

Announcer: Hello and welcome again to our listeners and viewers. I'm Malcolm Bell here at Mayo Clinic Rochester, your studio host for today's podcast of interviews with the experts. Today we are here to discuss a very interesting topic, very important topic of the role of multimodality imaging in pericarditis. I'm delighted to introduce our guest for today. Dr. Praj, who is an assistant professor of medicine, is at our, as you can see there in the background, he's at our Florida campus at Jacksonville. He's an expert in pericarditis, sees a lot of patients with pericarditis and recurrent pericarditis, but perhaps more importantly, he's a multimodality imager, giving him expertise in echo ct, MR. And, and nuclear. So Praj welcome today.

Dr. Praj Reddy: Yeah, thank you Dr. Bell.

Dr. Malcolm Bell: So let me first start off with the first question here for you and what is the role of imaging in general in the initial diagnosis of pericarditis?

Dr. Praj Reddy: Yeah, no, absolutely. So, you know, I think pericarditis oftentimes ends up being a, a clinical diagnosis. You know, patients presenting to the emergency room. They have relatively classic symptoms of either positional chest, chest discomfort, but more so from a, you know, an evaluation perspective. They might have a pericardial rub, their ECG may be classic for the diffuse st elevations and PR depressions that you might see. And then, you know, whether on a chest x-ray or on a bedside echocardiogram, you might see the presence of a pericardial effusion. And, and you know, there's likelihood that when a patient presents to the emergency room with chest discomfort or they might have some shortness of breath, there might be some imaging that the ED provider orders even beforehand, like a CT scan, either to rule out a PE or, or just ruling out any other kind of acute cardiac process too. As you can imagine, with an inflammatory process, the dimers tend to be elevated, so that differential diagnosis can be fairly broad. At the end of the day, I think the clinical diagnosis still carries a lot of weight. There's obviously a very characteristic presentation to what pericarditis shows up as. Oftentimes you don't really need to pull, you know, too much into the multimodality imaging aspect of it at the initial presentation. It may be something as simple as just a chest x-ray or an echocardiogram. But if you do end up having some CT imaging, again looking for other things, I always, whenever I see a patient down in the emergency room in that acute presentation, I look to see is the pericardium thickened on that CT scan? Is there an effusion there? Again, it just adds to the certainty of the diagnosis so that you can lead the patient to the right, right kind of treatment.

Dr. Malcolm Bell: Yeah, no, I, and then I think you've made the important, the really important point that it's very often this is a clinical diagnosis and you, you've really nicely summarized the, the things that you'd be looking for in the patient though, who presents you with sudden onset acute chest pain. Obviously, you know, the differential diagnosis, the important one is acute myocardial infarction. So, and, and sometimes it's not always so clear as I'm sure you, you've experienced. So in terms of getting immediate imaging, you know, I mean maybe there's no time to to get a cardiac MR or even CT sometimes, but, but these patients you are really need to have a sort of really rapid assessment. What,

what are the things that you're looking for that will steer you away from sending 'em straight to the cath lab and saying, you know, this really does look like pericarditis and as you said, you know, you may just have handheld ultrasound there in the emergency room. So how do you approach that situation?

Dr. Praj Reddy: Yeah, no, absolutely. And as you know, all of us try to look at this ECG and try to say, is this characteristic for like a, a pericarditis alone? And there's been many situations where I haven't felt confident enough just to look at the ECG and say, I'm confident that this is pericarditis. There's no other, nothing else on the differential. Yes, if everything kind of falls into line from a, you know, clinical presentation perspective, it's one thing I think with laboratory testing we get that pretty quickly. I know what, obviously in a STEMI situation it's still really important to make that diagnosis quickly, but if you have a troponin or even a point of care troponin that is elevated, that should raise your suspicion that there may be something else going on. Even if it ends up being a, a myocarditis along with the pericarditis, it still gives you an idea that there, it's not as simple as just pericardial inflammation. So the traditional kind of pericarditis alone shouldn't be giving you a, a troponin elevation and it certainly shouldn't be giving you kind of regional wall motion changes, things like that. On an echo, you know, you kind of brought up the idea of like you, we might not have time for multimodality imaging. One thing that we do pretty well is, especially in, you know, the Mayo Rochester campus, the triple rule out cts, the ED providers use that quite often. And I think that oftentimes is a really good kind of triage for us because we rule out the big pathology like PE dissection and then we're good enough to be able to at least say, is there a big coronary lesion there that should prompt a, a more quicker evaluation in the cath lab? So I agree with you. I think sometimes it could be hard just to rely on the clinical diagnosis alone, but if there's any red flags like that elevated troponin, I guess I'd have a low threshold to at least think about a triple rule out if I'm not convinced to take them to the cath lab.

Dr. Malcolm Bell: Okay, good, good points. And then maybe just briefly outline for the ct, I mean that's obviously the one we can do the fastest there. Yeah. After echo, what exactly are you looking for on the CT that would really push you towards the diagnosis of pericarditis?

Dr. Praj Reddy: Yeah, so on the CT scan it does, it's not as advanced as an MRI in terms of tissue characterization, but you still can see pericardial thickening and you're able differentiate that from fat relatively easily. So I think from a bigger picture perspective, even though it doesn't have all the kind of characteristics that an MRI might have, mainly I'd be looking for either a pericardial effusion or inflamed looking pericardium. And again, the absence of the other things would be helpful too.

Dr. Malcolm Bell: So you made the diagnosis, we, we don't have time today. Maybe another time you talk about the treatment 'cause that's obviously very, very important that we're really here to talk about the imaging Yes. Characteristics here. So in the patient then you've made the diagnosis, they treated that they improved, they go home. But let's talk about the patient who may have recurrent pericarditis and firstly maybe just remind our viewers and listeners, you know, how frequently does recurrent pericarditis

occur? Yeah. And then what are you looking for then in terms of imaging? What MO imaging modality would you use for a patient who's presenting that with recurrent pericarditis?

Dr. Praj Reddy: Yeah, no, great. And, and you know, I think the, the recurrent pericarditis population is oftentimes really challenging. And when we're talking about what's the likelihood it's estimated between 15 to, you know, 30% or so. So it's not a small percentage, it's a decent number of patients that might have recurrences. Obviously the spectrum of how often the recurrences are happening can be pretty varied, but, but it is certainly a, a fairly large group of patients that have significant symptoms attributed to it. Now when we're thinking about what's the role for imaging in that situation, you know, perhaps places like you know, Mayo Clinic, when we're getting referrals for second and third opinions, it tends to be a little bit more challenging to rely just on a clinical history because we're oftentimes really removed from the initial presentation. So that's the challenge that I see in clinic that I might see a patient two or three years after their initial kind of presentation for pericarditis. The history's a little bit unclear, unknown if like they actually had any of the characteristic symptoms. So I really, you know, utilize cardiac MRI, at least in my practice in that recurrent pericarditis state, mainly because it helps me first off solidify the diagnosis if they're having symptoms classic for pericarditis, if there's inflammation on that cardiac MRI, then I know that I'm on the right track when we're talking about some of the more advanced therapies. Alternatively, if they're having the same symptoms that they've been describing and the cardiac MRI is completely normal, the CRP is negative, then I'm really thinking there's an alternative etiology for pericarditis. This doesn't sound like that. So especially at, you know, referral centers, I think it's a really useful tool since you're oftentimes gonna be removed from the initial presentation. And then more importantly, kind of to see if there's any other unusual kind of conditions that are going on. So, you know, recurrent pericarditis oftentimes is still an idiopathic process, but there are a small percentage of patients, you know, it could be, you know, less than 5% that might have a pericardial mass. They could have pericardial thickening related to some sort of malignancy or other unusual process. So that's where, you know, multimodality imaging specifically with cardiac MRI is really gonna give you that reassurance that you're dealing with an idiopathic process that although it's symptomatic for the patient, it's not something life-threatening like a malignancy. I've seen situations where there's been primary pericardial lymphomas that have been treated as pericarditis and then when we do the imaging they didn't have any evidence of any other malignancy anywhere else, which is a primary process. We don't see it as much from a, you know, TB or infectious situations here in the US but that that can have a certain look to it as well in terms of bacterial pericarditis. So more importantly, I'm looking at the anatomy to help, you know, rule out other issues. And then I'm also looking to see, well, is the pericardium still thick? If they're presenting with a recurrent episode, is there edema there to suggest there's active inflammation? So that's another component to it and there's early and late enhancement that we look for. That again, helps me understand how chronic of a process is, is it, and how active is the inflammation?

Dr. Malcolm Bell: Does it help you in making a diagnosis of constriction at that point? I mean some of these patients will go on to get constrictive pericarditis.

Dr. Praj Reddy: Yeah, no, that's actually a great tool too, especially from, you know, patients presenting with recurrent episodes of pericarditis. They might have some element of scarring that's happening in their, in their pericardium. So if I show that there's no inflammation, but they have constrictive physiology and we do some deep breathing cine images on the MRI to help see is that that, is that phasic bound still there? And oftentimes it's a lot easier to visualize than on an echocardiogram because you see that diaphragm coming down and you see that kind of septal bounce where you see the RV kind of being pushed into the lv. So it is really helpful, but more importantly in those constrictive cases, we're helping decide is there any active inflammation that would help this patient or you treat 'em with anti-inflammatories rather than referring them to one of our cardiac surgeons because it's at this point a scarred process.

Dr. Malcolm Bell: Yeah. So we'll get to that at the end here. But you, you made the point, you know, you're in referral center and you may not have seen the patient at the, the initial diagnosis. On the other hand, sort of listening to you though, it does seem as though that this would be still very, very useful for someone who did see the patient, you know, in their own in your hospital and now, now following them up, you know, months later or a year or so later, cardiac MR really does seem as though that would be the tool to to use. Would you agree with that?

Dr. Praj Reddy: Yeah,

Dr. Malcolm Bell: Probably preferred it over CT perhaps if you had to make a choice.

Dr. Praj Reddy: Yeah, absolutely. So I, I would choose cardiac MRI over ct. I mean if I have the CT data I'll certainly look at it, but I think MRI just gives you a lot more information in terms of chronicity active inflammation. There's ways that we characterize it. I'd kind of describe it akin to how we look at the myocardium where yeah, the CT can see everything from the heart perspective, but it just doesn't have the tissue characterization that the MRI would offer.

Dr. Malcolm Bell: Perhaps before we wrap this up, in terms then of what you're seeing on the cardiac mr and particularly, you know now in patients with recurrent pericarditis, how useful do you find this in terms of then determining, you brought up, you know, the question of anti-inflammatory agents and then of course now we have some more potent agents that we use in these, in some of these patients and then of course the surgical pericardiectomy. What are the things that you're looking for in a cardiac MR that are really going to determine what specific treatment you're gonna offer that patient?

Dr. Praj Reddy: Yeah, so it, it, it's certainly, you know, is kind of evolved over time. I think, you know, some of the data that we had from, you know, earlier studies were just observational, but what we noticed is that patients that had an MRI kind of guided strategy rather than just using CRP or clinical

history alone, ended up being on much higher doses of steroids. They had more recurrence of their pericarditis and, and there's, there's at least a signal in earlier kind of observational studies that an MRI guided strategy ultimately led to kind of a decreased amount of steroid usage, mainly because of all the side effects that come with it, muscle weakness, weight gain, other things. And, and then more recently with some of the data with the IL one agents, we've actually had a prospective look at it. The data for that is a little bit mixed. So what we can say for certain is that if there's more delayed enhancement or more inflammation on that cardiac MRI, the chance that the patient has a recurrence sooner is, is pretty high and it might push you to using an IL one agent rather than steroids alone. If you see a lot of delayed enhancement because that's indicating to you that this patient has a lot of inflammation, their likelihood of recurrence is high, they might not do it well with the long-term steroid strategy because this is gonna be a prolonged process. Now the thing that's a little bit harder to kind of figure out is do we wait until that cardiac MRI is completely normal? And the best evidence for that again, is from this prospective trial, it's a small number of patients that they looked at because we're only about a year or two out from the initial kind of IL one agent trials. So what you notice is patients that have traced pericardial enhancement tend to have a recurrence much later, but they're still having recurrences. So do we wait until this MRI is completely normal before we pull back on therapy that's left a little bit unanswered, but what I could at least say for sure is if there's a lot of enhancement there on that cardiac MRI, you better be a little careful before you pull back on on treatment.

Dr. Malcolm Bell: Yeah, those are very complex decisions that to make and obviously you need all the information that's possible with you that to help in making those decisions. Just gonna ask you one very quick last question here. Sure. Patient who's had an initial diagnosis of pericarditis has recovered and, and has had no further symptoms. Do you recommend any routine follow up with cardiac MR for example, at, at a certain point just to show that everything's going back to normal

Dr. Praj Reddy: If they're doing well, again, this is gonna be the majority of the patients. So like upwards of 70% patients with idiopathic pericarditis likely don't need any further evaluation. So if they just had an isolated episode, it's recovered, it's a relatively and, and no other structural heart disease, I think you could just let the patient kind of come back to you if they're having any issues.

Dr. Malcolm Bell: Right. Well, I wish we had more time, those really valuable information, this field has clearly evolved over the last year, decade or so. And, and really thank you so much for providing, you know, your observations and and clarity to this very important and sometimes very perplexing and troubling absolutely population. So thank you once again and again. Thank you to our listeners and viewers for joining us today.