

Transcript: Cardioneural Ablation - A Promising Treatment Strategy for Refractory Vasovagal Syncope

Announcer: Welcome to Mayo Clinic's ECG segment Making Waves Continuing medical education podcast. Join us for a lively discussion on the latest and greatest in the field of Electrocardiography. We'll discuss some of the exciting and innovative work happening at Mayo Clinic and beyond with the most brilliant minds in the space, and provide valuable insights that can be directly applied to your practice.

Dr. Anthony Kashou: Welcome to Mayo Clinic's ECG segment making waves. In this episode, we will explore the promising treatment strategy of cardio neuroablation for refractory vasovagal syncope. Joining us is a cardiac electrophysiologist who helps in managing these patients. We'll cover the essentials of vasovagal syncope, how it's diagnosed, and the various treatment strategies we have available, including this innovative use of cardio neuroablation and even pacemakers. Now, before we get started, let's introduce our guest today, and he's no stranger to this, this podcast. Dr. Guru Kowlgi is an assistant professor of medicine at the Mayo Clinic in Rochester, Minnesota. He completed his medical education at Maulana Azad Medical College in Delhi University in India. before pursuing further training in the United States. He finished his internal medicine training at the University of Connecticut and Cardiology fellowship at Virginia Commonwealth University. Thereafter, he completed his cardiac electrophysiology fellowship here at the Mayo Clinic in Rochester, and we recruited him to stay on staff as a Mayo Clinic scholar. Since then, he's been incredibly productive and he recently completed a Master's of Science program in artificial intelligence in healthcare. Dr. Kowlgi has authored well over 80 peer reviewed manuscripts, probably closer to a hundred by now, with research interests spanning from cardio neuroablation to the cardiac applications of artificial intelligence. He actively participates in the medical community serving on committees and editorial boards, and has earned several awards for his clinical and academic achievements. You can also find him very active on social media where he teaches me and his handle. You can follow him @therhythmdoc. Thank you, Dr. Kowlgi for joining us today.

Dr. Guru Kowlgi: Thank you so much for having me, Dr. Kashou. Always a pleasure.

Dr. Anthony Kashou: You know, you know, I, I always learn from you, you, we've done episodes with you in the past, but this is a really interesting one, especially just given, you know, where you've carved out a, a specific interest in the space that, you know, I hadn't really heard of until I started speaking with you, but now this application of cardio neural ablation. But before we get there, let's start with vasovagal syncope. Help our neuro audience understand what this is just to the, the layman.

Dr. Guru Kowlgi: Of course. So syncope is a condition where the blood supply to brain is affected and that leads to people passing out. Now, you know when that happens because of a heightened vagal tone. So the vagus nerve is a nerve that supplies the heart among other organs. It is part of the autonomic nervous system, which is supposed to get active when you're resting. So it brings the heart rate down, brings the blood pressure down, but if it starts happening in other situations, so you have a high vagal tone, a resting bradycardia slow heart rate, but when you don't expect the heart and blood pressure plummet and cause you to pass out, that is what is called as vasovagal syncope. And you know, these patients oftentimes will have certain triggers. It may be triggered by certain emotional stressor, sometimes it can be triggered by pain or prolonged standing. So when you know they have these classic triggers and then they pass out, we call that vasovagal syncope.

Dr. Anthony Kashou: Okay. Okay. So there, there tends to be some classic trigger. I'm sure that that prodrome can be short or long, and this seems common. We think, you know, generally think of it benign, at least from my learning. But how do we actually diagnose this? Because it certainly can be troublesome to just passing out. Yes,

Dr. Guru Kowlgi: Yes, absolutely. And then you mentioned a couple key things there. So it, most patients with vasovagal syncope will have a prodrome, so they'll have a few seconds to a few minutes of warning symptoms. So these symptoms can be anything like flushing and like hot sensation. They can have some dizziness before this happens. We call that aura before the actual syncope episode happens. And because it gives them some time, and especially for patients who keep having recurrent episodes with specific triggers and they get these aura symptoms, it gives them time to maybe sit down if they're standing lie down, if they're already sitting down to prevent a passing out spell. So that's how it sort of becomes benign because they're able to prevent the fall in a way. And diagnosing this is, is really based on a very good history and, and for any kinda syncope history is paramount. So it's important when you, you're seeing a patient with syncope to ask all the right questions. So one, when did this start and how long does an episode usually last if they've passed out, if they have someone who witnessed the episode, then it's important to ask them, you know, when they fell down, how long were they out for? Once they hit the ground, did they get up right away or were they out for 20 minutes, 30 minutes? And after they woke up, were they back in their senses or did they have sort of what we call a postictal phase where they had a prolonged period where they were confused? So these are key determinations for, you know, whether this is a benign vasovagal syncope episode or is there a more sinister cause? And then we have to ideally rule out if there's any concern, you know, if any of these factors are missing. For example, if the patient had no prodrome and passed out suddenly, especially during activity, then we must do a workup to rule out any structural causes of syncope. From a cardiac standpoint, you know, we have to think about things such as arrhythmias or hypertrophic cardiomyopathy or things that cause impaired outflow, impaired blood going out of the outflow tract. So if it's hypertrophic cardiomyopathy, thick muscle in the chambers, then that can cause some obstruction blood flow and can cause people to pass out From an electrical standpoint, both fast arrhythmias and slow arrhythmias can cause syncope as well. So generally history will give us a clue about whether we

should be more concerned or not and that drives further investigation once we've rule everything out. And if the history sounds like vasovagal syncope, then that's how we make a diagnosis.

Dr. Anthony Kashou: It's good to hear that the history is still paramount. You know, it just as they teach us this in medical school, I, I mean it's so key, you know, from something cardiac versus, you know, vasovagal or something else. But you know, say you diagnosed someone with vasovagal syncope and you say, you know, the next step isn't, what do I do with it? You know, what is the prognosis of this? What available treatment strategies do you have at your disposal?

Dr. Guru Kowlgi: Yes. And you know, it's, the first thing really is to make sure the patients are well educated about why this is happening and, and because you know that there can be certain triggers, sometimes the easiest can be to avoid those triggers if they're avoidable. But let's say they cannot avoid those triggers, then it's important to recognize these symptoms. And that can be specific to every patient, like when they have these symptoms, then take precautions and try to prevent a fall from happening. As I mentioned before. Now let's say they're still having symptoms, what they can do is they can sort of almost curl into a ball, make- clench their fist and increase the afterload. So make it, make it such that the blood pressure goes up and that can prevent a fall as well. So these are the first steps when patients are having recurrent episodes. Beyond that, you know, we want them to be hydrated. So we, we tell them to stay on top of fluid supplementation and salt supplementation. Again, that increases the blood pressure. If they're still having episodes, we can give them medications to achieve the same. So there's certain medications like medodrine, which cause vasoconstriction and increases blood pressure or fludrocortisone which is also another medication to increase their blood pressure. There are certain other medications which are less studied, but then we can try a few things to get their blood pressure up. Now, let's say patients are still having these symptoms, despite all of these, there are guidelines in place where they save the patients over 40 years of age and has tried all these maneuvers and still having symptoms, they can be eligible for a permanent pacemaker implantation. Now, while this is part of the guidelines, we have seen unfortunately, many patients who end up with a pacemaker and yet have symptoms because vasovagal syncope can happen in a few different ways. The two main mechanisms are either a drop in heart rate or drop in blood pressure, and some patients can have both. So if it is primarily a heart rate drop, then those generally respond well to a pacemaker because that prevents the heart rate from dropping significantly. If it's a predominantly blood pressure drop that is more of a blood vessel phenomenon and having a pacemaker in the heart doesn't always fix their symptoms. So pacemakers are not a perfect solution. So that brings me to our newest treatment option, which is a kind of catheter ablation where we can put catheters inside the heart and actually target the areas where the vagus nerve touches the heart or innervate the heart. These areas are called ganglia or ganglian plexi, which are located on the outside of the heart, their collection of nerve cell bodies. And once we find them, we can ablate them, meaning burn them to damage these ganglia and prevent a vagal response. So patients can still have all those classic triggers, but they won't experience a drop in their heart rate or blood pressure. So that's kind of what, you know, I've been interested in and, and certainly something that offers benefit to over 85 90% of the patients we've done this for.

Dr. Anthony Kashou: So say you've done some of these preventive strategies, you've done, you know, the fluid intake, sodium intake in some medications, how long is it usually that you'll trial those until you, you proceed with some of these more invasive options?

Dr. Guru Kowlgi: Yeah, so I know I probably have some kind of selection bias in my practice because by the time the patients come to me, most of them have tried this for a few years or sometimes a couple patients tried, so 20 years before they came to see me. But if I'm seeing a patient for the first time, I would probably try it for at least three to six months, just see if it is something that lifestyle measures can fix. Because while I love doing ablations, it's always good to try non-invasive methods to see if we can help the patients. But it also depends on the patient and, and their scenario because I, I did have one patient who works with heavy machinery who's passing out on a daily basis and yes, you know, he was trying to stay hydrated, but then in, in that case, any high risk occupation, the stakes can be high. So if he passes out while operating something and injures himself, that is a problem. There were some other patients who had passing out spells and their prodrome was very short. It was like two or three seconds and then they couldn't prevent their falls and this guy fell and hit his head and had a brain bleed. So, so when we have some of these extreme scenarios, then I think it's safe to go to the more aggressive routes right away. But if it's more benign, if a patient can reliably tell that they have some time before their syncope happens, then maybe at least three to six months of these conservative measures or reasonable.

Dr. Anthony Kashou: Well, today's discussion, we explored vasovagal syncope, including what it is, how we diagnose it, and we looked at a lot of various treatment options that we have available from some of the preventive measures to all the way to the invasive ones, pacemakers and even cardio neural ablation. Now Dr. Kowlgi continues to lead this way here at Mayo Clinic and we appreciate his willingness to teach us about this, share his expertise on the this growing field and topic, and we hope to have him back to share new advances in this exciting space. Thank you again for joining us today.

Dr. Guru Kowlgi: Thank you so much.

Announcer: Thank you for joining us today. We invite you to share your thoughts and suggestions about the podcast at cveducation.mayo.edu. Be sure to subscribe to a Mayo Clinic cardiovascular CME podcast on your favorite platform, and tune in every other week to explore today's most pressing electrocardiography topics with your colleagues at Mayo Clinic.

Announcer: This has been a Mayo Clinic podcast.