Cath Lab Digest

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STRUCTURAL HEART

Management of Complex Valve Disease Patients

CLD talks with Structural Cardiologist Lowie Van Assche, MD, Baptist Health South Florida, Miami, Florida, about his presentation at Baptist Health's Echocardiography and Structural Heart Symposium, which took place September 27th-28th in Coral Gables, Florida.

How are standard structural heart disease patients different from more complex patients?

For most of our transcatheter aortic valve replacement (TAVR) or transcatheter edge-to-edge repair (TEER) population, the heart team approach has become straightforward. Usually these are stable outpatients, and we discuss each patient as a team in an effort to decide if we should provide medical management, transcatheter therapy, or surgical therapy. However, not infrequently, we will encounter patients who are very sick and it is unclear as to what approach we should take. These patients have complex presentations, fall outside of the guidelines, and don't fit inside the usual pathway of how we treat patients. The good news is that with new transcatheter therapies, we can help some of these patients who are not necessarily within what we might consider standard of care practice. In patients who have acute complications, the number one thing we try to do is get them out of trouble. If we can prevent these patients from decompensating and dying, many will go on have a positive outcome.

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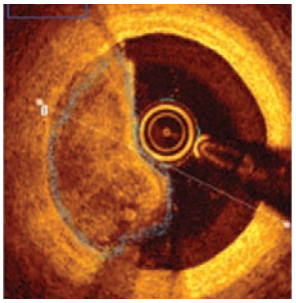
CLINICAL IMAGES

Optical Coherence Tomography in the Peripheral Vasculature



Jha Manvendu, DrNB; Ajay Dabas, MBBS, MS, DNB; Brijesh Kanti Biswas, MBBS

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PAD TREATMENT

Retrospective Review of Directional Atherectomy and Drug-Coated Balloon Use in a PAD Safety-Net Population

Shea E. Hogan, MD, MSCS; Matthew Holland, MD; Joseph Burke, MD; Paisley Johnson, MD; Demetria McNeal, MD; Lisa Cicutto, MD; Mark Nehler, MD; Pamela N. Peterson, MD, MSPH

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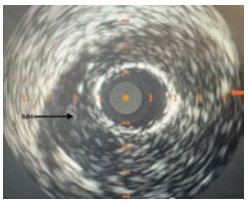
CASE REPORT

Not the Usual Suspect: Intracoronary Hematoma Presenting as an Acute STEMI



Yashwant Agrawal, MD; Dominika M. Zoltowska, MD; Anthony Elghoul; Anwita Reddy Nimma; Tim A. Fischell, MD

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HMP Global

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Management of Complex Valve Disease Patients

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I still follow one of my more complex patients over two years later, and he is doing really well. If we hadn't offered him an interventional therapy, he may have never left the hospital.

What are typical presentations for more complex patients?

We often see patients that come in with acute myocardial infarction (MI), and even though in the current age of primary percutaneous coronary intervention, many patients do very well, we still have patients who within days to weeks can have pretty significant complications from their MI, including valvular heart disease. They can have acute severe regurgitation from a papillary muscle rupture or chordal rupture of the papillary muscle. Some patients may experience an acute left ventricular outflow tract (LVOT) obstruction because the entire heart is so affected by the MI that it is experiencing a type of hypertrophic cardiomyopathy physiology. Many of these patients who just had a heart attack are too sick to undergo open heart surgery. They may be in respiratory distress and their blood pressure is low. Their heart function is under stress, so their morbidity and mortality for open heart surgery is fairly high. You could try to manage them with just medical therapy, giving them medications to support their blood pressure. Unfortunately, however, a lot of these complications are mechanical in nature, so unless the underlying problem is fixed, the patient is not going to improve and usually tends to spiral down. We can sometimes manage these acute complications with transcatheter therapies. Data are fairly scarce on using transcatheter edge-to-edge repair (TEER) for papillary muscle rupture, for example. The patients that were studied in all the trials were stable patients, so they had either a dilated ventricle causing functional mitral regurgitation, meaning the leaflets are functionally normal but are just not coming together because of a dilated ventricle, or patients who had more degenerative disease, where the leaflets became degenerated and would prolapse. We are very comfortable with treating those kind of pathologies, and can now treat patients with degenerative or functional mitral regurgitation who are on medical therapy with TEER, either with the MitraClip (Abbott) or Pascal (Edwards Lifesciences). However, a chordal rupture or a papillary muscle rupture can occur in patients who have had a large MI. The mitral valve is attached through little strings which are called chordae and then to two papillary muscles (Figure). If a papillary muscle is involved and infarcts completely, it can become very friable tissue. When that tissue becomes friable, depending on what area is affected, either the entire muscle can come loose, meaning the little chords with a little piece of muscle become completely mobile, or the chords rupture. If multiple chords rupture, the valve becomes completely dysfunctional. One reason patients experiencing a chordal rupture get so sick is because they go from no mitral regurgitation or very minimal mitral regurgitation to severe mitral recitation, probably in the course of a few hours. The heart cannot tolerate that. Other people who we treat more traditionally have developed mitral regurgitation over the course of years, so the heart slowly adjusts to the leakage. Of course, they still don't feel well and have shortness of breath, but they don't get acutely ill. These patients get acutely ill, have very low blood pressure, and need to be intubated.

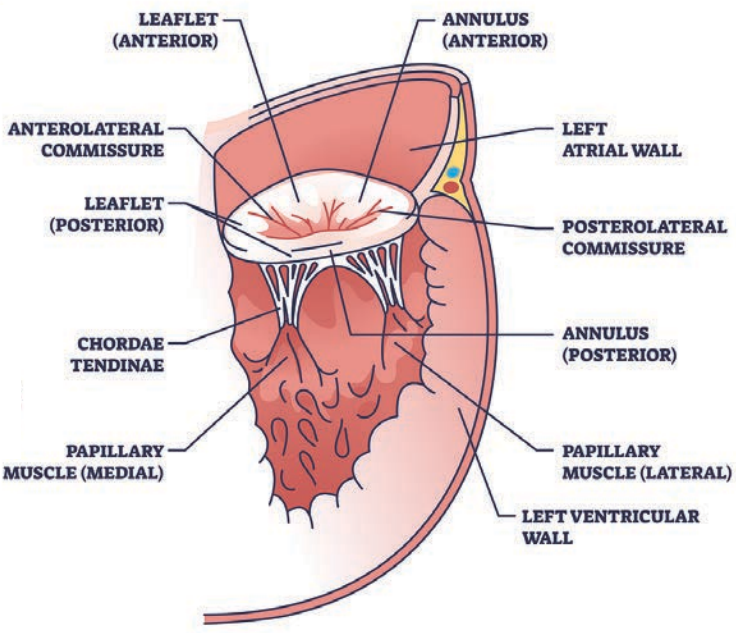

Figure. Illustration of the mitral valve showing the papillary muscles and chordae.

Can you tell us more about the heart team discussions?

We discuss our valve disease patients in the morning twice a week, including our complex patients. The patient is evaluated by a cardiac surgeon, an interventional cardiologist, a clinical cardiologist, and many times, an imaging cardiologist. We have structural heart imagers at Baptist Health South Miami Hospital. Imagers will review the echocardiogram,

interventionalists will review the images of the cardiac catheterization, and then everyone shares their opinion: do we think the patient can be treated successfully with a transcatheter therapy? Sometimes we decide the likelihood of having a good result with a transcatheter therapy is fairly low and the surgeon feels like the risk is not that high. Or we may send the patient for surgery, but the surgeon may have evaluated the patient and feels the risk of the patient dying during an open heart procedure is high, so we should try whatever we can to fix things with a transcatheter therapy. Typically, if someone has a large heart attack and their left ventricular (LV) function is reduced, it can be managed with medication. You optimize their guideline-directed medical therapy for a few months, and many patients will see some improvement in their left ventricular function. But all the other really acute/subacute complications are usually worse than typical reduced LV function and the patient will not be improved on medical therapy. These are discussions we have in the heart team on a regular basis.

Can you share more about valve complications that can arise post myocardial infarction?

An MI in different arteries can cause different mechanical complications. For example, I had a patient who had a papillary muscle rupture. He had previously had an occlusion of the circumflex artery. Often, the circumflex artery provides blood flow to the papillary muscle that goes to the posterior mitral valve leaflet. When you treat an MI, depending on what artery that MI was in, you can look for different mechanical complications if the patient comes back. You can consider that this patient had an MI in one particular artery affecting certain myocardial territory and it is more likely to be a rupture versus a ventricular sepal defect, let's say. There are correlations between where the MI is located and what complication can ensue. We don't do it routinely, but you can do a cardiac MRI, which is really the only test that shows the amount of scarring in the heart after a heart attack and can help you predict any problems. Some studies have already looked at patients with acute MI who went on to have a cardiac MRI, and have shown clear correlations. For example, if there is significant scarring in the papillary muscle, the risk of having a rupture is significantly higher than if there is no scar in that territory. So, if you are worried about a particular patient, you could do an MRI, and if it shows a lot of scarring, you may keep them in the hospital longer, or you may see them more frequently in the office to make sure you are not missing any of those complications.

The most important step is in taking the time to really understand why the patient is decompensating. The second is understanding the limitations. Sometimes we still struggle to find that balance when deciding whether a patient is a good candidate for a transcatheter therapy.

What are some of the challenges you see?

Some of the challenges involve truly understanding the pathology: knowing exactly what is causing the acute decompensation and why the patient is not doing well, because it changes the way you approach the patient and what kind of treatment you recommend. Unless you complete a good physical exam and obtain a good echocardiogram, you may misunderstand the pathology. The most important step is in taking the time to really understand why the patient is decompensating. The second is understanding the limitations. Sometimes we still struggle to find that balance when deciding whether a patient is a good candidate for a transcatheter therapy, because we have such limited data. There is also a publication bias; you can read about all the success stories, and thereby feel more confident that you can treat these patients successfully every time, but the not-so-successful cases are typically not so visible. That is important to know.

What might, in your experience, lead to a not-so-successful outcome?

There are certain problems that are difficult to fix. Sometimes the valves are just too small to put in a clip. Sometimes the leakage is coming from an area where you can't reach with a clip. Failed procedures are when the patient leaves with a still leaky heart valve. You want to be able to predict these problems, but predictions are challenging. A lot of work is being put into developing new tools directed at imaging done prior to the procedure, especially now with the growth in artificial intelligence, in order to help us understand the expected success rate. We want to be able to discern that this patient falls into category A, with a 90% chance of good success, and this patient in category B, and category C, and so on. Ultimately, the hope is to grow by using our technologies to better plan for interventions.

Any final thoughts?

We are still learning. We only have retrospective data at the moment. A few randomized trials are looking specifically at these problems — using TEER for post MI complications and using TEER for patients who present with cardiogenic shock. In the next three to five years, we should have some prospective, randomized studies reporting on these patient populations, providing more objective data on whether or not transcatheter therapies are actually helping these patients. Anecdotally, based on those complex patients we have treated thus far, I believe the results will be positive. ■

Baptist Health's 42nd Annual Echocardiography and Structural Heart Symposium will take place September 26-27, 2025.

More information is available:

cmeonline.baptisthealth.net/echo-symposium#group-tabs-node-coursedefault1

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