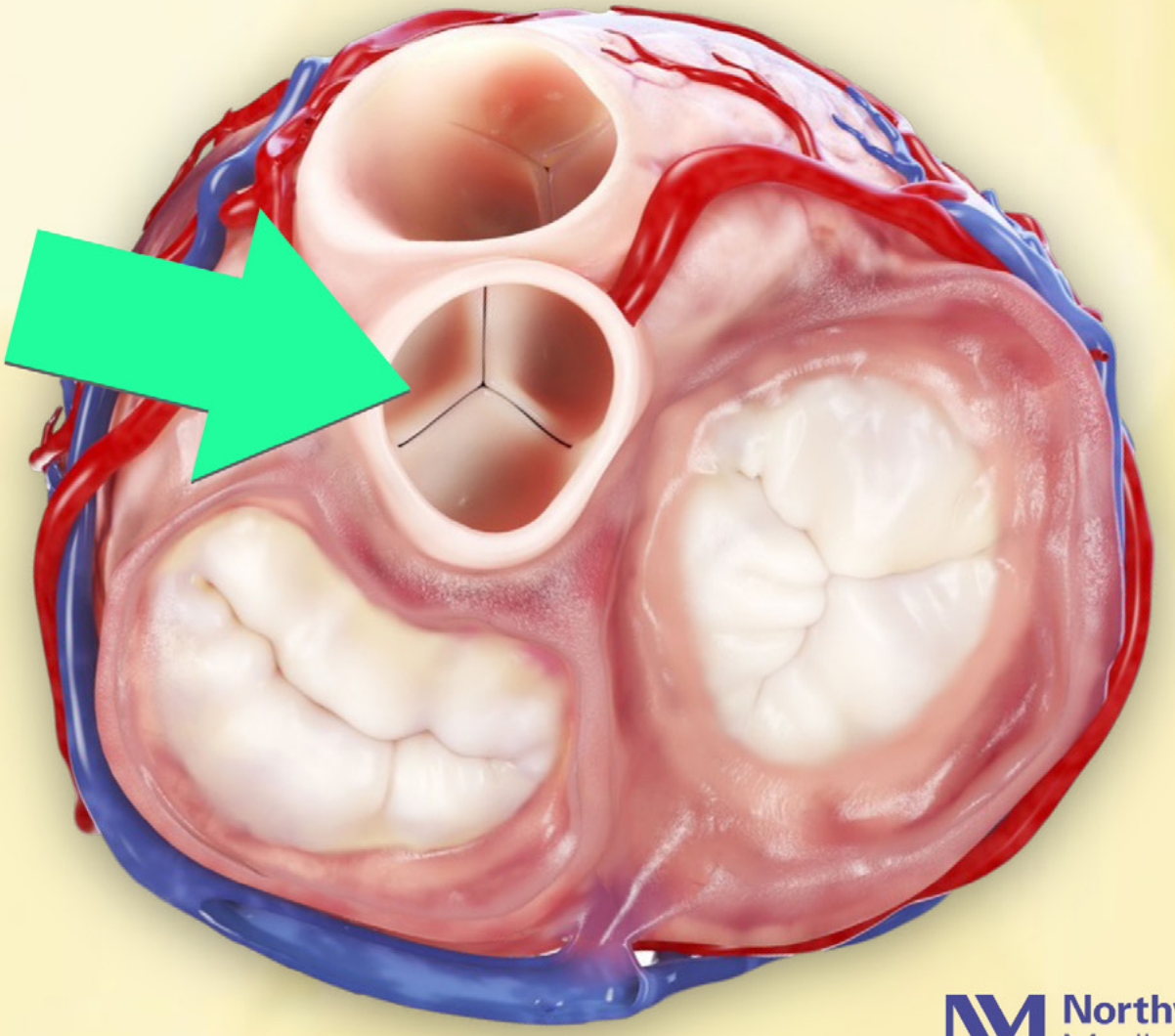
HeartValveSurgery.com

6 MISCONCEPTIONS OF HEART VALVE SURGERY



Northwestern Medicine®

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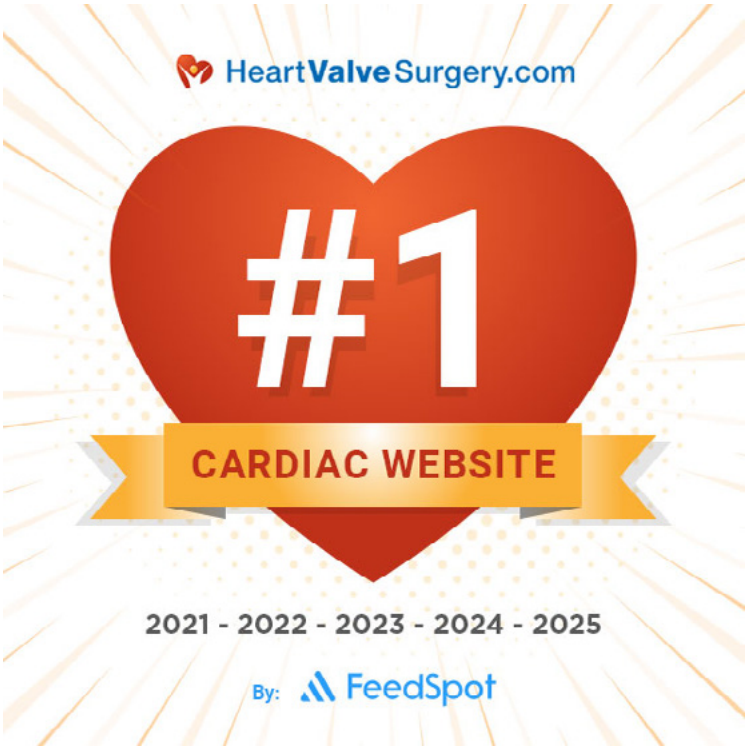

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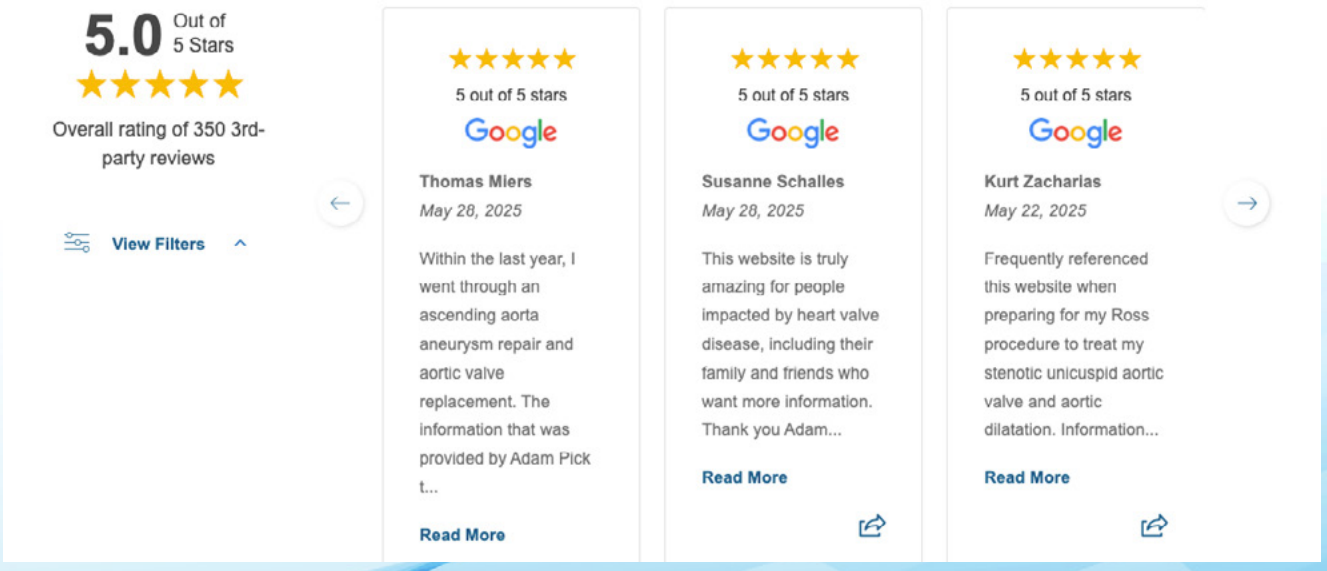

Featured Speakers

Dr. Chris Malaisrie

Cardiac Surgeon
Northwestern Medicine
Chicago, Illinois
(888) 535-6197
Learn More.

Adam Pick

Patient, Author & Website Founder
HeartValveSurgery.com
Los Angeles, California
(888) 725-4311
Learn More.

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Please note: A complimentary video playback of this eBook is now available on YouTube at this link.

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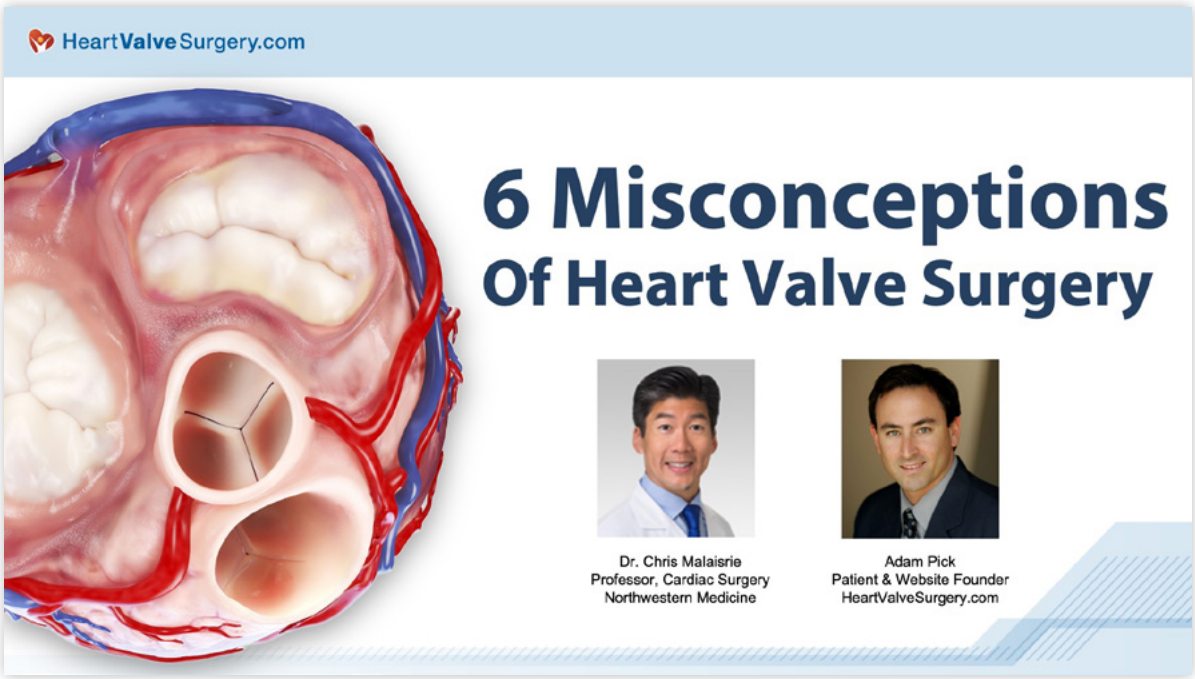
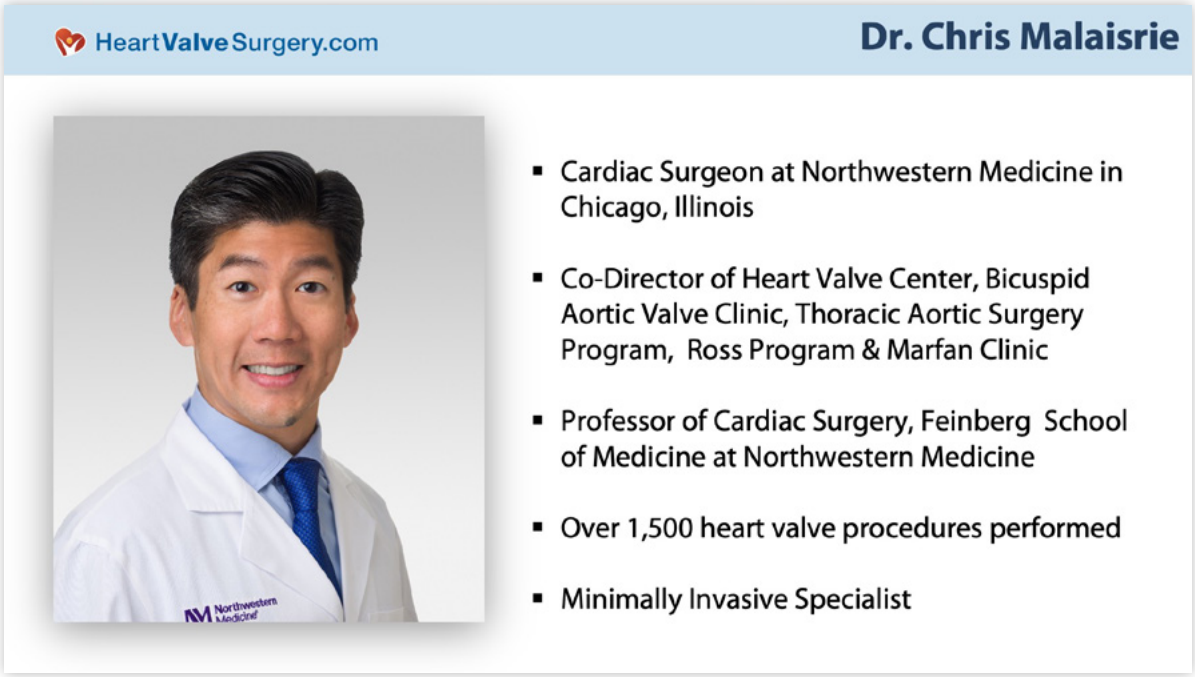
Introduction



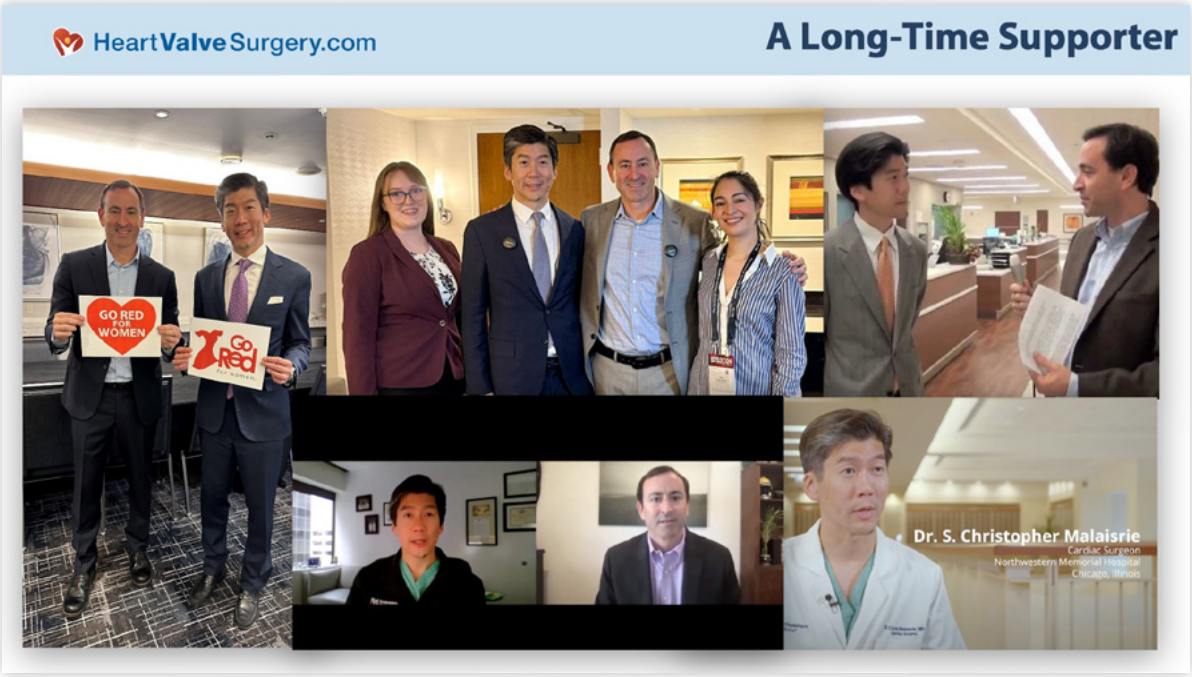
Adam Pick: Hi everybody, my name is Adam Pick and I would like to welcome you to the webinar, "6 Misconceptions of Heart Valve Surgery". If I have yet to meet you, I'm the patient who started HeartValveSurgery.com nearly 20 years ago in 2006. The mission of our website is very simple, we want to educate and empower patients just like you. This webinar, which has had over 700 registrations from patients and countries all over the world, was designed to support that mission. Now, throughout the webinar, you're going to be in what's known as "listen only" mode, but I encourage you to submit your questions in the control panel on your screen.

As for the today's agenda, I'm going to introduce the featured speaker, we're going to talk about the top six misconceptions, we're going to have an interactive question and answers session, and then I'm going to ask you to complete a very quick five question survey.



As for our featured speaker, I am humbled and honored that he's taking time away from his very busy practice at Northwestern Medicine to be with us today. Who is he? Dr. Chris Malaisrie is a cardiac surgeon at Northwestern Medicine in Chicago, Illinois. He is the co-director of the Heart Valve Center, Bicuspid Aortic Valve Clinic, Thoracic Aortic Surgery Program, the Ross Procedure Program, and the Marfan Clinic. He's not just going to educate patients here today, he's also a professor of cardiac surgery at the Feinberg School of Medicine.

During his extraordinary career, Dr. Malaisrie has not performed 100 or 300 or 500 or 1000 heart valve procedures; he's performed over 1500 heart valve operations. I've been thankful to learn a lot about his practice over the years. He specializes in minimally invasive techniques to help patients recover faster and get back to their normal life expectancy.



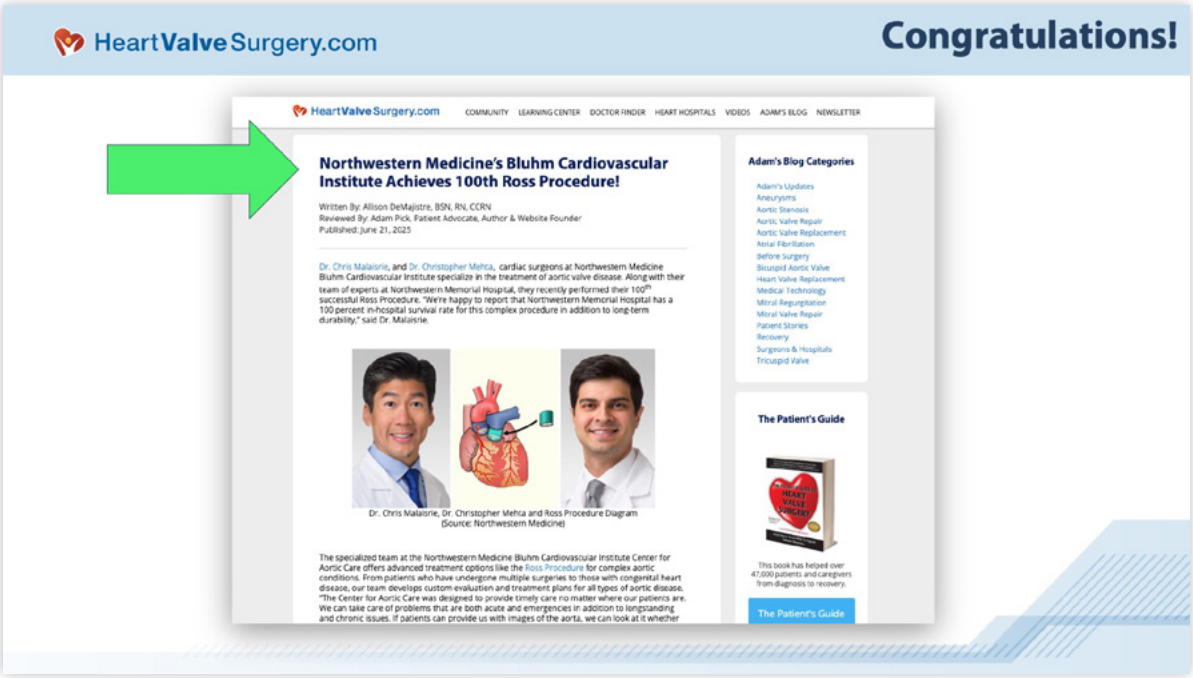
When it comes to Dr. Malaisrie, I want to tell you a couple things. The first one is he has been a supporter of the HeartValveSurgery.com community for nearly 15 years. Chris, you might remember this video, back in 2011, you and I, we didn't have any gray hairs. Things have changed over the years, but one thing has not. Your commitment to educating our patients in our community, whether it's through videos or through articles, is unparalleled. I estimate that you have helped over 250,000 people around the world learn about their disease.

When it comes to the clinical care, what you see in front of you right now are the smiling faces of patients who went to Dr. Malaisrie and his team at Northwestern Medicine and got extraordinary outcomes. Whether it's Joe or whether it's Jim or Tom or Jesse, these are all folks who are living great lives after their heart valve therapies. In particular, I was at a wedding not too long ago in San Diego where I came across Linda, who's one of Dr. Malaisrie's upcoming aortic aneurysm patients.

If you have any interest in learning more about what patients say about Dr. Malaisrie, you can go and see his patient reviews at HeartValveSurgery.com.

Specific to Dr. Malaisrie, there are some congratulations in order here because this is the 20th anniversary of the Bluhm Cardiovascular Institute at Northwestern Medicine. I wanted to congratulate you and your team on that. I was fortunate to spend some time with you earlier this year.

There's another great thing I know you just accomplished, which was your team's completion of the 100th Ross procedure at Northwestern Medicine with 0.0% in-hospital mortality. Dr. Malaisrie, I can't thank you enough for being here on behalf of all the patients on the line, "Welcome!".

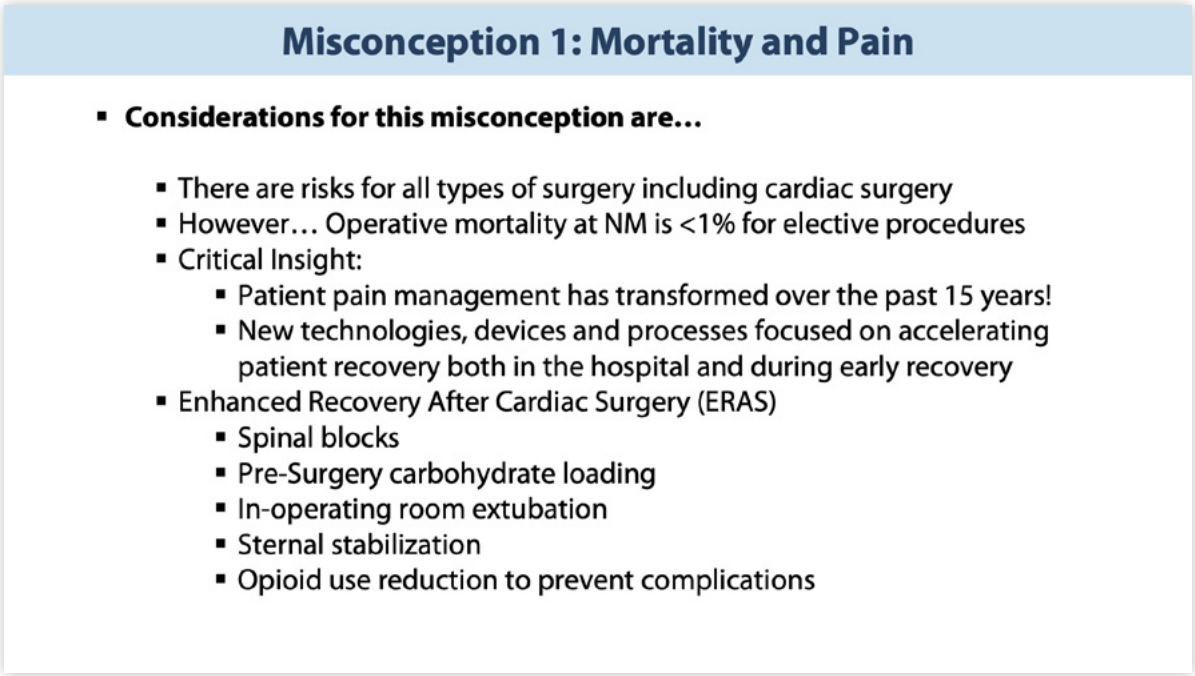


Dr. Chris Malaisrie: Thank you very much, Adam. I'm truly humbled to be part of this organization. I think we bring so much to patients because it really is about the patients and you come to me when you're having problems with your health.

That's a time of bad news and I love it when we get positive feedback after a successful operation. I like seeing all these thank you notes from the patients that we've treated through almost 20 years.

Adam Pick: Let's go ahead and talk about the six misconceptions of heart valve surgery. Do you want to start with the first misconception?

Misconception #1: Patients Should Be Concerned About Mortality and Pain After Heart Valve Surgery



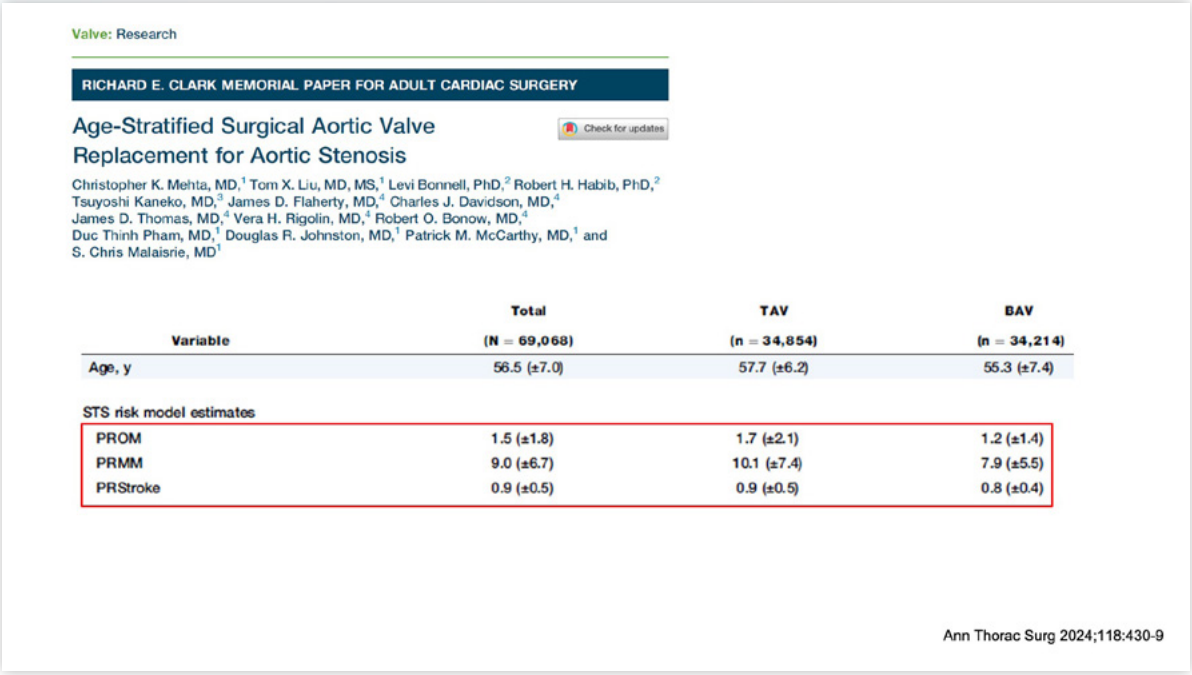
Dr. Chris Malaisrie: I think the first misconception is that patients should be concerned about mortality and pain after heart valve surgery. When we talk about mortality, we mean the risk of death.

While the risk of death is real after open heart surgery, meaning it's not 0%, it is a lot lower than patients think. STS, which is our Society of Thoracic Surgeons, publishes national data on outcomes after valve surgery. Most people are impressed to find that we can do an operation such as a mitral valve repair electively with an operative mortality less than 1%.

Other valves such as aortic valve replacement and certainly coronary artery bypass grafting can be done within a risk of about one to 2% to your life. It's a lot less than people think and it's gotten a lot better over the years. In short, you shouldn't be worried about these things because that's my job.

My job is to worry about how to get the patient the best outcomes possible. It's not just risk of death, it's also recovery, and we've made great strides through the years on making sure the patient has a successful quick recovery after surgery because that's a big deal for young patients who are still working. They've got to take care of their kids. Maybe they've got elderly patients they're taking care of.

One question I often get is, "How long do I have to be off of work? How long am I out of commission after valve surgery?" That time has gotten less and less. I think with programs such as Enhanced Recovery After Cardiac Surgery or ERAS cardiac for short where we use specialized techniques with anesthesia such as spinal blocks that's used to minimize pain after surgery, getting patients carbo-loaded afterwards to minimize the risk of low glucose after surgery, getting the patients off the breathing machine as soon as possible, sometimes in the operating room after valve surgery, specialized techniques to do closure of the sternum, that's the breastbone in front of the heart, and avoiding opioids as much as possible. We certainly don't want patients in pain, but we've got many options that can avoid opioids, that we can get patients out earlier.



Valve: Research

RICHARD E. CLARK MEMORIAL PAPER FOR ADULT CARDIAC SURGERY

Age-Stratified Surgical Aortic Valve Replacement for Aortic Stenosis

Check for updates

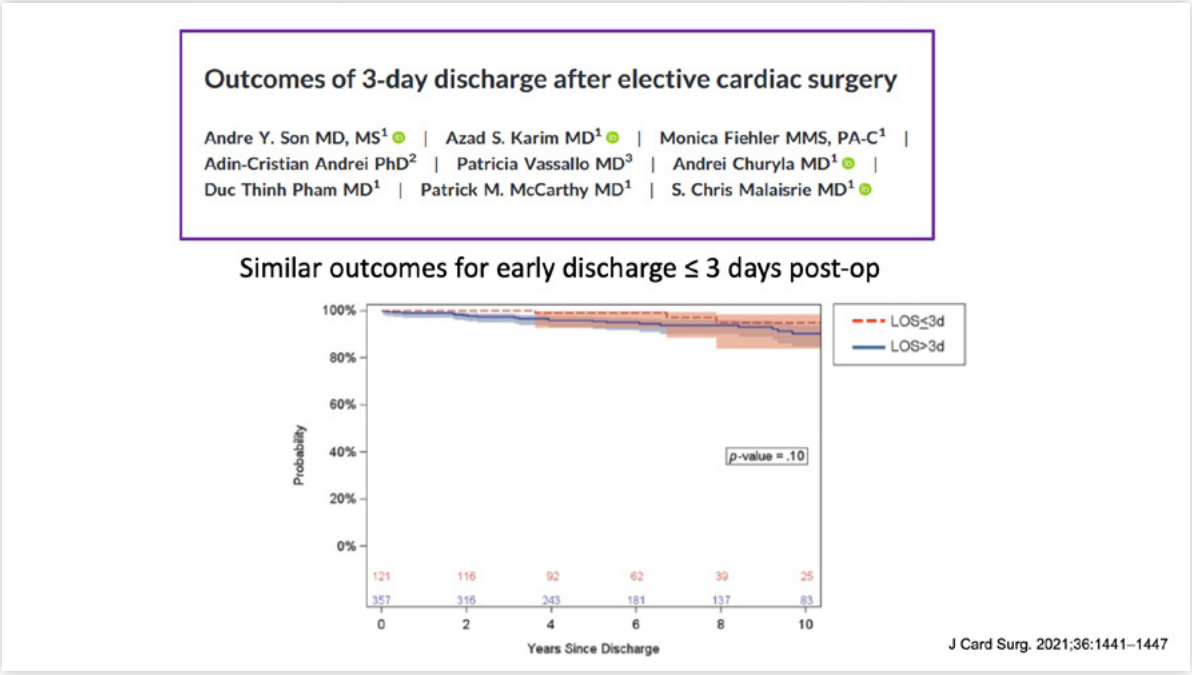
Christopher K. Mehta, MD,[1] Tom X. Liu, MD, MS,[1] Levi Bonnell, PhD,[2] Robert H. Habib, PhD,[2] Tsuyoshi Kaneko, MD,[3] James D. Flaherty, MD,[4] Charles J. Davidson, MD,[4] James D. Thomas, MD,[4] Vera H. Rigolin, MD,[4] Robert O. Bonow, MD,[4] Duc Thinh Pham, MD,[1] Douglas R. Johnston, MD,[1] Patrick M. McCarthy, MD,[1] and S. Chris Malaisrie, MD[1]

Variable	Total (N = 69,068)	TAV (n = 34,854)	BAV (n = 34,214)
Age, y	56.5 (±7.0)	57.7 (±6.2)	55.3 (±7.4)
STS risk model estimates			
PROM	1.5 (±1.8)	1.7 (±2.1)	1.2 (±1.4)
PRMM	9.0 (±6.7)	10.1 (±7.4)	7.9 (±5.5)
PRStroke	0.9 (±0.5)	0.9 (±0.5)	0.8 (±0.4)

Ann Thorac Surg 2024;118:430-9

Here is some of the data from our national society showing outcomes after aortic valve replacement, so a very common procedure for aortic stenosis, both for bicuspids and normal valves.

What we found in national datasets all across the country that your risk of death from this operation runs at about 1.5%, and that's pretty low. Specialized centers can do it with less, but this is what you can expect across the country. That's pretty impressive.



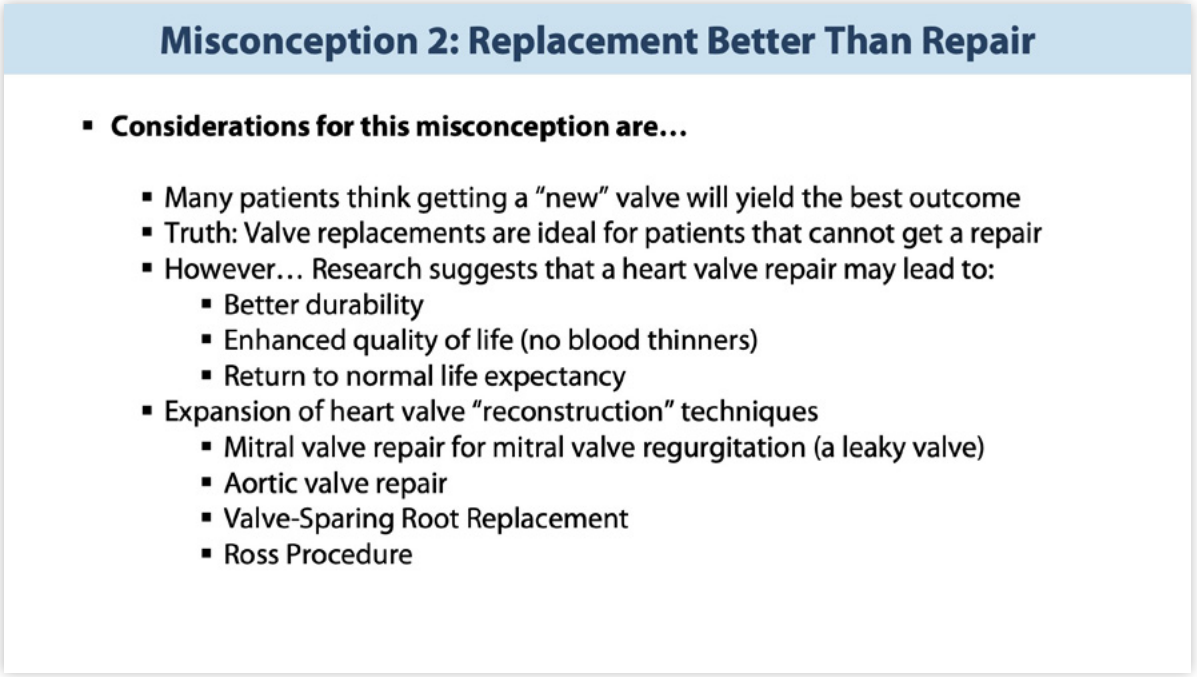
We have shown that patients may need only three days of recovery in the hospital after valve surgery, so that's pretty cool. Long gone are the days where patients have to spend weeks in the hospital recovering. We like patients to go home early. Three days is pretty quick. For instance, you have your operation on Friday, you could go home as early as Monday and not miss a beat.

There's still recovery after surgery depending on what incision you get. That could be anywhere from two to six weeks of recovery at home during which time we do want you up walking around, but maybe no golf, no tennis, no high-risk skiing during that time.

Adam Pick: Dr. Malaisrie, before we go on to the next misconception, you mentioned the ERAS, the Enhanced Recovery After Cardiac Surgery. I went to the leadership meeting in Austin last year. You were there and there were about 40 leaders in the space for recovery, but it wasn't like there were a thousand people there. I'm curious to know, is ERAS followed by all of the hospitals out there or do different cardiac centers use different protocols to help patients start their recovery and recover faster?

Dr. Chris Malaisrie: ERAS can be difficult to implement because it's not just one intervention that we use but multiple interventions. It's the whole package of things that we can offer for patients and get patients out in three days, for instance, and back to work earlier. Not all centers will be able to implement the same package, but societies such as ERAS cardiac have certainly made it a lot easier for all centers to adopt this practice.

Misconception #2: Heart Valve Replacement Is Better Than Heart Valve Repair



Dr. Chris Malaisrie: The second misconception we want to address is that heart valve replacement is better than a heart valve repair. That's a big, big misconception.

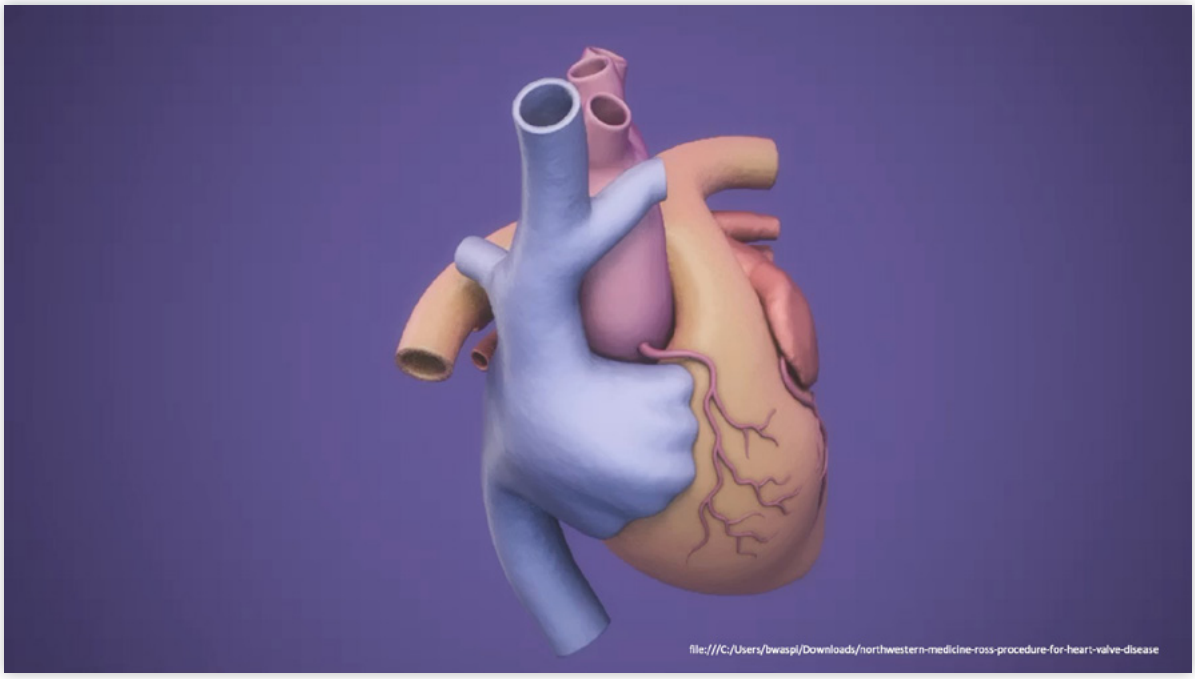
We sometimes think that parts in the body are like parts in a car. For instance, the fuel injector is broken that you just take it out and give you a brand new fuel injector. It actually turns out that your own tissue is the best tissue that you can have. We can repair your valve and leave you with your own valve that's going to be better than an artificial valve.

Please remember the artificial valves come in two varieties. One is a mechanical valve, so it's made out of high grade carbon. The other is a tissue valve or a biologic valve, and that's made out of animal parts, so either cow or pig. That's typical for an artificial valve.

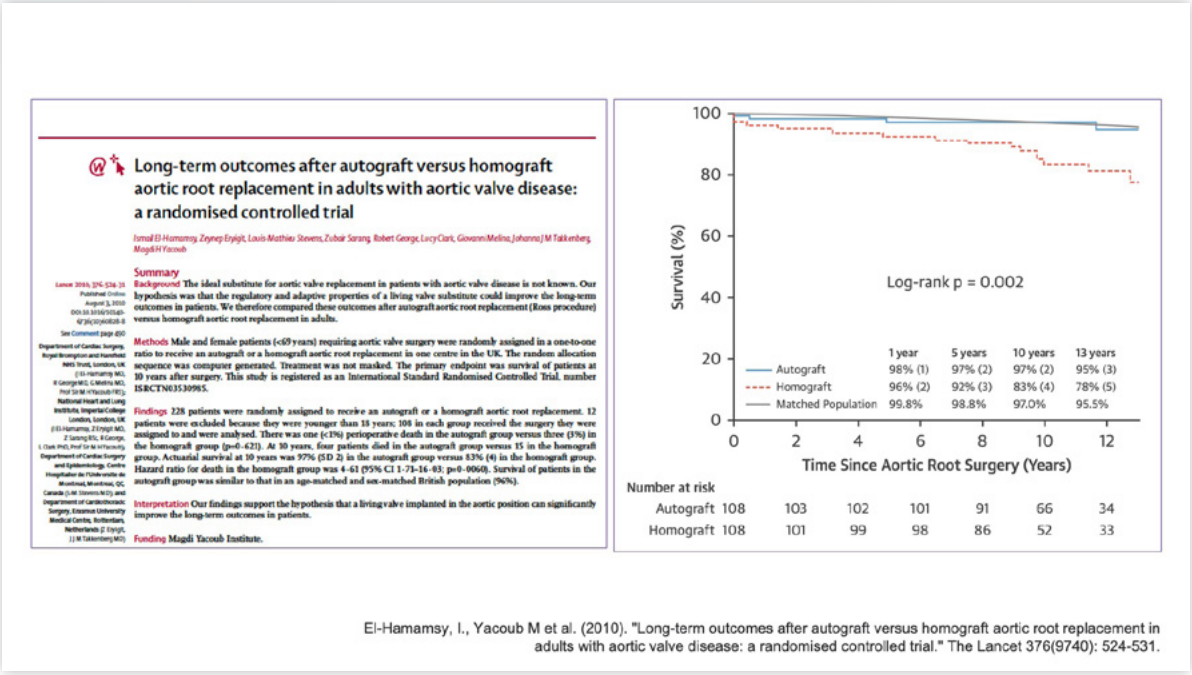
You may encounter options for repair versus replacement in mitral valve repair. I think that is the most common area where repair is done over replacement. The data for that is very good that you're going to do better with repaired mitral valve.

We have more and more data that valve repair for the aortic position with or without valve sparing aortic replacement is also superior to an artificial valve. We've shown that with our data at Northwestern. We've done more than 300 valve-sparing aortic root replacements, and we've demonstrated superiority for aortic valve repair over valve replacement.

I would also like to address the Ross procedure. While strictly this is not a valve repair, we are using your own parts. We take your diseased aortic valve, we give that to the pathologist and we replace it with your own pulmonary valve. So, it is your own body part.



Here is an animation of the Ross Procedure. A patient has aortic valve disease, usually aortic stenosis, and we take that out and we use a patient's own pulmonary valve and use that as a replacement part. We take a pulmonary valve that is frozen. It is a human valve. We have that available to us right away for every case, and we use that to take the position of your pulmonary valve. You will hear terms like pulmonary autografts, that is your pulmonary valve used in aortic position. The homograft is the frozen human valve we put in the pulmonary position. It is a translocation procedure. That's how the government bills it, meaning it's a little bit like "musical chairs". Disease valve goes out, pulmonary valve gets slide over and the frozen pulmonary valve gets moved in.



Long-term outcomes after autograft versus homograft aortic root replacement in adults with aortic valve disease: a randomised controlled trial

Ismail El-Hamamsy, Zeynep Eryigit, Louis-Mathieu Stevens, Zubair Sarang, Robert George, Lucy Clark, Giovanni Melina, Johanna J M Takkenberg, Magdi H Yacoub

Summary

Background The ideal substitute for aortic valve replacement in patients with aortic valve disease is not known. Our hypothesis was that the regulatory and adaptive properties of a living valve substitute could improve the long-term outcomes in patients. We therefore compared these outcomes after autograft aortic root replacement (Ross procedure) versus homograft aortic root replacement in adults.

Methods Male and female patients (<69 years) requiring aortic valve surgery were randomly assigned in a one-to-one ratio to receive an autograft or a homograft aortic root replacement in one centre in the UK. The random allocation sequence was computer generated. Treatment was not masked. The primary endpoint was survival of patients at 10 years after surgery. This study is registered as an International Standard Randomised Controlled Trial, number ISRCTN03530985.

Findings 228 patients were randomly assigned to receive an autograft or a homograft aortic root replacement. 12 patients were excluded because they were younger than 18 years; 108 in each group received the surgery they were assigned to and were analysed. There was one (<1%) perioperative death in the autograft group versus three (3%) in the homograft group (p=0·621). At 10 years, four patients died in the autograft group versus 15 in the homograft group. Actuarial survival at 10 years was 97% (SD 2) in the autograft group versus 83% (4) in the homograft group. Hazard ratio for death in the homograft group was 4·61 (95% CI 1·71–16·03; p=0·0060). Survival of patients in the autograft group was similar to that in an age-matched and sex-matched British population (96%).

Interpretation Our findings support the hypothesis that a living valve implanted in the aortic position can significantly improve the long-term outcomes in patients.

Funding Magdi Yacoub Institute.

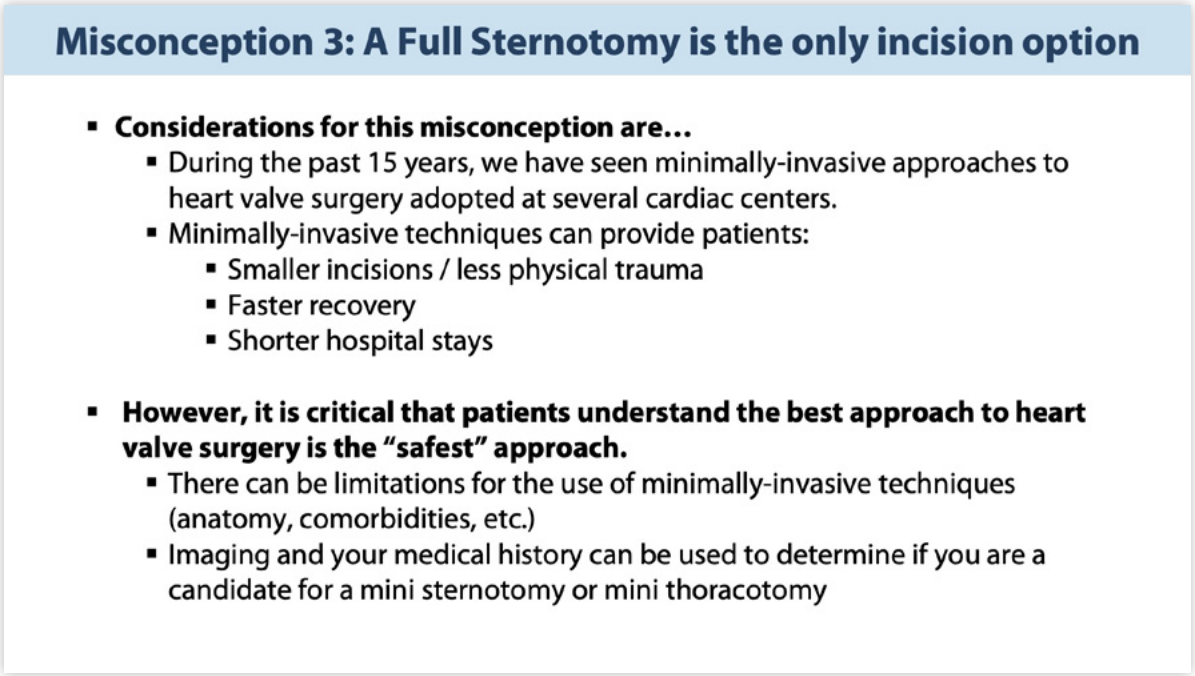
El-Hamamsy, I., Yacoub M et al. (2010). "Long-term outcomes after autograft versus homograft aortic root replacement in adults with aortic valve disease: a randomised controlled trial." The Lancet 376(9740): 524-531.

There's also data that shows that the Ross Procedure is better than replacement. This is a study from England by a world renowned cardiac surgeon who has been knighted. His name is Dr. Magdi Yacoub. He showed that not only is the Ross procedure better than a replacement valve, but it also restores normal life expectancy. The curves there on the right are Ross procedure in a normal population. Those curves exist right on top of each other. If you're good at looking at graft, you'll also notice that the percentage survival there is impressive at 95% at 12 years. The Ross procedure has been demonstrated to be better than replacement and also your best chance of returning to normal life expectancy, as in patient population that doesn't have valve disease at all.

Adam Pick: For the patients on the line who may have a form of aortic valve disease and are considering this very important consideration of a replacement versus a repair Ross procedure. Everybody knows I actually had a Ross procedure done nearly 20 years ago. I wanted to retain my own tissue in the aortic position. It has been nearly 20 years.

I have had no re-operation, no form of any kind of intervention, and I have not been taking any type of medication like Coumadin throughout the past 19 years. If you have any questions about that, don't hesitate to contact me. I can help from a patient perspective share my experience. Dr. Malaisrie, congratulations again to you and your team for all the work you've been doing in the Ross procedure.

Misconception #3: A Full Sternotomy Is The Only Incision That Can Be Used To Fix Heart Valves



Misconception 3: A Full Sternotomy is the only incision option

- **Considerations for this misconception are…**
  - During the past 15 years, we have seen minimally-invasive approaches to heart valve surgery adopted at several cardiac centers.
  - Minimally-invasive techniques can provide patients:
    - Smaller incisions / less physical trauma
    - Faster recovery
    - Shorter hospital stays
- **However, it is critical that patients understand the best approach to heart valve surgery is the "safest" approach.**
  - There can be limitations for the use of minimally-invasive techniques (anatomy, comorbidities, etc.)
  - Imaging and your medical history can be used to determine if you are a candidate for a mini sternotomy or mini thoracotomy

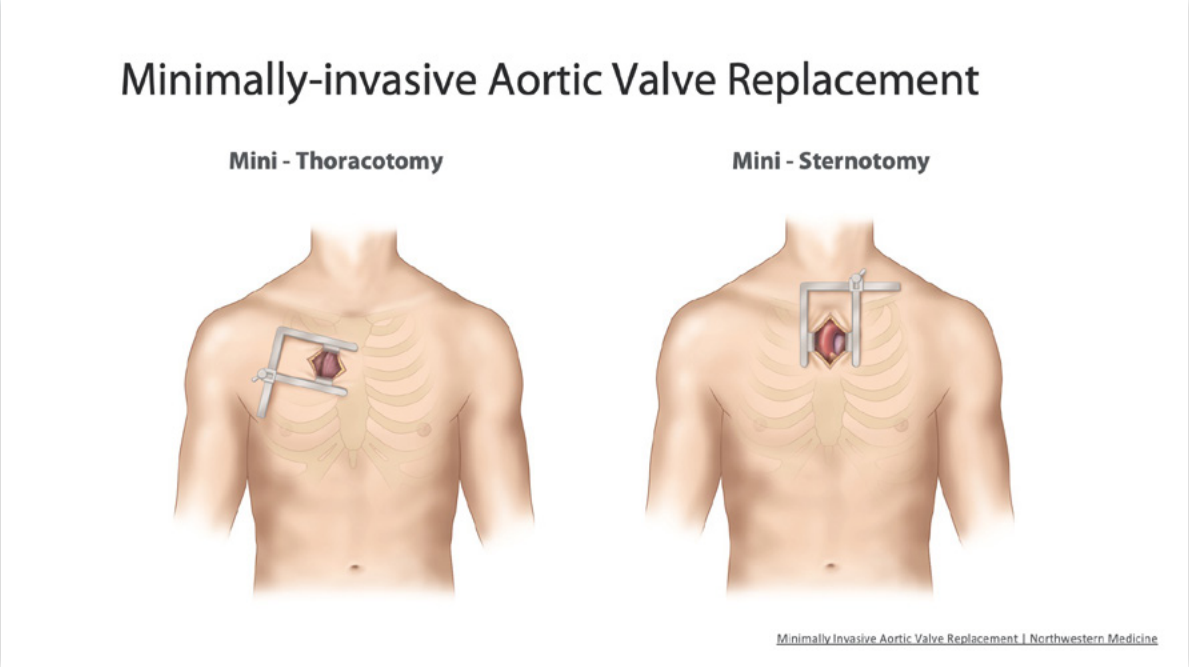
Dr. Chris Malaisrie: Third misconception is that a full sternotomy is the only incision that can be used to fix heart valves. We can do minimally invasive cardiac surgery, MICS for short, M-I-C-S. That's a subspecialty of cardiac surgery, and that's where we do heart surgery. It's still open heart surgery through an incision that does not involve a complete sternotomy. Sternotomy is dividing the breast bone, that's the bone in front of your heart.

These procedures have been done more than 15 years and the adoption has increased. For instance, if you need a mitral valve repair or an aortic valve replacement, then I would offer you a incision in between the ribs on the right side, we call that a right thoracotomy, right anterior mini thoracotomy or RAMT for short, with or without a robot. All these tools exist for us in order to spare you from a sternotomy.

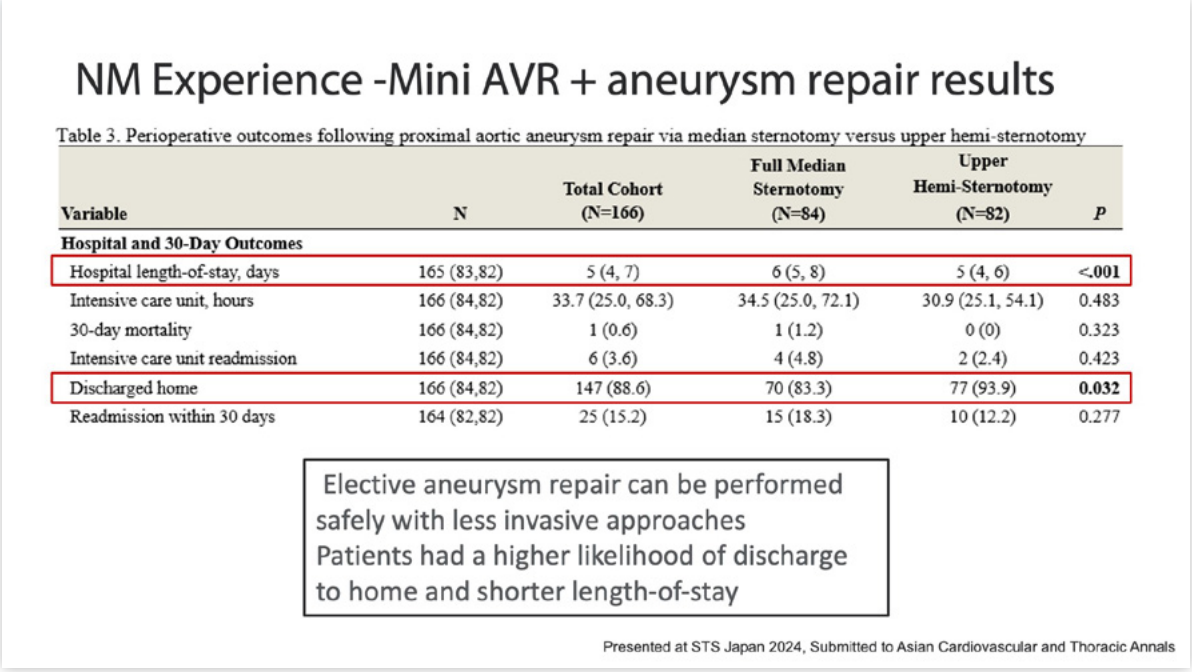
We found with that the patients do have faster recovery, less physical trauma, and very quick return to work afterwards. For instance, if you have an aortic valve replacement mini-thoracotomy with me, I would say that you would only need about two weeks of recovery at home and then you're free to go play golf and play tennis after that. I think that's really impressive for younger patients who want to get back to their normal activity.

Now, it's not a procedure that is suitable for every patient. There are things that we think about when we think about minimally invasive cardiac surgery versus full sternotomy. I think the biggest one is whether or not the patient has other cardiac diseases that should be treated the same time. MICS is great for isolated valves, but if the patient also needs bypass grafting for coronary artery disease, additional valve work other than the index valve or atrial fibrillation.

These patients I think should get a full sternotomy and a good chance at repair of everything at one time. This is the biggest group of patients. We always default the safest and most efficacious operation for the patient. I think that trumps the minimally invasive approach. It's better to get a perfect heart operation than to get minimally invasive heart surgery just because it's minimally invasive.



Dr. Chris Malaisrie: These are drawings of surgical approaches. You'll see that both of them avoid the full sternotomy. On the left side is a mini thoracotomy that's incision between the ribs. We don't actually divide the breast bone. You also hear about a mini-sternotomy where we divide only part of the sternum about half of it - so, leaving the other half completely intact.



NM Experience -Mini AVR + aneurysm repair results

Table 3. Perioperative outcomes following proximal aortic aneurysm repair via median sternotomy versus upper hemi-sternotomy

Variable	N	Total Cohort (N=166)	Full Median Sternotomy (N=84)	Upper Hemi-Sternotomy (N=82)	P
Hospital and 30-Day Outcomes					
Hospital length-of-stay, days	165 (83,82)	5 (4, 7)	6 (5, 8)	5 (4, 6)	**<.001**
Intensive care unit, hours	166 (84,82)	33.7 (25.0, 68.3)	34.5 (25.0, 72.1)	30.9 (25.1, 54.1)	0.483
30-day mortality	166 (84,82)	1 (0.6)	1 (1.2)	0 (0)	0.323
Intensive care unit readmission	166 (84,82)	6 (3.6)	4 (4.8)	2 (2.4)	0.423
Discharged home	166 (84,82)	147 (88.6)	70 (83.3)	77 (93.9)	**0.032**
Readmission within 30 days	164 (82,82)	25 (15.2)	15 (18.3)	10 (12.2)	0.277

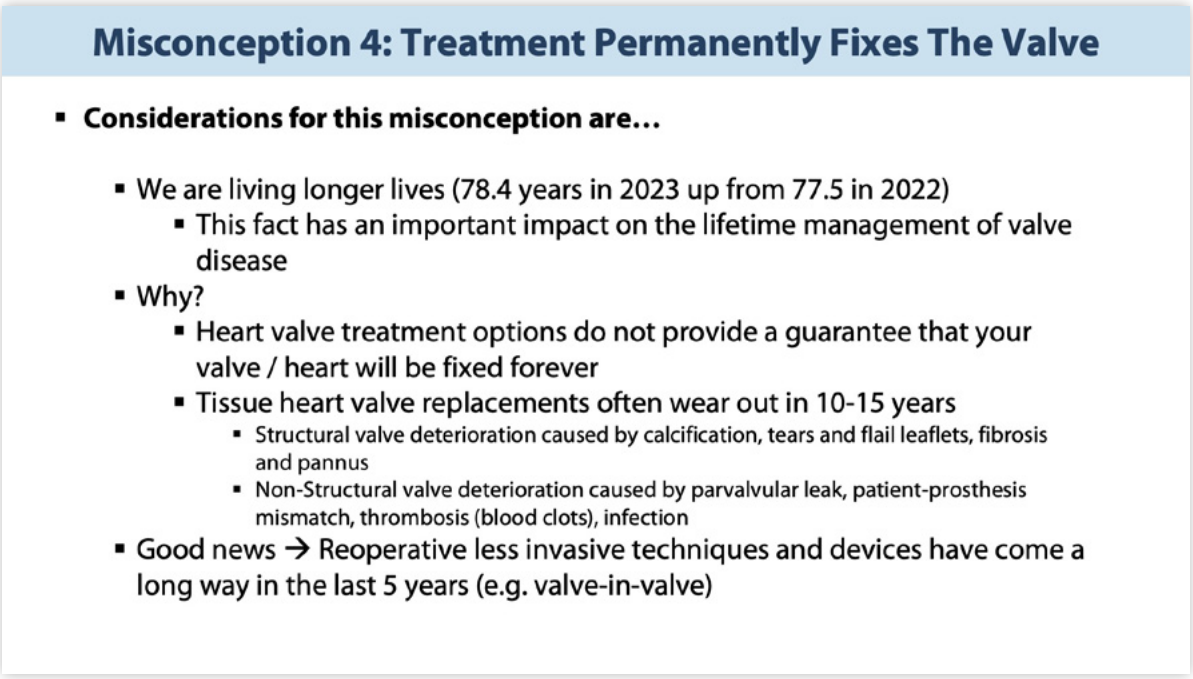
Elective aneurysm repair can be performed safely with less invasive approaches
Patients had a higher likelihood of discharge to home and shorter length-of-stay

Presented at STS Japan 2024, Submitted to Asian Cardiovascular and Thoracic Annals

Here's some data on minimally invasive heart surgery that we recently presented, and this is one operation where we'll do both a valve and an aneurysm. We looked at our outcomes, which have been great. Most of our patients who have aortic valve disease who also need an aneurysm repair underwent a partial sternotomy or mini sternotomy for this, and this can be done with very low risk and quicker return to home and recovery.

Adam Pick: Dr. Malaisrie, I want to thank you for stressing safety amongst all considerations, because I do get several emails and calls from patients who are so focused on getting a minimally invasive approach that sometimes they may not see the bigger picture. Thank you for ensuring that it's always – even though there are the benefits of faster recovery and smaller incisions, for ensuring that safety is first and foremost amongst your patients.

Misconception #4: An Excellent Heart Valve Surgery Will Permanently Fix The Patient's Heart Valve Defect

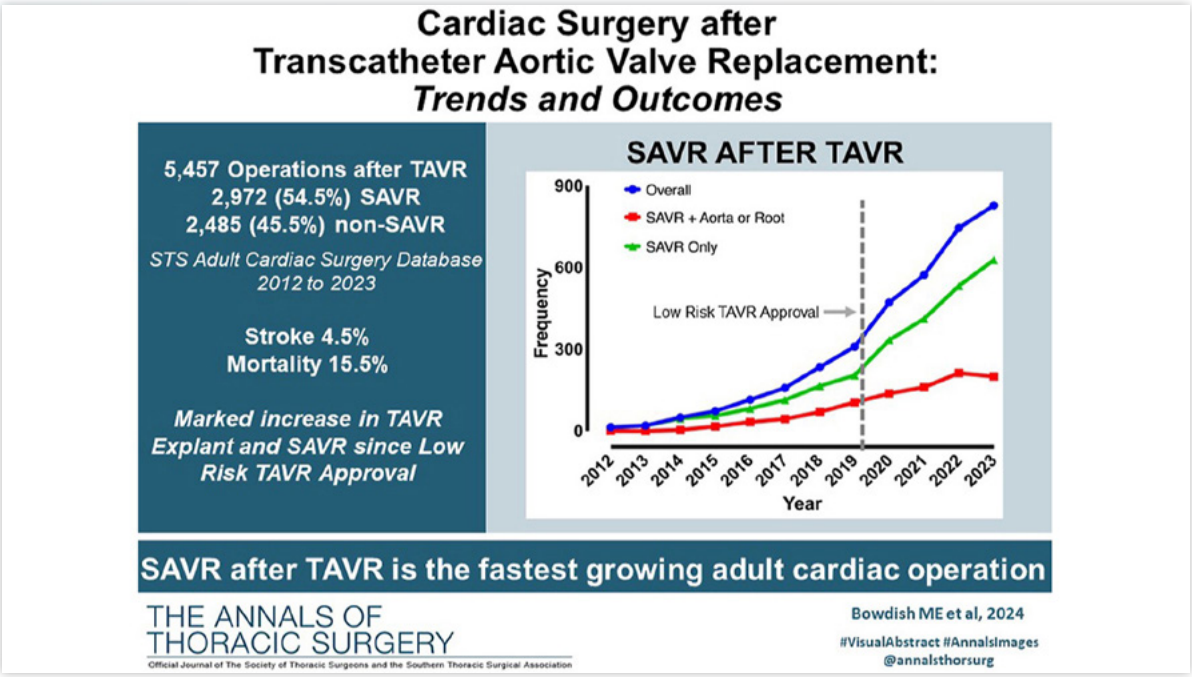


Dr. Chris Malaisrie: Misconception number four… An excellent heart valve surgery will permanently fix the patient's heart valve defect.

While we wish we can give you a "money back guarantee" on open heart surgery, we can't do that. Even the most durable valves we can give you, which is a mechanical valve or a valve repair, may fail in the future. The reason for that is patients are living longer and longer.

Say for instance, we operate on a patient, they're 20 years old, we would need 50 to 60 years of durability for them to get all the way to the end of their lifetime. We certainly hope that we can't guarantee it. I think some of the valve repairs have the best chance of offering that to patients, but there are some valves where we know will not last forever and patients should expect to have a second valve procedure. For those group of patients who receive a biologic valve, so an artificial biological valve, either a pig or a cow valve where that's done with surgery or a transcatheter valve surgery, these absolutely have a lifetime to it, and they've been studied very closely.

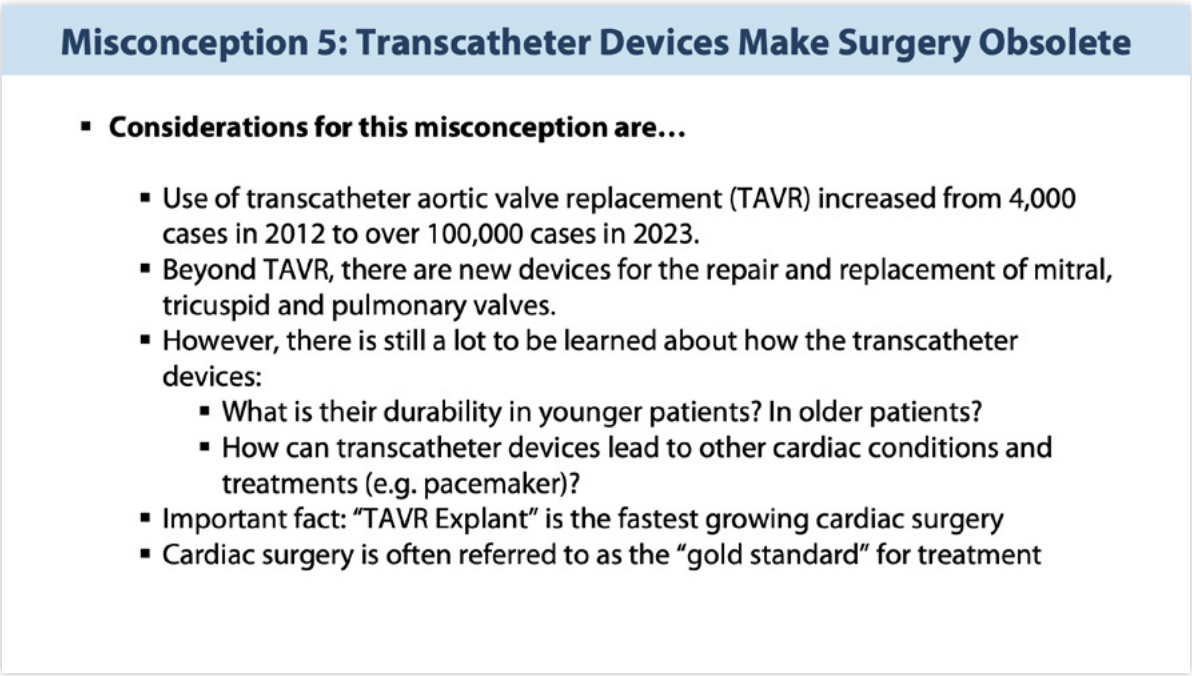
Tissue valves probably have a lifetime of about 10 to 15 years. If you're a young patient, you're looking at 30 or 40 years ahead of you, then you should be planning on a second procedure for that. Doctors call that the lifetime management of valve disease, but for you, it means that you're going to need two procedures and that takes a lot of thought. There's options we can offer you. There's a menu of operations we give you in the first operation and even bigger menu of operations that we can give you for the second intervention.



One piece of data that highlights that is the issue with TAVR, T-A-V-R or transcatheter aortic valve replacement for short. That's a procedure where we deliver the valve through the groin. There are no incisions on the chest. What we see over time is that failing TAVRs have increased almost exponentially.

The green and the blue line, particularly the green line, has gone up from 0% at 2012 or zero cases to about 600 cases in 2023. These TAVRs that are going in certainly are failing, and we're seeing more and more of those for re-operation.

Misconception #5: Transcatheter Devices Make Open Heart Surgery Irrelevant



Dr. Chris Malaisrie: Misconception number five, transcatheter devices will make open heart surgery irrelevant. I don't think so. The previous slide with TAVR explant is a good point of that. TAVR valves that go in will fail over time if patient lives long enough, and usually those patients will need a reoperation.

While transcatheter valve replacement or TAVR for short has been of great benefit to our patients, more patients are now being treated with over a hundred thousand cases with TAVR. TAVR has made so many strides for our patients because more patients are being identified with valve disease and therefore treated with valve disease. Now beyond TAVR, we also have transcatheter options for mitral valve and tricuspid valve. They're FDA approved and also for pulmonary valves. It's not just the aortic valve can be treated with transcatheter procedures, all the valves can be treated with that.

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Invited Commentary

Bonanza of Transcatheter Aortic Valve Explants Contributes to Surgeon Misery

Melissa G. Medina MD, S. Chris Malaisrie MD ✉

The question still remains, what is the durability? We should expect probably as good as surgical aortic valve replacement for TAVR in terms of durability, but we're not quite sure yet. I think data out to 10 years shows that TAVR is holding strong in terms of durability. That's good. If you're older, then probably the TAVR valve is going to be the last valve you'll ever need, but there are things that we should think about. TAVR explant is certainly a consideration, but right now we consider heart surgery as a "gold standard" by which we compare transcatheter valve replacement. This slide references an editorial that me and my colleague Dr. Medina has written. Based on that data that you saw earlier, more and more TAVR explants are being performed in the United States and these cases are complex. That was our point.

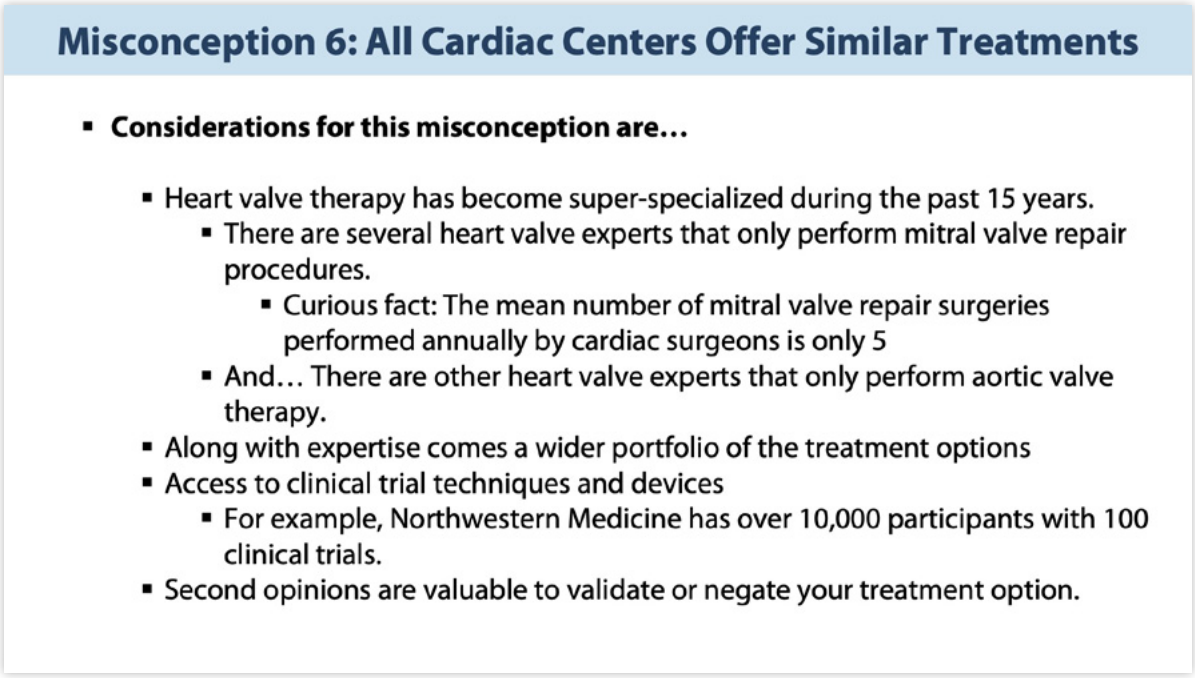
The risk of surgery for a TAVR explant is a lot higher than other open heart surgery, much higher than you would think. Although there are more cases coming to us, they're more complex as well.

Adam Pick: Dr. Malaisrie, I've got to ask you a question. I'm sure the patients might be wondering this. We saw obviously an increase in the utility of the TAVR explant procedure. I'm curious, you and your team and all the teams, the cardiac surgeons out there, follow therapeutic guidelines for which procedures are best for which type of patients. Has there been any kind of adjustment to the guidelines given this increase of TAVR explants?

Dr. Chris Malaisrie: I think there was a great enthusiasm for TAVR as it has been deployed across the country. It is guideline recommendations that older patients over 65, the TAVR should definitely be considered. Now, the enthusiasm for TAVR has expanded to our younger patients less than 65, where we really don't have a lot of data to support TAVR as an option for those patients. There are some younger patients that would benefit from it, like high risk patients who were not great candidates for open heart surgery.

I think the enthusiasm for younger patients has to be tempered because we do have great options for our younger patients in the form of open heart surgery, where that's a Ross Procedure, valve repair, valve replacement, minimally invasive cardiac surgery. We have so many options for our younger patients that they should consider more than just TAVR.

Misconception #6: All Cardiac Centers Offer Patients The Same Heart Valve Therapies

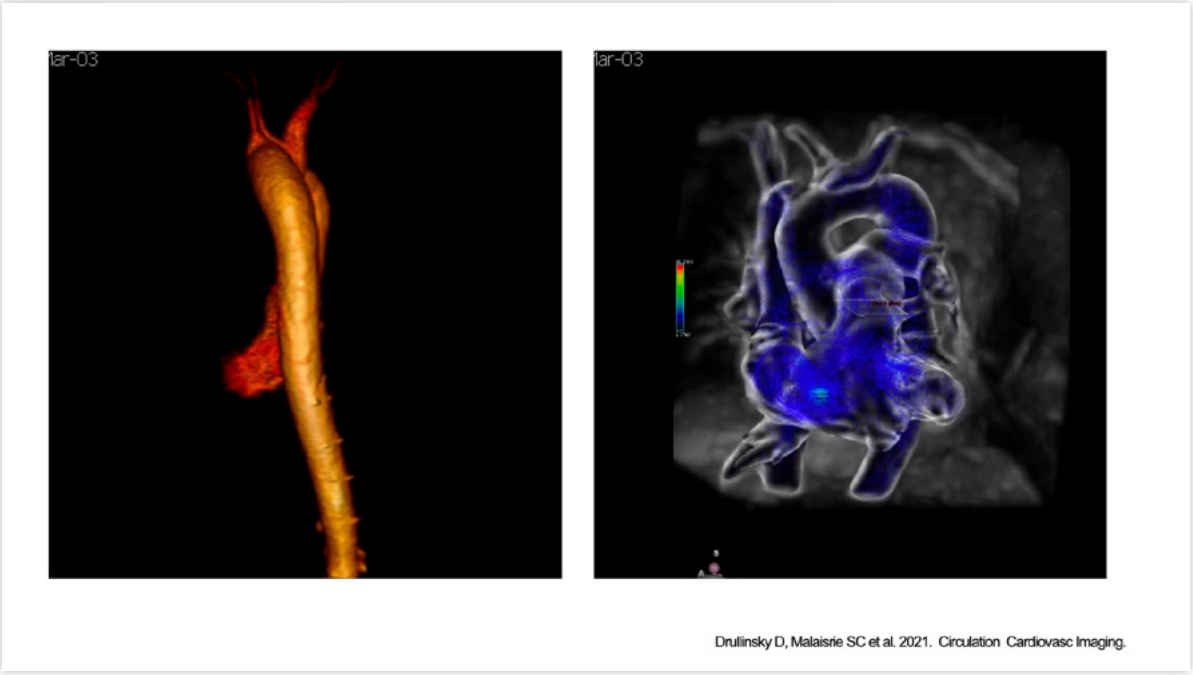


Dr. Chris Malaisrie: Misconception number six, all cardiac centers offer patients the same heart valve therapies.

There's several reasons that this isn't true. The first is that with more cases, super specialization does occur. We all know that the more that you do of something, the better you are at it. If a surgeon is only doing several cases per year, that surgeon is not going to be as good as someone who does tens, twenties, thirties, sometimes a hundred of these complex procedures per year.

That just makes sense.

I think more importantly is that specialized centers are the centers that are developing these new innovative procedures. For 20 years ago, when Adam I started this, TAVR was a brand new procedure and we were the first centers in the country to offer this operation procedure of patients all way back in 2007. It's the innovation in the clinical trials that we can offer patients that are the big difference for why you would want to go to specialized heart valve centers. In Northwestern, we have over 10,000 participants in a hundred clinical trials. I think we give as many options as possible for treatment for our patients with valve disease.



Drulinsky D, Malaisrie SC et al. 2021. Circulation Cardiovasc Imaging.

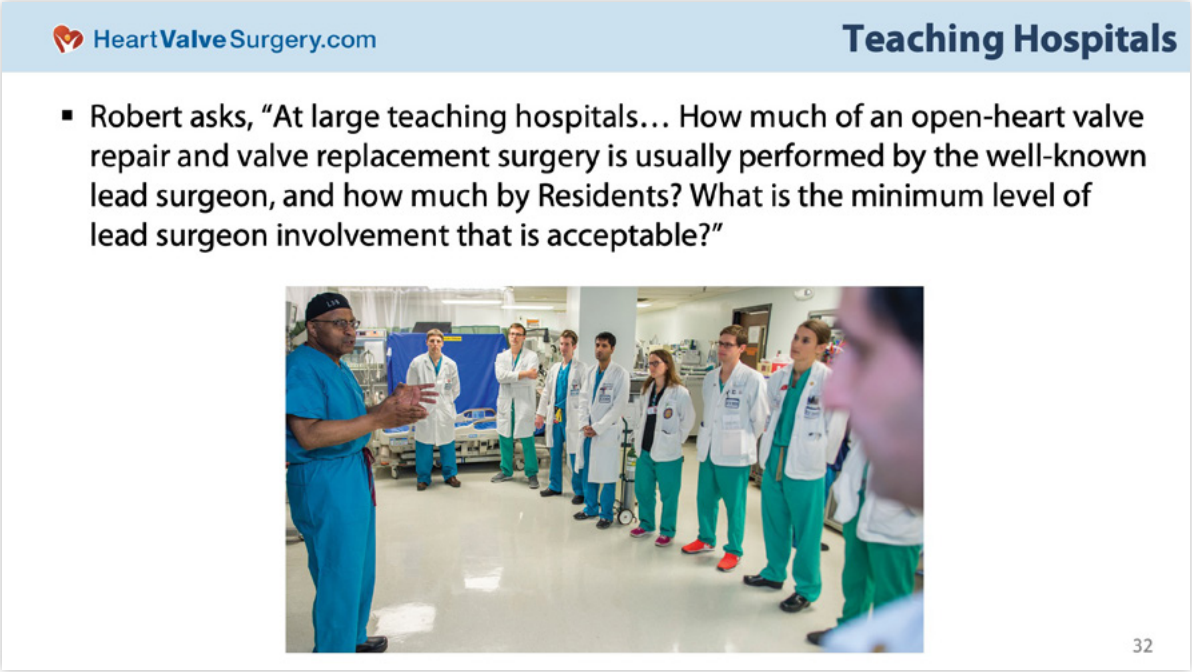
This is some great imaging pictures from our 4D MRI lab led by Michael Markl, who's also been with us for more than a decade showing the flow through the aorta. This is a completed Ross Procedure that we had the pleasure of studying with 4D MRI, and you can see the near perfect blood flow. You can admire it with your own eyeballs. You don't need to be a scientist, although we have quantified all of the flow patterns here. Just with your own eyeballs, you can see that the flow is near perfect.

Adam Pick: And Dr. Malaisrie, if it wasn't perfect, right here we see just a lot of laminar flow, what would be happening in this flow of, let's say a valve that was bicuspid and it was having problems? What might the patients be seeing here?

Dr. Chris Malaisrie: Yeah, the flow would be off angle, so not in a straight line, sometimes directed to the wall of aorta, which we think is part of the reason that patients with bicuspid valve also develop aneurysms. You would see very vertical flow, so it would be a twisting pattern in the flow pattern in the aorta; and definitely the red tells you there's a lot of red. That means the flow is very, very fast. It should be slow and smooth.

Adam Pick: Great, and if anybody wants to learn more about 4D MRI, just type 4D MRI at the search bar at HeartValveSurgery.com. Dr. Markl, we are lucky to spend some time with him and he shared all about the work that you and your team are doing there at Northwestern with this new technology in a new video. Dr. Malaisrie, that got us through the misconceptions of the webinar, the six misconceptions. Now we have gotten a bunches of questions from our community both here live and before the webinar.

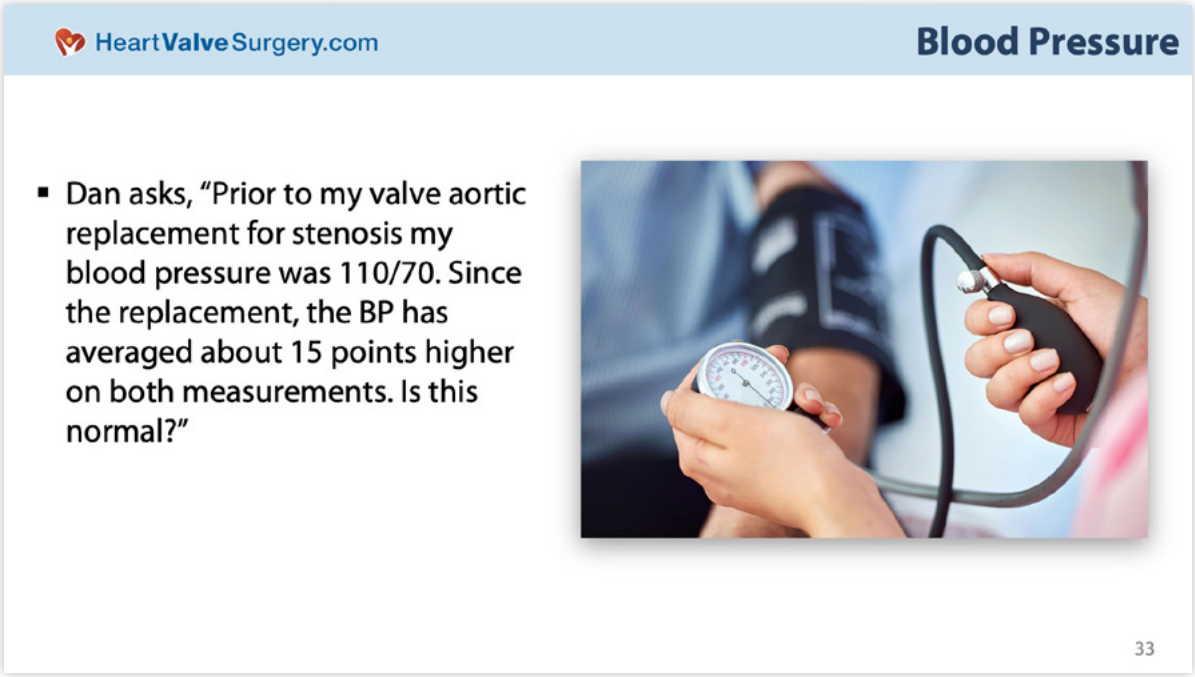
Questions & Answers:



Adam Pick: Let's go ahead and get into a rapid fire session here of questions and answers. The first one comes in all about teaching hospitals from Robert and he asks a really great question that we've never covered here before, which is at large teaching hospitals, "How much of an open heart valve repair or replacement surgery is usually performed by the well-known lead surgeon, and how much by residents? What is the minimum level of lead surgeon involvement that is acceptable?"

Dr. Chris Malaisrie: I'll answer that, but this is another misconception that a lot of patients have is that just because you have residents that the outcomes aren't good. It's totally opposite. Teaching hospitals have better outcomes than hospitals without residents medical students. You got to remember, one of our jobs as a professor of surgery is to train the next generation of doctors and for us heart surgeons. The resident is never independent. This is the lead surgeon's case.

The lead surgeon is always there for the critical portion of the heart operation, which is well-defined for us. That's usually defined as the period of time that the patient is on the heart lung machine. The heart lung machine is device we use to take over the function of the heart and lungs that allow us to operate on the inside of the heart. That's why we call it open heart surgery. Now, you may ask, well, what do the residents do? They'll assist during a critical part and they'll also open and close the incision.

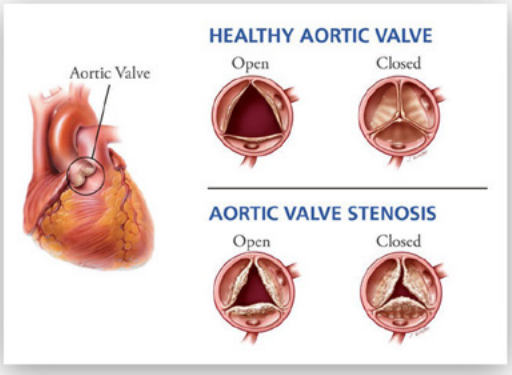


Adam Pick: Great, thanks so much. I hope that helped you, Robert. Let's move over to Dan, a really important question about blood pressure. He says, "Prior to my aortic valve replacement for stenosis, my blood pressure was 110/70. Since the replacement, the BP has averaged 15 points higher on both measurements. Is this normal?"

Dr. Chris Malaisrie: This is normal. A quick lesson on physiology, so patients with aortic stenosis, that means that the valve is narrow and tight, so it's obstructing blood flow through the heart to the rest of the body. In a diseased valve, that will reduce the blood pressure in most patients. Now with a successful valve replacement, that obstruction is relieved, so the flow to the body is higher. That means sometimes the blood pressure will be higher at the beginning and come down later as the body gets used to the normal flow. You'll need blood pressure medications occasionally. For Dan, I would say take the win. This sounds like a successful valve replacement for you.

Moderate Aortic Stenosis

- Carole McKeown asks, "My question is… Why must you wait until aortic stenosis is at the "severe" stage and not replace or repair the valve at "moderate"?"



Aortic Stenosis

	Mild	Moderate	Severe
AV Peak Velocity (m/s)	2.6 - 2.9	3.0 - 4.0	≥ 4.0
AV Mean PG (mmHg)	< 20	20 - 40	≥ 40
AVA (cm^2)	> 1.5	1.0 - 1.5	< 1.0

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Adam Pick: Great. This question, Dr. Malaisrie, seems to be coming more and more frequently in my inbox, which is about this idea of moderate aortic stenosis and you could, I'm sure, apply it to other forms of disease, moderate mitral regurgitation. Carol asks, "My question is, why must you wait until aortic stenosis is at the severe stage and not replace or repair the valve at moderate stenosis?"

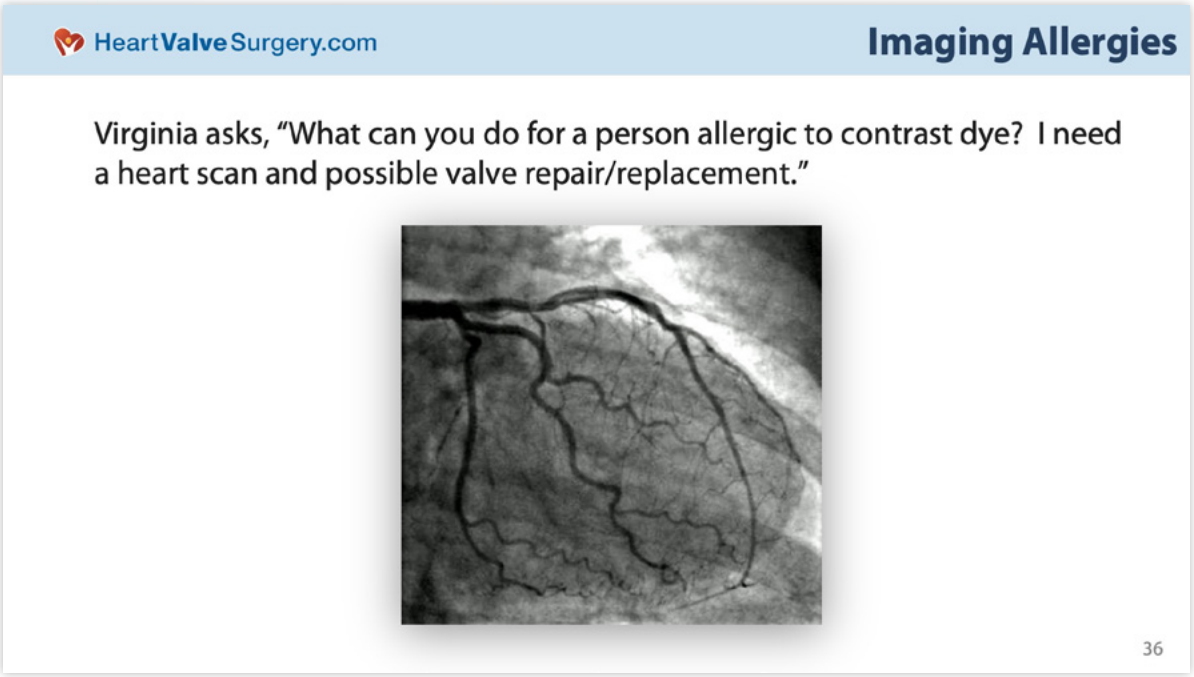
Dr. Chris Malaisrie: Yeah, well, we certainly want to treat patients when they become symptomatic or when there's damage to the heart. We take very close look at the echocardiograms, CTs, MRIs to make sure it's the appropriate time to make an intervention. We also don't want to break what's fixed, even if you'll need the operation later. For patients with moderate aortic stenosis, most patients don't have symptoms. There isn't any damage to the heart. We would like to wait as long as possible before we give you an artificial heart valve, because as soon as you get an artificial heart valve, then you'll have to contend with issues that arise with open heart, with artificial heart valves, that's coumadin for mechanical valves and a limited durability with tissue valves. We want you to live with your own valve as long as possible and then replace it when we have to.

Adam Pick: Great, a question coming in from Dennis about valve selection, which you were just addressing. It's kind of a case study, Dr. Malaisrie. He says, "I'm a 76-year-old man who walks five miles a day. He's asymptomatic, but he needs mitral valve AFib surgery. I want a mechanical valve as I don't want to have surgery again in my 80s. I've been on warfarin since 2006 with no issues. My local surgeon demands a biological valve and no debate was allowed. What does Dr. Malaisrie think?"

Dr. Chris Malaisrie: I think the debate is a worthy debate and we have these debates in our doctor meetings as well. For this case, I do agree with a local surgeon. At 76 years old, the durability for a tissue valve is pretty good. You're right, it can't beat the mechanical valve. The mechanical valve is made out of high grade carbon that's never going to break, but with a tissue valve at 76, there's a good chance that that's going to get you to the finish line. I definitely agree with the local surgeon. The key feature here is that the surgeon is going to offer AFib surgery. If the patient has atrial fibrillation, they're going to offer an operation like the maze procedure, which will eliminate atrial fibrillation afterwards. This is pretty goal. With the maze procedure, there's about an 85% chance the AFib will be gone at three months. With the treatment of atrial fibrillation also goes the need for anticoagulation. If the surgeon is going to do mitral valve surgery plus AFib surgery and you will be free from atrial fibrillation at three months, that means you would be off of Coumadin, then a tissue valve for you is a very attractive option.

Adam Pick: I understand that Northwestern has done a lot of work in terms of atrial fibrillation in the guidelines for open heart surgery when a patient is going in for some form of valvular disease or coronary artery. Is this a requirement now that the AFib is treated when a patient is having some form of open heart surgery?

Dr. Chris Malaisrie: It's definitely a consideration. Guidelines say that should be done at the same time of valve surgery, and for one important reason, and it's not to get you off Coumadin. The reason to do atrial fibrillation surgery is to reduce your risk of stroke and subsequent death. We've been able to show that very well that if you do a proper AFib surgery with closure of the left atrial appendage, that definitely reduction in stroke can result from that, and there is also an improvement of survival because the patient is not in atrial fibrillation.

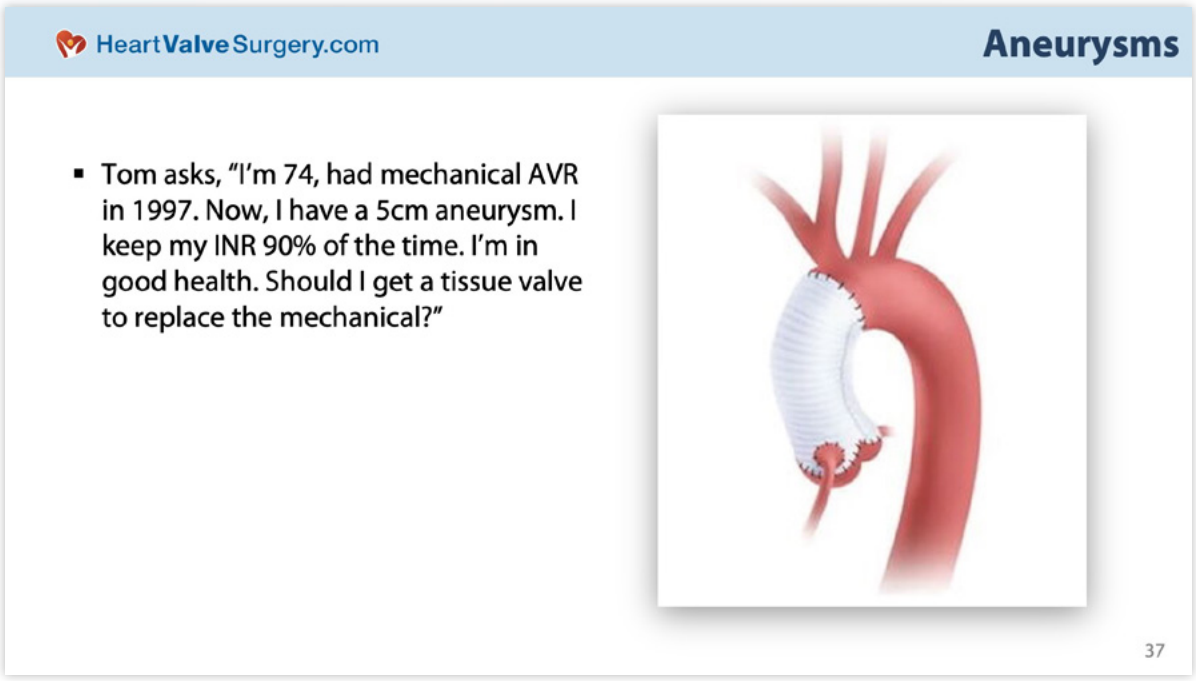


Adam Pick: Thank you so much for that work that you and I know Dr. McCarthy has been doing in particular. This is a question we've never gotten before, but I'm sure it happens and it's a situation. Virginia asks, "What can you do for a person allergic to contrast dye? I need a heart scan and possible valve repair/replacement."

Dr. Chris Malaisrie: There's different types of adverse reactions to contrast dye. If it's a true allergy, then it can be difficult to manage, but most patients have a reaction to contrast dye that we can treat. We can premedicate patients before they get the iodine contrast dye. Sometimes we have to admit the patients beforehand in order to get that done. Remember that this left heart cath is a same day procedure. Usually you come in, you have it done, you go home the same day, but if we have to premedicate you and watch you afterwards because it's necessary to get this heart study, then we'll do that for you.

Adam Pick: Yeah, and now maybe we can touch on another real time question coming in, “Do all patients get an angiogram before a heart valve surgery?”

Dr. Chris Malaisrie: Right, there’s other modalities to look at the coronary artery disease. This left heart cath, you see all these squiggly lines, those are called coronary arteries, and the traditional way to look at that is to introduce a small catheter through your wrist and inject the contrast dye. Now with the newer CT scans, that I think a lot of patients have been through, that the resolution of these newer scans allow us to look at the coronary artery disease with a contrast that is injected just through the vein. An interventional procedure is no longer required in order to look at the coronary arteries.



Adam Pick:I know this is one of your specialties, Dr. Malaisrie. I've spoken to a lot of your patients with aneurysms. Tom asks, "I'm 74, had a mechanical AVR (aortic valve replacement) all the way back in '97. Now I have a five centimeter aneurysm. I keep my INR 90% of the time. I'm in good health. Should I get a tissue valve to replace the mechanical valve?"

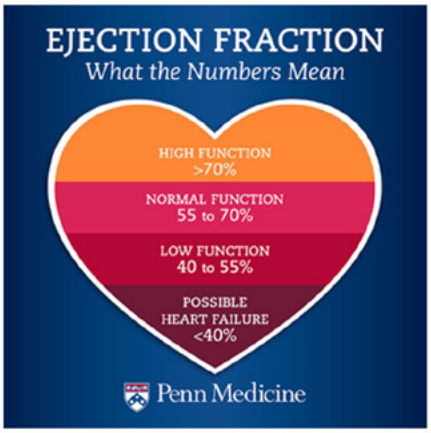
Dr. Chris Malaisrie: This patient has done so well with a mechanical valve, and since 1997, I count 28 years with a mechanical valve with no problems. That's the key point. If you have a mechanical valve, you never had bleeding issues, no stroke in the past, no embolisms to the legs, for instance, like the valve has served you very well, then I see no reason to replace the mechanical valve. We can just replace the aneurysm at the same time. On the other hand that some patients have trouble keeping their INR in range, they've been admitted for bleeding, they've had a stroke in the past, this does represent an opportunity for us to replace the mechanical valve and give you a tissue valve and free you from the burdens of Coumadin. It is very patient dependent.

Adam Pick: Got it, and we're going to go real time to Paul who asked the question on this topic of aneurysms. "Can someone with a dissected descending aorta receive a new aortic valve using a TAVR procedure?"

Dr. Chris Malaisrie: Yes, they can. A type B dissection involves just the descending aorta. It doesn't involve the ascending aorta or the aortic valve. I think the question relates to a chronic dissection, so maybe the patient has had the acute dissection in the past and now is living with a chronic dissection. Will that dissection interfere with delivery of the transcatheter valve? It does not, but we will take a very close look at the anatomy that you do have because there are certain situations where we would avoid going up through the groin, which is a normal delivery path for TAVR.

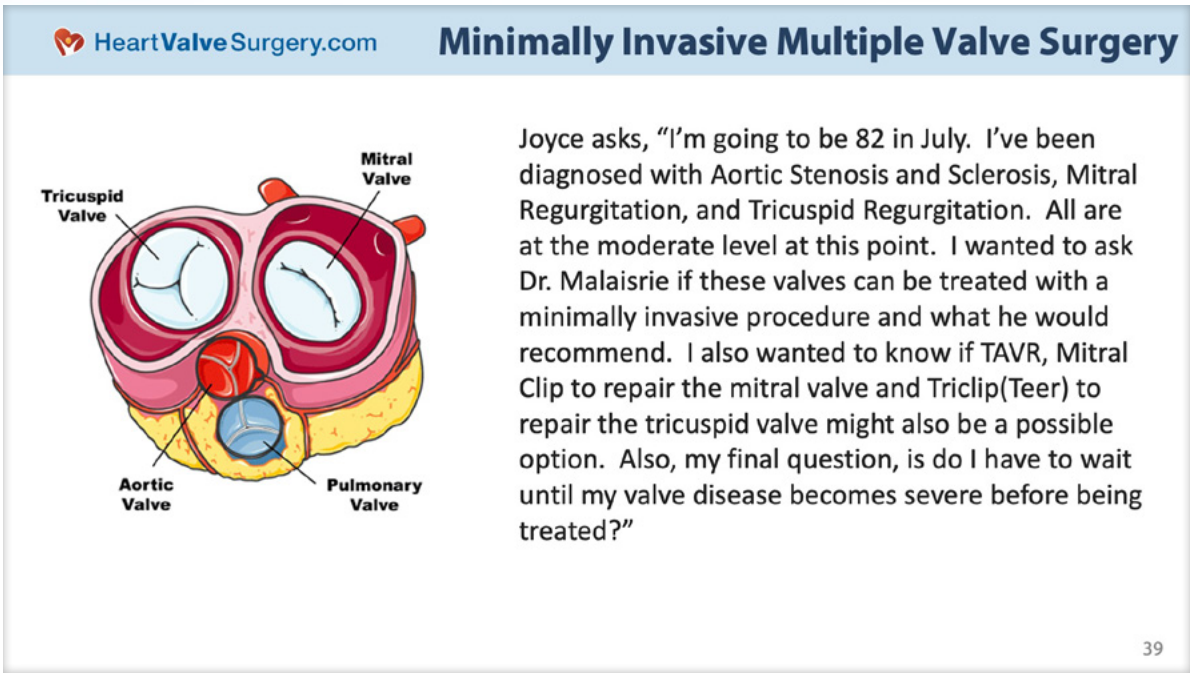
Ejection Fraction

- Evan asks, "Adam, Before SAVR I had a 52 ejection fraction. A 27mm bovine Edwards valve was installed. That was 4 years ago. My last echo in January showed a 53 EF which is the low end of acceptable. I would have expected higher. Is this a normal situation?"



Adam Pick: Great, now let's move over to something that I know we are all concerned about, which is – I know I was before surgery, is this notion of how well my heart is pumping in the injection fraction. We got a question from Evan who asked, "Adam, before SAVR, I had a 52 ejection fraction. A 27 millimeter bovine Edwards valve was installed. That was four years ago. My last echo in January showed a 53 ejection fraction, which is the low end of acceptable. I would have expected higher. Is this a normal situation?"

Dr. Chris Malaisrie: This goes back to what the status of the heart was before the valve surgery. If we caught this aortic stenosis, I'm assuming a little bit later, then the valve may be irreversibly damaged. For instance, the heart function cannot recover afterwards or scarring in the myocardial in the heart muscle itself. In those cases, the aortic valve replacement will halt the damage that has already been done, so we wouldn't expect the function to get better. However we get to it early enough and the heart function is reversible, then we would expect the ejection fraction to get better. Now, I'll tell you, at 53% ejection fraction, I would expect Evan to be living a normal life with full capacity to do a full range of physical exercise. I would be surprised if he said he wasn't.

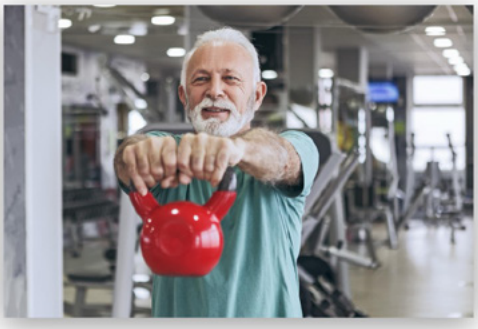


Adam Pick: Great, and moving on to this set of questions, Dr. Malaisrie, is about multiple valve surgery, and Joyce has a great question. She's going to be 82 in July. She's got AS, and sclerosis, mitral regurgitation, tricuspid regurgitation, all are moderate. I wanted to ask Dr. Malaisrie if these valves can be treated with a minimally invasive procedure and what he would recommend. I also wanted to know if TAVR MitraClip to repair the mitral valve, TriClip (TEER) to repair the tricuspid valve might also be an option. My final question is, do I have to wait until my valve disease becomes severe before being treated?

Dr. Chris Malaisrie: Yeah, this is a case where all the options are available to her. I would be very careful to look at the indication for any intervention. Before we think about what type of intervention, we think about, does the patient need an intervention at all, because sometimes medical therapy, we've got great drugs to treat heart failure and actually improves function of some of these valves. That's the first question. Usually patients with moderate disease do not require any intervention at the time. The question becomes, well, what about multiple valves? We just don't know that. I think the combination of aortic and mitral may be reasonable to treat that, especially if the patient is having symptoms, but if the patient is asymptomatic, I think you definitely have time to think about it. All the options are available to you. One benefit of open heart surgery is that all valves can be repaired at the same time. If you decide for a transcatheter approach, we typically space these out so you have three valve problems. We will probably do that in three different procedures.

TAVR, Exercise and Medication

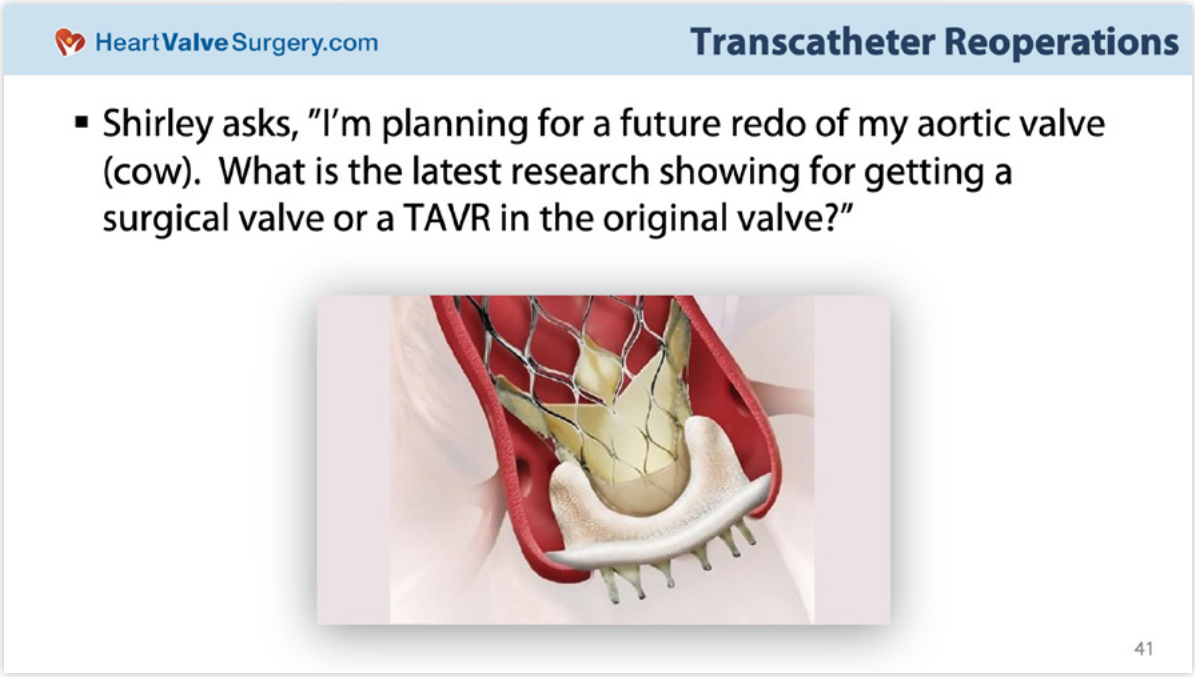
- Greg Egan asks, "Question regarding transcatheter aortic valve replacement (TAVR): Is TAVR resilient under intense exercise ? Does one require anti rejection / blood thinning drugs to maintain its proper performance as an artificial valve?"



Adam Pick: Great, and now more questions about TAVR coming in. We're going to have some follow ups real time from Greg Egan. He asks, question regarding transcatheter aortic valve replacement. Is TAVR resilient under intense exercise? Does one require anti-rejection or blood thinning drugs to maintain its proper performance as an artificial valve?

Dr. Chris Malaisrie: Yes, the valve is resilient under exercise. The testing that is done in a laboratory is very rigorous, meaning that they put it in the machine and it goes through over a million heart cycles and these valves can definitely take on the blood pressure that you would get during exercise. If you have a good TAVR or AVR, then I see no reason that you shouldn't go back to your normal activities. Now, the issue of blood thinners.

So anticoagulation. Coumadin or one of the DOACs, is that required after tissue valves? Typically they are not required after tissue valves, but a lot of patients need anticoagulation anyway, specifically atrial fibrillation. If you don't have atrial fibrillation coming in, there's a chance that you're going to develop atrial fibrillation sometime later in your life. That is a big consideration, because if you're already on Coumadin for another reason, mechanical valves should come into the discussion.

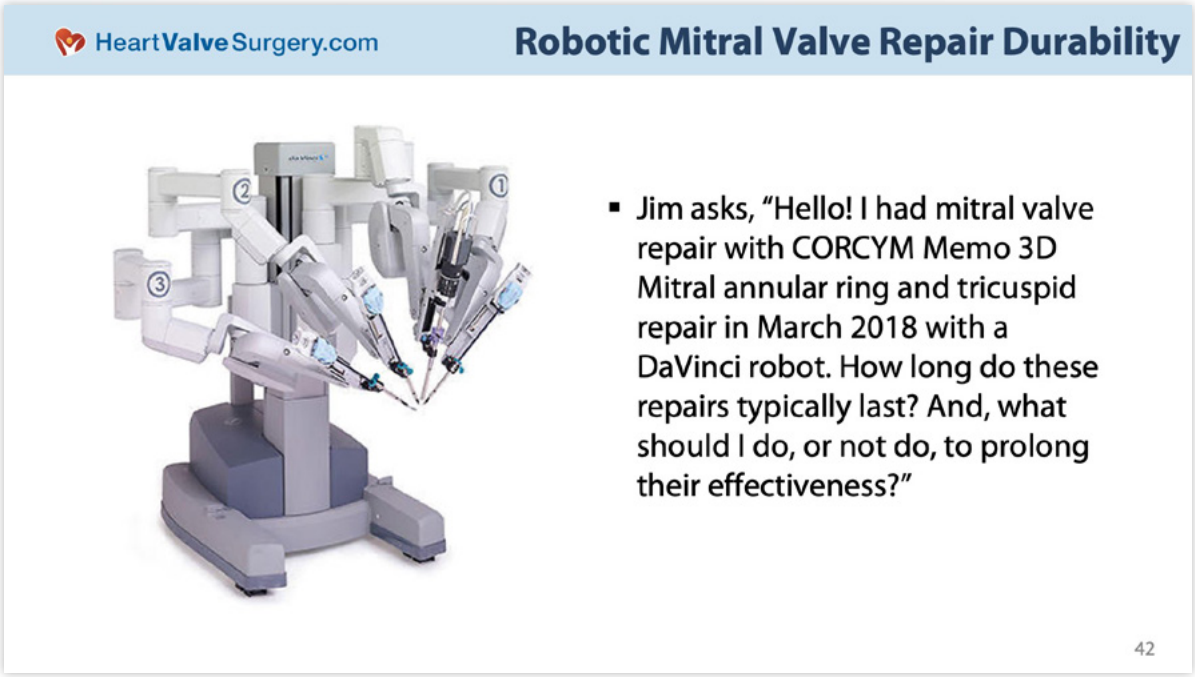


Adam Pick: Great points, and moving on, one more question. We get these a lot talking about the reoperations, which you have touched on, Dr. Malaisrie, and most importantly, the lifetime management of valve disease. Shirley asks, "I'm planning for a future redo of my aortic valve, which is a cow valve. What is the latest research showing for getting a surgical valve or a TAVR in the original valve?" I think she's talking about the durability of the valve-in-valve.

Dr. Chris Malaisrie: We've led studies on valve-in-valve procedures for patients who are low in intermediate risk and publications are forthcoming. I think the valve-in-valve operation after surgery, surgical aortic valve replacement can be very safe, very, very safe. We're talking about less than 1% risk to your life. The caveat is that we have to select patients very carefully. That means we have to take a close look at the CT scan of your heart and your surgical valve and see if the new transcatheter valve is going to fit in there and avoid complications with other structures inside the heart. The important thing that Shirley should know is before you go to your doctor is to find out what surgical valve you have in your body right now. Usually the company will give you a valve card. You should have that handy because you won't remember what valve you had and we need to know everything about that valve, not just the make, the model but also the size.

Adam Pick: So this is a real time question coming in from Susan, Dr. Malaisrie, about what you're talking about. She says, "Can you comment on a third aortic valve replacement?" It seems like she's maybe already had two surgical valve replacements because she asks, "I've been told that my current valve is too small for TAVR. Can you talk about that?"

Dr. Chris Malaisrie: Boy, so it sounds like the patient has had maybe an aortic valve replacement and also a valve-in-valve and may need a third valve inside the body. You can imagine that this case becomes more and more difficult because with each transcatheter case, more valves get stacked on each other. We cannot take any old valves out with a transcatheter procedure. If you want the old valves out, that would require open heart surgery. Now there's some cases where patients just will not tolerate open heart surgery. Yes, cases have been done with valve-in-valve-in-valve. That that case is feasible. It's going to take a lot of planning.



Adam Pick: We are going to bring the robot into this and robotic assisted procedures. Jim asked, "Hello, I had a mitral valve repair with a CORCYM Memo 3D Mitral annular ring and tricuspid repair in March, 2018 via da Vinci robot. How long do these repairs last, and what should I do or not do to prolong their effectiveness?"

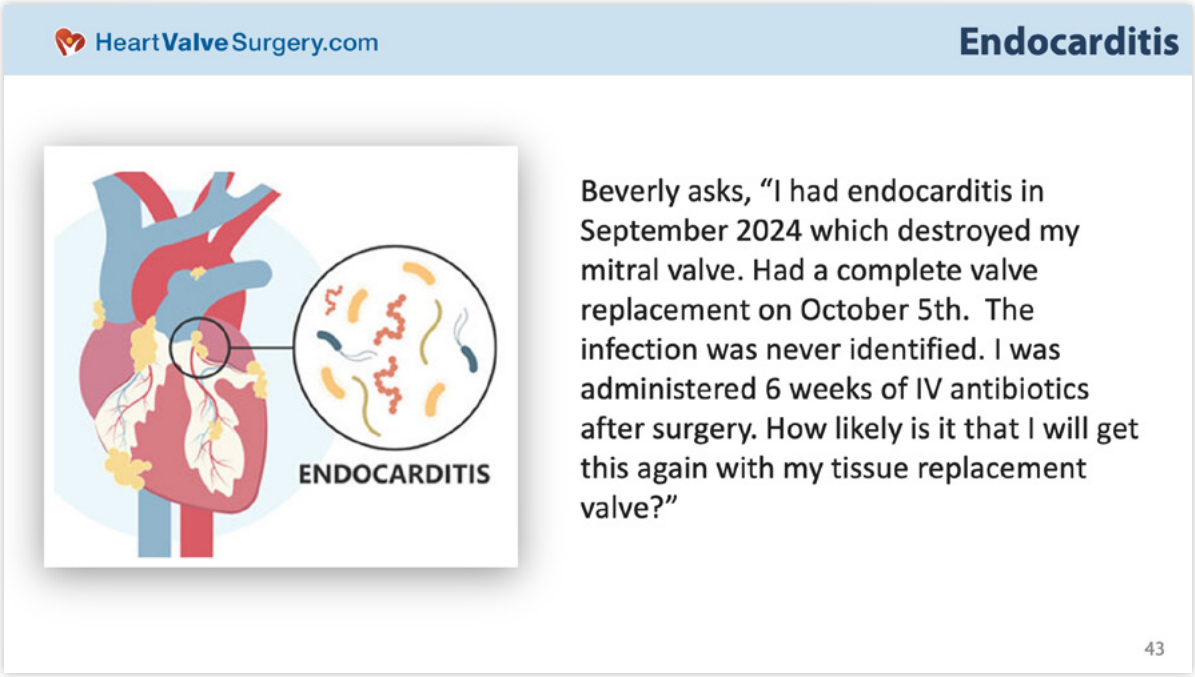
Dr. Chris Malaisrie: With a good mitral valve repair, assuming it's for mitral valve prolapse, we expect over 90% durability out to 10 years. I think you're going to have a very good outcome with mitral valve repair, tricuspid valve repair with a robot. We always recommend a heart healthy diet just like everyone else in our population. You take care of your weight, make sure you don't have diabetes, avoid a sedentary lifestyle and check your lipids; so everything that you would do normally to maintain a healthy heart, that will maximize your longevity.

Adam Pick: Got it, and earlier you were talking – and this is going real time, Dr. Malaisrie, to a question from Tina. You talked about recovery from cardiac surgery. Tina is asking, "Was the 3D discharge, was that for SAVR or for TAVR?"

Dr. Chris Malaisrie: That was for SAVR, so that was with open heart surgery. TAVR also has about a two to three average length of stay after the TAVR procedure. We can get pretty close with open heart surgery, especially with minimally invasive cardiac surgery, we expect about a three to five, but TAVR is the shortest length of stay at about maybe two to three days.

Adam Pick: Got it, and we're going to go real time again. We're getting some great questions. This one comes in from Natalie. I've never heard this question before. "Is the Ross Procedure an option for re-operative surgery after a Bental procedure?"

Dr. Chris Malaisrie: It is, so Ross Procedures can be done for patients with failing valves. About 10 to 20% of our Ross patients are re-operative surgery. It does make the operation more complex. It takes longer to do. It takes a little more careful planning, but the Ross procedure, as long as your pulmonary valve is okay, can be an option for aortic valve disease, whether it's reoperation or not.

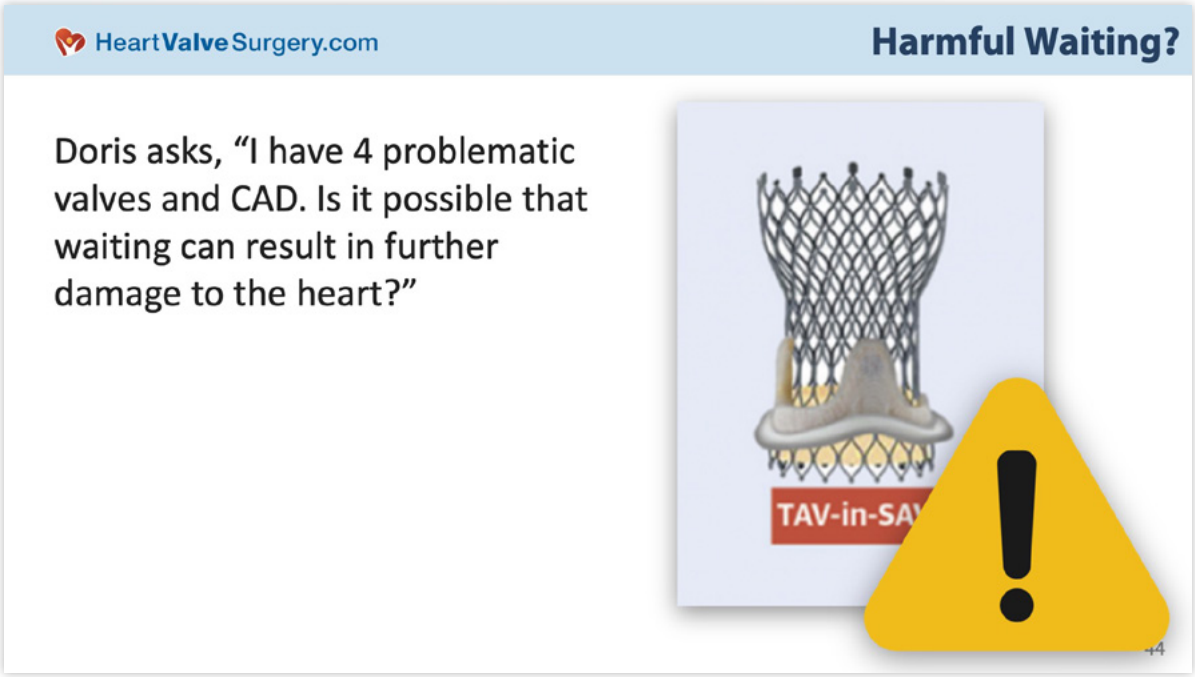


Adam Pick: Great. Let's move on to another disease that patients in our community suffer from, which is endocarditis. Beverly asked, "I had endocarditis in 2024, which destroyed my mitral valve. I had a complete replacement in October. The infection was never identified. I was administered six weeks of IV antibiotics after surgery. How likely is it that I'll get this again with my tissue valve replacement?"

Dr. Chris Malaisrie: This is an excellent question. Sometimes we just cannot find the bacteria on culture. We treat that with broad spectrum antibiotics. That's why you got IV antibiotics at home. That's a big deal, so it's not oral drugs. You have to have an IV at home and get in missed for six weeks. That's all in the efforts to reduce the risk of reinfection of your valve that you have in place. Now, the estimates range anywhere from risk of five to 15% risk of reinfection of the valve through no fault of yours, but there's things that you can do to minimize that risk. Since you do have a valve prosthesis, you have to let all your doctors know that you have an artificial valve. They should know already, but what we'll do in those cases is to give you preventive antibiotics during any elective procedures that you get. For instance, you see the dentist, let the dentist know that you've got artificial heart valve, and then they will prescribe antibiotics at the time of your dental procedure.

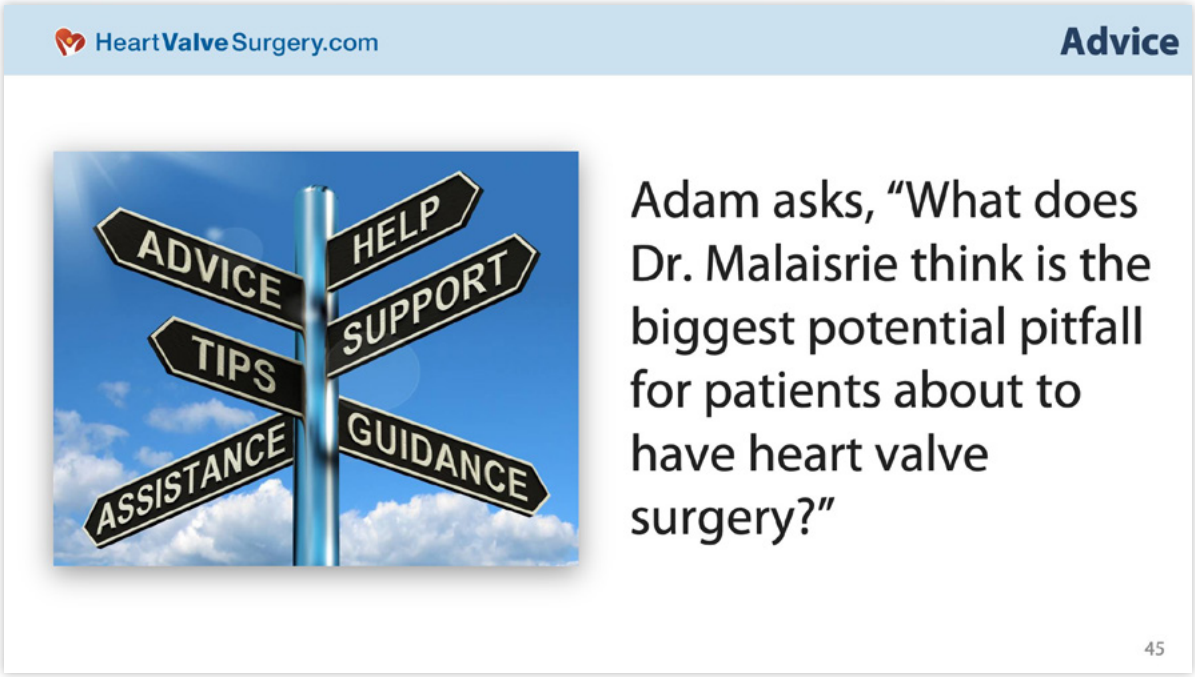
Adam Pick: Great, and this question, Dr. Malaisrie, we're going to real time is from actually your patient Steve Font Leroy. He says, "Adam, I'm actually an AVR patient of Dr. Malaisrie. I had it done back in 2016 and doing just super. I'm thinking about what to do when my bovine valve wears out. What's his perspective on timing for a TAVR?"

Dr. Chris Malaisrie: We would look at the valve function for sure. We monitor symptoms. We should be monitoring your valve with annual echocardiograms. If not, the stethoscope by a cardiologist does just fine, in my opinion, watching for symptoms. Now, I think that the longevity of your valve should last well 10 to 15 years. That's the estimate for our patients. You have to remember when we say 10 to 15 year valve, well, what does that mean? That means that half the patients will need a reoperation by that time. Conversely, that means that half the patients are doing A-okay at 10 to 15 years. We've certainly seen tissue valve last into 20 year, 30 year ranges. We can't guarantee it, but there's a chance that your tissue valve can last longer than the 10 to 15 years that we're talking about.



Adam Pick: Got it, and here's a great – this isn't a question, Dr. Malaisrie. It's a comment from Laura Lakner who says, one year ago today, Dr. Malaisrie replaced my aortic valve with minimally invasive surgery. I'm doing great, very active, very grateful. I'm just sending this along to say thank you. On behalf of Laura, thank you so much, Dr. Malaisrie. Let's move over. We still have a couple really great questions. This is interesting, getting back to that whole thing about waiting, Dr. Malaisrie. Doris asks, "I have four problematic valves and coronary artery disease. Is it possible that waiting can result in further damage to the heart?"

Dr. Chris Malaisrie: This certainly sounds like a heavy burden of valve and cardiac disease. Yes, I think that even in asymptomatic patients that the heart can undergo damage even before the patient has symptoms. For this patient, there's five reasons that the heart can get damaged. For you, Louise, I think imaging is going to be key to timing for any sort of intervention. Echocardiograms, MRIs look at the function of the heart very, very well, and it's going to be incumbent upon you and your cardiologist determine when is it the right time to intervene.



Adam Pick: Got it, and one question. This one actually comes from me, Dr. Malaisrie. You see a lot of valve patients. Earlier I think it was mentioned, the average by STS for therapies on mitral valves by cardiac surgery is only about five per year. I'm curious to know about how many valve procedures do you do annually?

Dr. Chris Malaisrie: I do 150 valve procedures per year.

Adam Pick: Okay, so a lot more than the average cardiac surgeon. My question would just be, and I'm sure patients on the line are wondering this, "What does Dr. Malaisrie think is the biggest potential pitfall for patients about to have heart valve surgery?"

Dr. Chris Malaisrie: The biggest one, and I see this fairly often, is to have a preconception of the therapy that you need before you actually see the cardiologist or cardiac surgeon. Now remember, there's a menu of options we can offer you. Open heart surgery, transcatheter options, minimally invasive, full sternotomy, Ross procedures, valve repairs, all these are available to you, but if you go in thinking that you just need this one procedure, then it takes everything off the table. You should have an open mind when you go see your cardiologist, cardiac surgeon about what is the best procedure for you.

Adam Pick: Great, and on that note, I want to go ahead and conclude the webinar, but please don't hang up yet. On behalf of all the patients at Heart Valve Surgery, I want to thank you, Dr. Malaisrie, for taking time away from your practice, taking time away from the Rocky Mountain Heart Valve Symposium that you're attending right now. I cannot thank you enough for the dedication and the commitment to your patients in helping them get the best procedure at the right time to help them recover as fast as possible. Thank you so much for being with us today.

Dr. Chris Malaisrie: Thank you very much.

Patient Resources

Since 2006, HeartValveSurgery.com has developed several resources to help you better understand your diagnosis, your treatment options and your recovery.

Listed below, please find resources created exclusively for patients and caregivers. We hope they educate and empower you.

- Adam's Free Patient eBooks - Download 10+ free eBooks about heart valve disease and treatment options for aortic, mitral, pulmonary and tricuspid valves.
- Heart Valve Learning Center - Visit the Heart Valve Learning Center to access over 1,000 pages of educational information about valvular disorders.
- Patient Community - Meet people just like you in our patient community. There's nothing better than connecting and learning from patients who are sharing their stories in our community.
- Surgeon Finder - Find and research patient-recommended heart surgeons that specialize in heart valve repair and heart valve replacement procedures.
- Heart Hospitals - Learn about medical centers that have dedicated teams and resources that specialize in heart valve therapy.
- Adam's Heart Valve Blog - Get the latest medical news and patient updates from our award-winning blog.
- Educational Videos - Watch over 100 educational videos filmed by the Heart-ValveSurgery.com film crew about heart valve surgery.