Identification of a small, depressed type of colorectal invasive cancer by an artificial intelligence-assisted detection system

A 64-year-old man underwent surveillance colonoscopy with a computer-aided detection (CADe) system (EndoBRAIN-EYE; Cybernet Systems, Tokyo, Japan) [1]. The system identified a 5-mm slightly reddish lesion in the sigmoid colon. Spraying with indigo carmine enabled identification of a clearly depressed area on the lesion (▶ Fig. 1, ▶ Video 1). The lesion showed type V₁ pit pattern, indicating high grade dysplasia or slightly invasive submucosal cancer [2]. Endoscopic mucosal resection was performed. Pathological examination showed a well-differentiated adenocarcinoma with slight invasion of the submucosal layer (▶ Fig. 2, ▶ Fig. 3, ▶ Fig. 4).

Artificial intelligence (AI) technology has regulatory clearance and is increasingly used during colonoscopy. A meta-analysis showed that CADe systems increase adenoma detection rates [3]. However, identifying subtle nonpolypoid lesions (e.g. 0–IIc type depressed lesions; laterally spreading tumors without granules) with CADe is still considered challenging. This is clinically relevant because a recent randomized trial found that such nonpolypoid tumors may be one of the causes of post-colonoscopy colorectal cancer [4]. Such lesions have greater...

▶ Fig. 1 Spraying of indigo carmine revealed a clear depression (Paris 0-IIc lesion).

▶ Fig. 2 Crystal-violet dye staining with magnification, showing irregular-shaped pit patterns of varying sizes (Kudo’s type V₁ pit pattern).

▶ Video 1 The EndoBRAIN-EYE (Cybernet Systems, Tokyo, Japan) outputs bounding boxes of suspected polyp candidate areas. The left image is the system’s output, and the right image is the original endoscopic image.

▶ Fig. 3 Photomicrograph of the specimen (hematoxylin and eosin staining), showing a well-differentiated adenocarcinoma.
malignant potential than other tumor morphologies and are often overlooked because of their appearance [5]. To the best of our knowledge, this is the first report of detection of a depressed, type 0–IIc lesion by CADe in real time during clinical colonoscopy. This AI-assisted detection was of particular value because the lesion was found to be a submucosal-invasive colorectal cancer.

Endoscopy UCTN_Code_TTT_1AQ_2AB

Acknowledgment

We thank Dr. Trish Reynolds, MBBS, FRACP, from Edanz (https://jp.edanz.com/ac) for editing a draft of this manuscript.

Competing interests

Shin-ei Kudo, Masashi Misawa, and Yuichi Mori have received speaking honoraria from Olympus Corporation (Tokyo, Japan) and have ownership interest in the products of Cybernet Systems (Tokyo, Japan). Masashi Misawa, Shin-ei Kudo, and Yuichi Mori have patents (Japan Patent JP 6059271 and JP 6580446) licensed to Cybernet Systems and Showa University.

References

[1] Ishiyama M, Kudo SE, Misawa M et al. Impact of the clinical use of artificial intelligence-assisted neoplasia detection for colonoscopy: a large-scale prospective, propensity score-matched study (with video). Gastro-

The authors

Shin-ei Kudo1, Masashi Misawa1, Yuichi Mori1, Yurie Kawabata1, Yasuharu Maeda1, Hideyuki Miyachi1, Kensaku Mori1
1 Digestive Disease Center, Showa University Northern Yokohama Hospital, Japan
2 Clinical Effectiveness Research Group, Institute of Health and Society, Faculty of Medicine, University of Oslo, Oslo, Norway
3 Graduate School of Informatics, Nagoya University, Nagoya, Japan

Corresponding author

Shin-ei Kudo, MD, PhD
Digestive Disease Center, Showa University, Showa University Northern Yokohama Hospital, 35-1 Chigasaki-chuo, Tsuzuki, Yokohama, 224-8503, Japan
kudos@med.showa-u.ac.jp

Bibliography

Endoscopy
DOI 10.1055/a-1704-8103
ISSN 0013-726X
published online 2021
© 2021. Thieme. All rights reserved.
Georg Thieme Verlag KG, Rüdigerstraße 14, 70469 Stuttgart, Germany

Endoscopy E-Videos
https://eref.thieme.de/e-videos

Endoscopy E-Videos is a free access online section, reporting on interesting cases and new techniques in gastroenterological endoscopy. All papers include a high quality video and all contributions are freely accessible online.

This section has its own submission website at
https://mc.manuscriptcentral.com/e-videos