SIIM CAIMI25
Conference on Artificial Intelligence in Medical Imaging
OCT 20-21 | UNIVERSITY OF CALIFORNIA, IRVINE

Effect of Oral Contrast on the Distribution of False-positive Polyp Candidates Detected by AI in CT Colonography

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Introduction/Background

CT colonography (CTC) is a minimally invasive imaging modality for detecting colorectal polyps and tumors. We developed an automated AI-based polyp detection (AIPD) system for CTC. However, the characteristics of CTC images and, accordingly, the detection performance of AIPD, vary depending on the bowel preparation method. We hypothesized that the distribution of polyp candidates detected by AIPD is influenced by the type of oral contrast agent used.

Methods/Intervention

We retrospectively analyzed 22 patients who underwent both CTC and optical colonoscopy at a single institution. The target lesions were colorectal cancers and adenomas ≥6 mm, where colonoscopy was used as the reference standard. We first evaluated the standalone performance of the AIPD system. The patients were then divided into two groups based on the oral contrast agent used (barium or iodine), and the false positives (FPs) detected by the AIPD system were classified into residual stool, haustra, ileocecal valve, small bowel, rectal tube, and others (Figure 1).

Results/Outcome

Median age was 56 years (IQR: 51.0–63.8) and 18 patients were male. There were 30 polyps, and a total of 183 FPs were reviewed. The AIPD system showed 95.5% per-patient and 96.7% per-lesion sensitivity (Table 1). The average FP count per patient was similar between the iodine and barium groups (8.4 vs 8.3), but their distribution differed between the groups. In the iodine group, the most common FPs were haustra (33%), stool (23%), and the ileocecal valve (16%). In the barium group, the most common FPs were stool (43%), haustra (32%), and small bowel (12%) (Figure 2).

Conclusion

The AIPD system achieved favorable standalone performance. Although the FP counts were similar between the two contrast-agent groups, the distribution of the FPs varied, likely reflecting differences in the appearance of residual materials such as liquid versus solid stool. These findings highlight the need to account for preparation-related variability in AIPD system assessment.

Statement of Impact

Understanding how bowel preparation affects AIPD system output is critical when such tools enter clinical practice. Our findings suggest that the selection of oral contrast agent in CTC greatly influences the output of AIPD, underscoring the importance of preparation-aware interpretation and model design.

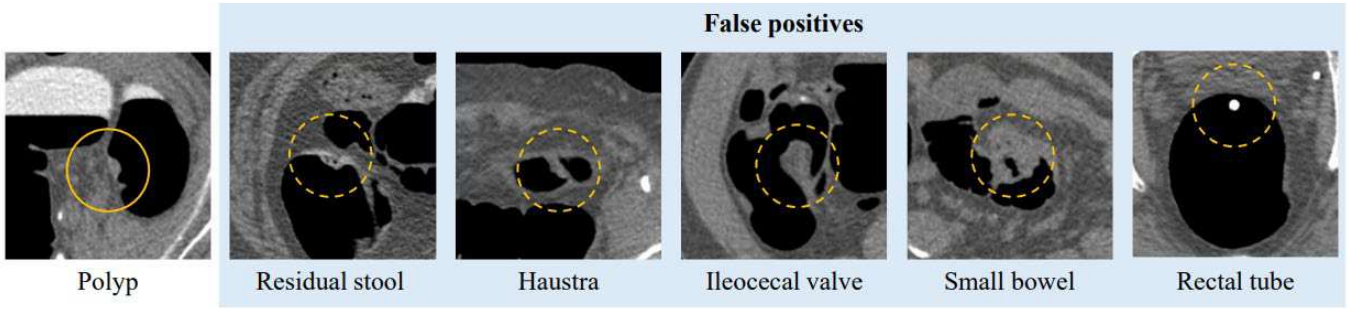

Figure 1. Examples of the detected polyp candidates

	Number of Cases	Sensitivity (Detected / Total, %)
Per-patient		
≥10 mm	10	10 / 10 (100.0%)
≥6 mm	22	21 / 22 (95.5%)
Per-lesion		
≥10 mm	11	11 / 11 (100.0%)
≥6 mm	30	29 / 30 (96.7%)

Table 1. Standalone performance of the AI-based polyp detection system

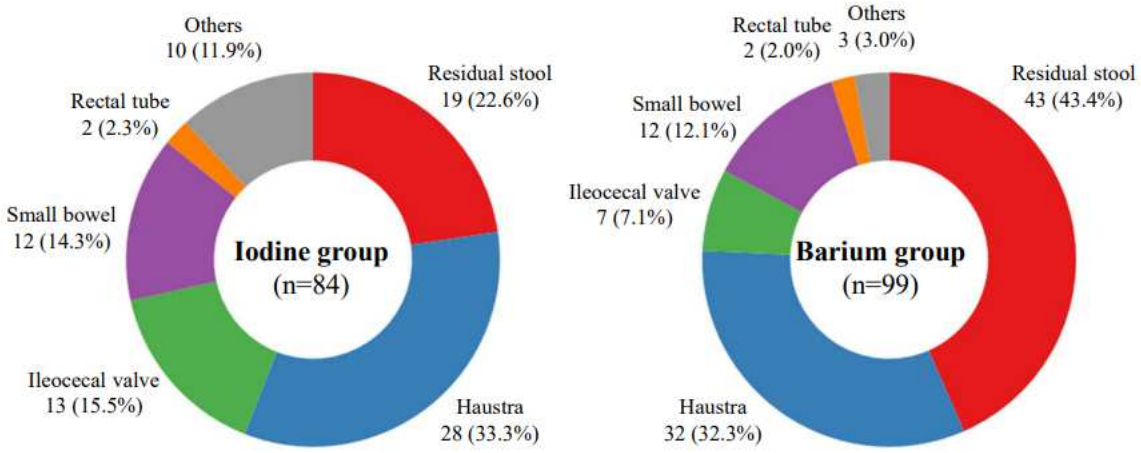

Figure 2. Distribution of the false positives in the two contrast-agent groups

Keywords

CT colonography; polyp detection; false positives; artificial intelligence; colorectal cancer