

COMPUTER AIDED QUALITY CONTROL SYSTEM IMPROVES BARRETT'S NEOPLASIA DETECTION IN AN EX-VIVO SETTING

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Presentation

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A computer-aided quality (CAQ) system for Barrett's esophagus endoscopy improved the sensitivity of an existing computer-aided detection system for neoplasia from 82.2% to 89.9% by automatically filtering low-quality images.

KEY POINTS

- The CAQ system was trained on 4,926 images from 243 BE patients to assess objective quality parameters (blurriness, illumination, specular reflections) and subjective parameters (mucosal cleanliness, esophageal expansion), providing real-time feedback to endoscopists.
- As a standalone tool, the CAQ system achieved Cohen's Kappa scores of 0.73, 0.91, and 0.89 for objective quality, mucosal cleanliness, and esophageal expansion, respectively, comparable to inter-annotator agreement.
- When used as a preprocessing filter for a CAdE system, the CAQ system improved sensitivity from 82.2% to 89.9% and AUC from 87.2% to 91.4%, while specificity remained stable at 74.7%.
- Validation was performed on 647 images from 51 non-dysplastic BE patients across eight hospitals for standalone quality assessment, and 956 neoplastic and 557 non-dysplastic frames from 12 referral centers for CAdE integration testing.
- This is the first CAQ system specifically aimed at automated quality control in BE endoscopy, with potential to improve diagnostic accuracy in BE surveillance.

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