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

Acknowledgments

We thank Peter Ntiamoah, David Beckles, Lina M. Larraondo, and Marc-Henri Jean for technical assistance.

Funding

Nikon Metrology NV
Warren Alpert Foundation, http://dx.doi.org/10.13039/100002558
The Cancer Center Support Grant of the National Institutes of Health/National Cancer Institute
P30CA008748

Competing interests

Hirotsugu 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.
The authors

Hirotsugu Sakamoto1,2, Makoto Nishimura3, Alexei Teplov1, Emine Cesmecioglu1, Noboru Kawata1,4, Jinriu Shi1, Yukako Yagi1
1 Department of Pathology, Memorial Sloan Kettering Cancer Center, New York, New York, USA
2 Department of Medicine, Division of Gastroenterology, Jichi Medical University, Shimotsuke, Japan
3 Gastroenterology, Hepatology and Nutrition Service, Memorial Sloan Kettering Cancer Center, New York, New York, USA
4 Division of Endoscopy, Shizuoka Cancer Center, Shizuoka, Japan

Corresponding author

Hirotsugu Sakamoto, MD, PhD
1133 York Ave., Suite 1020 MSKCC Josie Robertson Surgery Center, New York, NY 10065, USA
94036hs@jichi.ac.jp

References


Bibliography

Endoscopy 2022; 54: E254–E255
DOI 10.1055/a-1506-2683
ISSN 0013-726X
published online 8.6.2021
© 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 an open 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. Processing charges apply (currently EUR 375), discounts and waivers acc. to HINARI are available.

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