A PROOF CONCEPT STUDY OF NAVIGATION SYSTEM USING ARTIFICIAL INTELLIGENCE FOR COLORECTAL ENDOSCOPIC SUBMUCOSAL DISSECTION

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UEG Week Copenhagen 2023 | Poster

Colorectal

October 15, 2023

A proof of concept study demonstrates that deep learning using U-NET semantic segmentation can identify submucosal and muscular layers in colorectal endoscopic submucosal dissection procedure images with 83.0% pixel-level accuracy.

KEY POINTS

- The study trained an AI model on 1,561 images from 9 colorectal ESD procedures and validated it on 90 images from 1 separate case, using 16 different pixel-level labels including mucosa, submucosa, muscular layer, and blood vessels.
- The trained AI achieved 83.0% accuracy in correctly identifying labeled pixels, with relatively better discrimination of submucosa, muscular layers, and vessels which had larger labeled areas.
- The study population included 11 cases with mean age 71.9 years, mean tumor diameter 25.2 mm, colon to rectum ratio 8:2, and adenoma to T1 cancer ratio 5:6.
- The authors conclude that segmentation technology demonstrates feasibility of real-time AI-assisted ESD navigation and plan to improve the system by increasing training images.
- This work addresses the clinical challenge that accurate identification of blood vessels and muscle layers is essential for safe colorectal ESD but difficult when monitoring all image information during the procedure.

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