

Artificial Intelligence (AI) in Endoscopy

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Objectives

- Highlight different areas of AI in endoscopy

Does AI Impact Colon Neoplasm Detection?

- Majority of AI systems aim to improve PDR and ADR.
- AI systems have also been able to perform lesion characterization.
- A key goal of AI systems is to decrease lesion miss rate.

- Prospective single center pilot study.
- Primary endpoint was detection of colon cancer.

- 2 arms CAD vs standard.

- 768 pts enrolled
 - CAD: 337
 - Standard: 431

ID: 3521790 – GIE Vol 93, No 68 AB 191 2021

- PDR

- CAD: 65%
- Standard: 49.4%

- ADR

- CAD: 21.1%
- Standard: 10.7%

- MAP

- CAD: 0.33 +/- 0.77
- Standard: 0.17 +/- 0.58

- Advanced neoplasia detection

- CAD: 3.3%
- Standard: 1.4%

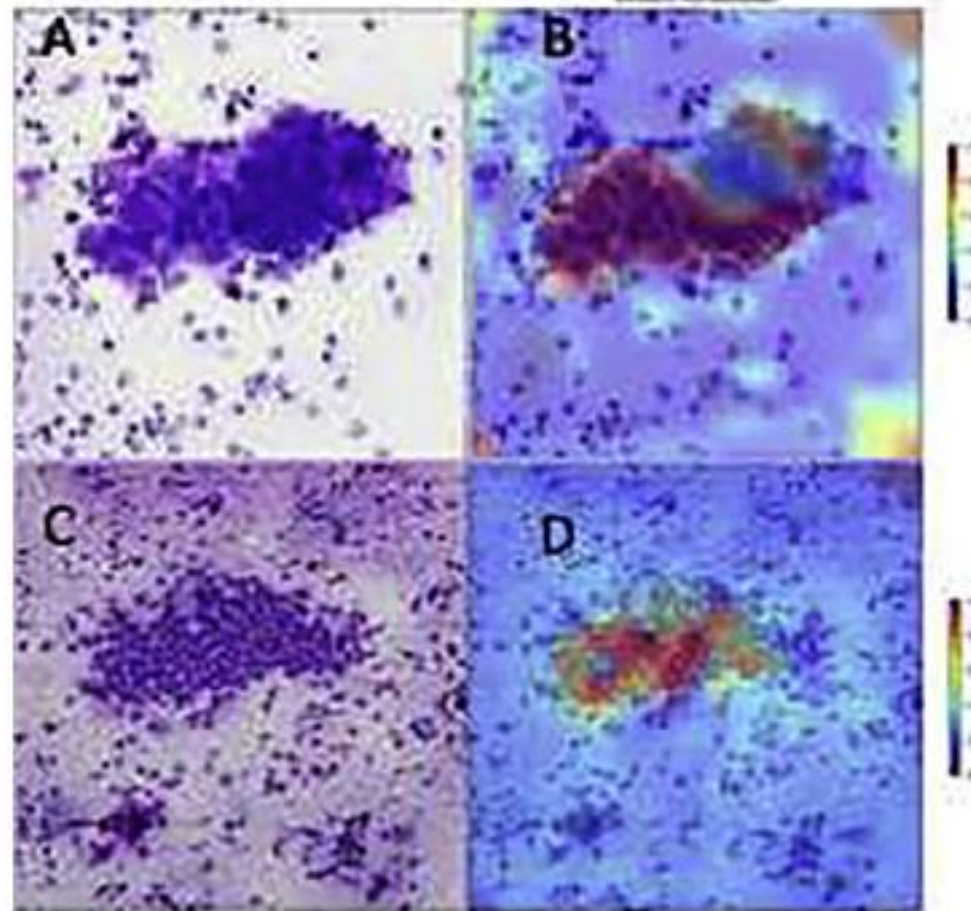
NO SIGNIFICANT DIFFERENCE

Role of AI for Rapid Onsite Cytology

- ROSE has been shown to improve diagnostic yield during EUS
- EUS-FNB provides higher diagnostic yield than FNA.
- Could ROSE assisted by AI improve diagnostic yield?

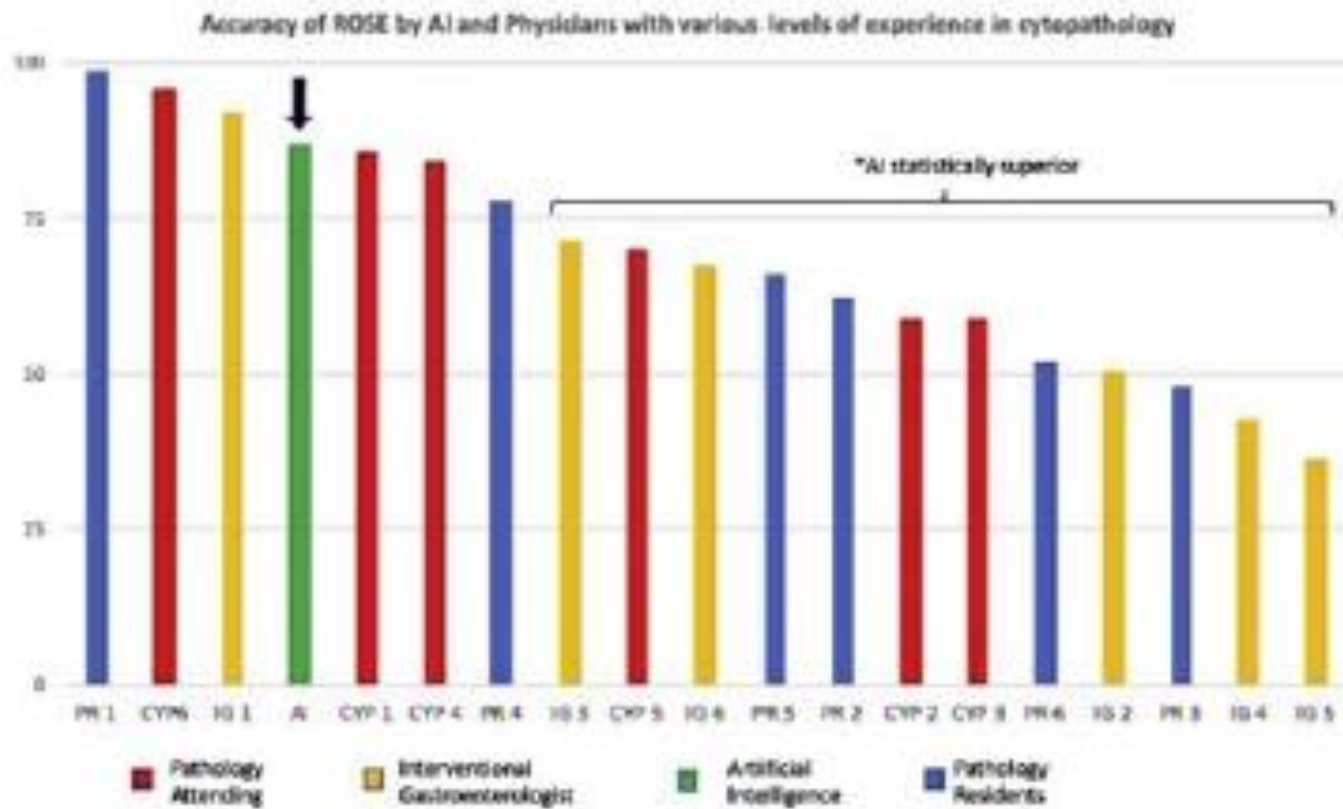
- 77 images were used.
- 18 physicians participated:
 - 6 cytopathologists
 - 6 interventional gastroenterologists
 - 6 pathology residents

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Pancreatic adenocarcinoma (A) with AI enhanced image (B)
 Ductal cells (C) with AI enhanced image (D)

Figure 1. Slides showing Pancreatic adenocarcinoma (A) with AI enhanced image (B); Ductal cells (C) with AI enhanced image (D)



AI ROSE Accuracy: 87%

Figure 2. Accuracy of ROSE by AI and Physicians with various levels of experience in cytopathology

AI Guided Targeted Biopsies for Barrett's Esophagus

- Seattle protocol challenges:
 - Labor intensive
 - Low compliance
 - Limited accuracy for dysplasia
- Can AI help the endoscopist better target dysplasia?

- A neural network was trained to identify all different degrees of Barrett's esophagus.
- 124 pt videos
 - 68 HGD/IMC
 - 56 NDBE/2 normal esophagus

ID:3522438- GIE Vol 93 No. 6s AB 194. 2021

- BE w/dysplasia
 - Sensitivity 90.5%
 - Specificity 80.4%
 - Accuracy 86.7%

Target Biopsy Prediction

- 91% accurate

Figure 1: Heat maps generated by the classifier algorithm trained on segments of whole videos. (A) Original image, (B) Expert delineation, (C) Heat map generated by classifier

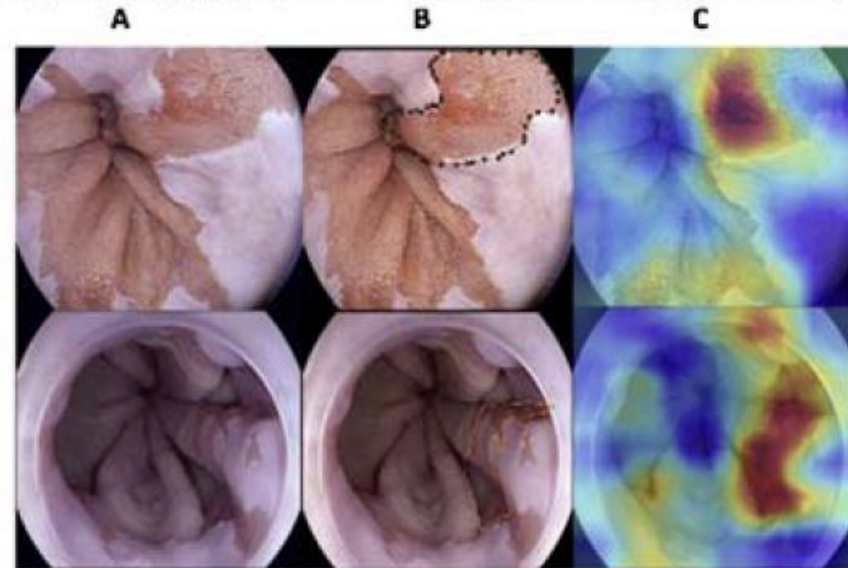


Figure 2: Localisation of the segmentation neural network with delineations and biopsies on i-scan 1 images with dysplasia. Green delineation = expert 1, blue de = expert 2, blue blob = Neural network delineation, Red/orange dot = targeted b predictions.



Conclusion

- The role of AI in endoscopy continues to grow beyond colon polyp detection and characterization.
- AI systems will only continue to improve.
- The impact of AI in endoscopy will likely improve quality of care with the ultimate goal of improving patient outcomes.