Meta-Analysis of 33 Randomized Controlled Trials Demonstrates Value of CADe in Colorectal Polyp Detection

Research Goal

Evaluate the potential advantages and disadvantages of use of computer-aided detection (CADe) during colorectal cancer (CRC) screening colonoscopy.

Systematic review and meta—analysis

33 randomized controlled trials (RCTs)

Key Results

CADe significantly improved detection of :

- Advanced adenomas
- Diminutive and small adenomas
- Proximal and distal adenomas

Clinical Relevance

- Colonoscopy is the gold standard of CRC screening, allowing for the identification and removal of pre-cancerous lesions before they progress.[2]
- While >10mm adenomas have the greatest potential for malignancy, diminutive (0-5mm) and small lesions (6-10mm) may also develop into CRC.
  - 0.6-5.6% of <10mm polyps show high—grade dysplasia and malignancy.
  - 3+ non-advanced diminutive adenomas have been associated with elevated metachronous cancer risk.
- Interval CRCs are more common in the proximal colon.

↑ **1%** increase in ADR

↓ **3%** decrease in risk of interval CRC

"Our study confirmed the role of AI-aidedcolonoscopy in safely improving the detection of colorectal neoplasia...without significant delays in procedure time."

– Lou et. al 2023

Artificial intelligence for colorectal neoplasia detection during colonoscopy: A systematic review and meta-analysis of randomized clinical trials[1]

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ADR = adenoma detection rate

Scan to read the study

Methodology

Meta-analysis of RCTs comparing CADe to standard of care

Primary outcome measures:
adenoma miss rate (AMR), adenoma detection rate (ADR), and adenomas per colonoscopy (APC)

Secondary outcome measures:
polyp miss rate (PMR), polyp detection rate (PDR), polyps detected per colonoscopy (PPC), procedure time, adverse events, and false alarms

33 unique randomized controlled trials

Including 8 tandem studies

27,404 patients

Excluded trials of patients with inflammatory bowel disease or hereditary polyposis syndromes

Results

AI significantly **decreased polyp and adenoma miss rates**

↓ **51%** relative decrease in **AMR**

↓ **53%** relative decrease in **PMR**

AI significantly **increased polyp and adenoma detection rates**

(1 additional adenoma for every ~5 patients examined)

↑ **24%** relative increase in **ADR & PDR**

↑ **39%** relative increase in **APC & PPC**

"Concerns regarding increased procedure time and complication risk with AI-aided colonoscopy were not substantially supported by our findings… adding an AI-aided system will not significantly affect the colonoscopy workflow"

– Lou et. al 2023

1. https://www.thelancet.com/journals/eclinm/article/PIIS2589-5370(23)00518-7/fulltext
2. https://www.fda.gov/consumers/consumer-updates/colorectal-cancer-what-you-should-know-about-screening