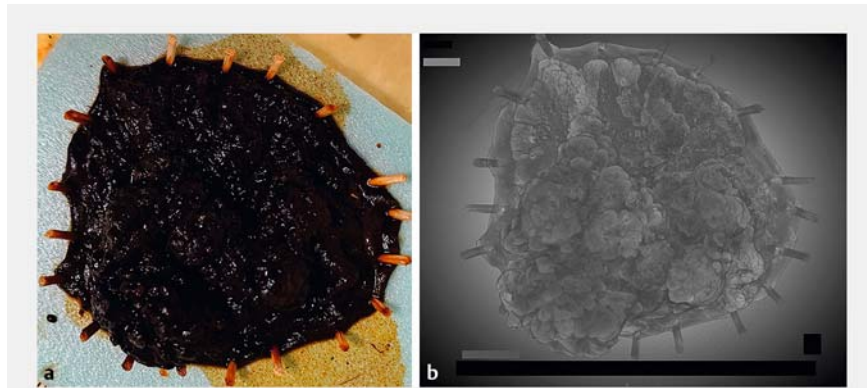


Pathological evaluation of a rectal endoscopic submucosal dissection specimen using micro-computed tomography

Endoscopic submucosal dissection (ESD) is widely used for resecting superficial gastrointestinal neoplasms that are difficult to remove en bloc by conventional endoscopic mucosal resection. After the resected specimen is sectioned into slices a few millimeters thick, slides are created for histologic examination. However, the slides produced represent only a small fraction of the lesion, and there is always the possibility of missing significant findings in the unexamined areas. Micro-computed tomography (micro-CT) is a novel in vitro tomographic method that allows the examination of fresh tissue or paraffin blocks non-destructively with a spatial resolution [1]. Previous studies have shown the potential of micro-CT images in revealing the detailed structures of breast cancer and thyroid cancer [2, 3]. Here we describe a superficial rectal cancer removed by ESD for which micro-CT revealed diagnostic information that was not well visualized on routine histology.

A 51-year-old woman was referred for resection of a laterally spreading tumor in the rectum. The patient underwent ESD and the lesion was removed en bloc. The resected specimen was immersed in 10% Lugol's iodine solution for 2 minutes and then scanned with a custom-made micro-CT for 10 minutes (Nikon Metrology NV, Leuven, Belgium) (► Fig. 1). Thereafter, the specimen was processed following the standard procedure. There was no effect of immersion in iodine on the quality of the slides. Paraffin blocks were also subjected to micro-CT scanning after slide preparation. Micro-CT images clearly showed the submucosal invasion noted on the hematoxylin and eosin (H&E)-stained slide, especially in the block scan (► Fig. 2). In addition, the micro-CT generated images between the sections that could not be seen with H&E staining (► Video 1).

In conclusion, micro-CT scanning of fresh ESD specimens and paraffin blocks



► Fig. 1 Appearance of the specimen resected by endoscopic submucosal dissection: **a** macroscopically, after penetration with 10% Lugol's iodine solution; **b** on micro-computed tomography imaging.

has the potential to enhance pathological diagnosis by providing a detailed histological structure of the areas that are not represented by standard H&E-stained slides.

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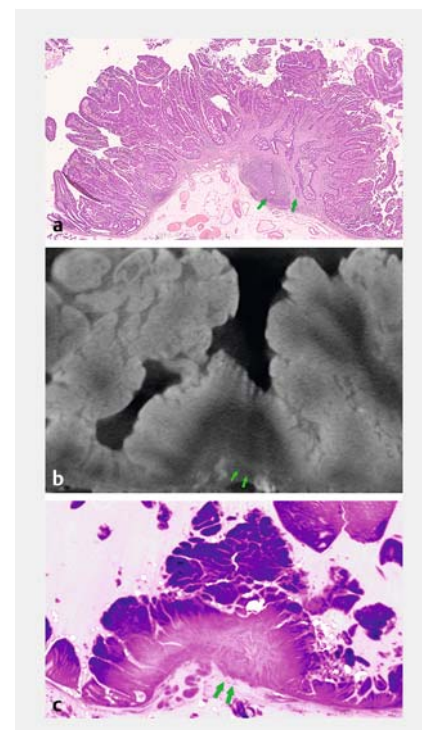
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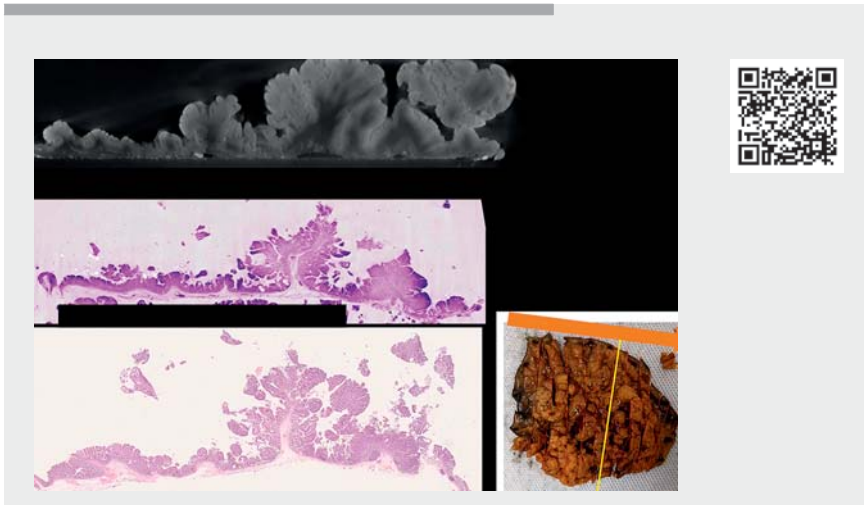
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Competing interests

Hirotugu Sakamoto has received honoraria and grants from Fujifilm Corporation. Makoto Nishimura has acted as a consultant for Boston Scientifics, Lumendi, and Olympus America. The remaining authors declare that they have no conflict of interest.



► Fig. 2 Images of the site of submucosal invasion (green arrows) on: **a** hematoxylin and eosin staining; **b** micro-computed tomography (micro-CT) of the fresh specimen; **c** micro-CT of the paraffin-embedded block.



Video 1 Micro-computed tomography for an endoscopic submucosal dissection specimen from an early rectal cancer.

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