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AI in GI: Leveraging CADe to Improve Colonoscopy Performance and Accuracy

Dr. Buch:
This is *GI Insights* on ReachMD. I'm Dr. Peter Buch, and today I'm joined by Dr. Charles Kahi to discuss how leveraging artificial intelligence, or AI, could help improve colonoscopy outcomes. Dr. Kahi is a Professor of Medicine at Indiana University School of Medicine, and he helped develop the American Gastroenterological Association Living Clinical Practice Guideline on Computer-Aided Detection-Assisted Colonoscopy, which was published in *Gastroenterology* in 2025.

Dr. Kahi, welcome to the program.

Dr. Kahi:
It's a pleasure to be here, Dr. Buch. Thank you.

Dr. Buch:
Looking forward to our conversation. Dr. Kahi, let's start with some definitions. What is CADe, and how does it differ from CADx and CAQ?

Dr. Kahi:
Well, they're all applications of artificial intelligence, or AI, as they pertain to colonoscopy. So thematically, they are under the same umbrella, but practically, when you apply them, they are looking at completely different aspects of colonoscopy. CADe—computer-aided detection—focuses on augmenting detection and highlighting of colorectal lesions. Conversely, CADx is more concerned with predictions of histology, so it's AI-assisted virtual histology, predominantly differentiating adenomas from serrated lesions. And in CAQ, the Q stands for quality. So those are systems that provide real-time assessments and feedback to endoscopists about the quality of their examination, but they can also serve different functions, such as rating bowel preparation quality, and in some instances, also helping populate endoscopy reports.

Dr. Buch:
Very helpful. And more specifically, does CADe have the potential to help with adenoma detection rates?

Dr. Kahi:
That's really the crux of the matter, isn't it? And CADe does help with adenoma detection in ideal settings. Now, you mentioned the living guideline developed by the AGA looking at the impact of CADe on colonoscopy outcomes, which I was fortunate to be a co-author on. The guideline was based on a systematic review and meta-analysis of a substantial body of literature—43 randomized controlled trials, actually—and the evidence in that ideal setting, that of a randomized trial, is indisputable.

AI—particularly CADe—can improve adenoma detection rate in aggregate, and the magnitude of the improvement was about eight to nine percentage points. You went from 37 percent roughly without the use of CADe to close to 45 percent with the use of CADe. Again, this is a very high altitude view of how CADe can impact adenoma detection.

Dr. Buch:
Thank you very much for that. And do you think CADe could help support our colleagues with low adenoma detection rates?

Dr. Kahi:
The devil is in the details with CADe, as it is really with many of the interventions and technologies that are used to enhance colonoscopy performance. The short answer is probably yes, by a small percentage. Studies have shown that when you apply CADe to

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individuals with low baseline adenoma detection—specifically lower than 25 percent—the magnitude of the improvement with CADe exceeds that of individuals with high baseline detection—specifically higher than 40 percent. So in that context, the answer is yes, you can improve the performance of individuals with low adenoma detection at baseline with using CADe.

There are also studies that show that it can benefit trainees. So fellows and gastroenterologists in training benefit from the addition of CADe to their curriculum, specifically to accelerate their ability to detect adenomas and all colorectal lesions for that matter. But there's a very important caveat here to keep in mind, and that's something we face with pretty much every new technology that is applied to colonoscopy with the aim to augment adenoma and other colorectal lesion detection. The issue is fundamental technique is the most important to enhance adenoma detection, and really, AI or any other technology added to colonoscopy cannot replace or palliate for suboptimal examination technique, meticulous examination, attention to subtle lesions—particularly serrated polyps—looking between folds, and looking in the right colon at least twice to ensure no lesions are left behind.

So the short answer is, in aggregate, if you look at low adenoma detectors versus high adenoma detectors, the benefit in terms of adenoma increment is higher for those that use CADe, but that cannot replace fundamentally sound technique.

Dr. Buch:
Thank you. And this next one has been intriguing me for a while since I've read some of your reports. Have there been any medical-legal issues around the use of CADe?

Dr. Kahi:
I'm not aware of any active litigation at this moment from my perspective, but I can tell you this is a subject of intense scrutiny at this moment because we don't really have a good ethical or legal framework on how to deploy and appropriately use AI in general in colonoscopy or other endoscopic procedures. And when you do surveys of physicians and their patients, that is actually one of the concerns that is listed as a negative potentially against widespread use of CADe, and you can see it from both perspectives.

Patients worry about breach of privacy and who exactly owns the data that is being collected by the AI systems in use, and that's probably a worry that applies both to patients and endoscopists. It's a very disastrous event, but for a patient who comes back with a post-colonoscopy colorectal cancer missed by a baseline colonoscopy, and that colonoscopy happened to be performed by an endoscopist who was using a CADe system during that examination, who is responsible for this? Is it the artificial intelligence system that is supposed to help detect lesions? Is it the endoscopist for whom the buck should stop? Or is it a combination of both that are responsible for this unfortunate event?

So I can't give you an answer yet. I think this is a subject of hot debate right now. Pun unintended, the jury's still out on this, but I think we should have a legal—not just medical-legal—framework for the deployment of AI and colonoscopy soon because I think that technology is going to be more widely available before we know it.

Dr. Buch:
Thank you for that.

For those just tuning in, you're listening to *GI Insights* on ReachMD. I'm Dr. Peter Buch, and I'm speaking with Dr. Charles Kahi to understand how AI can help with colonoscopy outcomes.

So moving on, Dr. Kahi, with all of this in mind, would you recommend CADe in community hospitals with limited resources?

Dr. Kahi:
As it stands now, I would not recommend it in lieu of basic fundamentals that should be present in any endoscopy unit, regardless of the resources. This is still a substantial investment, and we don't have good data about how CADe impacts long-term patient outcomes yet to be able to make a firm recommendation that it should be used by everybody universally.

And the reason I say that is, although in our guideline, the systematic review showed that you impacted the ADR favorably—the overall ADR increased by about eight percentage points—the modeling exercise that followed that looking at the impact of that ADR increase on the outcomes we worry about, which is long-term colorectal cancer incidence and mortality, were actually quite modest. They were positive. You prevented about 11 colorectal cancers per 10,000 patients over a 10-year period, and two cancer deaths, and you could say that any one of these numbers is worthy enough to pursue any cancer or any death averted. However, there was significant uncertainty about the precision of these estimates, so we don't really know what the long-term impact of CADe is on the hard outcomes for our patients.

So coming back to your question, would I recommend using it universally? Not at this stage because of this uncertainty about that impact and because when you have limited resources, you should really focus on the fundamentals—so ensuring you are using split preps for bowel preparation and making sure that you are measuring quality in the first place with your endoscopists. Everybody's ADR

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should be known. You are deploying interventions, feedback, and educational measures for endoscopists that seem to have lower performance. Technology can't replace fundamentally sound technique, and I think when you have limited resources, that's where the effort should be focused.

Dr. Buch:
Thank you. And what's your vision for AI in the endoscopy suite of the future?

Dr. Kahi:
The systems we have now are rather basic. It's a very exciting phase. We're seeing AI in its baby steps. But essentially, all with CADe systems, you have a green box that flashes on the screen that tells you there's a polyp that, hopefully, chances are you have already seen, so it's augmenting your ability and helping you focus on the screen and interrogate suspected lesions repeatedly.

The next generation, I think, will be much more seamlessly integrated in our suite, so the ideal would be you'd have a suite of AI technologies that are already built in your colonoscope—that would include CADe, but also CADX. You'd get real-time diagnosis, know if the polyp is an adenoma, a more advanced lesion, or a hyperplastic polyp, and that will make you to allow informed decisions regarding whether or not to respect the lesion—and, of course, integrated with CAQ, where you get real-time assessment of your performance and automatic grading of the bowel prep, which is very subjective currently, and essentially take the middleman out of this process. So it would be a very important ancillary support for the endoscopist, but it would be seamlessly integrated with your current colonoscope platforms.

Dr. Buch:
Thank you. And we're coming to the end of our conversation, Dr. Kahi. Do you have any additional thoughts you'd like to share with our audience today?

Dr. Kahi:
I want it to be an optimistic view on things. Yes, the technology we have now is the first step, but the future for CADe and other AI applications in colonoscopy is quite bright, in my opinion. And to be honest with you, I think AI is inevitable. It's only a matter of how we best utilize it and integrate it in our processes to improve our patient outcomes.

Although it's not ready for universal adoption, I think endoscopy units should make a concerted decision across the country to try AI and CADe specifically in their settings and see how it integrates with their practice and if it can help augment the performance of their endoscopists, particularly those with low baseline adenoma detection, and get it more in the mainstream for colonoscopy practice. But overall, my message is a positive one. I think CADe is here to stay, and I'm very excited to see the next iterations of the technology.

Dr. Buch:
Thank you. As those insights bring us to the end of our program, I want to thank my guest, Dr. Charles Kahi, for joining me today to discuss the use of AI in colonoscopy. Dr. Kahi, thanks for this very practical and informative update.

Dr. Kahi:
Thank you for having me.

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

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