

Advanced Endoscopic Characterization of Whipple's Disease



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Abstract

Whipple's disease is a rare multisystemic infection caused by the bacterium *Tropheryma whipplei*. Endoscopic findings are mostly limited and include pale yellow, shaggy mucosa with intermittent, superficial, and erythematous eroded patches of the duodenum. This video demonstrates the concept of advanced endoscopic imaging of Whipple's disease using confocal laser endomicroscopy. In this setting, endomicroscopy was able to visualize disease-specific histological changes *in vivo*. This article is part of an expert video encyclopedia.

Keywords

Endomicroscopy; Fluorescein; *In vivo* imaging; Standard endoscopy; Video; Whipple's disease.

Video Related to this Article

Video available to view or download at doi:10.1016/S2212-0971(13)70089-X

Techniques

High-definition white-light endoscopy and endomicroscopy.

Materials

- Endoscope: 90i Gastroscope and EG-3870CIK endomicroscope (Pentax, Hamburg, Germany).
- Video processor: EPK-i and EPK-1000 (Pentax, Hamburg, Germany).
- Solution: Fluorescein sodium 10%, 5 ml.

Background and Endoscopic Procedure

Whipple's disease represents a systemic infection caused by the bacterium *Tropheryma whipplei*. The infection can affect various organs, including the gastrointestinal, neurological, musculoskeletal, and cardiovascular systems. As clinical presentation and laboratory findings are often nonspecific and reflect the major organs involved, diagnosis of Whipple's disease often can be difficult.^{1,2}

Confocal laser endomicroscopy is an advanced endoscopic imaging technique enabling real-time *in vivo* histology during ongoing endoscopy at a magnification level of approximately 1000-fold. The technique enables visualization of cellular and subcellular structures up to a penetration depth of 250 μm . To obtain confocal imaging, it is necessary to use fluorescence agents, which can either be applied systemically (fluorescein

sodium) or topically (acriflavine hydrochloride and cresyl violet).^{3,4}

In this video, endomicroscopy is used to visualize disease-specific findings (foamy macrophages) of Whipple's disease *in vivo* during ongoing endoscopy.

Key Learning Points/Tips and Tricks

- Endomicroscopy enables *in vivo* microscopic imaging of Whipple's disease-associated histological changes (foamy macrophages) during endoscopy.
- Apply mild suction to the mucosa while performing endomicroscopy to stabilize the confocal image.

Scripted Voiceover

Starting time (min:sec)	Voiceover text
00:04	This patient was referred to our endoscopy unit due to general ill-health, with recurrent fever, malaise, and diarrhea. Moreover, the patient reported recurrent ankle pain over 1.5 years. Laboratory values demonstrate signs of systemic inflammation and normocytic anemia.
00:23	High-definition white-light endoscopy reveals pale yellow shaggy mucosa with intermittent, superficial, erythematous eroded patches of the duodenum.
00:36	In order to obtain <i>in vivo</i> confocal imaging we now inject 5 ml of 10% fluorescein sodium intravenously. Accordingly, the mucosa appears yellowish. The embedded laser system is clearly visible at the 7 o'clock position. Note also the blue laser light, which is scanning the duodenal mucosa.
01:01	In order to obtain high-quality confocal images in focus, one has to gently push the confocal window onto the duodenal mucosa and apply mild suction.

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01:14 *In vivo* histology now clearly demarcates morphological changes of the mucosa, such as vessel and lymphatic calibre and anatomy of the individual mucosal cells. Notable, endomicroscopy reveals engorged but non-distorted vascular and lymphatic vessels and massive macrophage infiltration within the lamina propria. Histopathology, afterwards, confirmed *in vivo* diagnosis of Whipple's disease.

Potential Conflicts of Interests

Consultant and speaker for Pentax and Mauna Kea Technologies; speaker for Essex Pharma, Abbott; research grants from Siemens, Olympus, Nycomed, AstraZeneca, Pfizer.

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