

Which Endoscopists Benefit from Using Computer-Aided Detection of Polyps During Colonoscopy?



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This summary reviews Shaukat A, Lichtenstein DR, Chung DC, et al. Endoscopist-level and procedure-level factors associated with increased adenoma detection with the use of a computer-aided detection device. *Am J Gastroenterol* 2023; 118: 1891-94.

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STRUCTURED ABSTRACT

Question: Does computer-aided detection device (CADe) improve adenomas found per colonoscopy (APC) in all endoscopists or in any specific groups of endoscopists based on their experience, withdrawal time, clinical setting, or baseline adenoma detection rate (ADR)?

Design: Multicenter, randomized controlled trial (RCT) with 1:1 randomization stratified by individual endoscopists (n=22).

Setting: Five US academic and community endoscopy centers. Study endoscopists (n=22) were required to have completed a minimum of 1,000 colonoscopies with ADR \geq 25%.

Study Patients: Inclusion criteria included: (a) \geq 40 years old; (b) screening or surveillance as indication for colonoscopy; and (c) colonoscopy complete to cecum with adequate bowel preparation.

Interventions/Exposure: CADe device is a software as a medical device tool

that uses a deep neural network to identify potential polyps during colonoscopy in real-time. Endoscopists completed an orientation video and performed up to 10 run-in cases with the device prior to study initiation.

Outcome: Primary outcome for the original study¹ was adenomas per colonoscopy. The prespecified secondary outcome, which is the focus of the current study, was association of procedure-related (academic vs community site of procedure, morning vs afternoon procedure, withdrawal time < 8 minutes vs ≥ 8 minutes, bowel preparation fair/good vs excellent) and endoscopist-related factors (baseline ADR $< 45\%$ vs $\geq 45\%$, 1-10 years of experience vs 11-20 vs > 20 years of experience) with APC.

Data Analysis: Modified intention-to-treat (mITT) analysis. APC was compared between standard colonoscopy arm and CADe arm with simple Z-statistic for procedure-related and endoscopist-related factors.

Funding: Iterative Health, Inc, manufacturer of the CADe device under investigation.

Results: Between January 2021-September 2021, 1,423 patients were included in mITT analysis. Among study patients, mean age was 60 years old; 53% male; 83% White; 65% had screening colonoscopies. Among endoscopists (n=22), 50% were community-based; mean years of experience 21; mean baseline ADR 46%; 98% of colonoscopies had adequate bowel preparation; mean withdrawal time 11 minutes; 72% of procedures were performed in the morning.

Although no statistically significant differences in procedure-related or endoscopist-related factors were identified, numeric increases in APC were noted when withdrawal time was ≥ 8 minutes vs < 8 minutes (0.21 vs -0.03), endoscopist's baseline ADR $< 45\%$ vs $\geq 45\%$ (0.30 vs 0.10), and for endoscopists with > 20 years of experience vs ≤ 10 years of experience (0.28 vs -0.04).

COMMENTARY

Why Is This Important?

The benefit of CADe on ADR is variable based on current research. Although most RCTs demonstrate increases in ADR,² RCTs performed in populations with high prevalence of adenomas, such as fecal immunochemical test positive individuals,³ have not demonstrated

benefit. Clearly, it's easier to show improvement in ADR if the endoscopists have a low ADR, such as GI fellows who are learning to perform colonoscopy,⁴ or if the patient population has lower prevalence of adenomas, such as average-risk 45-49 year olds getting colorectal cancer screening.

Pragmatic trials, which have not consistently demonstrated ADR improvement,

have led many endoscopists to question the benefit of CADE. In these trials, endoscopists in real-world settings are randomized to start using CADE at various times or at various locations in routine practice. Some have demonstrated benefit⁵, but only when the endoscopists made a commitment to using it in most of their cases. Endoscopists with high ADRs (> 45%) frequently complained that CADE identification of potential polyps--which pop up as little green boxes on the endoscopy display--was distracting and unhelpful. For these high performers, the addition of CADE did not seem to improve performance. Thus, our goal is to better understand which endoscopists and which patient populations would most benefit from the addition of CADE tools.

Key Study Findings

The use of the CADE device numerically increased APC for endoscopists with baseline ADR < 45%, when withdrawal time was ≥ 8 minutes, and for endoscopists with > 20 years of experience.

Caution

Although this was a prespecified secondary outcome, it is a *post hoc* analysis of a relatively small sample size. The relatively small sample size may account for results only showing numeric trends for improvement in APC for specific categories.

My Practice

In my colonoscopy practice, I routinely use CADE tools for polyp identification. However, I haven't seen a statistically significant increase in my ADR, but that's probably because my composite ADR (screening and surveillance) is >45% and CADE tools only increases ADR by a few percentage points. Nevertheless, I've found it helpful for identifying smaller and flatter polyps, which I might have missed. This benefit may have occurred because I committed myself to training with introductory videos and training my eyes to assess the little green boxes that pop up on the endoscopy display whenever a potential polyp is identified by the software. It can be distracting, and even counterproductive, to see these little green boxes pop up on your endoscopy display. Proper use of CADE tools probably prolongs my withdrawal time. CADE tools certainly are not a substitute for proper colonoscopy technique during withdrawal, working the folds to expose colonic mucosa and taking a second look in the right side of the colon and rectum. If endoscopists think that they can speed up withdrawal time because the CADE tool will identify polyps, then that may be a misuse of the tool.

Distal attachment mucosal exposure devices (e.g., Endocuff Vision; Olympus America, San Jose, CA), which are clear caps attached to the tip of the colonoscope, may be analogous to CADE tools for improving polyp detection. RCTs clearly demonstrate that

they increase ADR, but real-world experience data is minimal. Endoscopists must be committed to performing colonoscopy consistently with these tools and take the time to work the folds and expose mucosa in order to benefit ADR. Personally, I've found it distracting to use these distal clear caps and don't routinely use them. Again, each individual endoscopist has to make a commitment to learning and utilizing a specific tool in order to see an improvement in polyp detection. We need to figure out which endoscopists might benefit the most from using different specific tools.

For Future Research

Implementation research could assess obstacles to utilizing CADe tools, how endoscopists should be trained to use these tools and become committed to routinely using them in real-world settings. Additional prospective studies should identify specific groups of endoscopists that will benefit from the addition of CADe devices, including endoscopists with ADRs < 25%. Finally, as CADe devices improve, additional studies will be needed to determine effectiveness of future, improved versions.

Conflict of Interest

Dr. Schoenfeld reports no conflicts of interest related to this study.

Note: The authors of this study are active on social media. Tag them to discuss their work in AJG and this EBGI summary!

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