

Who Deserves EP Ablation

Announcer: Welcome to Mayo Clinic's ECG Segment: Making Waves, Continuing Medical Education podcast. Join us every other week 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. Kashou - Welcome to Mayo Clinic's ECG segment, "Making Waves." In this episode, we'll explore EP ablation. We're excited to have back with us, Dr. Guru Kowlgi, our esteemed guest and expert in this field. Today we're gonna focus on understanding the process and indications for EP ablation, exploring the reasons for why some patients might need multiple ablations, and then discussing some of the potential complications associated with the procedure. Dr. Kowlgi, an assistant professor of medicine at the Mayo Clinic in Rochester, Minnesota, completed his medical education at Maulana Azad Medical College and Delhi University, India before pursuing his further training here in the United States. Now, he finished his internal medicine training here at the University of Connecticut and his cardiology fellowship at Virginia Commonwealth University in Richmond, Virginia. Subsequently, he completed his clinical cardiac electrophysiology fellowship here at the Mayo Clinic in Rochester, Minnesota, and his Mayo Clinic scholar then recruited him and he stayed on staff where he's now recently completed his Master's of Science program in artificial intelligence in healthcare. And so that's a growing field and we're excited to sometime have him back to talk about that. Now, Dr. Kowlgi has authored over 75 peer-reviewed manuscripts and they continue to come out, with research interest spanning from cardio neural ablation 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 on social media. He's highly active and puts a lot of great content out there. So find him and his handle on Instagram, and I think even Twitter, is @TheRhythmDoc. And so thank you Dr. Kowlgi for joining us again today.

Dr. Kowlgi - Thank you so much, Anthony. It's a very kind introduction. I'm very happy to be here.

Dr. Kashou - Well, last time we had you, we talked about WPW in athletes. Now we're back and we wanna talk about EP ablation, so a little different, but kind of where we almost left off with that management with those patients. And let's go to the basics, even for myself, what is an EP ablation, as we say it, and how exactly do you do this every day?

Dr. Kowlgi - Yeah, it's a great question, one we get asked a lot by patients and providers alike. So ablation is the technique of applying energy to tissue in order to render it inexcitable. So in our world, in the cardiac world, in electrophysiology, we deal with patients who have these arrhythmias or abnormal rhythms in the heart, and then oftentimes, we can identify certain parts of the heart, certain pieces of muscles, certain tissue that are contributing to the arrhythmias. So what we do is we put catheters inside the heart and then we do this either through groin veins or groin arteries. Sometimes we go from the neck veins, and then we go inside the heart, find the

area where that is responsible for the arrhythmia and deliver energy with our catheters, and that process is called ablation. So as a result, we can hopefully treat some of these patients and minimize their symptoms and improve their quality of life. So just for completeness, in the past, a lot of this was done with open surgical techniques. So you could get a chest cut open and surgeons would go in and, using surgical techniques, would create lines of block, lights of electrical block inside the heart. And more recently, they used similar catheters, except with an open chest technique to perform these ablations.

Dr. Kashou - And so we've come a long way, it seems. And what a growing field this has really become. It's incredible. And so, we have this excitable area, you ablate it, but who do we do this for? What are the indications and maybe, who are the typical patients you see?

Dr. Kowlgi - Great question, and it is one that is a broad question, because the indications can vary depending on the arrhythmia we are treating. But I'll focus on some of the big concepts. The main thing we do in the EP lab is try and improve people's quality of life. So if it is someone with atrial fibrillation, which is an irregular arrhythmia in the top chambers of the heart, be it premature ventricular contractions, extra beats in the bottom chamber, be it ventricular tachycardia, fast rhythm disorder of the bottom ventricles, bottom chambers, what we try to do is do this ablation to get them feeling better, because a lot of these patients feel symptoms like palpitations, they can feel their heart racing, they can feel shortness of breath, they can get fatigue, and certain extreme scenarios they can pass out and even have certain cardiac arrest. So in order to improve those symptoms, we perform this ablation. And a second bucket of patients would be those that don't necessarily feel the symptoms, but we know the arrhythmias can cause some damage to their heart function. So one example would be atrial fibrillation going at a fast rate can cause something called tachycardia-induced cardiomyopathy, where the bottom chamber function declines over time. In those patients, even if they don't feel the symptoms of it, we're still more aggressive in offering them rhythm control approaches like ablation in treating them. Another example would be patients with premature ventricular contractions, extra beats in the bottom chamber. Sometimes they don't feel them, but then the PVCs are happening more than 20% of their beats. So when there're high frequency coming from certain areas of the heart, they can cause cardiomyopathy or weakening of the heart muscle. And those are the patients we target for ablation as well. So as you can see, it's a broad range of indications, but generally, symptoms or any downstream effect to cardiac function would be the main reasons to get an ablation.

Dr. Kashou - Very interesting. And I know the guidelines are evolving and there's sometimes class one indications for a symptomatic AFib, but you mentioned the three buckets are quality of life, AFib, atrial fibrillation, especially that's potentially tachycardia-induced component that can put people at risk of even heart failure and cardiac dysfunction, and then that third list of the ectopic ventricular beats. Are there patients that actually have to have this ablation more than once and why would they have to do that?

Dr. Kowlgi - Yeah, that's a great question. And oftentimes, when patients come to our clinic for the first time, they ask that question that, "Hey, my friend had three ablations. Does it not work the first time? Or why do they have to keep coming back?" And a lot of it depends on the arrhythmia and how challenging it is to ablate, and sometimes just the nature of the disease. So I'll take the example of atrial fibrillation, because it is the most common arrhythmia we ablate.

So what happens there is we are not getting rid of the AFib per se, but we are minimizing the burden of AFib by trying to get rid of triggers that cause AFib, that are most likely to cause AFib. And most often, these are the veins that bring blood from the lungs back to the heart. These are called the pulmonary veins. So we burn around them to try and minimize the chances of those triggers causing AFib. But there can be other triggers in the heart and sometimes that ablation lesions are not durable where they last for years. So over a period of time, there can be gaps that form the ablation lesions and we may need to do a touch up. I tell my patients that it is not a one-time fix. It's like a car that requires servicing every few years. If you get an ablation and you need a touch up in a few years, that is not entirely unexpected. So don't be swayed away from an ablation because you may need more than one. The other category would be patients where it's just tough to reach arrhythmia. So sometimes you can have PVCs coming from deep within the heart muscle. So you put the catheter on the inside of the heart the first time you do the ablation, but you're not able to get across the thickness of the heart muscle. So the next time, you may have to go on the outside of the heart to achieve that result in a better way. So many different reasons, be it technical challenges, the location of the arrhythmia or the nature of the arrhythmia that can make patients require more than one ablation.

Dr. Kashou - So we've kind of highlighted EP ablation, what you do, why it's done, some of those indications, and who has to come back at times, but some are wondering, and even myself, and you probably get this a lot, what are the complications that you kind of see from this? I know you said it's become less invasive, but what complications may exist?

Dr. Kowlgi - That's a good question and an important one. And yeah, while we become less invasive, it is still an invasive procedure where you put catheters inside a beating heart, right? So there are potential complications. So if I go in order of what we do first, we induce or put the patient under sedation with anesthesia. So there are complications from medications, from anesthetic medications that can happen. But then, more specific to what we do is we put catheters in the groin veins, for example. Anytime you put a catheter in a vein or an artery, there's a risk of bleeding. So there can be bleeding complications like hematomas, there can be complications where damage to the blood vessels happen, like pseudo aneurysm or arterial venous fistulas, connection between the artery and the veins. These are rare, happen less than one to 2% of the time, and if they happen, they're mostly benign and then it can be fixed. As you put catheters inside the heart, oftentimes we are giving patients medications to make their arrhythmias more inducible. So their heart's beating fast, they'll be pacing rapidly and the catheters are located right at the wall. So when the heart beats, the catheter can go through and through and cause a perforation or you can have bleeding around the heart muscle called pericardial effusion. When that happens, the key is to recognize that promptly and then to drain that with a needle, and then may increase the length of stay for the patient, but generally, something that we can manage pretty well. It's very rare to require open heart surgery to fix a perforation like that, that happens in the EP lab. But then, the other damage could be collateral damage, depending on where we are ablating, 'cause sometimes we are close to the conduction system of the heart where damage to the conduction system may require a pacemaker for the patient. Again, a low risk, usually less than one to 2%. Or we are close to the coronary artery is where, if we deliver too much heat, too much energy, we can cause an iatrogenic myocardial infarction or cause heart attack on the table. So the key to preventing all of this is to know that these can happen and then know specific locations in the heart where they're more likely, and then to keep all our senses open just to make

sure we identify them quick and then treat them if they happen. Lastly, anytime you put catheters inside the heart, we say there's a less than 1% chance of stroke, heart attack or death. It sounds scary, but no matter the best technology we use, there can be tiny blood clots that form on the catheter that can lead to these complications. They're extremely rare, so again, we tell patients not to be swayed away from an ablation, especially if the risk benefit profile makes sense if they have symptoms or other conditions that need to be treated with this.

Dr. Kashou - Well, thank you. And maybe that wasn't the best way to end there, with the complications, after we highlighted some of the indications and benefits. But I think, like you said, these complications are low risk, especially in the right operators. And it's usually a nice collaboration within the team here. So as we conclude our discussion, we've unraveled the high level components of EP ablation. Dr. Kowlgi's told us about some of what the procedure look like, how it's done, some of these indications, and that was kind of more high level, and then, some of the factors we have to think about for those that may require multiple ablations, and then, as we ended with the complications. And so hopefully, this broadened your knowledge, and certainly it helped me understand this better of what the insights in the world of EP ablation look like. Dr. Kowlgi, we appreciate your invaluable expertise and insights on this topic. Make sure you follow him @TheRhythmDoc on social media. You'll certainly learn a lot, and he's someone that I look up to and is well respected. So thank you for joining us today and we hope to have you back again.

Dr. Kowlgi - Thank you so much. Take care.

Dr. Kashou - 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.