

Advantages of Mitral Valve Repair

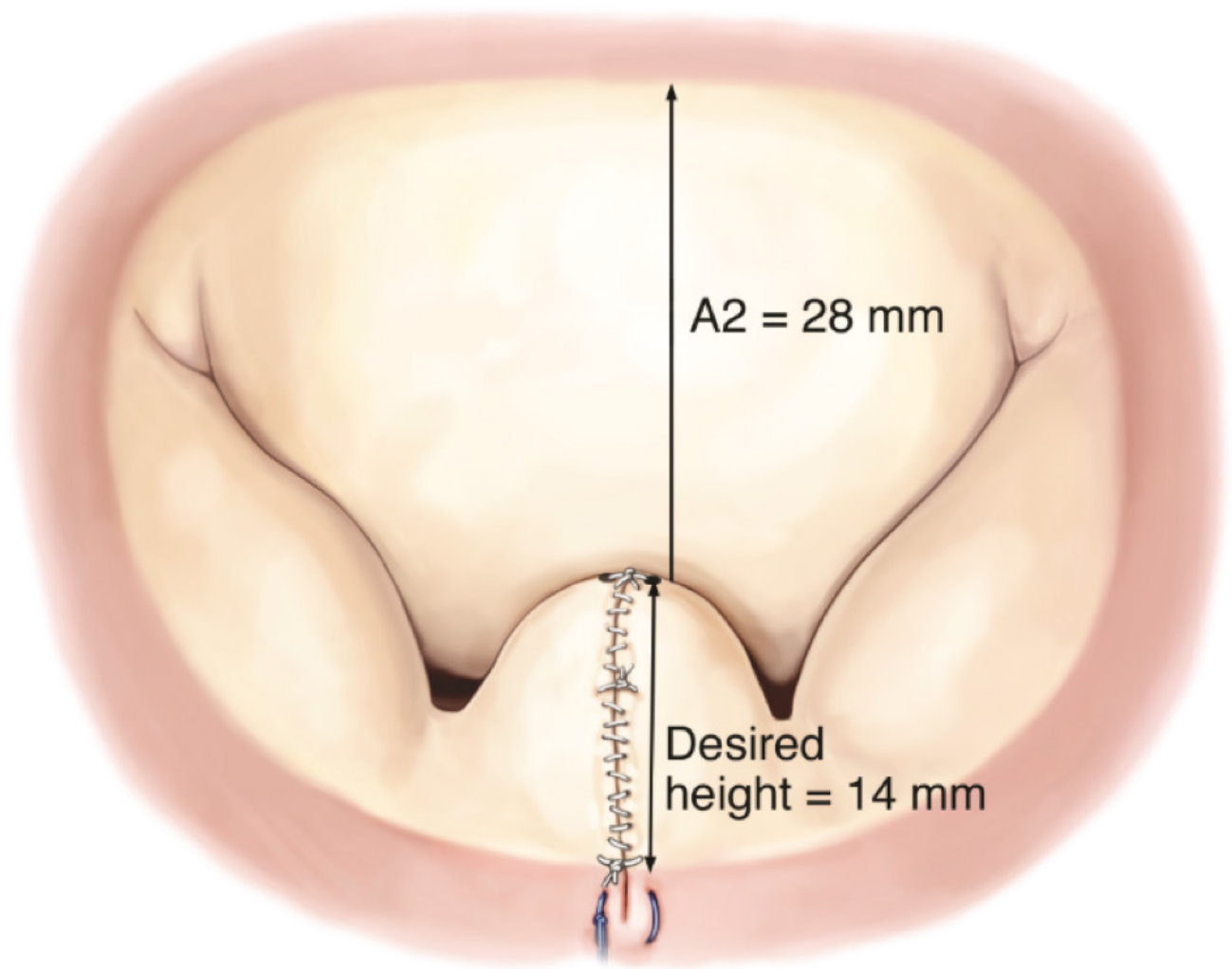


Table Of Contents

Featured Webinar Speakers	2
Webinar Introduction	3
HeartValveSurgery.com Community Patient	7
The Heart & Heart Valves	9
Mitral Valve Disease Burden	11
About Mitral Regurgitation	12
How Is Mitral Regurgitation Evaluated?	14
Different Types of Mitral Regurgitation	15
Long-Term Survivability of Mitral Regurgitation Patients	18
Mitral Regurgitation Treatment Options	21
Repairing A Degenerative Mitral Valve	23
Mitral Valve Repair Ring	25
Repairing the Mitral Valve Chords	26
The Alfieri Repair	27
The MitraClip	28
Advantages of Mitral Valve Repair	29
Dis-Advantages of Mitral Valve Repair	30
Dr. McCarthy's Surgical Outcomes for Mitral Valve Repair	32
Heart Valve Replacement Options: Mechanical & Tissue Valves	33
Valve-in-Valve Procedures	37
Live "Questions & Answers" Session	38

Featured Webinar Speakers



Dr. Patrick McCarthy

Cardiac Surgeon
Northwestern Medicine
Chicago, Illinois
(888) 531-7541

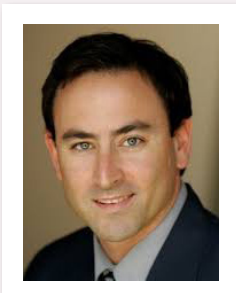
[Learn more.](#)



Dr. James Thomas

Cardiologist
Northwestern Medicine
Chicago, Illinois
(866) 306-2041

[Learn more.](#)



Adam Pick

Patient, Author & Website Founder
HeartValveSurgery.com
Los Angeles, California
(888) 725-4133

[Learn more.](#)

Webinar Introduction

Adam Pick: Hi, everybody. I'd like to welcome you to the webinar titled, "Advantages of Mitral Valve Repair". If I have yet to meet you, I am a former patient and I'm also the founder of HeartValveSurgery.com. Our mission is simple. We want to educate and empower patients with heart valve disease. This webinar - which had over 290 registrations from patients and countries all over the world - is designed to support that mission.



The graphic is a purple and white promotional slide for a webinar. At the top, it features the HeartValveSurgery.com logo, which includes a heart icon with a pulse line. Below the logo, the text reads "Patient Webinar" in bold, followed by "Advantages of Mitral Valve Repair" in a slightly smaller font. Underneath that, it says "The Webinar will begin at 5:00 PM CST" in red. The bottom section is titled "Webinar Speakers" and contains three portrait photos of the speakers. Below each photo is their name and title.

HeartValveSurgery.com

Patient Webinar
Advantages of Mitral Valve Repair
The Webinar will begin at 5:00 PM CST

Webinar Speakers

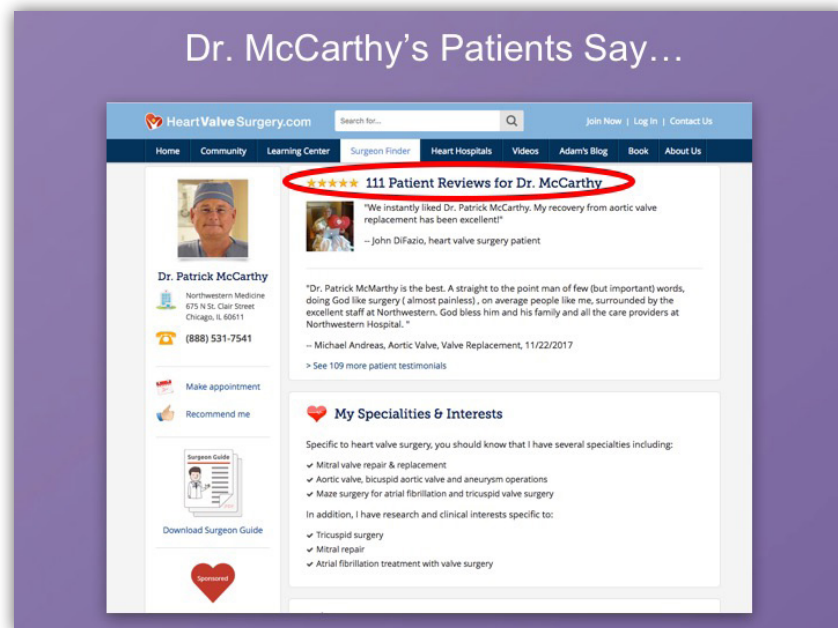

Dr. Patrick McCarthy
Cardiac Surgeon
Northwestern Medicine


Dr. James Thomas
Cardiologist
Northwestern Medicine


Adam Pick
Patient & Website Founder
HeartValveSurgery.com

During the webinar, all participants will be in "listen-only" mode. That said, you may submit questions during the webinar. Simply post your questions in the control panel on the right side of your screen. We will do our best to address your questions during the live "Q&A" section of the webinar. Lastly, as we conclude today, we're going to ask you to complete a quick five-question survey.

I am thrilled to introduce the featured speakers for the session. [Dr. McCarthy](#) is the Executive Director of [The Bluhm Cardiovascular Institute](#) and the Chief of Cardiac Surgery at Northwestern Medicine in Chicago. Dr. McCarthy has achieved and international recognition in the fields of complex adult cardiac surgery, including valve repair and replacement and atrial fibrillation. He has performed 10,000 heart operations, of which more than 4,000 involved valve therapy. You should also know that Dr. McCarthy is the number one recommended surgeon at HeartValveSurgery.com, and as you can see here, he's had [over 100 patient testimonials](#). Truly incredible!



[Dr. James Thomas](#) is the Director of [The Center for Heart Valve Disease](#) at Bluhm Cardiovascular Institute. Dr. Thomas is an expert in cardiovascular imaging, and is a past President of the American Society of Echocardiography. Dr. Thomas also serves as a lead scientist for ultrasound with NASA, researching the impact of space travel on the heart.

I could go on-and-on about the careers of Dr. McCarthy and Dr. Thomas and their achievements in cardiac care. Instead, I will just tell you that this team is celebrated by the HeartValveSurgery.com community, and for a very good reason. Since launching this website, Northwestern has successfully treated well

over 100 patients from our community, including many of the folks you see here. Robert Winter, Sarah Bloomfield, Ron Rovin, Jean Cook, Sharon Knickerbocker, Lisa Woods, Mark Kroto, John DeFazio, Carol Rice, Charlotte, Hartshill and Debbie Cross.



As you may have just seen - a few days ago - Dr. McCarthy and his team performed another successful mitral valve repair on Diane from Chicago. Personally, I'm humbled that Dr. McCarthy and Dr. Thomas are taking time away from their very busy practices at Northwestern to share their clinical experiences and research during this educational webinar.

To start, I'd like to introduce you to Dr. Patrick McCarthy.

HeartValveSurgery.com Community Member

Dr. McCarthy: Thanks for the nice introduction and welcome to all the participants. First, Adam, I want to thank you for all that you do for the patients and their families because people always come to us with a lot of questions and the anxieties. Whenever they go to your website, they feel a lot better. So, it's really doing a great thing for the patients that need heart valve surgery.



Heart Valve Surgery Community Member

- 48 year old man
 - Mitral regurgitation—diagnosed in 2010
 - Regular echo follow up
 - 2017 regurgitation severe, left ventricle enlarged—asymptomatic
- Local surgeon advised valve could not be repaired and would be replaced
- Mitral Valve Repair by Dr. McCarthy 2017
 - Discharged 3 days post-op
 - Exercising and doing well

 Northwestern
Medicine

Before we started, Dr. Thomas and I talked about introducing a patient that we had seen not too long ago, to set the stage for this webinar. The patient is a 48-year old man. We won't use his name, but he'd been to Adam's website. The patient had mitral regurgitation for many years, he'd had echo follow up. He was starting to develop an enlarged heart, even though he felt well, and so he was recommended to have surgery.

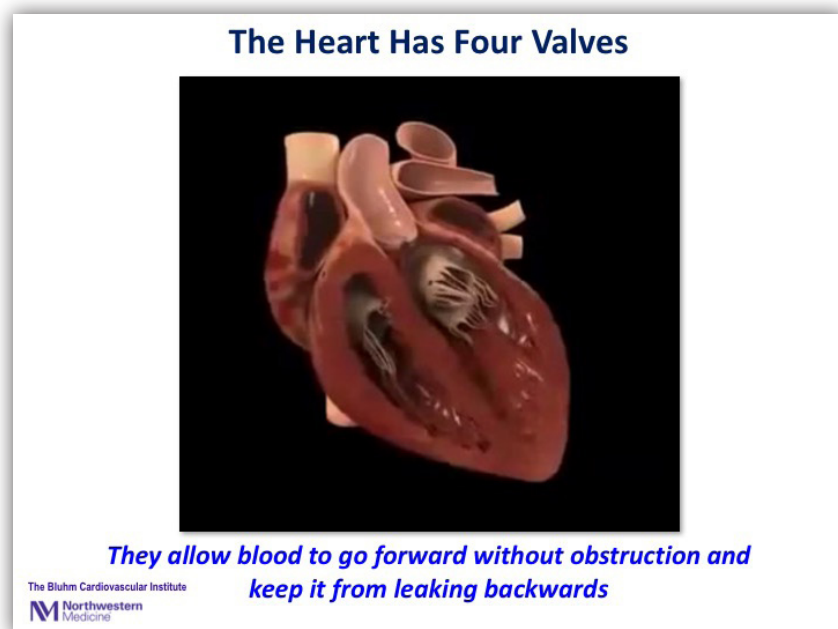
Locally, from the hospital he came from, they told the patient his valve was in such bad shape that he was going to need to have the valve replaced. We see that a fair amount of times. He came to us. I think he had searched us on

Adam's website, and in December, we did a mitral valve repair. He went home three days later. We followed up with him. He's doing great. He's exercising and he's doing fine. That really sets the stage for the type of patients we're going to talk about.

I'm going to introduce Dr. Jim Thomas who is an old colleague of mine. We were together at the Cleveland Clinic. He's going to talk about how cardiologists evaluate mitral valve disease.

The Heart & Heart Valves

Dr. Thomas: Hi everyone. Thanks Adam for putting this altogether. I didn't really know you that well before I came to Northwestern almost four years ago. But, I've really been pleased with our interactions. I do support the educational mission that you bring to the heart valve surgery world here.

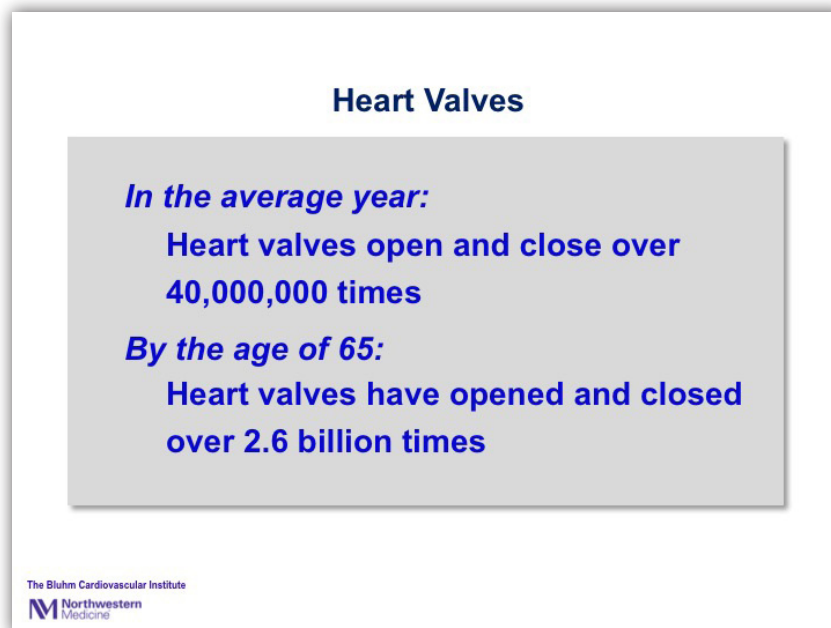


I'm sure most of our audience understands that there are four valves inside the heart. The function of any valve is to make sure that the blood goes in one direction. It should go forward through the heart. The valves need to prevent no significant blockage to forward flow, but prevent complete blockage to reverse flow. So, the blood doesn't flow backwards there. They're really quite remarkable valves. When you look at them, they're flimsy little things. You are surprised they

even really work. But, they do work remarkably throughout our life.

As we mentioned, there are four valves: three of them are the most common ones to be diseased. The aortic valve frequently becomes stenotic or blocked. The tricuspid valve on the right side of the heart, often become leaky, particularly in the presence of problems on the left side of the heart. Our topic for today is the mitral valve - which lies between the left atrium and the left ventricle and promotes blood going forward into the left ventricle and prevents it going backwards into the left atrium.


If you just do the math, it works out that in an average year, and this is not at a particularly high heart rate, heart valves open-and-close over 40 million times. Add that up, by age 65, your valves will have opened-and-closed over 2.6 billion times. You can imagine, by the time you get to a hundred, you may well have 4 or 5 billion cycles on all four of your heart valves. Yet for most of us, they function quite well throughout our lives.

An infographic titled "Heart Valves" with a white background and a grey box containing text. The text is in blue and black. It provides statistics on how many times heart valves open and close in an average year and by the age of 65. At the bottom left, there is a logo for The Bluhm Cardiovascular Institute and Northwestern Medicine.

Heart Valves

In the average year:
Heart valves open and close over
40,000,000 times

By the age of 65:
Heart valves have opened and closed
over **2.6 billion times**

The Bluhm Cardiovascular Institute
 Northwestern
Medicine

Mitral Valve Disease Burden

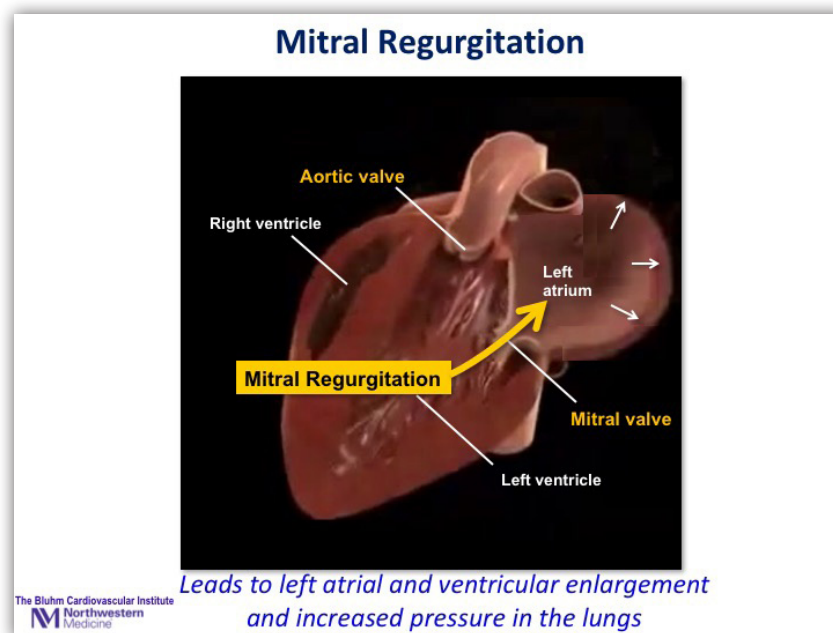
Dr. Thomas: There is a tremendous burden of heart valve disease. For our topic today, mitral valve disease, there are about 5 million Americans with moderate or severe mitral regurgitation. There's about a 10% risk, once you get to be 75 years of age, that you will have significant mitral regurgitation. If you look worldwide, there's many more patients who have rheumatic valve disease. Rheumatic valve disease typical produces blockage - so blood doesn't go forward normally. Our topic for the most part today will be mitral regurgitation.

Burden of Mitral Valve Disease

- **5,000,000 Americans with moderate or severe mitral regurgitation, ~10% risk over 75 years**
- **Worldwide, ~20,000,000 with rheumatic valve disease**

About Mitral Regurgitation

Dr. Thomas: In this diagram here, you can see that the label [mitral regurgitation](#) lies over the left ventricle, and when the left ventricle pumps, all that blood is supposed to go out the aortic valve. None of the blood is supposed to back into the left atrium there. When the valve starts leaking, you can get a significant amount of the pumping function of the left ventricle actually pumping the blood backwards into the left atrium. This increased blood going into the left atrium causes it to enlarge, raises the pressure inside of it, and also backs up blood into the lungs. So, patients get congestion in the lungs.



What are the consequences of mitral regurgitation? Well there are many things that we worry about. Of course, you may have symptoms of shortness of breath, fatigue, chest pain or things like that. But, there are long-term consequences that, even if you don't have symptoms, we are very concerned about. One of these concerns is weakening of the left ventricular muscle causing heart failure. Remember, each beat the heart may be working twice as hard... Because the heart is pumping so much blood back-and-forth into the left atrium.

Mitral Regurgitation

Consequences:

- **Weakening of the left ventricular muscle (heart failure)**
- **Elevation of blood pressure in the lungs (pulmonary hypertension)**
- **Tricuspid valve regurgitation**
- **Atrial fibrillation ... and risk of strokes from blood clots in the left atrium**

The Bluhm Cardiovascular Institute
 Northwestern
Medicine

The patient can get elevated blood pressure inside the lungs and that leads to a condition called pulmonary hypertension. That can eventually lead to failure of your right ventricle. That's very challenging to treat. Another consequence of the pulmonary hypertension is tricuspid valve regurgitation. That's simply a matter of this back pressure causing the right ventricle to stretch open and the tricuspid valve begins leaking.

One of the most common complications of significant mitral regurgitation is [atrial fibrillation](#), an abnormal heart rhythm, which raises the risk of strokes from blood clots that form in the left atrium. It also can produce real symptoms like fatigue and heart palpitations.

How Is Mitral Regurgitation Evaluated?

Dr. Thomas: When you see a cardiologist and you have mitral regurgitation, that cardiologist is going to do a few things. Of course, he or she is going to take a complete history on you and understand what your symptoms are. The cardiologist is also going to do a physical exam. Often with mitral regurgitation, there will be a loud murmur with typical features. As cardiologists, we learn how to recognize the different types of murmurs. Your cardiologist may also hear congestion in your lungs and notice edema in your feet.


Mitral Regurgitation
How a Cardiologist Evaluates It

Physical exam:

- Loud murmur with typical features
- Congestion in lungs, edema in feet

What tests can be ordered:

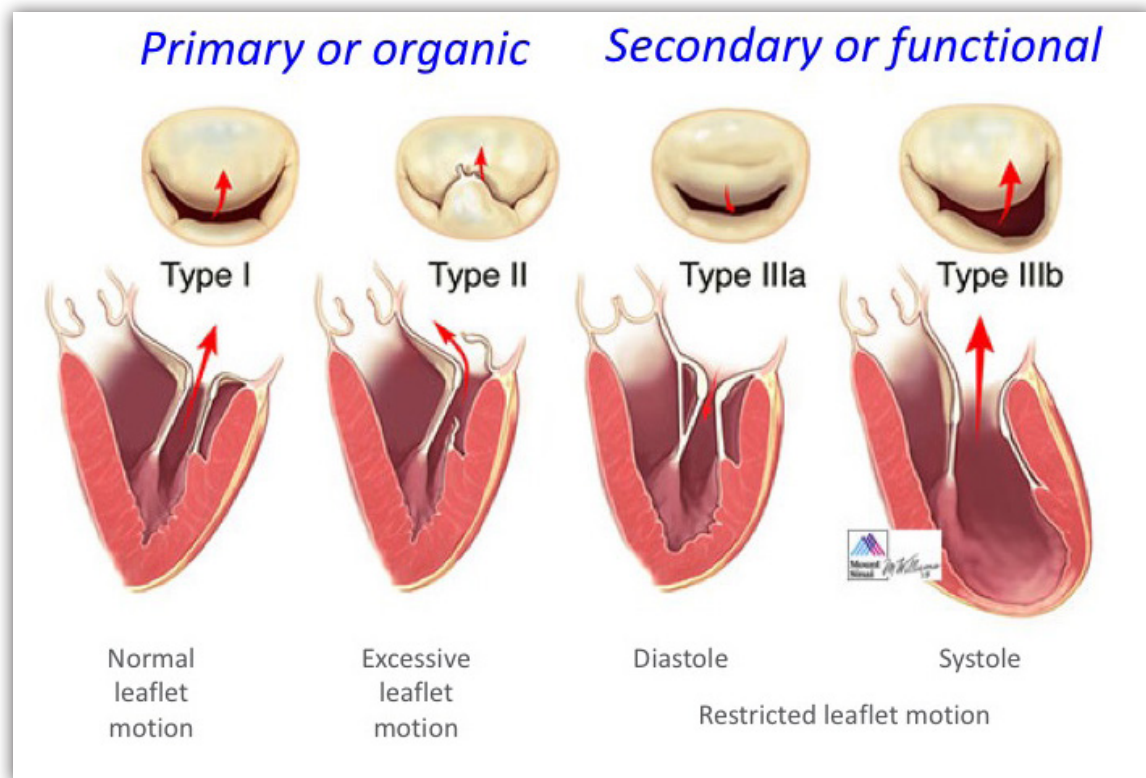
- Blood tests, EKG, chest X-ray (limited role)
- **Most valuable test: Echocardiography**

The Bluhm Cardiovascular Institute
 Northwestern
Medicine

There are a number of blood tests that can be ordered. Of course, there are some blood tests, there's electrocardiogram and chest X-ray. To be honest, at least early on in mitral regurgitation, those tests have a fairly limited role. **The most valuable test we have is an [echocardiogram](#) - where we use ultrasound to bounce sound waves off the structures of the heart and build it up into a picture of the heart.**

Different Types of Mitral Regurgitation

Dr. Thomas: About 40 years ago, a renowned surgeon in France named Alain Carpentier - who is really the "Father of Mitral Valve Repair" - came up with a schema for describing why mitral valves leak. We'll be talking today mainly about "primary" or "organic" mitral regurgitation. That means the actual problem is in the valve itself. Type I is where the valve moves pretty normally. But, if the valve has a hole in it... The valve may have get infected.

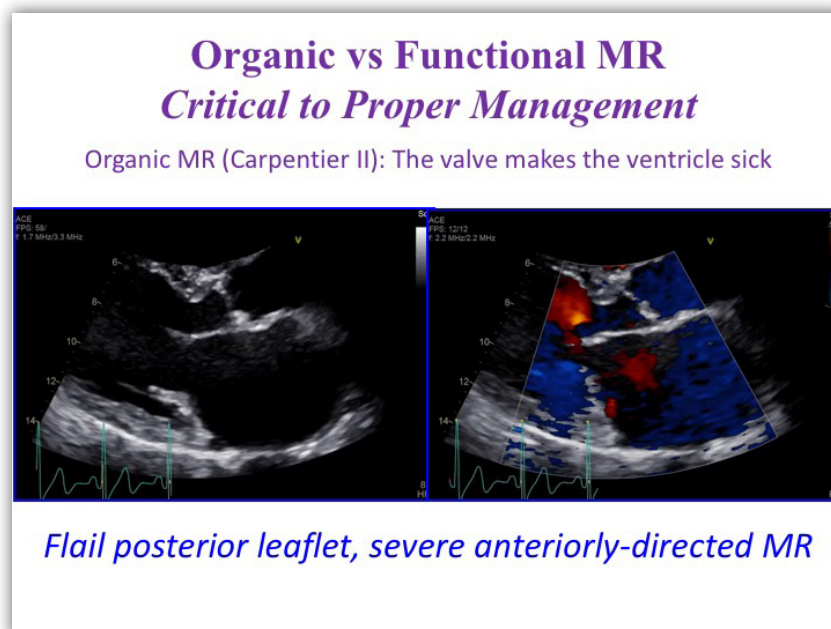


Type II is excessive leaflet motion and that's the most common condition we'll be talking about today. Type II is where the valve really is prolapsing backwards, or may even be ruptured and flailing back into the left atrium.

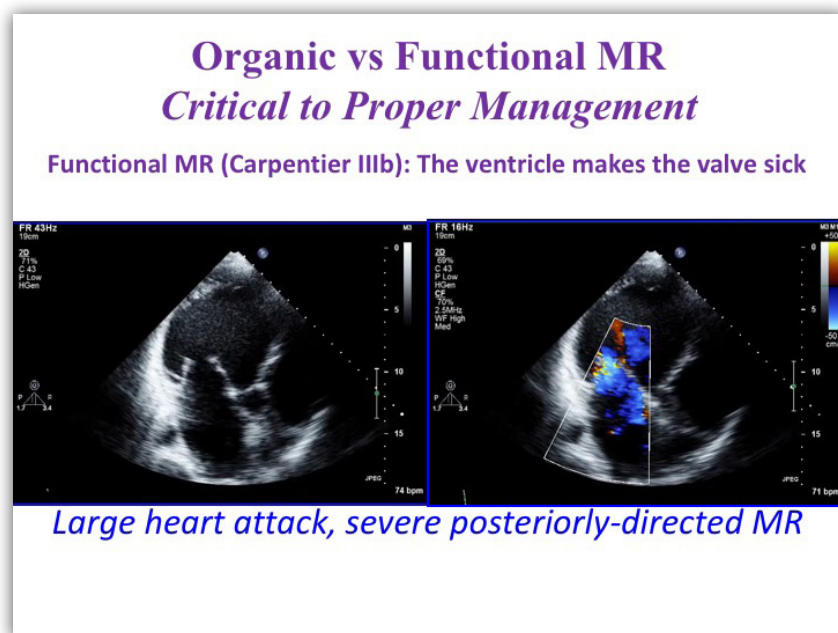
Then, there are two types of "secondary" or "functional" mitral regurgitation. The diagnosis that is most common is that once you've had a heart attack or have any sort of dilation of your left ventricle, it could actually tug on the strings that hold the mitral valve in place. It will restrict the ability of the valve to close. **The valve itself may actually be normal, but it's being pulled open by the abnormalities in the ventricle.**

We have ways of grading the precise amount of leakage that's going through the valve. We typically grade this on a four-point scale or a descriptive scale, 1+ to 4+, and mild, moderate, moderate-to-severe, or severe.

This image, as you can see on the left, is classic disease of the mitral valve. Remember that in organic mitral regurgitation, it's the valve that makes the ventricle sick. You can see that structure on the left there. That is the posterior mitral leaflet that's going back into the left atrium, and that's allowing severe mitral regurgitation to pass into the left atrium.



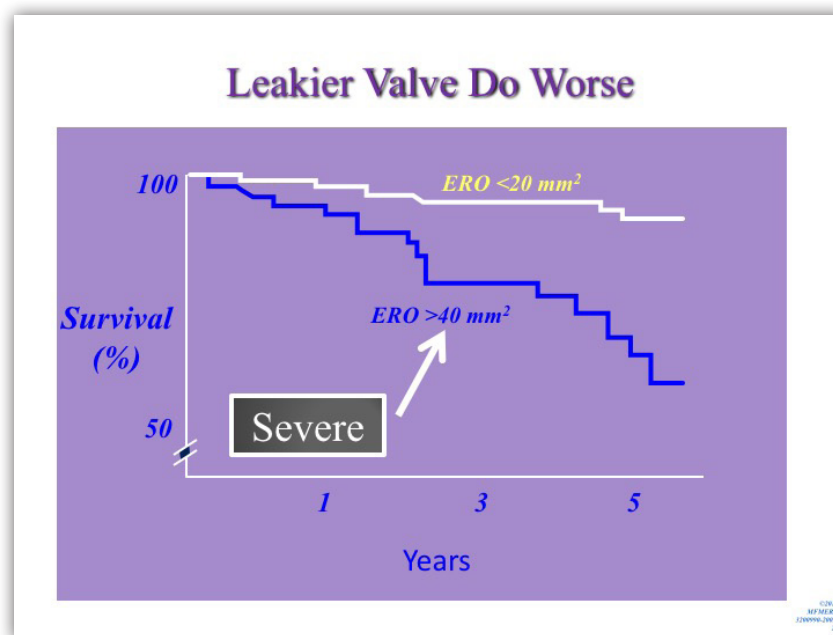
In echocardiography, we use color to show which direction the blood is moving. We can tell by looking at the colors whether the blood is going forward or backwards. There you can see, the valve is so leaky that we can't even really see the jet here. Trust me, that is a severely leaky valve. It would have an effective hole through that valve of about a square centimeter, which is as big as the round tip of a felt tip marker.



The other type of regurgitation we call “functional”. This patient had a large heart attack affecting the posterior wall of his heart. The valve that’s on the left - as you’re looking at the screen - is the posterior leaflet. Notice how it’s being tethered outward. It’s pointing up toward the top of the screen. That allows the valve to the right to miss it completely when it tries to swing shut. That allows a very large jet of regurgitation to come into the left atrium. That is basically a normal mitral valve but it’s being tethered outward by that large heart attack that this patient had.

Long-Term Survivability of Mitral Regurgitation Patients

Dr. Thomas: We have a lot of data to guide the treatment of organic mitral regurgitation. We know that leakier valves do worse. When we're trying to classify the severity of the regurgitation, we look at a number called the ERO, the effective regurgitated orifice area. If it is greater than 40 square millimeters, we know that those patients will do worse over time. When we see that, we start to think very hard about whether surgery is the right thing to do.

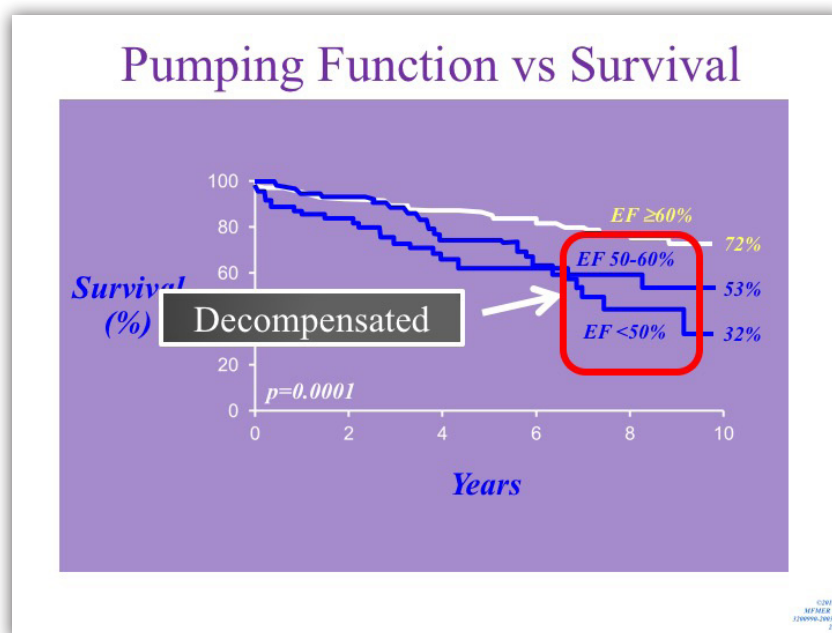


Adam Pick: When you say the patients will do worse, what specifically do you mean from the patient perspective? Does that mean they'll experience more symptoms? They'll be more fatigued? Or, will it lead to other forms of cardiac problems for the patient down the road? Can you explain a little bit more about that?

Dr. Thomas: **On this particular graph, the word on the left is “Survival”. That means how many people will be alive after that period of years.**

Patients who have these leaky valves do worse. This is a natural history study here. So, we very much want to interrupt that curve. If you operate on these patients, they will do much better. For this reason, we pay a lot of attention when we see that ERO getting over 40 square millimeters. The patients will typically develop symptoms and they will develop other types of heart disease like atrial fibrillation.

That is what we call “severe”. That is in fact the boundary line between moderate-to-severe and severe. Once we reach that truly severe stage, we start to have some very serious conversations with our patients.



We also pay very close attention to the pumping function of the left ventricle. These are patients that all have severe mitral regurgitation, but we have stratified them by the severity – by the percentage of blood that is pumped out of the ventricle on each pumping cycle. You can see that if you pump over 60% of your blood out each cycle, you do better over time than those who have a pumping fraction less than 50%.

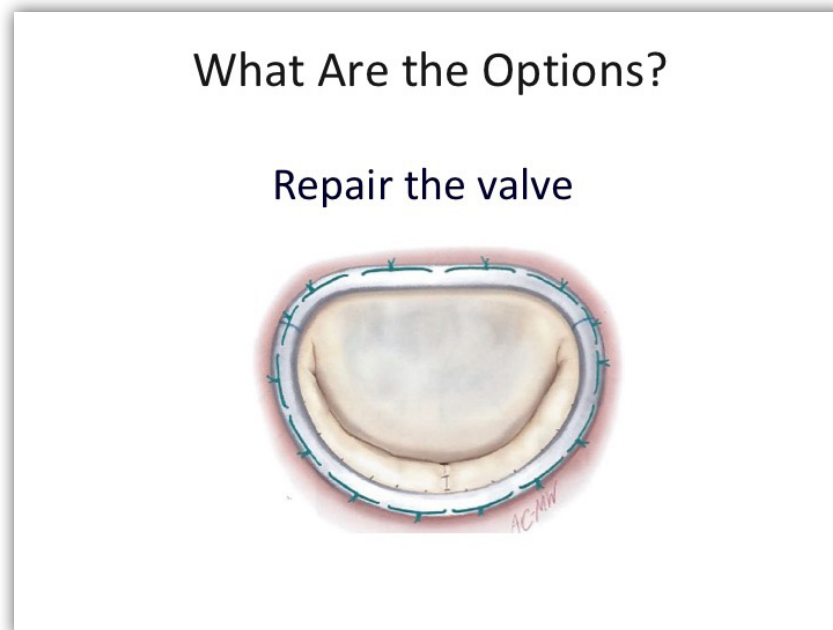
Understand that in most situations, an ejection fraction of 50% is still in the normal or low normal range. In the setting of mitral regurgitation, however, that is severe. This is a real red flag that we need to move quickly... Because ventricles do not do well at this level when they have severe mitral regurgitation.

Anything under 60% we call “decompensated”, even though that is really a normal ejection fraction in other settings.

When we make the diagnosis... When we decide that something needs to be done... That’s when I turn it over to my surgical friend, Dr. McCarthy.

Mitral Regurgitation Treatment Options

Dr. McCarthy: What we're going to look at to start is a series of pictures from the surgeon standpoint. I tell my patients when I meet them, that the echocardiography (the black and white shadows and then the flashes of color like a bunch of flowers) are really helpful. However, I get to look right at the valve. This is truly open heart surgery. We literally open the left atrium.



The key question is, "What are the advantages to mitral valve repair?" That is the title of this session. So you know, some valves can be repaired and some can't. The type of of mitral valve disease that we're mostly going to talk about today is one that Dr. Thomas referred to as "Type II" or "degenerative".

Some Valves Can be Repaired: Some Can't!

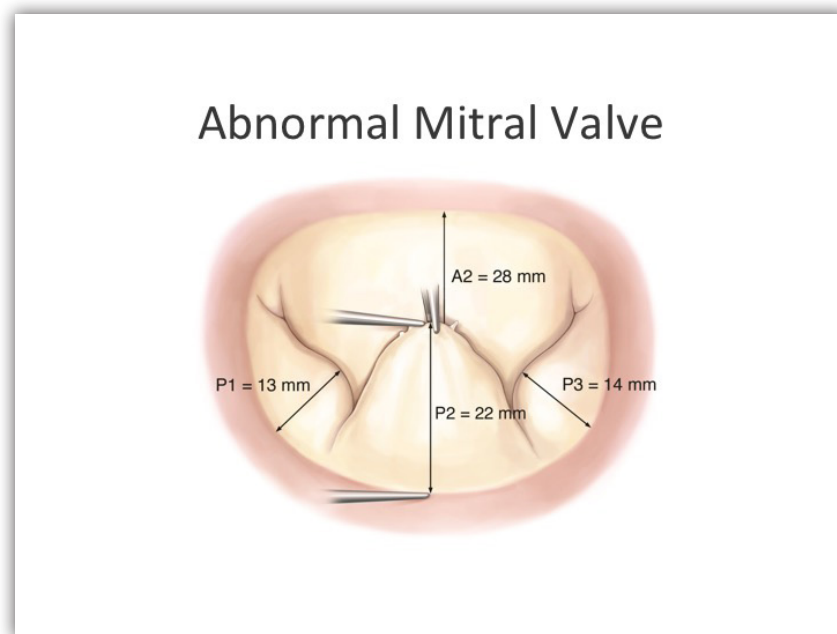
- Mitral "Prolapse"
- Degenerative Valve Disease
- Barlows Valve
- Myxomatous Valve
- Fibroelastic deficiency

People hear different words about it. For example, mitral valve prolapse. Commonly, patients say they've been told they have a "prolapsed valve" since they were in their 20s. We also call it "degenerative" valve disease. Or Barlow's valve sometimes. You hear about it as a myxomatous valve. Or fibroelastic deficiency. Basically, what it means is that there's some strings on the valve and they're not doing well. Since your heart beats 20 million times every year, that is a lot of wear-and-tear. Sometimes, the strings on the valve don't hold up.

Repairing A Degenerative Mitral Valve

Dr. McCarthy: This is a typical picture for what one of those valves may look like with degenerative disease or myxomatous disease.

Here at Northwestern, we measure a lot of things about the valves. We have a database with thousands of these. There's two leaflets. There's the anterior leaflet - that's A2 - that I've marked up there on the diagram. Then, there is the posterior leaflet. Mitral valves have two leaflets.

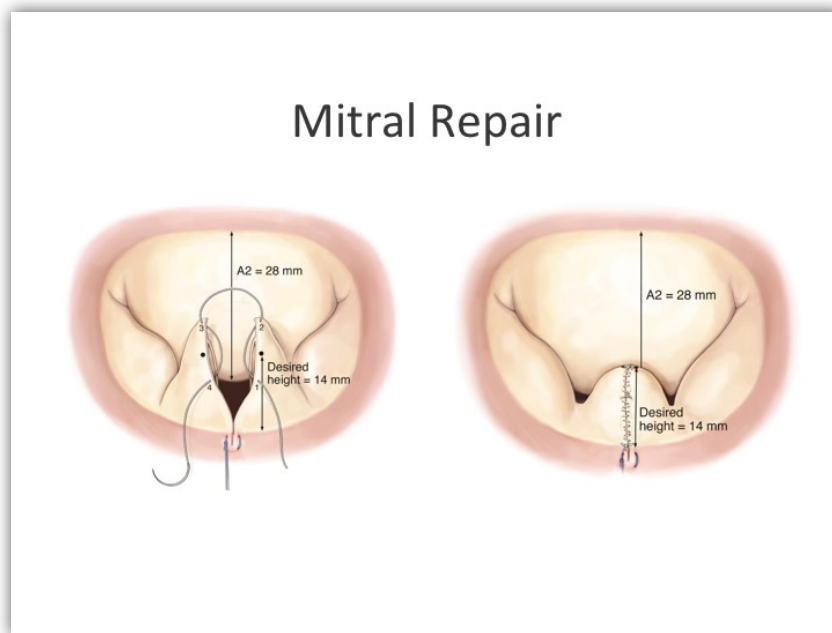


You may see in some of your echo reports P1, P2, P3. The most common condition that we face is broken strings or what we call a flail of P2, the middle part of the posterior leaflet. That's also kind of elongated. That should only be about ten millimeters, which is about half an inch. It's almost an inch tall. It's way too tall, and then the strings broke on it.

How do we fix that? The most straightforward fix that I'm going to show you - and this probably applies to about 70% of the patients that we help - is that we cut out the areas where the strings broke. I tell patients when I see them, and I bet many of you have heard this conversation before... **That your valve is like a**

parachute. There are strings on the parachute.

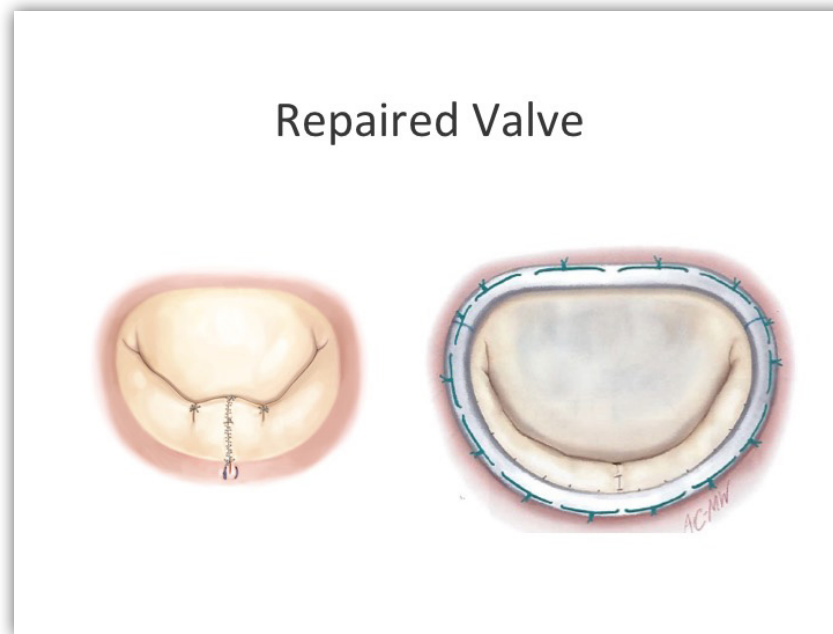
It's as if one corner of the parachute, the strings have broken. You can picture a parachute with both broken strings, and it's going to leak a lot there. The way we repair that is we cut out the area where the strings have broken. Then I use very fine sutures. Those sutures are about the width of a human hair, and then we put the valve back together.



What I'm showing - this is more for the surgeons - is precisely how we do that. We want to get the measurements just right. We want to get the posterior leaflet half the height of the anterior leaflet. This is for my surgical colleagues, and we talk about how we put this back together. Then, we cut out the broken part and sew it back together and make it the proper height.

After we have it to the proper height on the left side, what you'll see is that there's also what we call "clefts" in the valve, which is how you separate out and identify P1 from P2 and P2 from P3. We put a couple of additional sutures there. Then, the final thing is that the valve has been pulled apart. It's not just the cords broke.

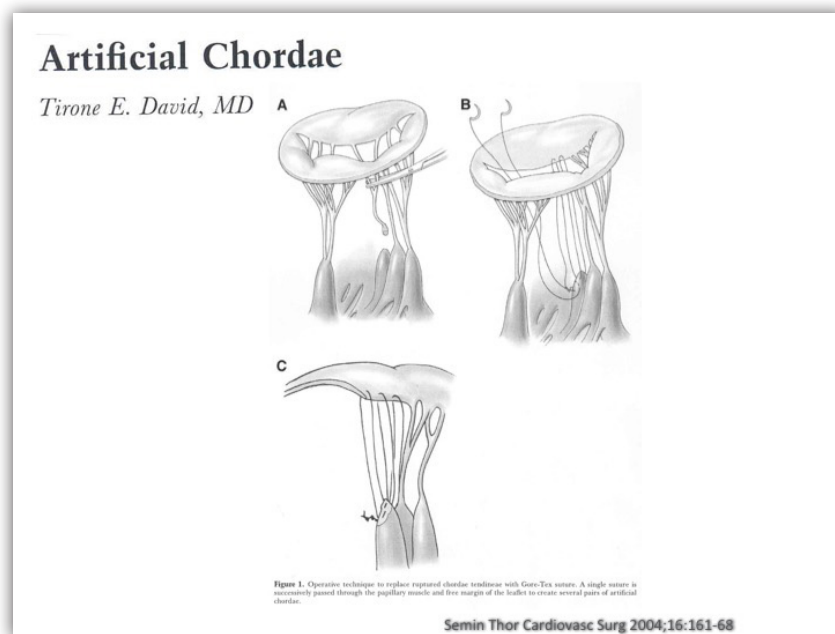
The Mitral Valve Repair Ring



Dr. McCarthy: In addition, the valve itself is stretched. We have to put a ring around it so that it comes back into a proper amount of overlap. The rings come in different shapes and sizes - some are kind of small and some would be extra large. **We have to choose the right ring to fit that specific patient.** We don't know until we're in surgery. It depends on what the measurements are and how we repair the valve to determine what we would do.

Repairing the Mitral Valve Chords

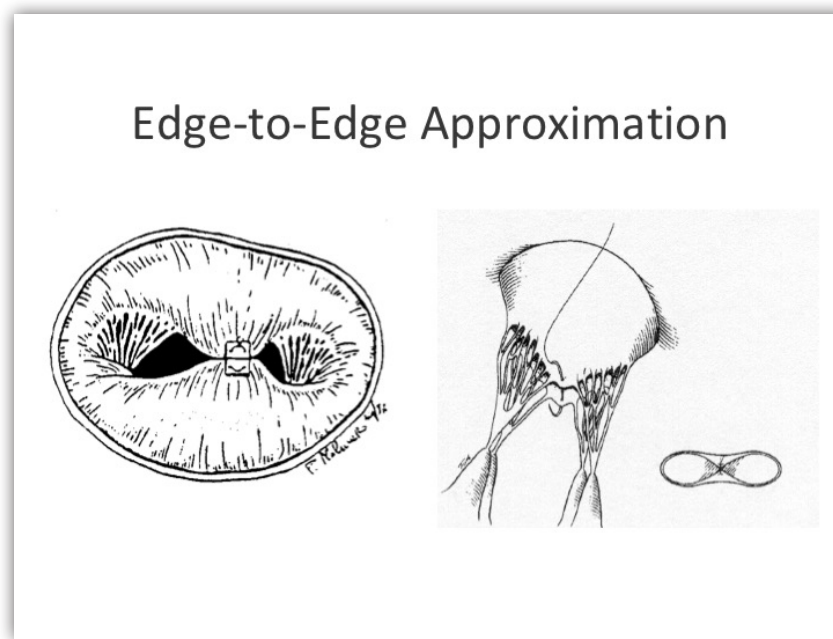
Dr. McCarthy: There's different ways to do mitral valve repair. What I showed you just now was the "time-honored tradition" of respecting the area with the broken strings. Dr. Tirone David in Toronto pioneered another technique that is also very popular, which is to add artificial chords. Think of the parachute being repaired with some new strings on it.



We use little sutures of GORE-TEX and we tie it down to the muscles of the heart where the strings originate. Then, we have to get the length just right so that they can do that. This is another technique that surgeons have in their repertoire to repair a mitral valve.

The Alfieri Repair

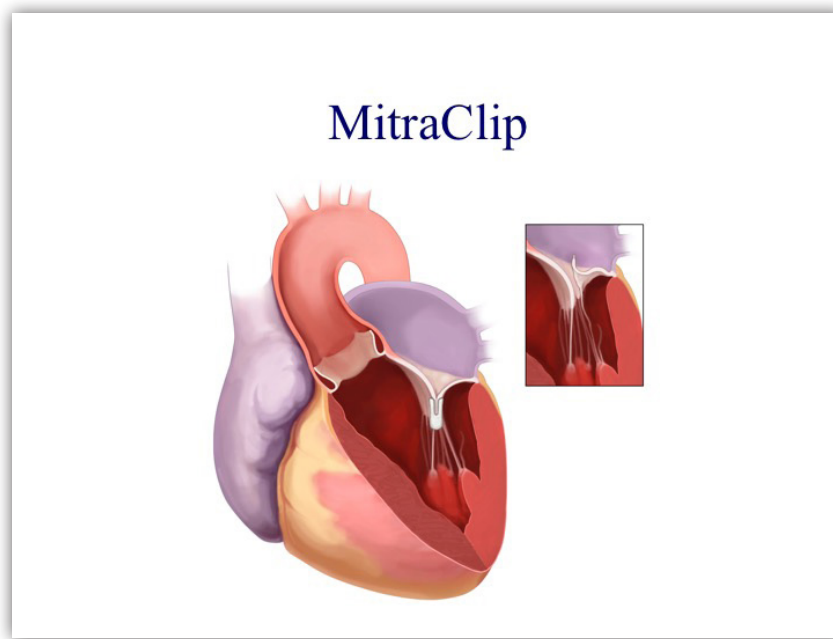
Dr. McCarthy: Another way to fix a mitral valve that you'll hear about is... An Alfieri repair. We also call it an "edge-to-edge" approximation. We do that sometimes when the valves are really getting complex and there's multiple areas where the chords are too long or broken.



We can actually sew little bits of the valve together. For instance, in this valve it's right in the middle of the posterior and the anterior leaflets. That's called the Alfieri repair. That way you have normal chords that are supporting the abnormal area. You turn the valve into – some people call it a "bow-tie" look on the left where you have two smaller orifices there.

The MitraClip

Dr. McCarthy: The Alfieri repair was a procedure that began back in the 1990s. As a little sidebar, Dr. Mehmet Oz (aka Dr. Oz) was visiting me at the Cleveland Clinic. Dr. Oz is a heart surgeon. I was doing the Alfieri repair and his team started working on a patent that eventually led to this device... It's called the [MitraClip](#).



Dr. McCarthy: The MitraClip is a new repair technique that is noninvasive. Instead of suturing the two leaflets together, you clip them together with a little metal clip. It's a good option for patients who are elderly and have a lot of other medical problems - maybe the patient needs a second or third operation. For the right patient, it can be good. It's actually more the exception rather than the rule.

The Advantages of Mitral Valve Repair

Dr. McCarthy: What are the advantages of mitral valve repair? First of all, it's resistant to infection, and it's resistant to stroke. Your body covers the white part of that ring that is there, and so it gets incorporated.

What Are the Advantages to Repair?

- Resistant to Infection
- Resistant to Stroke

Patients are far less likely to get an infection than they are with a replacement valve. Also, since it's just natural tissue, patients don't have to be on blood thinners typically. They don't take Coumadin or anything like that.

The Dis-Advantages of Mitral Valve Repair

Dr. McCarthy: What are the disadvantages? I showed you a real simple mitral valve repair where it was just the one area where the strings have broken. But, it can be complicated. Maybe you could determine looking at that echocardiogram (through the black and white shadows) that we don't always know until we get into surgery just how complicated it's going to be.

What Are The Disadvantages?

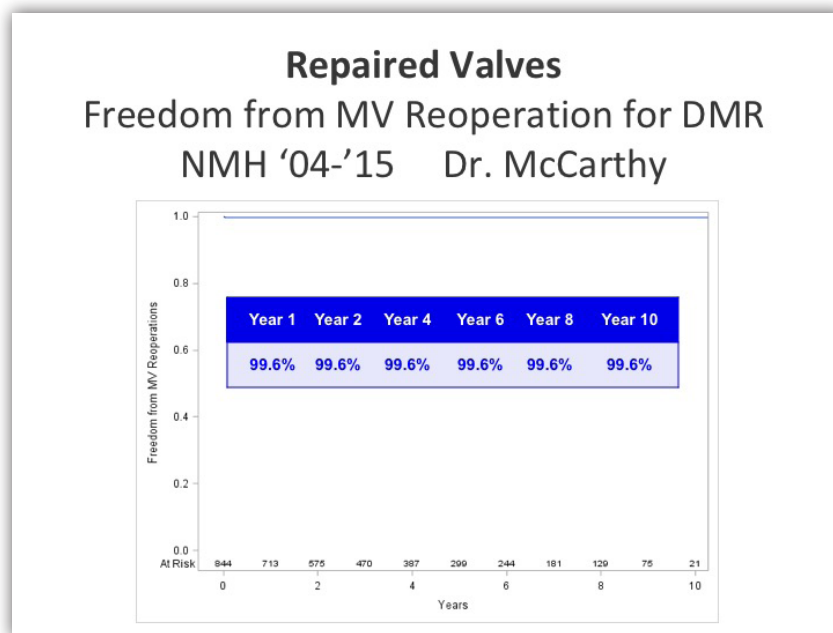
- It can be complicated
- It may be hard to find a team who can do it
- Later, other chords ("strings") may break
- Scar tissue can form (with either)

For many of the patients, I tell them that the chances for repair are over 95%. Nothing in medicine is 100%. We don't know until we actually look at the valve during a procedure. It's also something where there aren't a lot of people that do this. There's a handful of us who do a lot of them. **For instance, I do about 200 a year. Across the country, most of the surgeons do five to ten mitral valve repairs a year.**

The other disadvantage is that after surgery other chords on the valve might break. Or, you could have scar tissue that could form that might keep the valve from opening properly. You can also get scar tissue that forms over a replacement. Like any operation, you would get scar tissue potentially forming. We see that sometimes. I'll talk about it, but it's not very common - neither of those.

Dr. McCarthy's Surgical Outcomes

Dr. McCarthy: Recently, we looked at the group of patients that I just talked about with degenerative mitral regurgitation (DMR). It's about 900 patients that I did.

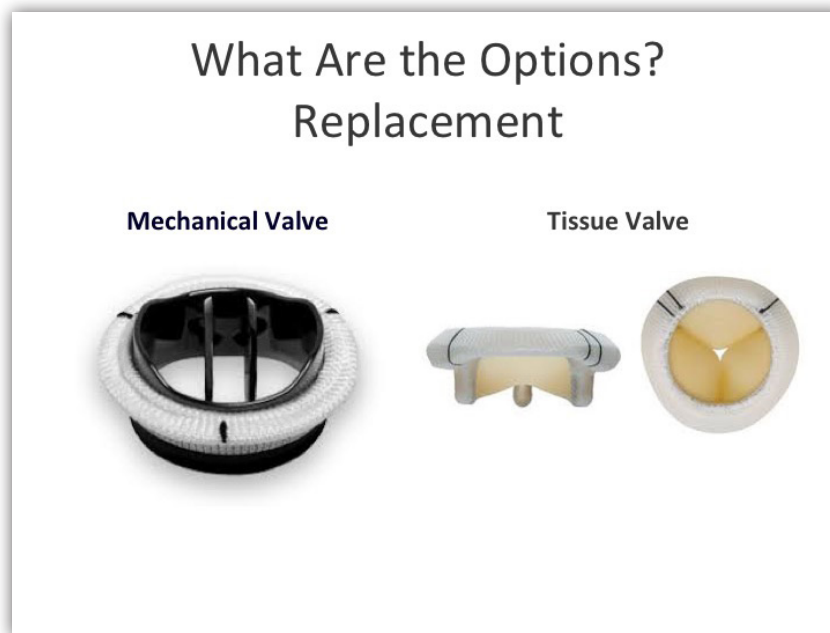


Ten years later, 99.6% were free of needing a second operation. For the group that needed a second operation, it tends to be in the first year. In the first year, in particular, that might be when people form scar tissue. A re-operation might be needed if somebody breaks a different chord. Every once-and-awhile, there's something rare that might happen - like an infection.

For the most part, when we fix these valves today, then the patients are going to have a really longer durability for decades - hopefully for the rest of their life. This is much better than the data that was done in the 1990s when we were really just pioneering this - when I was at the Cleveland Clinic. The results today are a lot better than they used to be.

Heart Valve Replacement Options: Mechanical & Tissue Valves

Dr. McCarthy: Sometimes though, you can't repair the valves. It may be, for instance, Dr. Thomas had mentioned there's 20 million people with rheumatic fever (as an example). Rheumatic fever causes a lot of scar tissue. The scar turns to calcium. You can not reliably repair those valves and so you have to replace them. Broadly, there's two kinds: mechanical valves and tissue valves. There's pig valve and cow valves. Here at Northwestern, we almost always use cow valves.



Of those two, why would you choose a mechanical valve? The advantage to a mechanical valve is that it lasts forever; the valve itself works. Those mechanical parts are made out of carbon. They don't break. They don't always quite last forever. For instance, today we're taking a patient in transfer, 12 years out. She formed scar tissue that is over the mechanical valve and is keeping it from opening. Theoretically, the mechanical valve would last forever, and patients don't need another operation. But in reality, sometimes they do.

Why Mitral Valve Replacement?

Mechanical Valves

- Advantages: “last forever”
- Disadvantages: stroke or blood clots
- Need Coumadin, high dose
- Noise

The big disadvantage day-to-day is that you run a risk for a stroke and it can be pretty high. It would be 2% to 3%. Sometimes patients come to me, and they think it's just 2% to 3% total, but it's per year. For instance, at 10 years it's 20% to 30% risk for a stroke. At 20 years, it goes up to 40% to 60% depending on the age of the patient. Therefore, you have to be on Coumadin, which is a blood thinner, not a very friendly drug, and at a high dose of that blood thinner, which interacts with all sorts of other things. You would certainly not want to be on a blood thinner on the half-pipe in the Olympics and bang your head on something on a blood thinner. That's a drug that people have to be very careful about. Finally, some people say the noise bothers them. It's very unpredictable. We can't tell when it is or is not going to bother them. In some people, once they have it, then it drives them crazy.

Why Mitral Valve Replacement?

Tissue Valve advantages/disadvantages

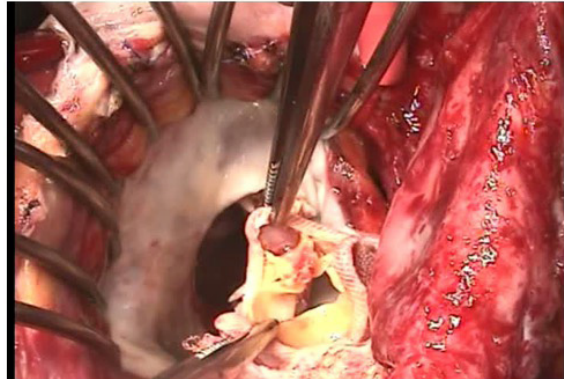
- No Coumadin (Usually)
- Not Living Tissue: no rejection
- But they wear out



Tissue valves... why select a tissue valve? The majority of valves these days being replaced are tissue valves. The good thing about the tissue valves – and this would be on the right – would be one of those banged up, scared valves with a lot of calcium. In that group of patients, most patients don't need to be on Coumadin. Long-term, they'd typically just take aspirin. It's not living tissue, cow or pig tissue. It's been treated, so you don't really reject it. The disadvantage is that they wear out. It typically is dependent on the age of the patient and a few other things like kidney failure that may impact it.

For instance, a tissue valve in an 80-year-old could easily last 30 years. If it's in

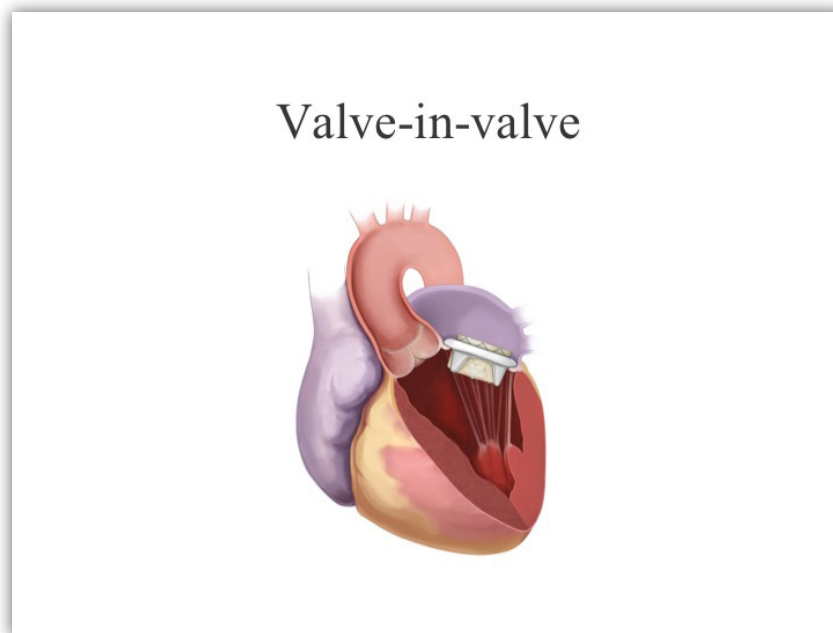
91 year old, reoperation
Torn Porcine Valve



a 20- or a 30-year old, then the valve may only last 10 years. It depends a lot on the age of the patient. Here's an example of a patient. For instance, this was a 91-year-old patient who had had a pig valve. They occasionally will pull away from the frame around there and they'll tear. That 91-year-old needed a second operation. Fortunately, she did well.

Valve-in-Valve Procedures

Dr. McCarthy: We think that the days of doing second operations are starting to come to a close. The nice thing also about tissue valves is that you can put a heart valve inside it. Ten years ago, this was highly experimental, almost science fiction. Now, it's FDA approved. What we can do is go up through a vein in the leg, up into the heart, across the septum (it's called in the upper chambers, the atria,) turn the new valve around, and put it inside the old cow valves. Then, blow up a balloon and it just sits there inside the old cow valve. Most of the patients today that are getting a tissue valve if it does wear out in 15, 20, 30 years, that may well be what happens is that they won't go through a second operation - like what I showed in the 91-year-old patient. They'll just come in and spend a day or two in the hospital and get it treated this way.



We tried to give you a high-level overview mitral repair, but then also, sometimes what do we do when we can't repair the valves.

Questions & Answers Session

Adam Pick: To Dr. McCarthy and Dr. Thomas, thank you so much for sharing all of that incredible information, specific to the repair advantages and tissue valves as well. As you have been talking, questions have been pouring in from Linda, Don, Michelle, William and many others. We're going to shift gears and go into a real-time Q&A here. One of the questions is coming in from Alice. She says, "If you have been diagnosed with myxomatous degeneration of the mitral valve, and it has repaired, approximately how long will the repair last?"

Alice asks, "If you had been diagnosed with myxomatous degeneration of the mitral valve, and it has been 'repaired', approximately how long will the repair last?"

Dr. McCarthy: Alice, that was that curve that I showed. It depends on the level of complexity of the valve. These days, if it was being repaired, most patients it's going to last the rest of their life. If it was repaired back in the '90s and it was very complex, and it involved both leaflets and all, especially the anterior leaflet, then the results may not have been as good. Even in that group 20 years later, about 90% are still working. We sometimes see people with a failed repair late, but it's not that common. Usually, they last.

Sara asks, “Is mitral valve re-repair common? Is this a sub-specialty or do all cardiac surgeons do this? I will be needing this in the future. My old repair held 15 years plus.

Adam Pick: To your point, Dr. McCarthy, Sara just asked, “Is mitral valve re-repair common? Is this a subspecialty or do all cardiac surgeons do this? I will be needing this in the future. My old repair held for 15 years.”

Dr. McCarthy: Mitral valve re-repair, when it’s necessary, which is not all that common, when it’s necessary, sometimes you can repair it and sometimes you can’t. It’s hard to predict. Dr. Thomas and I just reviewed a patient earlier today that’s about 15 years out. He will need a second operation. It’s definitely a sub-specialty and almost a “sub-sub-specialty”. Even of the repair surgeons, the ones that do 20 or 30 a year, these don’t come along all the time. It depends on the age of the patient, too. If a patient is 75 years old, and I think that a tissue valve is going to last them the rest of their life, then I would tend to do a replacement rather than run the risk of a repair not working.

Dr. Thomas: That’s right, Sara, we often ruminate over these very hard to decide situations... Is it something that’s likely to be repairable again? Or, is it better to go ahead and do the replacement?

Tammy asks, “When my mitral valve gets fixed will that help my Afib?”

Adam Pick: Tammy asks, “When my mitral valve gets fixed, will that help my a-fib?”

Dr. McCarthy: It sounds like she hasn’t gone through surgery yet. If she is getting atrial fib and it is related to the mitral valve disease, or even if not, then typically we treat the atrial fib. It’s called the [Maze procedure](#). Adam has some information about it on the website. It’s now called a “Class 1” indication, meaning that if you’re there to fix the valve, then the surgeons should do it unless they have a really good reason that they don’t think that they should. Treating the mitral valve in itself (if you have atrial fib) will help a little bit. You should do this ablation that’s called the Maze procedure. That will really help a lot. Then the chances of having recurrent atrial fib will be much lower after that.

Adam Pick: I have read that oftentimes when a valve procedure is being done, and the patient has a-fib, at times the a-fib can almost be left behind and not treated by clinicians. Is that somewhat accurate or completely false?

Dr. McCarthy: It commonly is done that way, but it's getting more and more common. Ten to fifteen years ago, they came up with some new technology so that we can do ablation pretty quick and easy. Right now, we use what's called cryoablation so that we can ablate the areas where the a-fib comes from. It adds about 5 to 10 minutes to the mitral valve operation to do that. I think across the US the last we saw, it was 50% at a time when people had atrial fib before mitral surgery that was being treated but it varies. For instance, here at Northwestern it's 97%. If somebody has atrial fib before surgery, and I know it can cause a stroke or it can cause other things, we just go right ahead and we treat it, unless there's a particularly good reason not to. That is not the same everywhere.

Paul asks, “I was diagnosed 10 years ago with MV prolapse. It just recently progressed to moderate. The doctor said we’re going to “wait and see” what happens. Will I need mitral valve repair?”

Adam Pick: Paul asks, “I was diagnosed ten years ago with mitral valve prolapse. It just recently progressed to moderate. The doctor said we’re going to wait and see what happens. Will I need mitral valve repair?”

Dr. Thomas: Well that’s a great question, Paul. I think the first question you need to understand is, “Have you really had an accurate quantitation on the valve there?” We try to educate the cardiology community and the echo community so that these studies are done in a uniform manner. But, you do need to make sure that you’re really going to a cardiac center that sees a lot of heart valve disease and is experienced at quantifying the degree of regurgitation. I see a lot of valves that are read as moderate; some of them are mild and really are not going to cause any problems. Some of them are severe and should be addressed more aggressively.

The notion of “wait and see” though is a very well-established approach to this. I’ve had patients that I’ve followed for 15 years before they finally progress to the point that they needed to be done. You need to be seen regularly. Depending on the severity, you may be seen every couple of years, every year, every six months. One of the tests that we like to do is to put patients on the treadmill and see just how far they can go. Then, we look at their mitral valve with the echo after they’ve exercised, to see if it is getting worse under those conditions. That will help guide us when the time comes to operate on them.

I think as long as you’re being followed very closely, this is a perfectly acceptable way to be managed.

Jerry requests, “Looking for some information about the NeoChord procedure?”

Adam Pick: Jerry has a request here. He writes, “Looking for some information about the NeoChord procedure.”

Dr. McCarthy: NeoChord is a new approach to treating patients with mitral valve prolapse. There’s also the Harpoon. Those are two different companies that are out there to treat it with similar approaches. I mentioned like the strings on the parachute, one approach was to essentially add new strings, which would be the artificial chords that I showed, mentioning it from Toronto.

This is a new experimental procedure with NeoChord, very small incision, at the tip of the heart on the left side of the chest. Surgeons go in through the very tip of the heart and then, essentially, spear or Harpoon the leaflet where the string has broken. Then attach the new strings and then pull them down and secure them to the surface of the heart. It’s been mostly in Europe right now, several hundred patients in Europe, and it’s just barely beginning in the US.

For such an early experience, it looks, I would say, kind of, encouraging. It’s not for everybody, especially if you have a really complicated problem with multiple chords in many different areas. It’s one that we’re following closely and we’ll be joining those studies with Harpoon as soon as those begin.

Adam Pick: Here is a procedural question about the process of open-heart surgery. Dr. McCarthy and Dr. Thomas, a lot of our patients in our community are very nervous or anxious about waking up with the ventilator tube in. JP asks, "Please ask if it is possible to keep a patient under anesthesia until the tube is removed after open-heart surgery."

JP asks, “Please ask if it is possible to keep a patient under anesthesia until the tube is removed after OHS?”

Dr. McCarthy: Yes, that would be the part of the procedure that I hate the most. That’s what patients certainly say that they don’t like. It’s completely different than it was 20 years ago when I was beginning my career. People had that breathing tube in typically overnight. Any of my patients may remember one of the very first things I ask them is, “Do you smoke?” If people don’t smoke, then that breathing tube comes out right away. If people do smoke, of course they should quit, but especially quit if they’re going to go through heart surgery.

Waking up after any heart operation like this isn’t like when you wake up in the morning when your alarm goes off and a minute or two later you’re wide awake. It’s very slow and staged. People gradually come out of anesthesia these days. Most people, here at Northwestern, the breathing tube comes out about two to four hours afterwards. The majority of them don’t remember it, and the ones that do remember it, most of them don’t remember it very well because they were still kind of groggy. It’s not like the old days. People used to just hate that thing for good reason.

Adam Pick: Is it common for a patient, who is completely asymptomatic, to go through with a mitral valve surgery?

“Is it common for a patient, who is completely asymptomatic, to go through with a mitral valve surgery?”

Dr. Thomas: I wouldn't say it is common for that, but it certainly happens. Patients have remarkable abilities to accommodate for things that are going on.

This is one of those situations where usually it's the symptoms that bring the patient to attention. It happens not uncommonly that a patient may be relatively asymptomatic. That's one of those situations where we like to put them on the treadmill, discover if they really are asymptomatic when they really go on the treadmill. It lets us plot that over years.

If we see a situation where the pumping function of the heart is starting to deteriorate, or the pressure is going up inside the lungs, or a number of other of other things that we know are markers for bad outcomes, we will recommend surgery for those patients even if they truly are asymptomatic. They typically will do very well afterwards.

Dr. McCarthy: Adam, can I mention something about that too.

Adam Pick: Sure.

Dr. McCarthy: Earlier, we talked about 20 million heartbeats every year. Every time your heart beats, the blood goes back-and-forth, back-and-forth. Over

those millions of heartbeats, your heart starts to get enlarged, and then it gets weaker. Dr. Thomas talked about how the heart can get weak. Dr. Thomas had mentioned that. People, eventually, can develop heart failure. Remember, the patient that we used at the beginning of this was totally asymptomatic. The patients, these days, that go through surgery, about 50% are supposedly asymptomatic.

Now, having said that, when you ask them really carefully, they say they feel fine. I always tell people... I look at their spouse during the consult - or whoever, their friends and family. The patient always says they're "totally fine", but their family member or friend is shaking their head "No!". The family says the patient gets tired, or the patient gets a little winded going upstairs. We go for walks. The patient can't keep up like he or she did a year ago. That asymptomatic idea is a little bit fuzzy sometimes.

Adam Pick: This is a question designed for both of you. It's a question that I always talk to patients about. I'm curious to know your feeling. What do you consider to be the most important two questions patients should ask their surgeons, their medical teams, when diagnosed with severe mitral valve disease?

Adam asks, “What’s the most important 2 questions patients should ask their surgeons when diagnosed with severe mitral valve disease?”

Dr. Thomas: I’ll start this out here. I think there are different settings where people find out about this. I would say, for sure, you want to end up with a very experienced medical center and an experienced surgeon who is doing a lot of mitral valve procedures - seeing a lot of patients with disease, and really know how to approach them.

If you’re in a smaller community where they may do very good surgery for bypass graphs and things like that, it’s appropriate to ask if you should be seen at a cardiac center that really specializes in heart valve disease, and there’s a real heart team that works so closely together - the way Dr. McCarthy and I do and our interventional colleagues. That would be a question that I would like patients to ask.

Dr. McCarthy: The approach we have is the same one that the patient would have, which is “What are the risks?” and “What are the benefits?” For a healthy 55-year-old typical patient, the risk to their life to go through this open heart operation is less than 1%. The other risks are also quite low. The benefits are in particular the valve can be repaired, but hopefully it’s going to stay repaired. It re-establishes, puts them back on the curve to have a normal life span.

Those are the risk benefits. Different scenarios, if the patient is 85, has had prior heart surgery, that risk is going to be a lot higher. The benefits may be lower. Maybe

we would be looking at MitraClip, or something that's less invasive and quick and easy. Figuring out that equation of "What's the benefit versus the risk?" is what we're always doing when we talk with our patients.

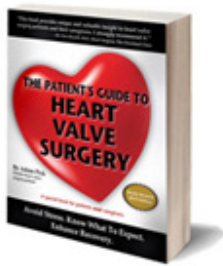
Adam Pick: Great questions and great points. With that response, we're going to start winding down the webinar. On behalf of the entire HeartValveSurgery.com community, and all the patients across the world with valve disease, I'd like to extend an extraordinary thank you to Dr. McCarthy, Dr. Thomas, the entire team at Northwestern Medicine for helping put together this webinar and for sharing their expertise with all of us today. As we always say, "Keep on tickin!"

Dr. McCarthy: Thanks, Adam.

Dr. Thomas: Thanks a lot, Adam. Thanks, everyone.

HeartValveSurgery.com Resources for Patients

Since 2006, HeartValveSurgery.com has developed several resources to help you better understand your diagnosis, your treatment options, your surgeon and cardiac clinic selection, and your recovery. Listed below, you will find resources created exclusively for patients and caregivers. We hope they educate and empower you.



[7th Revised Edition of The Patient's Guide To Heart Valve Surgery](#) – Read this practical book for heart valve surgery patients and their caregivers. Written by Adam Pick, the founder of HeartValveSurgery.com, this step-by-step guide helps patients avoid stress, know what to expect, and enhance recovery.



[Surgeon Finder](#) – Created by thousands of patients, caregivers, surgeons and cardiac centers, the Surgeon Finder is the world's only patient-recommended database of heart valve surgeons. You can search by location, by name, by problematic valve and by surgical procedure.



[See Leading Cardiac Clinics](#) – To help you research leading cardiac centers that specialize in heart valve treatment, our new 'Cardiac Clinics' section was launched in April, 2012. Now, with a few simple clicks you can go on virtual tours, meet surgeons, meet nurses, see patient success stories and more.



[**Connect With Other Patients**](#) – You are not alone. Meet patients -- just like you -- at our special community of patients and caregivers. This global community was designed to help you learn from other patients, stay connected with your support group, and empower you.



[**Visit Adam's Heart Valve Surgery Blog**](#) – Recognized as one of the 'Top 50' surgical blogs on the Internet, Adam Pick provides patients and caregivers the latest news, technology updates, patient tips, surgeon interviews and patient success stories.



[**Watch Educational Videos**](#) – Learn about heart valve disease, diagnosis and treatment options from the world's leading cardiologists and cardiac surgeons.