



Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/vjgien



INNOVATION FORUM AND EXPERIMENTAL ENDOSCOPY

Blue Laser Imaging Provides Excellent Endoscopic Images of Upper Gastrointestinal Lesions[☆]



Hiroyuki Osawa^{*}, Hironori Yamamoto, Yoshimasa Miura, Wataru Sasao, Yuji Ino, Hiroyuki Satoh, Kiichi Satoh, Kentaro Sugano

Department of Internal Medicine, Division of Gastroenterology, Jichi Medical University, 3311-1 Yakushiji, Shimotsuke, Tochigi, Japan

Received 25 February 2013; accepted 18 June 2013

KEYWORDS

Blue laser imaging (BLI);
Esophageal cancer;
Barrett's esophagus;
Early gastric cancer;
Intestinal metaplasia;
Duodenal cancer;
Video

Abstract

Background/aim: Image enhanced endoscopy including narrow band imaging, flexible spectral imaging color enhancement and i-scan is useful for detailed examination of upper gastrointestinal lesions. We aimed to clarify the usefulness of blue laser imaging (BLI) method, a new endoscopic system, to image upper gastrointestinal lesions.

Procedure: We observed upper gastrointestinal lesions including early gastric cancer and early esophageal cancer using white light images and subsequently BLI bright images and BLI images.

Results: In gastric cancer, irregular microvessels on the tumor surface are clearly identified for both differentiated and undifferentiated lesions with high magnification, similar to those using narrow band imaging. In addition, irregular surface patterns are seen in differentiated lesions by enhanced white circles, which form white zones on the tumor surface. Finding these circles allow us to rule out undifferentiated lesions. Another advantage is to enhance gastric intestinal metaplasia as green-colored mucosa in both distant and close-up views, leading to higher color contrast with brown gastric cancers. This leads to early detection of gastric cancers and shows a demarcation line between the cancer and areas of metaplasia. In squamous cell carcinoma of the esophagus, BLI produces a higher color contrast between brown lesions with intraepithelial papillary capillary loops and the surrounding area without magnification. The extent of Barrett's esophagus is easily shown as a high color contrast with the brown gastric mucosa.

[☆]The terms of this license also apply to the corresponding video.

^{*}Corresponding author.

E-mail address: osawa@jichi.ac.jp (H. Osawa).

Conclusions: Blue laser imaging produces excellent images useful for detection and detailed examination of upper gastrointestinal lesions.

© 2014 The Authors. Published by Elsevier GmbH. Open access under [CC BY-NC-ND license](#).

Video related to this article

Videos related to this article can be found online at [10.1016/j.vjgien.2014.01.001](https://doi.org/10.1016/j.vjgien.2014.01.001).

1. Background

- Image enhanced endoscopy including narrow band imaging (NBI), flexible spectral imaging color enhancement (FICE) and i-scan is useful for detailed examination of upper gastrointestinal (GI) lesions.
- It is ideal to obtain clear visualization of both the microvasculature and microstructure of the tumor surface over a broad area to precisely diagnose GI malignancies.
- Blue laser imaging (BLI) endoscopy (Fujifilm Co, Kanagawa, Japan) has been developed as a new endoscopic diagnostic method for GI pathology using two laser sources, which produce a new type of bright, high resolution images of digestive tract mucosa.
- BLI has the potential to detect early cancers of the GI tract, determine the delineation of the lesion and demonstrate the surface and vascular patterns before endoscopic submucosal dissection (ESD).

2. Strengths and limitations of standard procedure/device

- Neither vascular nor surface patterns are clearly visualized in gastric cancer by white light images.
- Differentiated early gastric cancer is not distinct from intestinal metaplasia with high color contrast using white light images.
- The demarcation line between Barrett's mucosa and upper portion of gastric mucosa is not determined by white light images alone.

3. Potential benefit of the proposed procedure/device

- The bright images produced by a combination of spectral images and white light images with wide wavelengths produce the great depth of field on the magnified images. This combination results in high resolution images in excellent focus on the uneven surface of the tumor.
- Both vascular and surface patterns are clearly visualized in gastric cancer.
- Minute white circles in differentiated gastric cancer are identified at high magnification distinct from the unstructured pattern in undifferentiated lesions.

- BLI detects malignant lesions surrounded by intestinal metaplasia with both distant and close-up views. Most differentiated malignant lesions are visualized as a brown area and the surrounding intestinal metaplasia is green.
- The demarcation line between Barrett's mucosa and upper portion of gastric mucosa is determined by BLI.

4. Materials

- These images are generated using two laser sources and the fluorescence excited by one of them. The illumination of the first laser source with a short wavelength (410 ± 10 nm) produces a clear image (BLI image) of superficial microvasculature and microstructure of the digestive mucosa.
- Another laser source at 450 ± 10 nm produces deep vascular and structural images of mucosa and also excites fluorescence, leading to white light images.
- The combination of illumination using these two laser sources characterizes a new bright image (BLI-bright image) of digestive mucosa including both detailed microvasculature and microstructure.
- Upper gastrointestinal lesions including early esophageal cancer and early gastric cancer were observed by initially white light images and subsequently BLI bright and BLI images.

5. Endoscopic procedure

- This system changes easily from a white light image to a BLI-bright image and subsequently BLI image by the simple push of a button on the endoscope.
- At first, BLI images are observed without magnification and magnified images are subsequently with low, middle and high optical magnification using magnifying scope equipped with soft hood on its tip.

6. Discussion

BLI has been commercially available for GI tract lesions in Japan since 2012 but has not been evaluated regarding the usefulness for upper GI lesions. This is the first report to show characteristic images of these lesions using BLI system by video. It is important to observe the microvascular and microsurface pattern to evaluate GI malignancies. NBI produces sharply distinctive images of microvessels due to narrow bandwidth by an optical filter but inversely leads to

Download English Version:

<https://daneshyari.com/en/article/3114533>

Download Persian Version:

<https://daneshyari.com/article/3114533>

[Daneshyari.com](https://daneshyari.com)