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Summary

QUANTIFYING ENDOSCOPIST SKILL: A NOVEL COMPUTER-AIDED QUALITY IMPROVEMENT SYSTEM FOR COLONOSCOPY

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Colorectal

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A computer-aided quality improvement system for colonoscopy was developed using deep learning to quantify endoscopist skill and mucosal inspection quality, showing significant differences between expert and non-expert operators.

KEY POINTS

- The CAQ system uses a multi-head deep convolutional neural network trained on 18,922 annotated colonoscopy images to evaluate appropriateness for mucosal inspection, distance from mucosa, and presence of blind areas in the field of view.
- Validation on 29 colonoscopy videos (8 by non-experts) showed experts had significantly higher proportions of appropriate images during examination compared to non-experts (median 56% vs. 49%, p=0.005).
- Experts also scored significantly better on distance assessment (median 4.2 vs. 3.2, p=0.0004) and blind area evaluation (median 1.6 vs. 1.2, p=0.0007) compared to non-experts.
- The CAQ system addresses a limitation of computer-aided detection systems, which cannot reduce exposure errors when polyps are obscured by objects, by promoting meticulous mucosal inspection to reduce blind spot areas.
- This approach may help standardize colonoscopy observation technique by quantifying endoscopist skill objectively.

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