The existence of an endoscopically observable capillary plexus in the deep colonic mucosa

Colonoscopy allows microvascular observation on the luminal surface; however, the precise depth of the blood vessels being observed is unknown. We successfully generated 3D reconstructed images of the microvessels of the crypts and associated mucosa from tissue slides using Synapse VINCENT [1, 2]. Endoscopic images of a normal colon were compared with the histological preparation of the colon microvasculature to clarify the depth of the vascular structures being observed by colonoscopy.

We present colonoscopic images of a 51-year-old man with normal mucosa; he had provided written informed consent. The sigmoid colon was observed with the white light and blue laser imaging (BLI) modes of the LASEREO endoscope system of an EC-L590ZW colonoscope (Fujifilm, Tokyo, Japan).

▶ Video 1 shows the two plexuses of the colonic mucosal capillary network and their connections. One plexus was present at the subepithelial level; the other was at the crypt bottom, just above the muscularis mucosa. The two plexuses were connected via capillaries that ran along the crypts. We reconstructed a 3D histological image from the 2D tissue section images acquired by digital microscopy and compared this with the endoscopy images (▶ Fig. 1): the capillary plexus in the deep mucosa could be observed with both white light and BLI at low magnification.

It is believed that the arteries that enter the colon wall form a submucosal plexus with repeated bifurcations, and then rise through the muscularis mucosa to form a polygonal capillary plexus below the epithelium [3, 4]. However, our results revealed that the colonic mucosa had capillary plexuses not only at the subepithelial level but also at the crypt bottom level. By providing crypt stem cells with oxygen and nutrients, a deep mucosal capillary plexus can be formed. This is the first report showing the existence of an endo-
scopically observable capillary plexus in the deep colonic mucosa.

Endoscopy_UCTN_Code_CCL_1AD_2AJ

Competing interests

This research was supported financially by FUJIFILM Corporation. Yuichi Teramura is an employee of FUJIFILM Corporation. The remaining authors declare that they have no conflict of interest.

The authors

Fumikazu Koyama¹,², Takeshi Ueda³, Kohei Morita⁴, Hisao Fuji⁵, Yuichi Teramura⁶, Chiho Obayashi⁴, Masayuki Sho¹
1 Department of Surgery, Nara Medical University, Kashihara, Japan
2 Division of Endoscopy, Nara Medical University Hospital, Kashihara, Japan
3 Department of Surgery, Minami-Nara General Medical Center, Yoshino, Japan
4 Department of Diagnostic Pathology, Nara Medical University, Kashihara, Japan
5 Department of Gastrointestinal Endoscopy and IBD Center, Heiwakai Yoshida Hospital, Nara, Japan
6 Endoscopy Systems Division, Medical Systems Business Division, FUJIFILM Corporation, Tokyo, Japan

References


Bibliography

Endoscopy 2021; 53: E417–E418
DOI 10.1055/a-1324-2429
ISSN 0013-726X
published online  27.1.2021
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Georg Thieme Verlag KG, Rüdigerstraße 14, 70469 Stuttgart, Germany

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