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Summary

FIRST MULTIDEVICE ARTIFICIAL INTELLIGENCE MODEL FOR INTRAOPERATIVE PREDICTION OF COLORECTAL ANASTOMOTIC LEAKAGE

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Endoscopy | Surgery | Mechanisms & Personalised Medicine | Colorectal

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A multicenter AI model using laparoscopic video frames achieved 99.0% accuracy and AUC 0.997 for predicting anastomotic leakage after colorectal surgery across seven different device platforms.

KEY POINTS

- The convolutional neural network model detected anastomoses with mAP50 of 0.973 and identified frames associated with anastomotic leakage with 99.0% accuracy and AUC ROC of 0.997 in a multicenter dataset of 71 colorectal surgeries and 17,801 frames.
- This is the first multidevice, interoperable AI model for intraoperative anastomotic leak risk stratification, validated across seven different laparoscopy systems including conventional and robotic platforms from four centers in Europe and the Americas.
- The model provides a bounding box highlighting the anastomotic region contributing most to leak prediction, enabling surgeons to assess whether the model's focus is clinically appropriate.
- Thirteen of 71 patients developed anastomotic leakage during follow-up; normal anastomosis required stoma closure and at least six months of clinical follow-up.
- The model currently analyzes only laparoscopic frames and does not incorporate patient clinical data such as comorbidities; next steps include larger cohorts, external validation, and real-time intraoperative testing.

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