

Announcer: Welcome back to Mayo Clinic cardiovascular podcast series, interviews with the expert. I'm your host, Sharonne Hayes. I'm a noninvasive cardiologist and vice chair of faculty development and academic advancement for the Department of Cardiovascular Medicine here in Rochester, Minnesota. Today I'm joined by Dr. Arashk Motiei, who is assistant professor of medicine, an interventional cardiologist here at Mayo Clinic in Rochester. And his expertise is in endovascular procedures. So today our topic is chronic limb threatening ischemia. So chronic limb threatening ischemia is a common problem associated with high morbidity and mortality. And Dr. Motiei will share with us contemporary management strategies for those patients who need aggressive and multidisciplinary evaluation and treatment to reduce the risk of limb loss and also to reduce their associated cardiovascular risk. Welcome.

Dr. Arashk Motiei: Thanks very much. Thank you for the opportunity. Glad to be here.

Dr. Sharonne Hayes: So Arashk, what are the key clinical manifestations of chronic limb threatening ischemia, and why should I, as a general cardiologist really care?

Dr. Arashk Motiei: Sure. Chronic limb threatening ischemia has two primary clinical presentations. The first is a patient who presents with gangrene or ischemic ulceration, typically involving the feet. Now gangrene is straightforward to diagnose. You see it, and you know what it is, ischemic ulceration in patients with CLTI typically involves the forefoot. It's anywhere along the toes. It can be seen at the calcaneus level. And a third common site of involvement is the lateral or the medial margin of the forefoot, which is kind of a watershed area between the distributions of the anterior tibial and posterior tibial arteries. But you should also bear in mind that if patients have ulceration from other etiologies, for example, neuropathic ulceration and diabetics, that ulceration may not heal well in the presence of a significant underlying PAD. So you still have to address the PAD in those cases. The second common clinical manifestation is rest pain. This is a type of patient who comes with a very characteristic history. They'll say that they have pain in their foot at night. The pain is worse when they're in a supine position. And many of them learn that if they dangle the foot off the side of the bed or get up and walk around, the pain gets better. We call this improvement in pain with dependency. They're relying on gravitation to pull flow under the foot, and when they place that foot in an independent position, they're helping with the perfusion of the foot. Some of them will in fact start sleeping in recliners because that's, that's one way they can get enough sleep without having to wake up multiple times at night because of pain. When we see patients with pain, the key differential is neuropathic pain. You can have a diabetic patient who can have PAD, but can also have diabetic peripheral neuropathy. So it's clinically important to distinguish between the two. And neuropathic pain is also more noticeable to most patients at night. It's not that it's not there during the day, but patients tend to have a higher degree of somatic awareness at night, and they tend to notice it more at night. But one key clinical feature there is that it does not improve with dependency. So when you take the history, you can distinguish between the two. Using those characteristics

Dr. Sharonne Hayes: Really helpful. I mean, we're trying to prevent limb loss and mortality. So what is the risk? I, I'm sure there's people walking around who have these symptoms that have not been, they may not even bring it up to their internist or their cardiologist if they're seeing one. So why, why should we be more aware? What are the

Dr. Arashk Motiei: Risks? Sure. I, I, I think the key message that I wanna deliver is that of all the patients that we see along the atherosclerotic spectrum, be it coronary artery disease, cerebrovascular disease, or peripheral arterial disease, patients with chronic limb threatening ischemia are at the highest risk of adverse outcomes, not just limb related, but also in terms of their general cardiovascular event rates. There are prior data that showed that the amputation free survival, which means patients survive to about one year with both limbs, is only about 50%. So of every four patients that we see, two will be alive at the end of the next year with both limbs, 25% of patients will lose a limb and another 25% will have a fatal cardiovascular event. There are more contemporary data for, for example, from the best CLI study, which was a comparison of endovascular and surgical techniques, which was recently concluded. What they showed was that a median followup of 2.7 years, the mortality was about 33 to 38% in these patients. And above the knee amputations occurred in about 10 to 15%. So there has been some improvement in the outcomes of these patients with improvement in revascularization techniques and also general preventative cardiovascular care. But we are still far from where we wanna be. We're, we've still got a long way to go.

Dr. Sharonne Hayes: Yeah. Well, thanks. So the patient comes to our office, maybe they give a, a, a history that is consistent or we see some signs on physical examination. What are some of the next steps in terms of diagnosing this?

Dr. Arashk Motiei: Sure. So the classic test that has been done is the ankle brachial index. One key message that I wanna deliver about the ABIs is that it, these are unreliable in patients with chronic limb threatening ischemia. We know, for example, from the impact deep trial, which was a trial that studied a drug-eluting balloon versus plain balloon angioplasty in patients with infra popal disease, that between 28 to 42% of patients with chronic threatening ischemia and angiographically proven infrapopliteal disease will have either normal or supernormal ABIs. So the key message is that if the situation clinically looks like CLTI, please do not rule it out if the ABI has looked normal, they can look normal and they can be deceptive in that regard. The second thing with ABIs is that they sometimes come back with a report of non compressibility on the vessels. If you see a vessel described as non-compressible, especially if it's a tibial vessel, you should bear in mind that about 50% of the times that vessel is going to have a hundred percent occlusion. So non compressibility, when reported, indicates a high probability of disease and, and needs to be evaluated further. The other test that we frequently do is something called transcutaneous oximetry, where we measure the oxygen tension in the foot at and in the leg at various levels to determine two things. One is wound healing potential, and the second is amputation level. But the key thing with TCPO2s again, is that there's a lot of overlap between patients who go on to heal their wounds and patients who do not heal their wounds. So it's really important not to use TCPO2s on their own as a sole determinant of wound healing potential or of a major decision like amputation level. You

have to look at some other clinical data. There are anatomic tests that can also be done such as duplex ultrasound, and CT angiography. These are excellent tests. You can localize the disease, you can see the extent of the disease. And especially with ct, you get a very detailed map of what's going on. And that helps you with operative planning. You can plan your entire procedure based on what the CT looks like. These are not needed in every single case. I think many operators, when they see a patient with chronic limb threatening ischemia, will go directly to angiography. And I wanna emphasize that angiography is a gold standard, and that any patient who is faced with the possibility of an amputation deserves to have an angiogram done as soon as possible. Non-invasive testing can be used to supplement all these things, but it should not delay the definitive procedure, which is angiography and revascularization.

Dr. Sharonne Hayes: Yeah. So, so if I heard you right, nobody, we, we should not depend particularly for a serious, a decision about amputation with a CT angiogram.

Dr. Arashk Motiei: Is it The CT angiogram can certainly help you plan and diagnose the issue, but it can occasionally obviate the need for an angiogram. But in most cases, I think a key decision like petition should, should only be made after you've done a full angiographic assessment and you've determined, you know, what you can do from a revascularization standpoint. And then based on that you can determine what amputation level to choose. So I think I, I, I wanna emphasize this because there are many patients in the US who currently will undergo a major amputation procedure without any form of vascular assessment. And I think, I think that, that, that needs to change. I think these patients definitely deserve an angiogram. That's a gold standard. And that's, that's, that's the one definitive way by which you can assess and treat these patients and take them to revascularization.

Dr. Sharonne Hayes: So Arashk I know that is really your practice right now and what you're trying to change. So give us sort of an overview of what you and others might have to offer in terms of revascularization of this limb threatening ischemia.

Dr. Arashk Motiei: Sure. So revascularization is possible in the vast majority of cases. I wanna emphasize that point. Most commonly these days, we accomplish this with endovascular techniques. It's also commonly done with surgical revascularization and appropriate cases. But I have to say that over the last, especially decade and a half, there has been remarkable progress that has been made with endovascular techniques and most complex lesions. I would say easily over 80 to 90% of them can be successfully revascularized, even if they're long segmented CTOs. Now, there is a subgroup of patients that we refer to as the no option patients. These are patients who have advanced infrapopliteal or below the ankle disease. These are patients who have either failed a conventional endovascular or surgical revascularization, or they simply do not have targets for revascularization. We, until recently, in the last few years, did not have any good strategies for, for this type of patient. But, and, and we also know that they have very poor outcomes from recent registry data. We know that such patients have about a 39 to 44% six month amputation free survival. However, we have a newer procedure called deep art serialization. In this procedure, we convert one of the posterior TAL veins and the lateral plantar vein into

a conduit for delivering blood flow in the foot. And we know from the promise trial that studied this, that we can expect approximately a 66% amputation free survival for patients when treated with this technique. And that's a substantial improvement with what we have historically observed. So I, I think the key point is that for most patients, revascularization can be done, and it is successful in salvaging limbs, especially when it's done in a timely fashion.

Dr. Sharonne Hayes: It sounds like you've got your work cut out for you over the next few years with these new techniques.

Dr. Arashk Motiei: That's correct.

Dr. Sharonne Hayes: And raising awareness about, I think what for many of us who, who trained before these techniques were available, kind of with a mindset, very much of we're heading toward limb loss. And I think what you've described for us is a lot of hope for, with these new techniques of both providing survival but also event free and amputation free survival.

Dr. Arashk Motiei: That's correct. I, i, I think a lot can be accomplished with current techniques. We are far ahead of where we were, you know, even 10, 15 years ago. For most patients, things can be done, but the key thing is that the treatment has to be done in a timely fashion. There is now an increasing recognition that there is a time to treatment effect for these cases. So the key message that I wanna deliver is that if you see somebody with a situation that looks like CLTI, please make sure that they see one of us who specialize in this as quickly as possible. And then our goal is to try to expedite their evaluation and revascularization as much as possible. Usually, you know, if there, if there are substantial delays for certain types of wounds, for example, a calcaneal wound, you, you have a very little window of time before that ulceration gets to the heel bone and then the limb is not salvageable. So I think time is of the essence. It's, it's really important to make sure that everything is done quickly so that these limbs can be saved.

Dr. Sharonne Hayes: And I suppose there is still a role for people like me doing preventive cardiology to make sure they're on stats and they quit smoking and all of those other important things going forward.

Dr. Arashk Motiei: Absolutely, as I, as I mentioned, one of the key problems that we face in these patients is the high, extraordinarily high burden of cardiovascular events. You know, mi strokes, death from cardiovascular causes. So I think the treatment of these patients does not end in the cath lab. The treatment goes well beyond the cath lab. And what you do outside the cath lab is, is equally, and I would argue even more important for their long-term health. So it's, it's really critical to focus on the cardiovascular risk factors, making sure that their lipids are controlled, making sure that they're on, on appropriate antiplatelet therapy, hypertension, diabetes, working on smoking cessation. All of these

things are critically important. We tend to get a little bit distracted and we focus mostly on the procedural aspect of things. But it's really critical to bear in mind that a lot of the mortality that we see is not specifically from a limb, it's from other things. And the only way to impact that is by, by very aggressive cardiovascular risk reduction strategies.

Dr. Sharonne Hayes: And there's a lot of hope on that end too, obviously with tools. Right. Yeah. Thank you so much for bringing this important issue to the forefront for us, because I think it may help people, particularly those who don't see this a lot, to think it's not how we did it 10 years ago. It's how it's the path forward.

Dr. Arashk Motiei: Thank you very much. I'm glad to be here. Many thanks for the opportunity.

Dr. Sharonne Hayes: This wraps up this week's episode of interviews with the Experts. I'd like to thank Arashk for joining me today and discussing this important topic. And we look forward to you joining us again next week for another interview with the experts. Be well.