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Summary

SEMI-AUTOMATED SEGMENTATION OF INFLAMED BOWEL WALL ON NONCONTRAST T2-WEIGHTED MRI FOR STREAMLINED VOLUMETRIC ASSESSMENT OF CROHN'S DISEASE

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A semi-automated segmentation algorithm for Crohn's disease MRI achieves agreement with human readers comparable to inter-reader agreement, using data from multi-centre trials.

KEY POINTS

- Current MRE evaluation of Crohn's disease is subjective and based on 2D assessment of selected areas rather than full disease volume; validated scores like sMARIA often fail to capture early treatment response.
- A semi-automated pipeline was developed using k-means clustering and Random Forest Regressor to segment abnormal bowel on coronal T2-weighted MRI from the METRIC trials across 6 hospitals.
- Algorithm-human agreement (N=37, mean Dice 0.521, Symmetric Hausdorff Distance 15.1mm) was comparable to human-human agreement (N=18, mean Dice 0.603, Symmetric Hausdorff Distance 13.1mm), with no detectable difference in Dice scores (p=0.230) or Symmetric Hausdorff Distance (p=0.099).
- The algorithm will be embedded in a web-based platform to provide quantitative imaging biomarkers for researchers and clinicians monitoring Crohn's disease activity and treatment response.

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