

Percutaneous Mitral Valve Replacement

Announcer: Welcome to the Mayo Clinic cardiovascular continuing medical education podcast. Join us each week to discuss the most pressing topics in cardiology and gain valuable insights that can be directly applied to your practice.

Dr. Friedman: Hello, my name is Paul Friedman, Chair of the Department of Cardiovascular Medicine and I'm delighted to be joined by my colleague, Dr. Mayra Guerrero, in the Division of Interventional Cardiology. She's a Professor of Medicine and an Associate Program Director in our Fellowship Program. Mayra, thank you so much for joining me today.

Dr. Guerrero: No, thank you. Thank you for the opportunity.

Dr. Friedman: Today we'll be talking about transcatheter mitral valve replacement, really an area that you've been pioneering and spearheading, so why don't we just start with the basics, what is it?

Dr. Guerrero: Thank you, well transcatheter mitral valve replacement is a minimally-invasive procedure that allows physicians to replace the mitral valve without the need for standard open-heart surgery. So it is less invasive, it's basically a stent, inside of the stent is a new valve and we place the stent inside of the mitral valve using a small plastic tube, that we call catheter, and through that plastic tube, we introduce the stent to be delivered in the mitral valve.

Dr. Friedman: Is this done with a person under general anesthesia? Are they awake, asleep?

Dr. Guerrero: They're usually a couple of ways of doing this. We can place the catheter, the delivery catheter, through a small incision in between the ribs. The other way is we place the catheter in a vein in the femoral area, in the groin area, and yes, it is usually then under general anesthesia, not necessarily in the OR. When we do it from the groin, it can be done in the cath lab, and the patient wakes up at the end of the procedure.

Dr. Friedman: Okay. So you described two approaches: transfemoral and transapical, or the one with the incision between the ribs being transapical versus transfemoral. When do you choose one versus the other?

Dr. Guerrero: It's the type of the device. Some devices require the transapical access, and some already evolved to transfemoral access. At the beginning, most of them were transapical because of the size of the prosthesis, it's large enough that requires a larger diameter catheter, which is harder to be introduced in a femoral vein versus a transapical access, but some of those valves have already evolved to the transfemoral access. So it's device-dependent basically.

Dr. Friedman: So what are the main differences between the transcatheter versus standard mitral surgery?

Dr. Guerrero: Well, for the patient is recovery time is much easier and faster after a minimally-invasive procedure, compared with open-heart surgery, and the risk may be also significantly lower because it's less invasive, so lower risk and faster recovery.

Dr. Friedman: What about valve type, valve reliability, valve durability? Any differences there?

Dr. Guerrero: Yes, it's not known yet. This field, it's relatively young compared with tether or other technologies, so we don't have all the answers, we don't know yet in terms of durability, however, there is limited data on transcatheter valves out to six years post-implant, and the valves perform well even six years after. We don't know what would happen in year 10 or year 20, but we do know that we can usually fix those with another transcatheter mitral valve, and most likely with transfemoral access.

Dr. Friedman: I see. Is this approved in the United States?

Dr. Guerrero: That's a great question. The only approval that we have in the US is for mitral valving valve, so we use an aortic transcatheter valve to replace a mitral valve, but for the dedicated mitral transcatheter valve, the dedicated devices, none of them are approved in the US as of yet. They're only approved under clinical trials. So it is our hope that soon as we finish this clinical trials and the data becomes available, we may see approval in the near future in the United States, which was the case in Europe where it has been approved, at least one device, since January of 2020.

Dr. Friedman: I see. Who's a candidate? Who are the best people to undergo this treatment?

Dr. Guerrero: Currently patients who have high risk of complications for standard open-heart surgery. Many of those patients would be a candidate for transcatheter mitral valve replacement in a clinical trial, if the anatomy is favorable. The problem is that not every patient has favorable anatomy. We would have to start with a CAT Scan, do some measurements, and see if we have the device and the size that that particular patient needs. So about half of the patients may not qualify due to challenging anatomy. We hope that with newer devices, that number can improve in the future, but we can start with surgical risk. If surgical risk is high, then we could initiate that evaluation.

Dr. Friedman: How does a doctor or patient begin the process of evaluation to see if it's needed or an option?

Dr. Guerrero: Well, at our center, I think the best initial step would be an evaluation in the valve clinic, and then from there, we can talk to the patient about the multiple options. I have to emphasize there's multiple options. There are already three devices that we can offer depending on anatomy or the patient's needs, and we can talk to the patients about those options, obtain the CT Scan, and see which option would be best for that particular patient.

Dr. Friedman: Now, there's valve replacement and then there's valve repair and catheter devices that approximate a valve repair. Do you want to comment on that a little bit for us?

Dr. Guerrero: Yes, transcatheter repair is also an option, and there are already randomized trials evaluating devices, comparing with the MitraClip, which is the one that we had had for several years, and patients may actually qualify for either repair or replacement, and sometimes it's challenging because they qualify for both. So we talk to the patient about the pros and the cons of each of the options. For example, for replacement a patient would need long-term anticoagulation, or at least for six months, but perhaps even longer, versus with a repair, long-term anticoagulation is not needed. So we would talk about all those details with the patient and family members and let them choose which path they would like to pursue if they are candidate for both.

Dr. Friedman: So you mention MitraClip, maybe say a few words about what it is and who's a candidate for that, and how it differs in replacing a valve?

Dr. Guerrero: Yes, so MitraClip is a device that allows us to repair the mitral valve without surgery. We use a small plastic tube, again it's transfemoral, transvenous, we use a vein in the groin area. Most patients go home the following day, and it's a repair; it is not a replacement. We can significantly improve the severity of the mitral regurgitation, however it doesn't completely eliminate regurgitation, versus a replacement, you obtain better results in terms of reduction of the amount of residual mitral regurgitation, so it may be more effective immediately, but it's more involved.

Dr. Friedman: So the MitraClip, of course, is just putting a clip between loose leaflets to hold them together like an Alfieri stitch, as opposed to replacing the whole valve.

Dr. Guerrero: Correct, it's basically to approximate and get the anterior and posterior leaflet closer to the crazy amount of regurgitation.

Dr. Friedman: And then for physicians listening, if you're not an invasive cardiologist, you're patient has just had a transcatheter mitral valve replacement, what should you check? What should you watch for? What are complications? What medications will they need? How do you manage them effectively?

Dr. Guerrero: Post-procedure, we usually like to obtain an echocardiogram in about one month. In a clinic visit, we would like to evaluate symptoms and obviously physical exam, as well, looking for murmur and amount of, evidence of fluid retention, edema, and make sure the lungs are clear, but on echocardiogram, we would like to evaluate several parameters, the amount of residual regurgitation, any stenosis, any increased gradient, any change in left ventricular function or right ventricular function. Some of these procedures leave behind septostomy, meaning iatrogenic atrial septal defect, and we need to evaluate the amount of shunt and how the right ventricle is handling that excess of flow. Sometimes that can be decreased RV function, so we always check for that, as well.

Dr. Friedman: Now, do you expect that hole in the interatrial septum from the transseptal puncture of managing the valve to close on its own? Do you ever have to close them with a plug?

Dr. Guerrero: That is a question for which no one has an answer yet. The limited data that he have indicates that there's no need to close those most of the times. They tend to close on their own, and the only study that compare closure versus no closure found no difference. So as of today, we don't have any evidence to suggest that we should close those septostomies. We just keep an eye on the septal defect and function of the right ventricle, as well as any potential hypoxemia. So there are only a couple of clinical reasons to close, and we usually would know those before the patient leaves the hospital.

Dr. Friedman: Great, Dr. Mayra Guerrero, thank you for joining me. It's been a very interesting session.

Dr. Guerrero: Thank you, thank you very much for the opportunity.

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