

## Open Access

## The Role of Dual Red Imaging in Gastric Endoscopic Submucosal Dissection

In Kyung Yoo and Joo Young Cho

Department of Gastroenterology, Cha Bundang Medical Center, Cha University College of Medicine, Seongnam, Korea

See “Clinical Usefulness of Dual Red Imaging in Gastric Endoscopic Submucosal Dissection: A Pilot Study” by Naoki Yorita, Shiro Oka, Shinji Tanaka, et al., on page 54–59.

Endoscopic submucosal dissection (ESD) is a widely used non-invasive treatment for gastric lesions, including early gastric cancer and dysplasia.<sup>1</sup> Novel techniques have been developed to reduce serious adverse events associated with ESD, such as bleeding and perforation. In such a scenario, endoscopic hemostasis is an important technique used to prevent distinct complexities. When intraprocedural active bleeding cannot be controlled, the procedure time might be longer and the risk of perforation increases.<sup>2</sup> Occasionally, emergency intervention or surgery with excessive transfusion might be necessary in case of severe bleeding.<sup>3</sup>

Recently, image-enhanced endoscopy (IEE) has been developed, which encompasses various methods of enhancing contrast during endoscopy using optical and/or electronic methods.<sup>4</sup> A new IEE technique, dual red imaging (DRI), has been introduced that captures images using three kinds of wavelengths: 500 nm, 600 nm, and 630 nm. The 540 nm light can visualize small blood vessels in shallow tissue, and the latter two (600 nm and 630 nm) can penetrate deep into the tissue and reflect with little attenuation. The displayed image

shows that the 600 nm light is significantly more attenuated than the 630 nm light, which enhances the visibility of the deep vessels.<sup>5</sup> When blood vessels are absent, the reflected light is visualized with low attenuation; however, the reflected 600 nm light becomes highly attenuated in the presence of highly concentrated blood when compared to the presence of low-concentrated blood. Thus, the reflected image becomes reddish with the concomitant occurrence of a color contrast. This enables visualization of thick vessels, allowing instant discovery of bleeding points.

Yorita et al.<sup>6</sup> showed that DRI enhanced the visibility of bleeding spots during gastric ESD, hence reducing the need for coagulation. Thus, they suggested that DRI could be a potentially safe method to perform gastric ESD.<sup>7</sup> This study had several limitations. The results were based on a small sample size with a retrospective review of images. Moreover, there was a selection bias, which is an inevitable limitation of a retrospective study.

There was a report on the role of DRI in colorectal ESD that stated that DRI improved the visibility of arteries in the submucosal layer,<sup>5</sup> thereby enhancing the speed and safety of the procedure. Notably, it has been reported to be useful in predicting the prognosis of ulcerative colitis and the depth of esophageal varices, especially with respect to submucosal fatty tissue.<sup>8,9</sup>

In this study, the authors have demonstrated DRI as a useful approach in gastric ESD, especially under unfavorable conditions such as blood pooling. Additional studies with a larger sample size will be needed to verify the role of DRI in gastric ESD.

Received: January 6, 2020 Revised: January 12, 2020  
Accepted: January 12, 2020

**Correspondence:** Joo Young Cho  
Department of Gastroenterology, Cha Bundang Medical Center, Cha University College of Medicine, 59 Yatap-ro, Bundang-gu, Seongnam 13496, Korea  
**Tel:** +82-31-780-5641, **Fax:** +82-32-780-5005, **E-mail:** c jy6695@naver.com  
**ORCID:** <https://orcid.org/0000-0002-7182-5806>

© This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/3.0>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

### Conflicts of Interest

---

The authors have no financial conflicts of interest.

### ORCID

---

In Kyung Yoo: <https://orcid.org/0000-0003-0909-339X>

## REFERENCES

1. Jeon SW, Jung MK, Cho CM, et al. Predictors of immediate bleeding during endoscopic submucosal dissection in gastric lesions. *Surg Endosc* 2009;23:1974-1979.
2. Yamamoto Y, Kikuchi D, Nagami Y, et al. Management of adverse events related to endoscopic resection of upper gastrointestinal neoplasms: review of the literature and recommendations from experts. *Dig Endosc* 2019;31 Suppl 1:4-20.
3. Tajiri H, Kitano S. Complications associated with endoscopic mucosal resection: definition of bleeding that can be viewed as accidental. *Dig Endosc* 2004;16(Suppl 1):S134-S136.
4. Jang JY. The past, present, and future of image-enhanced endoscopy. *Clin Endosc* 2015;48:466-475.
5. Ninomiya Y, Oka S, Tanaka S, et al. Clinical impact of dual red imaging in colorectal endoscopic submucosal dissection: a pilot study. *Therap Adv Gastroenterol* 2016;9:679-683.
6. Yorita N, Oka S, Tanaka S, et al. Clinical usefulness of dual red imaging in gastric endoscopic submucosal dissection: a pilot study. *Clin Endosc* 2020;53:54-59.
7. Yahagi N, Horii J, Goto O, et al. Dual red imaging; a new endoscopic imaging technology for clear visualization of bleeding points in endoscopic submucosal dissection. *Gastrointest Endosc* 2014;79(5 Suppl):AB464.
8. Furuichi Y, Gotoda T, Kasai Y, et al. Role of dual red imaging to guide intravariceal sclerotherapy injection of esophageal varices (with videos). *Gastrointest Endosc* 2018;87:360-369.
9. Naganuma M, Yahagi N, Besho R, et al. Evaluation of the severity of ulcerative colitis using endoscopic dual red imaging targeting deep vessels. *Endosc Int Open* 2017;5:E76-E82.