart Surgery Program, IL, USA.

Taking to the podium will be Dr. Nisivaco, who will offer a short introduction to R-TECAB for those less familiar with the procedure – including its benefits, robotic-nuances and general procedural processes etc. – as well as detailing when the procedure first emerged in their practice. "Dr. Balkhy first began performing beating-heart R-TECAB in 2007 (about 10 years into his practice)," she told *AATS Daily News*. "Notably, this occurred after several years of experience in traditional, open coronary artery bypass grafting [CABG] with some key aspects of his current R-TECAB procedure: off-pump surgery, skeletonized bilateral internal thoracic artery [BITA] harvesting, and use of certain technologies that were evolving at the time (e.g. anastomotic devices)."

Discussing the types of patients R-TECAB has been used for thus far, Dr. Nisivaco relayed Dr. Balkhy's experience in beginning with single-vessel cases (typically a left ITA grafting of the left anterior descending artery), then incorporating bilateral ITA harvesting to allow for multi-arterial grafting. "Currently, we routinely perform 1–3 arterial grafts with only ITA conduits for patients with single or multivessel disease," she said. "In those with more complex coronary artery disease [CAD], we incorporate a hybrid revascularization strategy to achieve complete revascularization."

As their experience in R-TECAB grew, so did the inclusion criteria regarding patient factors. Now they have performed this procedure on a wide variety of patients with various comorbidities, such as those with diabetes (including insulin-dependent patients), chronic kidney/end-stage

renal disease, higher age groups, and multivessel disease. "Although we believe all patients benefit from the quick recovery associated with avoiding coronary artery bypass [CPB] and non-rib spreading small incisions, certain 'higher-risk' patients may indeed benefit the most from this minimally-invasive approach," noted Dr. Nisivaco. "At this time, our only absolute exclusion criteria for R-TECAB is emergency surgery."

Of course, beating-heart TACAB at the present time cannot be performed without the assistance of robotic technology, which highlights the importance of a new era. "The enhanced visualization of the robot and high instrument dexterity inside the chest are essential to the procedure," continued Dr. Nisivaco "This is especially true in more complex coronary revascularization procedures, e.g. BITA harvesting and/or multivessel grafting, in which the benefits of the robotic technology are particularly important."

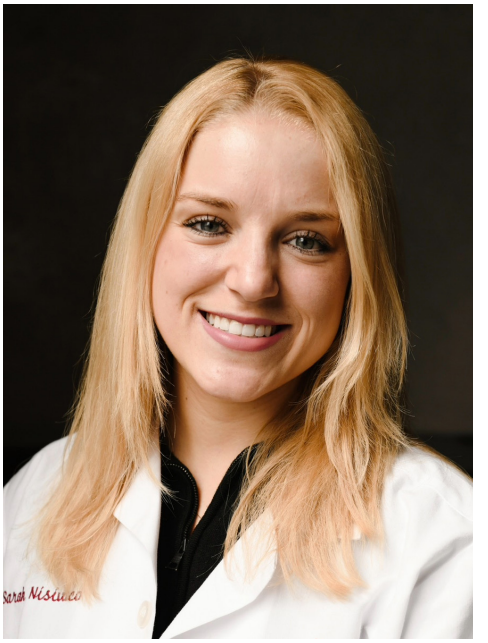
She went on to note that the training for R-TECAB has been somewhat variable based primarily on individual surgeon factors. When robotic cardiac surgery was first introduced in the early 2000s, surgeons learning this technology had no prior experience with the robot during their training. Now, a newer generation of surgeons is quite familiar with robotic technology from their foundational training (given the high use of robotics in general surgery, thoracic surgery, etc.), and it is already apparent that this helps streamline the training in cardiac robotics.

"Surgeons can start learning robotic-assisted cardiac procedures such as TECAB relatively early in their practice," stressed Dr. Nisivaco. "At present, the training typically entails spending 1–2 years at a certain center that performs the robotic procedure of interest in order to learn it."

On that note, one might venture that R-TECAB will be limited to specialist centers, owing to its training foundations, and a steep learning curve. "We believe certain factors are instrumental in the success of an R-TECAB program," commented Dr. Nisivaco. "One key factor is the routine performance of robotic-assisted procedures such that the surgeon and entire operating room [OR] team are extremely familiar with the technology. Through this method, as we have experienced, the robot becomes merely another intraoperative tool that everyone is comfortable with."

Dr. Nisivaco continued: "As is typically the case in most surgical procedures, the more experience the better, and we believe this is true for robotic coronary surgery. We have always advocated for a strategy of using a robotic approach whenever possible such that this technology becomes a tool in the OR that the operator is quite comfortable with. This naturally leads to better outcomes over time, as well as expanded patient inclusion criteria as the surgeon experience grows. In the beginning of a surgeon's robotic experience, it is advised to select more 'straightforward' cases on less complex patients.

"Over time, as noted previously, more difficult and complex cases can be taken on. We have published on our experience with performing off-pump R-TECAB in high-risk populations such as high preoperative STS scores, the elderly, low ejection fractions, and morbid obesity.[1, 2–4] We demonstrated good outcomes in these studies, with results similar to the whole TECAB cohort. However, these patients were generally operated on after many years of experience by Dr. Balkhy."



"The upcoming generation of surgeons is showing true excitement and interest in robotic heart surgery, and specifically R-TECAB."

Sarah Nisivaco & Husam H. Balkhy

Another key factor is the epicardial stabilizer – the importance of which cannot be over-emphasized in off-pump epicardial procedures such as TECAB, noted Dr. Nisivaco. "Only certain specialized centers may have access to these tools at the current time, but we believe as the procedure becomes more common (as we've seen with robotic-assisted mitral valve surgeries), the technology will become more widely available."

Indeed, the learning curve has historically been steep for R-TECAB, but certain strategies in the training and adoption of the procedure are useful, continued Dr. Nisivaco. To that end, and in addition to the factors mentioned above, experience with off-pump CABG and routine BITA harvesting in the open setting can help to shorten the learning curve.

"A final note on the technology would be that Dr. Balkhy currently performs a robotic sutured anastomosis but, prior to this, he used an automated anastomotic stapling device. We have published extensively on our experience with this device.[5–7] Although it is not currently available, we believe it and similar devices can help immensely in the overall R-TECAB learning curve, and particularly in the most challenging part of the operation – performing an endoscopic coronary anastomosis. This is especially true for surgeons who are early in their experience."

In her presentation today, Dr. Nisivaco will relay 10-year outcomes from an entire series of almost 900 robotic beating-heart TECAB patients – the largest to date. In the series, 17% had an ejection fraction of 40% or less.[1] "The data on outcomes for both single and multivessel procedures is excellent, including use of BITA conduits in multivessel cases," she said.

"Fifty-four percent of the cases presented in this series of TECAB patients were multivessel. We have previously published on our outcomes of multivessel grafting in robotic off-pump TECAB.[8–10] Our recent study – which looked at a series of patients undergoing 'advanced' hybrid coronary revascularization (TECAB with BITA grafting plus percutaneous coronary intervention [PCI]) showed good early- and mid-term results, and excellent graft patency.

"Advanced hybrid revascularization is an option

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in patients with multivessel CAD that allows for complete revascularization with BITA grafting to major left coronary targets and PCI to right coronary artery or distal circumflex branches, and (importantly) maintains the sternal-sparing nature of the procedure."

Moving on to comment on some of the typical challenges noted in this treatment space, Dr. Nisivaco stressed that complication rates have gone down significantly over the last 10 years, including conversions and take-backs for bleeding. "Our current rate for these two events are 0.1% and 0.8%, respectively.

"Long-term pain has not been a significant issue for our patients given that we do not perform a thoracotomy. The largest port in our procedure is 12 mm, and this is extremely well tolerated. In terms of target-vessel repeat revascularization rate over the 10-year follow-up period, in this series, it was around 3%."

Looking to present and future goals, Dr. Nisivaco began by commenting on randomized controlled trials, noting that – despite them being considered the gold standard – conducting such trials in a highly technically demanding procedure such as R-TECAB can be difficult. "However, we would hope that with the wider adoption of this procedure, such trials (especially those relating to hybrid coronary revascularization) will become more feasible," she said.

"Both now and moving forward, we are focusing on technology advancement, and training junior surgeons to perform R-TECAB. Given the resurgence in interest in robotic cardiac procedures, we believe it is of the utmost importance to turn our attention to training this young group of surgeons. We have seen that they are eager to use new technologies, and we should be encouraging of this mindset of innovation and technology advancement, as our interventional cardiology colleagues have successfully done.

"Additionally, we should contribute to fostering an innovative mindset, and one place this is possible is training in current robotic cardiac systems. Some examples of this include engaging with our current societies to create opportunities for training fellowships, and formal hands-on workshops at national meetings. Exposure early in one's career is also important, which is why we continue to discuss and publish on our experience performing R-TECAB as much as possible."

There was a high degree of enthusiasm for this procedure in the early 2000s, shortly after it was first performed, noted Dr. Nisivaco. This level of interest in and therefore use of the technology for surgical coronary revascularization meant substantial industry involvement and thus advancement and improvement in the technology. New devices were emerging that either made the procedure possible (e.g., the epicardial stabilizer) or simplified it (e.g., the automated coronary anastomotic stapler). "Yet, for a variety of reasons in the subsequent years, engagement by the surgical community waned, the number of TECAB procedures being performed nationwide decreased, and declining industry engagement soon followed," she said.

"The result of this has been the loss of certain key technologies with noticeable consequences for the few centers still routinely performing TECAB. For example, the epicardial stabilizer (vital to the procedure) was not made for the updated robotic system, therefore our program has had to maintain the use of the older robot model in order to continue performing TECAB. Additionally, the aforementioned automated anastomotic stapler device was taken off the market, after which we switched to a robotic sutured anastomosis, our current method.

"Nevertheless, the upcoming generation of surgeons is showing true excitement and interest in robotic heart surgery, and specifically R-TECAB. This generation is emerging from training already familiar with robotic technology. We, therefore, have hope that they will persist in the pursuit of performing robotic cardiac surgery procedures such as TECAB, and that industry re-engagement and advancements in cardiac robotic technology will soon follow."

Adding a take-home message for the AATS audience, Dr. Nisivaco highlighted that data from over a decade of performing robotic beating-heart TECAB at her center has shown the procedure to be safe and effective. "We continue to offer it to our patients, despite challenges with instrumentation and newer-generation robotic systems," she said.

"The long-term outcomes are durable, and in the presence of a hybrid program can offer patients with multivessel disease an excellent revascularization strategy with multiple arterial grafts, and no risk of sternal wound complications. If you would like to know more, we elaborated on these considerations in detail in a recent *JTCVS Tech* editorial entitled 'Robotic totally endoscopic coronary artery bypass grafting: It's now or never!'."[11]

"The long-term outcomes [of R-TECAB] are durable, and in the presence of a hybrid program can offer patients with multivessel disease an excellent revascularization strategy with multiple arterial grafts, and no risk of sternal wound complications."

Sarah Nisivaco & Husam H. Balkhy

AATS
DAILY NEWS

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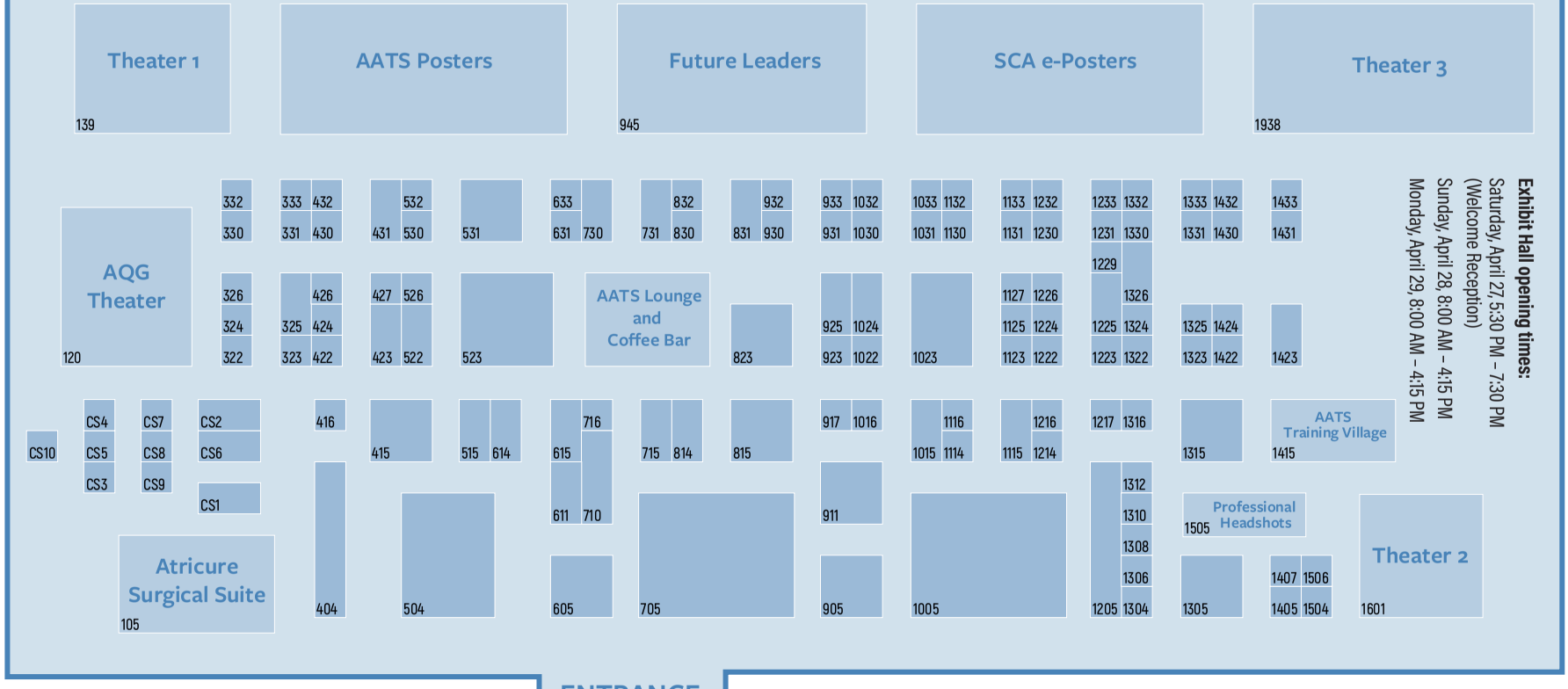
References

1. Peev MP, Nisivaco S, Torregrossa G, et al. Robotic Off-Pump Totally Endoscopic Coronary Artery Bypass in Patients With Low Ejection Fraction. Innovations. 2022;17(1):50–55.
2. Balkhy HH, Nisivaco S, Kitahara H, et al. Robotic Beating Heart Totally Endoscopic Coronary Artery Bypass in Higher-Risk Patients: Can It be Done Safely? Innovations (Phila). 2018;13(2):108–113.
3. Kitahara H, McCrorey M, Patel B, et al. Benefit of Robotic Beating-Heart Totally Endoscopic Coronary Artery Bypass in Octogenarians. Innovations (Phila). 2019;14(6):531–536.
4. Kitahara H, Patel B, McCrorey M, et al. Morbid Obesity Does not Increase Morbidity or Mortality in Robotic Cardiac Surgery. Innovations (Phila). 2017;12(6):434–439.
5. Balkhy HH, Nisivaco SM, Hashimoto M, et al. Robotic Total Endoscopic Coronary Bypass in 570 Patients: Impact of Anastomotic Technique in Two Eras. Ann Thorac Surg. 2022;114(2):476–482.
6. Balkhy HH, Nathan S, Torregrossa G, et al. Angiographic patency after robotic beating heart totally endoscopic coronary artery bypass grafting facilitated by automated distal anastomotic connectors. Interact Cardiovasc Thorac Surg. 2020;31(4):467–474.
7. Balkhy HH, Nisivaco SM, Husain AN, et al. The C-Port Distal Coronary Anastomotic Device Is Comparable With a Hand-Sewn Anastomosis: Human Histological Case Study. Innovations (Phila). 2018;13(2):140–143.
8. Balkhy HH, Nisivaco S, Kitahara H, et al. Robotic Multivessel Endoscopic Coronary Bypass: Impact of a Beating-Heart Approach With Connectors. Ann Thorac Surg. 2019;108(1):67–73.
9. Kitahara H, Hirai T, McCrorey M, et al. Hybrid coronary revascularization: Midterm outcomes of robotic multivessel bypass and percutaneous interventions. J Thorac Cardiovasc Surg. 2019;157(5):1829–1836.e1.
10. Balkhy HH, Nisivaco S, Kitahara H, et al. Robotic advanced hybrid coronary revascularization: Outcomes with two internal thoracic artery grafts and stents. JTCVS Tech. 2022;16:76–88.
11. Balkhy HH. Robotic totally endoscopic coronary artery bypass grafting: It's now or never! JTCVS Tech. 2021;10:153–157.

Exibitors at the AATS 104th Annual Meeting



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Applied Medical	1217
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AATS

105th Annual Meeting

Friday, May 2–Monday, May 5, 2025
Seattle Convention Center I Summit
Seattle, WA, USA

President
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