



# Artificial Intelligence for Colonic Polyp and Adenoma Detection: The Way Forward

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Colorectal cancer (CRC) is one of the leading cause of cancer deaths worldwide and increasing use of screening colonoscopy has reduced the CRC related mortality.<sup>1,2</sup> The adenoma miss rate has been shown to be 25% for any adenoma and 27% for serrated polyps in a meta-analysis.<sup>3</sup> This may explain the occurrence of interval cancer. Adenoma detection rate (ADR) is one of the important quality indicators of colonoscopy. An improvement in the ADR is associated with lower interval CRCs and lower mortality.<sup>4,5</sup> New technologies have been reported in the literature to improve ADR, including enhanced optics, endocuff attachments, extra wide angle endoscopes and cap-assisted techniques to have a better mucosa visualization and eventually reduce the adenoma miss rate.

In the field of gastroenterology, Artificial Intelligence (AI) has emerged as a promising tool. AI aims to aid the endoscopists to improve the colonoscopic adenoma and polyp detection rate. By increasing polyp detection on colonoscopy, AI can reduce the performance variability. The first European regulatory approved computer-aided detection (CADE) system, GI-Genius (Medtronic) was initially studied in a retrospective design.<sup>6</sup> Repici A, et al in a randomized control trial showed that CADe significantly increases ADR and adenomas detected per colonoscopy without increasing withdrawal time.<sup>7</sup> A novel version of EndoBRAIN-EYE, a Japanese regulatory approved CADe system was also tested in another recent study.<sup>8</sup> ENDOANGEL system has been developed using deep neural networks not only to improve the ADR but also to monitor withdrawal speed, procedure time for intubation and point out the blind spots due to slippage of the colonoscope.<sup>9</sup> The real-time AI-aided colonoscopy has shown to improve ADR even for experienced endoscopists and enhances the quality of colonoscopy. However, there is a paucity of multicenter, randomised comparative studies, in particular of the Asian population and for the proximal colon.

In a recent multicenter, randomized, tandem-colonoscopy study the authors did a comparative study of computer-

assisted detection versus conventional colonoscopy for proximal colonic lesions.<sup>10</sup> In this study, three asian centers participated and patients were enrolled prospectively. The patients were randomized to receive AI based examination or conventional white-light colonoscopy at the time of first withdrawal from the cecum till the splenic flexure. This was then followed by tandem examination of the proximal colon with white light in both groups. Out of the 223 patients, men and women were almost equal in proportion and the mean age was 63 years. Seven patients were excluded as the patients did not undergo tandem examination and 108 patients were included in each group. The proximal polyp and adenoma detection was higher in the CADe group and was statistically significant as compared to the conventional colonoscopy group. The average number of proximal polyps and adenomas detected per patient were also significantly higher in the CADe group. There was no difference in the miss rate for proximal adenomas in both the groups. The proximal adenoma detection rate was increased in patients with fair bowel preparation, shorter withdrawal time, and endoscopists with lower adenoma detection rate.

## Commentary

This multicenter Asian trial has given fair evidence for the role of CADe to improve the proximal adenoma and polyp detection, however it may not be able to decrease the number of missed proximal colonic lesions. To adopt AI in the day to day clinical practice, more literature from multicenter randomised clinical trials based on head to head comparative colonoscopies with and without CADe will be needed. Indian data on use of AI for polyp and adenoma detection is scarce. In a recent initiative by the Indian Society of Gastroenterology, multiple centers across the country have collaborated to assess the colorectal polyp prevalence during colonoscopy. The study also aims to

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have a subgroup analyses to assess the ADR in presence of CAde compared to conventional colonoscopy. Future studies evaluating the utility of CAde in education for endoscopy, characterisation and identification of the lesions with and without CAde may give a new dimension on the utilisation of CAde and a paradigm shift in the learning curve of endoscopy. Real-time AI-aided colonoscopy has the capacity to increase the ADR even for experienced endoscopists and hence, has a promising role to improve the quality of colonoscopy.

#### Conflict of Interest

None.

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