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Exploring Technological Advances in GI Training: Practical Insights for Clinicians

Dr. Buch:
This is *GI Insights* on ReachMD. I'm Dr. Peter Buch, and today I'm joined by Dr. Nabil Mansour to discuss advanced techniques in GI training, including artificial intelligence. Dr. Mansour is an Associate Professor and the Director of the McNair General GI Clinic at Baylor College of Medicine in Houston, Texas.

Dr. Mansour, welcome to the program.

Dr. Mansour:
Thank you for having me.

Dr. Buch:
It's a true pleasure. Dr. Mansour, what should we know about simulation-based training for colonoscopy, including mannequin, smartphone, and virtual reality?

Dr. Mansour:
Well, simulation training has been around for a long time when it comes to colonoscopy and endoscopy training. The truth is it's probably been underutilized. Part of that is because the tools that we've had access to haven't always been the best. Some of the older mannequin models don't really feel realistic. Some of the VR simulators have been quite expensive, and getting evidence that they transfer to real-world performance has not been the best.

But having said that, I feel the technology is improving. Some of these new VR platforms are better. There are some new and improved mannequin-based platforms as well, which are far more realistic. There is some data from randomized trials now that shows that trainees who have practiced on some of these simulators improve their learning in all of these in the early part of their training.

And I would say where things get really exciting is the potential for AI to augment simulation—so having AI work with simulators. So instead of having a simulator that maybe just gives you a score at the end, AI could allow us to provide real-time feedback and point out blind spots while we're doing a colonoscopy, analyzing your scope handling, flagging if there's areas that you're not visualizing very well, and providing for targeted training, depending on the trainee's areas of weaknesses.

Dr. Buch:
What are the benefits and limitations of using computer-aided detection to assess in colonoscopy training?

Dr. Mansour:
So computer-aided detection, or what's referred to as CADe, is pretty much the best known application of AI in colonoscopy that we have today. This is a system that highlights suspected polyps using a bounding box. And in most studies, particularly randomized controlled trials, CADe has shown a consistent benefit at improving adenoma detection and reducing adenoma miss rates. It also has been studied in trainees, and even in trainees, it shows that it does improve the detection rates. In some studies, the detection rates in trainees using AI have more than doubled compared to not using AI, and we've shown that in our own health system as well.

And there was a study from China published last year that actually showed that novice endoscopists, when they used AI, their adenoma miss rates became noninferior to expert endoscopists. So it shows that AI can help bridge the early learning gap and accelerate the recognition of lesions.

But we also have to be cautious. Early exposure also comes with risks. If trainees are introduced to AI too soon and potentially become

dependent on it, they may not develop the fundamental skills that you would need in terms of lesion recognition and ability to identify these lesions that they would need for independent practice, especially since we're now in a time where the vast majority of GI practices are still not using AI. So if you have trainees training on AI their whole time in training and then they go out into practice and they don't have AI, we don't know what the result of that will be.

Dr. Buch:
Thank you. And just as a follow-up, for our clinicians out there, what's the data showing on AI use for clinicians who have had experience with colonoscopies, who have had a whole bunch of colonoscopies under their belt, in terms of getting useful and productive information?

Dr. Mansour:
In terms of useful productive information, if we're referring just to CADe, the only thing it does, essentially, is it works as an extra set of eyes at helping identify additional polyps. And even in high-level detectors, so people who have adenoma detection rates above 40 percent, most studies have shown that they still improve even further. The training is higher for those who are on the lower end of the detection ranges compared to higher-level detectors, but even experienced high-level detectors have shown improvements.

The big controversy with this is, it just picking up more small polyps that may be less significant? Is it actually going to make a difference in the long-term when it comes to decreasing colorectal cancer incidents or colorectal cancer mortality? And for that we need to wait for additional data.

Dr. Buch:
Thank you. So what does the future hold for AI in endoscopy?

Dr. Mansour:
So I would say the future for AI in endoscopy is moving towards multimodal systems. Right now, most of the tools that we have are single purpose, and they're typically focused on detection. But hopefully, very soon, we'll have systems that can do multiple different things at the same time—so detect lesions but also characterize them in real time.

This is available outside the US where you have systems that will tell you if a polyp is an adenoma, which is precancerous, versus a hyperplastic polyp, which is not, but also, they can monitor exam quality. And the hope is that you could combine that information from these different AI modalities and maybe combine it with voice inputs or call outs from the endoscopist and then use that to automatically generate complete, structured endoscopy reports. So the dream would be finishing your case, and then you have a complete AI-generated report that's already done as soon as your case is finished. The physician just needs to go review that report. If all looks good, sign and move on to the next patient instead of spending time manually completing a procedure report. That's where AI can really help with efficiency gains, which I think will get people a lot more excited than AI just for polyp detection.

Dr. Buch:
For those just tuning in, you're listening to *GI Insights* on ReachMD. I'm Dr. Peter Buch, and I'm speaking with Dr. Nabil Mansour about utilizing advanced techniques, including artificial intelligence, in GI training.

So moving on, Dr. Mansour, how can augmented reality assist in procedural training?

Dr. Mansour:
So augmented reality is interesting. Augmented reality is a type of technology that adds an information layer on top of what the endoscopists can already see. So think wearing AR glasses or goggles while doing a colonoscopy. There's not a ton of data on this right now, but for training, augmented reality could, for example, allow supervisors to see exactly what the trainee sees through smart glasses and provide live coaching, perhaps even remotely. It could also, for example, generate heat maps of gaze patterns showing where the trainee looked and where they didn't. That can help identify blind spots in detection.

I think we're still early with this in GI. There's a little more literature in the surgical literature on AR that is showing that it has already improved training outcomes, so I think it's something that might be coming soon, especially with some of these, newer, augmented reality technologies that are coming out. But I haven't seen anything concrete published or know of anything that's been widely used in GI as of yet.

Dr. Buch:
And moving on from there, what can you tell us about automatic quality control systems for trainees?

Dr. Mansour:
So these are AI systems that move beyond real-time polyp detection. These are things that have been studied mainly outside the US—in

Asia—particularly, in China. So, for example, these are systems that would monitor the withdrawal speed of the scope and the stability of the scope movement and flag blind spots. So they're systems where you're using AI to help in real-time improve the quality of the examination. So this automatic quality control system, basically gives you prompts for unstable views, areas of incomplete inspection, and also combines a CADe system where it can flag suspected lesions with a bounding box in real time. These have also been studied for upper endoscopy as well. And the idea is that AI can improve detection, not just by finding lesions directly, but also by reinforcing these core principles of high-quality endoscopy technique.

And it's easy to imagine how tools like these could be beneficial in training. Real-time prompts reminding a trainee to slow down as they're performing a colonoscopy and as they're withdrawing the scope, to inspect more carefully, to avoid blind spots, or to go back and look at areas that have missed could be very valuable. But you also have to be careful with cognitive overload, especially if this is an early trainee. Having an early trainee have exposure to something like this might just be too many inputs, which can lead to cognitive overload. So this is maybe something that's best for a second or third year trainee after the trainee has already mastered basic scope handling and navigation. We don't have these in the US quite yet, but hopefully, sometime soon.

Dr. Buch:
Looking forward to it. How do you address the erosion of skills in utilizing AI?

Dr. Mansour:
So this is a very interesting question and something that has actually come up quite a bit, especially recently. There was recently a multicenter observational study that was published from Poland in *The Lancet GI and Hepatology*, and it looked at endoscopists who routinely used AI or CADe, and basically asked the question: If we took the AI away after they had used it for some time, how do these endoscopists perform? So they looked at the adenoma detection rates three months before AI and then three months after AI was introduced, and basically had taken the AI away after these endoscopists had gotten used to using it for three months.

And what they noted was that the adenoma detection rate actually fell from what it was prior to them having AI. So while using AI it was fine, but after using AI and taking the AI away, it had actually dropped from 28 percent to 22 percent in this study. These were experienced endoscopists with over 20 years of experience. It's the only study that has shown this so far, but it is something that's concerning to an extent. I think the mechanism makes sense. Eye tracking studies have shown that with AI, endoscopists' gaze patterns narrow, consistent with cognitive overloading. It's almost like you're letting AI do some of the work for you, and I think it's a natural phenomenon.

So we have to think about how we're going to mitigate against this risk, especially with trainees in particular, but maybe make sure that occasionally we're still turning the AI off, that we're tracking competency without the AI, and making sure that we are not losing these clinical skills, at least unless we get to a point where these become fully standard.

AI is powerful, but we do have to be thoughtful about how we implement it. We do have to be concerned, about deskilling for fellows. We have to be concerned about the risk of what some people are would call "never-skilling." So if trainees always learn with the AI turned on, they may never develop these independent skills in lesion recognition that they would need.

So I would say we have to structure our training curricula carefully in this day and age where we have AI, and we have to be very intentional about how we're exposing AI to our trainees and make sure that it's not hurting them in the long run. So AI can be a tutor, but we have to not let it become a crutch.

Dr. Buch:
Thank you. I want to thank my guest, Dr. Nabil Mansour, for sharing his very timely insight on the use of AI in GI training.

Dr. Mansour, it was a pleasure speaking with you today.

Dr. Mansour:
Thank you again for having me.

Dr. Buch:
Absolutely.

For ReachMD, I'm Dr. Peter Buch. To access this and other episodes in the series, visit *GI Insights* on ReachMD.com, where you can Be Part of the Knowledge. Thanks for listening, and looking forward to learning with you again very soon.