Patient Webinar Transcript

Advantages of The Ross Procedure

Webinar Speakers

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I. Introduction from Adam Pick, HeartValveSurgery.com founder

Dear Patients & Caregivers,

As patients with aortic valve disease can be confused about their diagnosis, treatment options, surgeon selection and outcomes, The Mount Sinai Medical Center and HeartValveSurgery.com held a live, online webinar titled, “The Advantages of the Ross Procedure”, on Thursday, October 3, 2013.

During this live event, Dr. Paul Stelzer, a leading cardiac surgeon from Mount Sinai, shared critical information about aortic valve disease and treatment – with a focus on Ross Procedure.

The webinar was an overwhelming success -- with over 140 patient and caregiver registrations from all over the world. During the webinar, Dr. Paul Stelzer shared his clinical experiences and patient success stories specific to the Ross Procedure.

For those patients and caregivers who were unable to attend this event, I prepared this eBook to help you learn more about aortic valve disease and treatment.

If you have any questions, please email me at adam@heartvalvesurgery.com.

Keep on tickin!

Adam Pick
Ross Procedure Patient, Author & HeartValveSurgery.com Founder

P.S. If you would prefer to watch the video playback of this webinar, click here.
II. Featured Webinar Speakers

The featured speakers for the webinar were:

**Dr. Paul Stelzer**
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Learn more.

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III. Written Transcript & Presentation Slides

In addition to providing you the written transcript of the “The Advantages of the Ross Procedure” webinar, we will also provide you the presentation slides shared during the online event.

Webinar Introduction

Speakers: Adam Pick & Dr. Paul Stelzer

Adam Pick: I would like to welcome you to the webinar titled the “Advantages of the Ross Procedure”. I am a former Ross procedure patient and the founder of HeartValveSurgery.com. The mission of HeartValveSurgery.com is to educate and empower patients with heart valve disease. This webinar – which had over 140 registrations – from patients in countries all over the world is designed to support that mission.

During the webinar, all participants will be in listen only mode. That being said, you may submit questions during the webinar. Simply post your questions in the control panel that is located on the right side of your screen. We will do our best to address your question during the Q&A section of the webinar. Lastly, at the end of the webinar, we ask that you complete a very quick, five question survey about this event.

Now, I am thrilled to introduce the featured speaker of this webinar. Dr. Paul Stelzer is
the professor of Cardiothoracic Surgery at Mount Sinai Hospital in New York City. Specific to the Ross Procedure, Dr. Stelzer is one of the leading surgeons in the world -- having completed over 530 Ross Procedures. I’ve known Dr. Stelzer for several years now. I can go on, and on, and on, and on about this really incredible person. I can go on about his background, and I can go on about his achievements in cardiac surgery during his 32-year career.

Instead, I will simply tell you that this man is absolutely loved and celebrated by the members of our community -- some of which you see here. Since launching this website in 2006, Dr. Stelzer has successfully treated many patients from this website including Peter Woglom, Jeff Shebovsky, Mark Kroto and Debbie Rafael.

I am humbled that Dr. Stelzer is taking time away from his very busy practice to educate all of us about this unique form of aortic valve replacement. So, without further ado, I would like to introduce you to Dr. Paul Stelzer.

Dr. Paul Stelzer: Thank you very much Adam. It is a pleasure to be here with you so that we can talk a little about what the Ross Procedure is, and what it might have to have offer for patients in 2013 and the future.
About Your Heart Valves

Speaker: Dr. Stelzer

The basic anatomy of the heart is most beautifully described in these pictures which show you the structure of the four (4) heart valves. They are all arranged pretty close to one another. The aortic valve is in the middle. The pulmonary valve is just above it. This is when the heart is relaxing and filling with blood through the mitral and tricuspid valves into the ventricles.

In the next slide, you see what happens when the heart squeezes. The contraction phase of the heart opens those semilunar valves close the aortic and pulmonary valves. This is when the blood is actually being pumped to the lungs. As you see in these two pictures the aortic and the pulmonary valves look just alike.
These aortic and pulmonary valves are right next to each other and that’s what occurred to Donald Ross so many years ago.

Specific to aortic valve replacement, what could be better than putting in a donor valve? That is the first thing that Dr. Ross did way back 1962. But, Donald Ross wasn’t sure how long the donor valve could last.

So, Donald Ross thought, “Could this pulmonary valve – sitting right next door to the aortic valve – make a new aortic valve?”

He also thought, “What if we put the potentially troublesome donor valve, also known as a homograft, in the pulmonary position – where the pressures are lower and the consequences of failure are much less?”


Basic Purpose of Cardiac Valves

Speaker: Dr. Stelzer

To review, the basic anatomy of the cardiac valves are supposed to do a few things:
• To allow blood to pass through them.
• To allow blood to go one way and never go backwards.
• To never obstruct blood flow without forming blood clots or damaging the blood.

The two basic problems that the aortic valve specifically gets into are stenosis and regur- gitation, also known as stickiness and leakiness. Stenosis, also known as a narrow valve, produces a requirement for the heart to generate more pressure. And the leaking valve, the regurgitant valve, requires extra blood volume (fluid) to be re-pumped through the valve.

The heart responds to these defects by dilating -- getting bigger and bigger over the course of time. You can imagine the heart getting stronger similar to the act of muscles lifting weights – which we call them hypertrophy, the thickening of the muscle.
Causes of Aortic Valve Disease

Speaker: Dr. Stelzer

Causes of Aortic Valve Disease

- Congenital - Bicuspid Aortic Valve
  - 1-2% of the population has this
  - More common in males
- Rheumatic Fever
  - Much less common now
- Degeneration
  - Calcium deposits with age

There are a lot of different causes for aortic valve disease.

The most common cause that we see in young people -- who may be candidates for the Ross Procedure -- were born with a valve that wasn’t formed exactly right.

We call them a “Built-on-a-Monday “ kind of valve, or bicuspid aortic valves. About 1% or 2% of the population actually have bicuspid aortic valves. Interestingly, bicuspid aortic valves are diagnosed about 3 times more commonly in males than females.

There are a couple of other causes which are less common -- especially in the Western world. For example, rheumatic fever is still common in less developed countries.

Also, there can be degenerative causes -- especially in the elderly. For example, many valves may have calcium deposits on the aortic valve which can build-up over time thereby making it difficult for the valve to open and close properly (e.g. stenosis).
Symptoms of Aortic Valve Disease

Speaker: Dr. Stelzer

The cardinal symptom that we see in patients with aortic valve is shortness of breath. Many patients may have short windiness when they run up the stairs or try to climb to bigger hills.

Chest pain happens to some people because the oxygen supply is restricted by the oxygen demand. The heart muscle needs more oxygen to do more work – and, even though the coronary arteries maybe perfectly fine – if the amount of obstruction from aortic stenosis is severe, the heart just says, “Ouch, I can’t do that. I’m not getting enough oxygen to do that work.”

Occasionally, the pressures within the heart just can’t be maintained and the patient will pass out (faint).
When To Operate?

Speaker: Dr. Stelzer

When do we decide to fix it?

When a patient is developing these symptoms -- and we can’t blame it on anything else -- then, we should operate.

“Why is that?” you might be wondering.

That is when your life expectancy curve diverges from normal populations. **Once you develop symptoms, 50% of patients die within 2 years.** So, that’s a healthy risk if you don’t do something about it.

There are also signs on echo that trouble may be brewing -- even though you may feel great. That’s when the regurgitation side of the equation comes in -- more so than stenosis. Because there’s that subtle insidious dilatation that happens to the left ventricle,
which can weaken the cardiac muscle to **the point where it can not recover**.

That doesn’t mean you have to get an echo every two months. It means that once a year or every six months only if you are getting close to the kind of measurements we worry about.

We look at the pulmonary artery pressures in many forms of valve disease – because particularly for exercise, the rise in pulmonary artery pressure may indicate the heart is just not able to get keep up with the physical demand of your body. For that reason, stress tests help us see what your heart does in response to exercise.

Particularly with aortic stenosis... If your blood pressure does not go up – which it should do under exercise circumstances... If it goes down, that is also a sign that your heart is not able to keep up with the demand.
Many patients, their family members and friends, ask me, “Will a pill cure aortic valve disease?”

Unfortunately, a defective valve is like having a faucet that is not working. You need to call the plumber.

There is medical treatment that is available for regurgitation. Some medications can stall out the need for operating -- for a couple of years. But, there really is not any medication that can fix a stenotic valve that fails to open.

**Balloon valvuloplasty** – putting a balloon into a valve and blowing it up -- is something that is used very commonly in very young children (infants). That’s been a real life saver for those kids. The balloon valvuloplasty has helped save lives. It is possible to do in some young adults as well. It has also been done in pregnancy, for instance, when stenosis has been discovered in young woman. You can pop the balloon through that valve and get the female patient safely through pregnancy.

But, unfortunately, as the valve starts to calcify, the balloon valvuloplasty has a very poor durability. It is extremely uncommon for a valvuloplasty to last one year. That doesn’t mean you cannot do it again. But, once you’ve done it a couple of times, the chances of turning a sticky valve into a very badly leaking valve is considerable. So, that’s not a great option at this point.
Valve repair is a possibility for aortic valve regurgitation. Aortic valve repair is certainly an option we need to explore in the young patients. Stenosis repair, however, is not an option for those patients whose leaflets are really bad (stiff).
Reasons For Aortic Valve Replacement

Speaker: Dr. Stelzer

So the replacement reasons, which we have already discussed, are summarized on this slide – aortic stenosis, aortic regurgitation and... Sometimes patients can have both aortic regurgitation and aortic stenosis.
Aortic Valve Replacement Options

Speaker: Dr. Stelzer

A key question that patients and their physicians must evaluate is, “What type of heart valve replacements can we choose from?”

There are lots of valve replacement options available today. There are mechanical devices. There are cow and pig valves -- and, even horse valves.

In the far right, bottom corner of the slide, you can see the pulmonary autograft. That is the native pulmonary valve of the patient.
Guidelines For Valve Replacement Selection

Speaker: Dr. Stelzer

To determine which valve is best for the patient, there have been some guidelines developed by the American Heart Association and American College of Cardiology over the years. If you look at these guidelines, when you have to replace the valve, what kind of valve do you see?

For patients under the age of 60... it looks pretty simple. If you have any reason to need a valve, you get a mechanical valve. Or, if there is some compelling reason not to use anticoagulation – then you get a bioprosthetic valve, also known as a biological valve.
Well those guidelines were published back in 2003.

But, look at the trend -- what has been actually happening for the decade prior to the publishing of these guideline.

Yes, people were following the guidelines back in the early 1990’s. But, in spite of those guidelines, the percentage of mechanical valves dropped in half – from 60% to 32%.

Why did this happen?
Event-Free Survival With Mechanical Valve

Speaker: Dr. Stelzer

The reason for the decrease in mechanical valve replacement use is the face that mechanical valves are not the “walk in the park” that we would love it to be. We used to tell patients that if we put the mechanical valve in you may never need another operation.

But, here’s what really happens. There are a lot of people that do not have such a wonderful time with a mechanical heart valve. You can see in this graph that there are some undesirable events. The top part shows that valve-related deaths, 15 years after surgery, are about 10-15%. There’s a little group of people who had to get operated on because they have infections. There’s a group of patients who have thromboembolic phenomenon (clots). Then, there’s another kind of unexplained category of deaths.

By the time you get to 15 years from mechanical valve implant, less than a quarter of patients are dead. That is very humbling.

There is no “free lunch” out there when it comes to valve replacement choices.
Understanding Animal Tissue Valves

Speaker: Dr. Stelzer

What about the Animal Tissues?

- Tissue Technology – Improving
- Durability – Increasing
- Anti-mineralization Techniques
  - Membrane Phospho-lipid Removal
  - Blocking residual Glutaraldehyde
- Hemodynamic Profile Improvements
  - Stentless Valves – Root Replacement
  - Equine Valve with semi-stentless design
  - No Anti-mineralization Treatment

What about the animal tissue alternative?

The good news is that the technology of tissue valves is constantly getting better. We are now in the “3rd generation” of tissue technology. The tissue valves available today are definitely more durable.

In the past, we typically got a 7 to 12 year valve. Now, the tissue valves can last 15 to 20 years – specifically in older patients.

We made them better by learning different ways to fight against the tendency for the valves to calcify overtime. These valves are better in terms of important blood flow characteristics.
However, the real Achilles heel of the animal tissue valves is that durability is inversely proportional to patient age. Particularly, when the patient is less than 35 years old, a valve that we think is going to last for 15-20 years -- has to be taken out 6 years after you put it in.

That is not very good news. Here you see how the data actually pans out for the different age groups.

If you are 65 -- and you live for 15 years after implant -- the chances that you’re going to need a reoperation is about 8%. But, if you’re 10 years younger, the chance for a reoperation is 18%, more than double. If you’re 40 years old, there’s a 37% chance that you are going to have the tissue
valve replaced. You can see how the reoperation curves keep getting worse and worse the younger the patient is.

The chart above is just another way of graphically demonstrating that durability is age related. The different color curves relates to chances of having to get another valve essentially for structural valve degeneration. You can just go right down the curve. If you’re 50, if you’re 40, if you’re 30, if you’re 20 years old.
What About The Ross Procedure?

Speaker: Dr. Stelzer

Given the challenges with mechanical and tissue valves, this brings us to a fundamental question for patients with aortic valve disease have at least a 25-year life expectancy. That questions is, “What About The Ross Procedure?”

Here is Donald Ross, the last time I visited with him a few years ago. Let’s talk a little about what he came up with -- so many years ago -- in the late 1960’s.
Donald looked at that pulmonary valve that was positioned right next to the aortic valve -- as we saw earlier. This concept was to take that fully alive tissue -- from the patient’s own pulmonary valve -- and switch it into the aortic position (also known as the autograft). Then, Donald took a homograft (a donor valve) and placed into the pulmonary position.

Originally, we didn’t call this technique a Ross Procedure. We called it the Pulmonary Autograft Procedure.
Donald actually started this surgical technique way back in 1967.

Over the years, the Ross Procedure has evolved as we learned better ways to achieve long-term surgical outcomes.

Ross Procedure - Evolution

- 1967 - Pulmonary Autograft as Subcoronary Aortic Valve Implant
- 1972 - “Cylinder” Modification
- 1986 Elkins & Stelzer perform first in US
- 1987 Stelzer modifies procedure to a Full Aortic Root Replacement with Coronary Artery Ostial Re-Implantation
This is a more modern drawing of the concept.

Now, when we put the autograft in at Mount Sinai, I like to support it with a strip of Teflon felt to keep that from bleeding and to keep it from stretching.
Who Can Benefit From The Ross Procedure?

Speaker: Dr. Stelzer

Assumptions

- No Major Co-Morbidity
  - Normal LV Function
  - Not on Dialysis
  - No CAD
  - No Complex Congenital Issues
- Potentially Normal Life Expectancy
- Elective Operation Possible
- Appropriate Surgical Talent Available

When we do this kind of surgery, there are assumptions, or criteria, as to who should have it performed. The Ross Procedure is not for everyone.

One of the assumptions is that you need to have a patient with at least a 20 to 25 year life expectancy. That is why the Ross Procedure is for young people. If we see a patient who is 70 or 80 years old, we don’t have to do this fancy operation because they do not need it. The animal tissue valves are a good solution for them.

However, those tissue valves are not going to outlive the young patient. So, we want to try to get good function and good durability – without having more operations than the patient actually needs.

“What are the other criteria for Ross Procedure patients?” you may be wondering.

First, your ventricle has to be good. The left ventricle function is a major determinant of your life expectancy. If that’s normal, great.

Dialysis is not a good thing in terms of life expectancy. So, dialysis removes patient options away from the Ross procedure.

Coronary disease is not a contraindication. But, if you are going to do a young man’s valve operation, you better be able to do young man’s coronary operation.
Complex congenital heart disease is a real problem that may not allow us to do this kind of surgery.

So, we really want a patient who’s got a potentially normal life expectancy -- to make it worthwhile to do the Ross Procedure.

And, an elective operation is the only way to do the Ross Procedure. There is no such thing as an emergency Ross Procedure. This is something that you need to plan ahead of time.
The Positives of The Ross Procedure

Speaker: Dr. Stelzer

So there’s some positive things about the Ross Procedure. There are some potential negative things about the Ross Procedure.

As for the positives:

• The **blood flow characteristics** – we call the hemodynamics. It is hard to beat the original equipment (the patient’s own pulmonary valve).

• The advantage of having living tissue in your aortic valve. **Living things do things that dead things don’t.** One of the things that Sir Magdi Yacoub talks about is the biological feedback that living cells talks to the other cells in their neighborhood. They influence the coronary blood flow. They influence how the whole aortic group works. It’s a dynamic concert of living cells – talking to each other. The only way to have that be absolutely normal is to have a living aortic valve using the Ross operation.
• The **lifestyle** that you get as a result of not having to have blood thinners and having excellent blood flow is that you can do pretty much whatever you want. The only thing I tell people not to do is Olympic weightlifting. That’s just a little bit strenuous on that little ole valve and puts a little more stress on the walls than you would like to have. But, if you want to do a triathlon, climb Mt. McKinley, you can learn how to do that safely.

• There’s certainly the **potential for more than 20 years of lifestyle**. I would caution that the potential does not mean it’s a “guarantee” that is going to happen. But, you don’t even have the potential for that, without a re-operation, in an animal tissue valve.

*Adam Pick:* Dr. Stelzer, we had a question from Sharon Darris on this topic. She writes in, “As a 20-year Ross procedure recipient, what is the longest patient that you know of and how long do you anticipate a patient can live without an aortic pulmonary valve replacement?”

*Dr. Paul Stelzer:* The longest one that I know of is one from England that was over 40 years. I think it was 42.
The Negatives of The Ross Procedure

Speaker: Dr. Stelzer

What about things that might not be so easy about the Ross Procedure?

The complexity of the double valve – actually double root procedure that this involves – is more challenging. There have been concerns about the mortality risk of doing a more extensive operation – that’s the chances of you not making it out of the hospital alive. It’s what we call operative mortality. That has been reported in different series all the way from 1% to 6%. One percent is pretty typical for aortic valve but six percent is out of hand. So again, it depends on the experience of the operative team.

There’s been questions raised about the suitability of the Ross Procedure in patients with bicuspid valve disease. That has reared its ugly head again recently. But the question is because bicuspid valve patients tend to have weaker elastic tissue in the wall of the aorta. So, there’s a greater tendency for the aorta to stretch over time – to form an aneurysm or even to have an aortic dissection at some point.

I think the response to that is you can either quit doing the operation or you can learn how to do it better. I chose the second alternative. So, the consequence is the patient has stenosis, that the root can dilate, and that’s something – we do a lot of things now that we didn’t do 25 years ago – to prevent that from happening.

You’ve also introduced something on the right side of the heart. You’ve put a pulmonary homograft, a donor valve, that’s now in the position – where the pulmonary autograft used to be. That can degenerate, too, can’t it?
I say, “Yes. It certainly can.” So, you have a potential for trouble on the right side of the heart. Now, you’ve changed a single valve disease into a double valve disease... That’s a potential objection that’s been raised by a number of people -- particularly surgeons who don’t do the Ross operation. It’s a consideration that deserves respect, but I thought it was going to be a bigger problem than it turned out to be.

Risks at re-operation are also something that are different depending on what was done the first time. As long as you know what you did the first time, it’s pretty easy to re-do it the second time in most patients. But, it is more difficult. No question about it. Any re-operation is more difficult than the first one.

This is a picture, artist’s rendition, and surgical picture of what the Ross Procedure should look like.
Dr. Stelzer’s Experience With 540 Ross Procedures

Speaker: Dr. Stelzer

This is my personal experience -- since March of 1987 -- with **540 patients**. As you can see, it’s about 3 to 1 favoring men to women. The average age in this group is 43. It’s a wide range, but the vast majority of them are in the middle of that, from the 20 to 50 year old range.

As I say that, there are only two kinds of patients; the kind that have complications and the kind that don’t operate. Early on, I lost some patients. I lost six people -- three of those were due to bleedings and various other reasons – for the other three.

Currently... I have yet to update the slide but I’ve now done **300 Ross Procedures, in a row, without a death**.
This is the reason I can tell people – when I sit in the office and talk to you about surgery – I can do the Ross Procedure for a very low mortality rate.

The other things that’s very interesting...

One of our medical students did a survey with the Social Security Death Index, which is a way of finding out whether people are alive or not. Looking at all the patients that I had done the Ross Procedure on and I had a Social Security numbers for, we could look up and see their status – living or dead. **In 15 years, we had a survival of 93%**.

I think that fact is pretty respectable.
What are my Ross Procedure patients doing?

These people are doing some pretty amazing things – stunt pilots, champion bicycle racers, endurance sports, including Ironman Triathlons. It’s pretty amazing. It’s something that’s a real joy to be able to give people their life back.
Why Choose The Ross Procedure?

Speaker: Dr. Stelzer

Why Choose Ross in 2013?

• No Anticoagulation
• Quiet
• Normal Hemodynamics
• Normal Coronary Flow Reserve
• Living Neo-Aortic Valve
• Normal Active Lifestyle
• QUALITY and LENGTH OF LIFE

The reasons that someone might choose a Ross in the current era...

• **No blood thinners.** Of all the reasons people come to me for this specific operation, that at the top of the list. Patients do not want to take Coumadin for the entire life.

• The **noise** that’s made by a mechanical valve is annoying. People say they get used to it. I’ve taken out at least seven mechanical valves to put a Ross in patients. The patients all say, “It is really nice to not have to listen to that clicking sound anymore.”

• The **normal blood flow** that influences things like coronary flow and talks to other cells around it, that’s a key advantage over the long term.

• The fact that you can do whatever you want in life – is also a great thing.

• **Length of life.** If that 93% at 15 years didn’t sound good to you, let me tell you that the normal life expectancy of aortic valve replacement patients is 50% at ten years. Why is that? Let’s look at the next slide or two because this is important information – a message that the medical community has not really heard.
Survival Advantages With The Ross Procedure

Speaker: Dr. Stelzer

This is Sir Magdi Yacoub who is acknowledged as the greatest surgeon in Great Britain living today. He did a randomized controlled trial. Very few studies of that nature exist in cardiac surgery to understand how one valve compares to another.

In the study... There were patients that were candidates for either valve. We flipped a coin to see which valve you get. This was done for two groups of patients, 108 patients in each group. After ten years, the study compared Ross patients to patients who had an aortic homograft, both put in as root replacements.

Why did Sir Magdi Yacoub use a homograft. Well, Magdi Yacoub did that because it was the best available tissue valve – better than the animal tissue valves.

In ten years, there was a significant difference in the survival of Ross patients over the homograft patients. The Ross Procedure patients came out on top – not just doing better but living longer.
Here’s more data about the survival advantages of the Ross Procedure.

On this chart, the Ross patients are on the top – where there’s the dark line. The homograft patients are on the dashed red line. The green line is what we call the control population. **You can see that the Ross patients are on the same survival curve as a normal person.** But, the tissue valve, the best available tissue valve, the homograft was not. That difference was statistically significant. That’s a pretty impressive finding when done in a randomized trial.

**Important Points of Yacoub Trial**

- Homograft – Surrogate for Best Available Tissue Valve
- Both done as Full Root Replacements
  - Optimal Hemodynamics and Flow Patterns
- 44% age 21-34 and 36% 35-50
  - Clearly the Age most Challenging for Tissue
  - Age most likely to get Mechanical in past
That tells you the structure of the trial. The patients – 44% of them were between the ages of 21 and 34 and 36% of them between the ages of 35 and 50.

This is the very age groups where tissue valves have the greatest challenges. And, these are the people most likely to get a mechanical valve in the past – as shown in the earlier slide.

This is a very interesting thing. In the title of this paper in the Lancet is the little symbol up there – in the upper left hand corner. That symbol was put there by the editor of the journal. It suggests, “This is a paper that’s so significant, that your practice should be affected... You should be doing something different if you’re not doing this.”

But, it hasn’t changed anybody. Why?
Press On The Ross Procedure

Speaker: Dr. Stelzer

There’s been a lot of negative press on the Ross Procedure.

People talk about how the operation takes too long, there’s too much risk, there’s the two valve business, not everybody can do it, and you can not do it through a key hole.

It is very fashionable to do very minimally invasive surgery these days and the Ross Procedure is not minimally invasive surgery. Others talk about how there’s a very high chance that you’re going to have a re-operation, and it’s going to be risky when you do that.

This has been predicted by some real leaders in the field of cardiac surgery but has not
been proven by data.

What about those re-operations? Well, if you put in an animal tissue valve, a reoperation is pretty much inevitable. The risk of mortality might be 1% at the first operation and we usually say it’s about double that during the second operation.

In the days when the original operation was 5% and the re-do was 10%, that’s why it was reasonable to put in a mechanical valve than have a 15% chance of trouble by 20 years.

But now... those risks have gone down. That’s one of the reasons we do more tissue valves. My estimate is that about 20% of patients who’ve had a Ross operation will have either or both valves re-operated or intervened upon within 20 years. That means that **80% of people will not be reoperated on.** Sometimes we can repair the autograft in the aortic position. Sometimes we have to replace it.

Is the risk of reoperation high? As I say, it depends on how you approach that, and if it is high, how much higher?
This is a concern about dilatation that came to fore after we’d been doing this for a while. As I told you, Donald Ross put the autograft inside the aorta and closed the aorta over it. When I started doing them, I started doing them as a full root replacement. Little did we know that that tissue was going to stretch. So, this picture was 11 years out – I said, “Whoa, that doesn’t look good.”

Notice that the inflow end of it, right where the coronary artery is coming out over there, that’s not stretched because of that felt strip that I put in at the inflow end.

This is a table of patients of mine that have had to have further surgery. Most of them I’ve done. Some have been done elsewhere. Usually patients will call me, email me if
something’s going on. I wish they would all send me an echo every year. But, they don’t.
I guess they’re out having too much fun.

The reasons for why we had to re-operate on them are in the tables above. Notice on the right side of the heart, the RVOT homografts – only eight patients. The vast majority of troubles have been with the autograft. So I said, “Oh, I thought the homograft was going to be the big trouble.” They are lasting just fine.

I should mention that all of the operations were successful. Nobody died at re-operation.
The German-Dutch Ross Registry provides a tremendous amount of data, and probably our best, and our freedom from re-operation. Everything in there, just look that over, and also doing it more than one way. There’s more than one way to do this and get good results.
How Might TAVI Aortic Valve Treatment?

Speaker: Dr. Stelzer

People ask me about percutaneous valves, the TAVI or TAVR as it’s called now, the transcatheter aortic valve implant or replacement. Does that change how we think about these things?

Well, it does in terms of the age. How low can you go on age and think you’re going to get away with a tissue valve strategy? If you can put a valve inside that valve percutaneously, then you can renew that warranty can’t you... just like we did there with that homograft. This is a concept that’s been demonstrated and done in Europe and it’s currently under study in the United States. We can lower the age assuming we can get that tissue valve in there in an adequate size. That’s an important thing – that you see down there -- the size of the initial device to keep greater than 19.

I should probably modify that from recent information that says you’ve got to be at least 23 or the valve that you put inside is not going to be as big as you think. How many matryoshka dolls can you put together? How many times can you keep putting a valve inside a valve inside a valve? The other aspect of it is what’s happening to the aortic root or the ascending aorta. That, at this point, we can’t intervene except with open surgery, so we want to make sure that we take care of that, which we didn’t know 20 years ago.

The durability data of the percutaneous valves is really not there. The only data we really have, a five-year survival of 30%. That’s because these really old, sick people that are getting those valves are not really a way of saying, “How would it work in me if I’m 50?”
Could you do a TAVI in a patient that had a Ross?

Well, we just showed you one on the right side of the heart, the pulmonary side. What about on the left side, the aortic position?

I think it probably could be done, but it’s never been done. Because of those strips of Teflon felt, you’ve got a landing zone that could perhaps hold the pressure of a self-expanding valve. But, that’s something that we’ll have to wait for in the future.

The key thing is to have an established root that won’t dilate into an aneurysm. Then, if the valve fails, that might be treated. At the present time, percutaneous valves are only used for stenosis, and not for regurgitation. Again, in Europe they have rescued some regurgitant valves, especially the valve-in-valve, and even the David procedure that failed has been treated successfully. That’s a little more comparable I think to what a Ross procedure patient might be if in need of rescue. It’s tantalizing to think what might be possible.
Conclusions About The Ross Procedure

Speaker: Dr. Stelzer

My final impression is that this operation should definitely be on the menu for patients aged 15 to 50 years old with severe aortic valve disease. The survival advantage of a living aortic valve is something that I don’t think we should ignore.

The Ross Procedure is the most difficult of the options in terms of the technical ability to do it, but it is doable.

Mechanical valves are the most durable, but you pay a price. That price is not that you have to have another operation, but it’s the most likely of the options to cause a stroke in the course of the next 20 years. That’s what I call a “life changing experience” as opposed to a “re-operation”.

The animal tissue valves are going to fail early, and how many times you have to go back in. The 20-year old is going to need a zipper, the 50 year old may be able to get a TAVI. But, how long are those going to last?
Questions & Answers

Speakers: Dr. Stelzer and Adam Pick

Adam Pick: Thank you so much Dr. Stelzer. That was really excellent and really helpful. We’ve got time for just one or two questions here. Lyle Roberts is on the phone call, and I know in a previous slide, you just discussed the age range here, and Lyle has a question. He says, “I’m 64, with normal life expectancy, is the Ross procedure an acceptable option?”

Dr. Paul Stelzer: I’ve had that question asked to me, and if I had a patient who said, “Look, my parents lived to be a hundred, and I want to do mountain climbing, and triathlons, and I’m 64, and I have stenosis, and I’m in great shape, and there’s nothing wrong with my arteries, my kidneys, my lungs, or my brain. Can I have a Ross?” I’ll say, “Yeah, sure you can. It can be done.” Is it going to be a major advantage over using a tissue valve strategy? Not as big as when you’re 34 – as when you’re 64. But if you really want to put your valve to that kind of hemodynamic test, there are very few things that can produce that kind of blood flow characteristics like the Ross can.

Adam Pick: This next question comes from Damian. He says, “In general, when deciding on a surgeon, how many prior surgeries do you recommend that a surgeon conduct given the uniqueness of the Ross procedure?”

Dr. Paul Stelzer: That’s an excellent question, and you look back at that learning curve of mine, most of my trouble was in the first 30 people. I think that’s my minimum number to say experienced. But it’s not just Ross experience, and that’s an important perspective. A Ross operation, especially the way I do it, is a root replacement. Aortic root replacements are done with other materials, with other devices. So, if you’ve had a lot of experience doing that kind of surgery, that really counts. But, there is unique stuff that you have to do in a Ross, particularly harvesting the autograft from the pulmonary outflow tract, and that can be mastered. That’s not the most difficult part of the operation even though it may be the most intimidating to surgeons who’ve never done it. That’s something that can be taught. As long as you know how to use anything to replace the aortic root, the concepts are very similar. You just have to be much more gentle with that delicate tissue of the pulmonary autograft. The surgeon has to be gentle.

Adam Pick: Dr. Stelzer, with that response, we are going to conclude the webinar, but please don’t exit the webinar just yet. On behalf of the entire community here at HeartValveSurgery.com and all the patients with valve disease, I’d like to extend an extraordinary thanks to Dr. Stelzer and his team at Mt. Sinai for sharing their incredible expertise with everybody on the call today.
We are going to put together a video of this session. We’re also going to put together a written transcript in the form of an eBook that will be posted at HeartValveSurgery.com shortly.

As we end the webinar... I’d like to say thanks to everybody on the call for your participation in this amazing online event.

To contact Dr. Paul Stelzer, please call (866) 322-1668 or click here.

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