DIAGNOSTIC PERFORMANCE OF ARTIFICIAL INTELLIGENCE-ASSISTED SYSTEMS IN DETECTING NEOPLASTIC AND NON-NEOPLASTIC POLYPS IN THE DISTAL COLON: A DIAGNOSTIC ACCURACY META-ANALYSIS

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Background

Early detection of colorectal polyps is crucial for the prevention of colorectal cancer, one of the leading causes of cancer-related mortality worldwide. Artificial intelligence-assisted systems (AIAS) have emerged as promising tools to enhance the detection rates of neoplastic and non-neoplastic polyps during colonoscopy. However, their diagnostic performance, specifically in the distal colon, requires comprehensive evaluation.

Aim

To assess the diagnostic accuracy of AI-assisted systems in detecting neoplastic and non-neoplastic polyps in the distal colon through a systematic review and meta-analysis.

Methods

A comprehensive literature search was conducted in PubMed, Embase, and the Cochrane Library for studies published up to April 2024.

Methods

Studies were included if they evaluated the diagnostic performance of AI-assisted systems in colonoscopy for detecting polyps in the distal colon and provided sufficient data on diagnostic accuracy measures. Statistical analyses were performed using R software (version 4.0.3) with the mada package.

Results

The meta-analysis included 8 studies encompassing a total of 1,721 patients, of whom 622 had confirmed malignancies. The pooled sensitivity of AI-assisted systems was 86% (95% CI: 76–92.2%; I²?=?85.4%), indicating a strong ability to correctly identify malignant polyps. The pooled specificity was 77% (95% CI: 60.7–87.9%; I²?=?93.9%), reflecting a good capacity to correctly identify non-malignant polyps, although significant heterogeneity was observed among studies. The false-positive rate was 23% (95% CI: 12.1–39.3%). The diagnostic odds ratio was 20.49 (95% CI: 7.43–56.47), suggesting excellent discriminatory power.

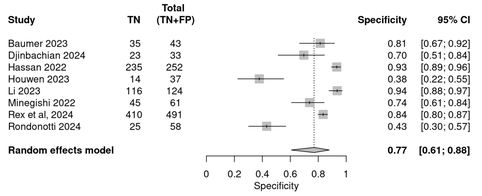
Results

Additionally, the positive likelihood ratio was 3.73 (95% CI: 2.05–6.82), and the negative likelihood ratio was 0.18 (95% CI: 0.10–0.33), indicating that AI-assisted systems are effective in both ruling in and ruling out polyps when used in clinical settings.

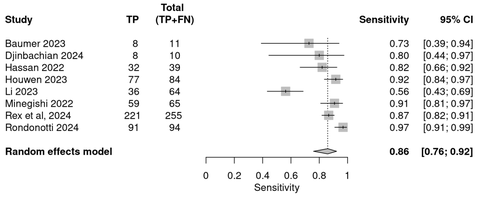
Conclusion

AI-assisted systems demonstrate high diagnostic performance in detecting neoplastic and non-neoplastic polyps in the distal colon, with substantial sensitivity and specificity. Despite significant heterogeneity among the included studies, the overall evidence supports the integration of AI technology into routine colonoscopy practices. This integration could lead to earlier detection and removal of polyps, thereby reducing the incidence and mortality associated with colorectal cancer. Future large-scale, multicenter studies are necessary to validate these findings and to further explore the long-term clinical benefits and standardization of AI-assisted colonoscopy.

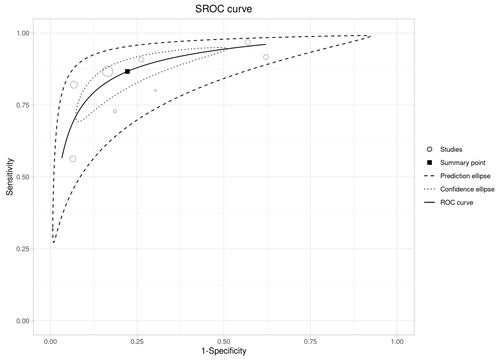
Specificity



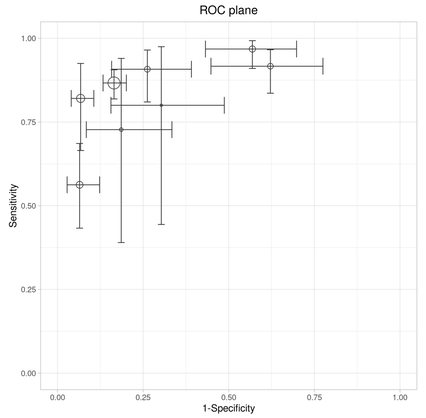
Sensitivity



S-ROC Curve



ROC Plane



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Conflict of interest

No conflict of interest to declare.

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