

Recognizing the Longstanding Concerns in ECG Interpretation Proficiency

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." For decades, concerns have been made about ECG interpretation proficiency amongst healthcare professionals. Today, we're gonna dive into some of those longstanding concerns. We're fortunate to have Dr. Adam May back with us today. He's a cardiac intensivist and assistant professor of medicine at Washington University School of Medicine in St. Louis. If you didn't get last episode of the beginning of this series, make sure you go back and listen to that. We talked a lot about foundational importance of ECG and why it's an essential skill for the healthcare professionals to know about and how it impacts patient care, and the potential consequences of inaccurate interpretation. So that's just a plug to go listen to that one if you haven't. We're gonna continue on in this journey and talk about some of the concerns. And so Dr. May, thanks for joining us today.

Dr. May - Thank you, Anthony, pleasure's all mine.

Dr. Kashou - Well, the first one we kind of laid out the foundation, we're gonna keep building on this and through the series. And we've talked about, and we see this firsthand, that not everyone has the ability to competently interpret an ECG at an expert level, and it'd be very easy for us to blame them. But apart from those concerns, I wanna dig a little deeper. So before we get there, how long do you think these concerns about inadequate ECG interpretation proficiency amongst medical providers has really been raised?

Dr. May - Yeah, Anthony, the short answer to this question is a very long time and by the way, having inadequate ECG interpretation competency is a very common thing. So if you're a healthcare provider that struggles with it and knows that they should get better, don't feel bad about it. This is common and very nearly ubiquitous amongst healthcare professionals, and this issue has been going on for decades. Concerns about ECG interpretation proficiency have been raised dating several decades back. Early acknowledgements go in the late 20th century highlighting proficiency gaps amongst practicing physicians, and kind of the bottom line is that it's a persistent challenge. And despite advances in medical education, technology relating to ECG interpretation and its procurement, these concerns are gonna persist well into the 21st century and at present and in the future, it's gonna be a point of discussion amongst the academic community and also medical educators. Now this problem is a big problem. It's a common problem. It's been around for a long time, and there's a reason for this. There are certainly key challenges and limitations in sort of tackling this problem. And one of the things that I have observed with you, Anthony, is sort of the assessment of ECG interpreter competency and proficiency. So my question to you, Anthony, is what are the key limitations and challenges that you find in assessing ECG interpreter proficiency?

Dr. Kashou - Yeah, no, that's a great question and it has been going on for a long time, the limitations raised, as you mentioned. Probably longer than we have, but we do have reports at least half a century, at least 50 years that we're seeing these reports coming out of just the lack of proficiency, and as you mentioned, it's here to stay. We're seeing this renaissance in this world and so we better hold onto it and really figure out how we can solve this problem. And when I think of the key challenges and limitations and there's probably many that I won't be able to think of and that I'll miss, but one, I think it's important to note the subjectivity of ECG interpretation. It isn't just a science, it's an art and like all arts, it's the subjected to individual interpretations. The way you see it, the way different ones will see it will be completely different, okay? And so some might perceive and interpret an ECG the same way, but maybe differently. Those that are maybe a seasoned cardiologist or emergency medicine doctor that sees ECGs every day, maybe it's more the same. But there is something to say about that pattern recognition and that art of recognizing those patterns that comes over time, and so I do wanna mention the subjectivity that comes and maybe what makes teaching this a bit difficult. There's also a diverse number of findings, right? There's a lot of things that we talked about last time from rhythm disorders, ischemia, structural abnormalities, a number of different things that we're expected to learn and because there's so many different findings, it's not something you're gonna learn in five hours. This is something that is gonna take diligent training, testing, and then also repetition, practicing the skill, really developing it so you can add that to your toolbox because we know almost all of our patients are getting ECGs that are coming in with chest pain at the very least and some athletes are getting them yearly to just monitor them, and so the diversity of findings is really key thing. So we mentioned subjectivity, so many findings, and perhaps a really important one is just the lack of standardized testing. One of the major hurdles in assessing ECG interpretation skills is the absence of a universally recognized benchmark or gold standard test that can be deployed across medical studies because we know so many of our medical professionals are expected to know this. Different institutions might have varied criteria as well and some of them may have no training at all, and so it varies between institutions, what we call LVH versus not could vary between institutions. And so apart from the findings, a way to test medical professionals to ensure competency is still something we have to solve. And it really doesn't go without saying that there's this evolving technology that we're seeing right in front of our eyes and the realm of this medical technology is incredibly dynamic. We have innovations that are refining these existing tools. We see different advances in technology whether it's the hardware or software devices with different mobile home monitoring devices, different deep learning models that are really giving us a lot of predictive analytics, and so there's that. And we always say that everyone should be doing better, but there are time constraints. Everyone has personal lives and medical school you probably remember, like I always say, we're kind of drinking from that fire hose. We're always trying to stay abreast of the new technology whether it's cardiac or MRI, but during that time it's just staying afloat for myself. So there's always time constraints that we're against the wall that we have to get through and so pouring through all the data to learn this is a skill that is not expected or is gonna come just from medical school. It's something that you have to continue and so I know that was a long-winded answer, but I would say that challenges are again, the subjectivity, so many findings, lack of any standardized testing. We have so much technology that's changing and then really all of us are busy, right? And we don't always have the time to do it. Now the one thing I do wanna follow up is where do you see from these implications, these challenges of how can we address these things? Where do you see as implications of these performance gaps essentially?

Dr. May - Yeah, so this is a great question. A lot of implications are involved with this and relating to the limitations on understanding and addressing performance gaps. One of the main issues I think is that we don't really know exactly what works in terms of teaching and also how do you convey and transmit this knowledge to medical providers? What's the single best way? Truth is we don't know what the best way is and if there is a best way, maybe it's only a best way for one professional group and not all of them. So in truth the science at this present time doesn't really tell us what is the most desirable and preferred way to actually address performance gaps in ECG interpretation. Now because of that, we essentially have a variety of ways to teach ECG and there's inconsistent and highly variable training programs and methods and approaches across any sort of medical education institution. So varying standards within medical schools and training programs certainly can increase the likelihood of inconsistent levels of proficiency amongst larger professional groups. And not only just inconsistent training amongst different institutions. We don't even have competency standards that really provide us with clear guidance on what to do, and the competency standards that are available, in large part, they're not necessarily data-driven. They seem to be mostly arbitrary on what would be expected for a certain class of medical professionals. It's these two issues that I think ultimately lead to a overall lack of progress in identifying the challenges and barriers of ECG interpretation, but also this enables us to adequately address those challenges and barriers. So Anthony, there's a lot of issues with deficiencies and ECG interpretation proficiency, and this certainly can be applied to a wide variety of healthcare professional groups. Now in your opinion, how have deficiencies in ECG interpretation proficiency been observed across different medical disciplines?

Dr. Kashou - Well, without getting into too much detail because we just published this study on looking at what does proficiency look across healthcare professionals and those that are interested can go find that, but I'll say it's quite variable, right? I mean, what's interesting is variable based on the number of training and maybe pretty much how much experience which is the expected findings, but what was quite fascinating apart from the variability amongst them is that huge persistent existing gaps were seen across all specialties. And so first, there are gaps amongst professionals and then there's the variability within it. Now what makes it even tougher and why it's important is because in emergent settings, we know that the fast-paced environment doesn't allow for people under pressure. You're in the ICU all the time. If you have a patient presenting with a wide complex tachycardia and you have to quickly determine what's going on, well, it can be hard. And so if you don't possess the skill or the proficiency to be able to handle that pressure when the time comes, it makes it difficult. But when we think about trainees the journey of every medical trainee whether you're training as a paramedic, a nurse, nurse practitioner, our PAs, medical students, it's quite rigorous, we're expected to know a lot, and it's constantly evolving because so is the field. And so when we see our trainees, they're equipped with the latest knowledge when they graduate. That doesn't mean they've had the same amount of volume and practical exposure to be able to do this competently and proficiency under that stress as some of the more seasoned practitioners. Now we've identified obviously a lot of gaps in ECG interpretation, something that we really want to improve and see if we can improve that theoretical, but also the practical proficiency that people see. And so when I think of these sort of things, it certainly varies across specialty based on experience. But the common takeaway is that most medical professionals are not getting trained in this scale and if they do, it's not sufficient, and after they get trained they're not getting additional training, and the lack of practice thereafter

is also what's showing up and is why I would say and we've found that most medical professionals lack ECG interpretation competency. Now I do wanna go down that rabbit hole and hear data, but we will get to an episode where we'll talk about these in further detail. But I wanna end by asking you where do you see is the significance of addressing these concerns, especially in improving patient care because we mentioned that in the first episode of the series of the impact on patient care?

Dr. May - Yeah, great question, Anthony. So the significance is great and getting better ECG interpretation from healthcare professionals will lead to, is essentially very high yield and ultimately it's a practical way to improve the outcomes of your patients. Now addressing ECG interpretation deficiencies can lead to more accurate diagnoses potentially for very severe medical conditions and ultimately leading to better tailored treatments and medical care that you're providing for your patients. This type of endeavor can ultimately lead to enhanced provider confidence where clinicians are confident in their ECG interpretation skills and then can make more confident decisions, more decisively, efficiently, to address the needs of the patient. And ultimately I think this can lead to better patient outcomes, better patient care, but also cost efficiency issues can be adequately alleviated with a better ECG interpretation amongst all healthcare professionals. So reducing the number of misinterpreted ECGs can decrease the number of unnecessary tests, treatments, hospital stays, complications that can arise from faulty ECG interpretation. The amount of benefit that you can get from addressing this concern is multiplicative. It can be a very practical and effective way to improve the healthcare of patients.

Dr. Kashou - Well, I don't wanna say it, but we're pretty much coming up to the end of our time and there's so much we covered here really highlighting some of the concerns that we've seen. And as we conclude just another episode of the series, we're reminded of the importance of continuous learning and precision in the field of medicine, especially that it continues to evolve and the ECG continues to remain an important aspect of our care. ECG interpretation with its intricate patterns and profound meanings underscores the dedication of healthcare professionals worldwide. We learned today about longstanding concerns about ECG interpretation proficiency. In upcoming episodes, we're gonna look at those deficiencies in greater details, give you the numbers. We talked about the variability, but we'll highlight some of those gaps and there certainly are gaps. We hope you'll join us again for more heart-to-heart conversations. Dr. May, thank you for joining us today.

Dr. May - [Dr. May] Thank you, Anthony, it was a lot of fun.

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