

## Improving ECG Literacy

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" We're so glad you could join us. Today we have an exciting episode planned for you as we discuss ECG literacy, including various approaches to teach and learn this important skill. We have an expert discussing joining us today who's gonna help us better understand of how we can actually improve ECG proficiency. So let's get started here. The ECG remains a vital aspect of patient care across a broad range of specialties. In fact, it is one of the most performed diagnostic tests in modern medicine. However, variability and interpretation accuracy and skill level exist across all medical disciplines and training levels. In this episode, we're gonna look at ECG literacy, including practical, teaching, and learning approaches. We're fortunate to have one of the best ECG educators I know, Dr. Adrian Baranchuk, to discuss this further. Dr. Baranchuk is a professor of medicine at Queens University in Kingston, Ontario, Canada. He serves as the editor-in-chief of the "Journal of Electrocardiology and "JACC" in Spanish. He is the past president of the International Society of Electrocardiology, the current vice president of the The International Society for Holter and Noninvasive Electrocardiology, and he's the president-elect of the Interamerican Society of Cardiology. His contribution to the medical field is undeniable by anyone, with more than 600 authored medical articles, 57 book chapters and counting, and 10 books. It's amazing all he's been able to accomplish and continue. Dr. Baranchuk, what a true honor to have you back with us. Thank you again for joining.

Dr. Baranchuk: Thanks, Anthony. It's a real pleasure to be with you again and I am delighted to have the opportunity to chat with you.

Dr. Kashou: Yeah, so, well, I think this is, you know, between both of us one of our passions, and that's teaching, and of all the teachers I know I definitely have you amongst the top three in this field. I wonder what teaching methods should we apply to ECG interpretation in learning this skill? Is there a best way in... What are your thoughts on these?

Dr. Baranchuk: Well, thank you, this is a quite interesting question. And let me conceptualize how do we approach ECG teaching and education? The two ways that you can approach different type of students that are interested to get involved in the world of electrocardiology is through two different mechanisms and approach. The first one, we call it pattern recognition, and I'm going to use a simple example, right? So I meet with you today. Now, we don't see each other for three months and I'm walking in Rochester. And I see that face with those glasses, that wonderful brown and blue tie. And I, without even looking at you in detail, I quickly recollect, I know this guy. This is Anthony Kashou from the Mayo Clinic. How do I know that? Because I am reconstructing a pattern that is in my hard drive of my brain, where I saw you for a 15-minute period of time for this interview, and I can recollect who you are when I see you three months later. That is called pattern recognition. In electrocardiology, sometimes the life of the patient

depends on how quickly and accurate we can establish a pattern recognition. For example, if you have a heart attack because one of your coronary arteries is being occluded and you may die if I don't do diagnosis quickly, I look at the ECG and I say, this patient is having a heart attack. He has an anterior myocardial infarction and needs his artery to be open in the next 90 minutes. That took 10 seconds. How is it possible? Because if we teach the rules of pattern recognition and we insist and we teach again, and we show it not once, but several times until the student can incorporate that into his own hard drive in his or her brain, then you can establish a series of patterns that these people is going to be able to recognize upon seeing it again weeks, months, or years after the first exposure. So the first rule then, or the first teaching approach, is the so-called pattern recognition, but that does not make the trait for all the different diseases that we need to recognize by using the simple electrocardiogram. The second mechanism is called inductive deductive mechanism, where I present to you now an ECG, but you incorporate in your analysis the clinical context of what that patient is experiencing. Is the patient presented with high fever, vomiting, and diarrhea? Well, what I'm seeing is taking me to think that some metabolic disorders associated with that are responsible for those changes. Or if you show me a very rapid rhythm that presents with narrow signals rather than wide signals, then I start thinking in an algorithm of is that rhythm not only narrow, but regular? Yes, it is. Okay, I have ruled out something very common called atrial fibrillation. Is the sequence of activation the normal one, or now the lower chamber is beating before the upper chamber. That allows me to rule out other tachycardias and concentrate in one or two where I can treat the patient and then retrospectively go back to the ECGs and be absolutely sure on what is the name of that clinical presentation. So as you can see, I am not applying my pattern recognition. What I'm applying is, all right, if the patient presented in this way or in that way, and I can establish an algorithm to differentiate different diagnosis, then I can arrive to the final accurate diagnosis by applying an inductive deductive mechanism. So if we concentrate in teaching using one of these two methods, then we can discuss, Anthony, and I know that this is an area of your personal interest, on how to reach our audience. But we should try to keep in mind these are the two big principles in ECG education.

Dr. Kashou: Yeah, I really like that the inductive, deductive aspect using the clinical acumen to get to what is the most likely diagnosis, especially in differentiating some of those, say wide complex tachyarrhythmias, and then using also the pattern recognition. And I've always felt that pattern recognition is certainly one way. It usually takes time though, seeing thousands. And you're very kind to seeing me, you won't miss that, but it's taken me a while, I would say a long time to start to recognize some of those subtle patterns. And I think that comes with just, as you mentioned, your growing interest and passion and learning through it, but those are two really fundamental approaches. I really like how you laid those out. As we start to learn, and that's kinda building the foundation, there's the thought of the erosion of the skill. In this way, the ECG interpretation skill, as we say as trainees go through different aspects, we go through a cardiology rotation, we're perfect, we're back up to speed with our ECG skills. And then we go to hematology, oncology, rheumatology, all these different specialties and the skill starts to fade. Or it's you're in general practice and you're just not seeing enough ECGs. Do you see any value in continual medical education in this skill?

Dr. Baranchuk: Another excellent question. And years ago, we proved that sometimes med students of the last year of their career do perform better in an ECG interpretation than a PGY, a

resident of the second or third year. How is that possible? Because as you said, now the resident is exposed for months and months to other specialties that are not cardiology without seeing ECGs, and there is an erosion of the previously acquired knowledge. So how do we fight erosion? And that is with permanent exposure that you very, very smartly posed as continual medical education. But continual medical education in 2022 is a different concept than what it was in 1990s when I was a trainee, because to me continue education meant go again and again and again to the same page of the same book to see the same image. And we do know that they're not two ECGs from two different patients that are identical even when they are having the same condition. This is when the new generation of ECG teachers, and I do include you within the top three new educators on ECG, is that the digital platforms allow us to be exposed not to one, not to two, but to hundreds, hundreds of ECGs showing exactly the same condition, but in different patients. And then the access to that type of education by mobile devices, as your phone, allows to a sort of semipermanent exposure that avoids the so-called erosion of knowledge. It is very interesting for me as a mentor of different students across the world to receive a picture of this individual in the beach enjoying a sunny day with his cell phone looking at, for example, just to mention one, the EKG guide platform and say, "Dr. B, I'm still practicing while I'm on vacation." And I have to convince them and say, hey buddy take few days of vacation. That's perfect to recharge batteries and forget about the phone. "No, no, but look at this ECG. Isn't it this great?" So this is an example to show you how students want and need to be educated today. And the digital platform to educate on electrocardiology not only proved to be an excellent tool in the more strict way to teach ECG, but also allows a more permanent exposure avoiding knowledge erosion. And I think that that is a change in the strategy that is here to stay. So today we're still shaping it, improving it. How can we digitally evaluate knowledge? How can we use digital platforms to help people taking exams to be credited by the different institutions across the world? Yes, there's a lot of work to do. However, something has been achieved. The young generations want to learn in digital platforms and the books have to be accessible in both ways, for those like me that still enjoy having the the paper copy in their hands and the people that could feel more comfortable by acquiring knowledge through digital platforms.

Dr. Kashou: It's really... You do think of the traditional learning ways and over the the last few decades we've seen kind of the evolution of, and probably even accelerated by COVID in us, is more of the the digital learning and almost a merger of these two different digital and traditional ways of learning. And it's really interesting for you to say that. You're right, I think there's a lot of interest. If we on Twitter, we see a lot of people sharing a lot of good content, learning from each other, encouraging each other, and just always feeling like they're plugged in. Maybe that's the way we engage learners today, and I know you're a very active part of that community. And speaking of which, there's this ISE, the Young Community. The Young Community of that whole organization that you started. Can you share a little bit about that community and why you started that?

Dr. Baranchuk: So during my presidency of the ISE, that stands for the International Society of Electrocardiology, what I've noticed is that at that point I was the youngest. And I do have full respect, admiration, and I keep learning from the people that has paved the way that now I trans, right? But a renovation of the individuals bringing us their needs and desires on how they want to be educated, it became mandatory to me, because you can be an excellent teacher, but if you don't adjust to the needs of the person that is going to be educated, that communion may fail. I'm

not saying transferring responsibility is still in the teacher. There is a gradient of knowledge, right? The teacher knows more than the student, but not necessarily knows how to better reach the student if you're not eager to integrate the student views into your practice. And that is something that don't believe that was easily accepted by the whole community. There was a fight to demonstrate that having a Young Community was going to inject gas in our cars, and it was going to give us even more energy to explore, investigate, and some time master the way of educating people in the platforms that they want to be educated. So with that in mind, we made a call to all these experts, to provide us with students that were thought to be the most motivated at that point of time. And we created this Young Community with representatives from North America, Latin America, Europe, Asia. And what we did is to discuss different avenues of our profession. So one of them was, how do you want to be educated? How are you learning ECG? Are you buying the traditional books, or you're going into platforms? Then we realized that each one of these individuals had a lot of research potentially. Okay, how can this group potentiate what you want to do as a researcher? And then the third topic was innovation. Can we create a system where your ideas, rather than being dismissed, because are coming from a young mind, are facilitated and potentiated? And the results were amazing. So very quickly, very quickly, the society, the Young Community starts growing up. Now we need to have a sort of entry criteria. So who do we accept and when do you graduate from this group? And then the same group came up with how to transition the leadership of this society. So it moved from Turkey to Argentina. And now, I apologize, I don't know who's going to be next, because they have their own identity and they don't need farther permanent supervision. It is true that they come to some of us saying, "We have this idea. We want to implement it this way. We need somebody with more experience than us to help us out," right? Either connectivity or seeking for funding or aspects of investigation or science where a more experienced guy can help out, right? But the cherry of the cake is about four to five weeks ago. They hosted, they hosted, the International Society of Electrocardiology, an International Society for Holter and Noninvasive Electrocardiology, which we call the ICE meeting, is International Congress of Electrocardiology. It was completely designed and hosted by the International Society of Electrocardiology Young Community. They designed the platform. It was all virtual. 27 countries represented during two full days of ECG discussions. In each round table, at least 50% of the speakers were from the ISC Young Community. And something that fills my chest with pride is they look after DEI, diversity, not only gender diversity, but also age diversity. On the same round table you have a Bayes de Luna from Catalonia, and you have a med student from Istanbul in the same round table sharing experiences and views from generations. You have gender equity and you have inclusiveness. There were several people as speakers that I have not met ever in my life and I was shocked on how good they were. And I am one of those guys that think that, but you know everybody in this field. No, no. Because if you're talking a PGY2 cardiology from an institute in Germany, I don't know this individual. And it happens that that individual for the last two years has been researching it on an area that I had no idea. And now I can be educated by this individual. So again, I extend my call to the young people, young people like you Anthony, to become ECG investigators, to become ECG teachers. The power of the young individual teaching cannot compare to anything.

Dr. Kashou: It's really remarkable what you've done and not only in your career in the field Lyme carditis, we've spoken about before in this, and just your ability to empower such a Young Community to make them feel that they're a part of the process. And I've always felt that way

speaking with you. I do wanna give a chance, how could others join this community and learn more about it?

Dr. Baranchuk: So basically there are two easy ways to get engaged. One is via social media, identifying the ISE Young Community hashtag and start following and see how the activities are promoted there. The second one is going to the International Society of Electrophysiology website, where all these activities are being announced. And there are free webinars. When I say free access, there's no a need to pay to attend these sessions, where you can either participate from the audience, or you can establish links and networking with the speakers and with the ISE Young Community. I think that these are the two best ways to get closer, and the cool thing is there's room for everybody. So if we are lucky and some med students and internal medicine or cardiology residents are listening and they are interested in this, there's room for everybody

Dr. Kashou: It's amazing. And so both on Twitter following the hashtag and the website, we'll have to be sure to check those out and follow all the work that the Young Community is doing. And thank you for really empowering that, because it's gonna make a difference and just encourage more to want to get involved in all of this. The ECG-

Dr. Baranchuk: Thank you, Anthony.

Dr. Kashou: The ECG remains an essential aspect of patient care. Even with technological advances this skill will continue to remain fundamental to the practice of medicine. Educational approaches that merge these traditional and digital learning approaches will be critical in meeting and maintaining competency standards for all medical professionals. Dr. Baranchuk, thank you for sharing your insights into this important skill. It's clear you've given a lot of thought to it. Thank you for your continued dedication to the whole Young Community and really improving ECG literacy across the world for all medical professionals. On behalf of our team, thank you for taking the time to join us today.

Dr. Baranchuk: Thank you for having me here today. Thanks.

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