



Endoscopic submucosal dissection of early-stage rectal cancer using full-time red dichromatic imaging to minimize and avoid significant bleeding

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Management of bleeding during endoscopic resections (and even more so in endoscopic submucosal dissection [ESD]) is a critical aspect of the procedure. The low rectum has a higher risk of bleeding because of a rich venous plexus; this can increase procedure time compared with the proximal rectum.¹ Red dichromatic imaging (RDI), a novel image-enhanced endoscopy technology, has been reported to improve the visibility of deep vessels and bleeding points compared with white-light imaging (WLI).²⁻⁴ WLI can be switched to RDI instantly with the press of a single button on the endoscope. We present a case of ESD in the low rectum in which RDI was very useful and effective.

An 84-year-old man presented with an 18-mm type 0-Is tumor in the low rectum with concomitant internal hemorrhoids. The anal margin of the lesion extended onto the

dentate line. The tumor was Type 2B and V₁ severe irregular by Japanese NBI Expert Team and Kudo pit pattern classifications, respectively. Prior biopsy revealed Group 5 adenocarcinoma, and we decided to perform en bloc resection by ESD for accurate histologic staging.

We used a GIF-H290T gastroscope (Olympus, Tokyo, Japan), EVIS X1 (Olympus) as the light source, a standard injection needle (Boston Scientific, Boston, Mass, USA), and a Dual knife J (Olympus) for ESD.

The entire procedure from submucosal injection to mucosal incision and submucosal dissection with complete resection was performed using RDI (Fig. 1). Submucosal injection was initiated after assessment of the location of the deep vessels using RDI. Circumferential mucosal incision was then performed without significant bleeding.



Figure 1. Endoscopic submucosal dissection of a rectal tumor using red dichromatic imaging. **A**, A 20-mm-diameter, type 0-Is tumor in the rectum was in contact with the dentate line. **B**, Mucosal injection with red dichromatic imaging while avoiding deep vessels (*arrow*). **C**, Mucosal incision was made to avoid the blood vessels (*arrow*). **D**, Appearance of bleeding with white-light imaging. **E**, Visualization of bleeding point (*arrow*) with red dichromatic imaging; bleeding is notably more distinct than with white-light imaging. **F**, Submucosal dissection with red dichromatic imaging.

When bleeding occurred, we identified bleeding points easily with RDI and achieved targeted, quick, and effective hemostasis. With RDI, the bleeding points were more distinct compared with WLI. From injection to resection, the tumor was resected en bloc in 30 minutes as a 30- × 20-mm specimen. No adverse events occurred. The patient's postprocedure course was uneventful. Histologic examination of the resected specimen revealed tubular adenocarcinoma with deeper submucosal invasion, Ly0, V0, tumor budding (-), VM0, HM0 (Video 1, available online at www.VideoGIE.org).

RDI enhances the contrast between the vessel and surrounding tissues by using red, amber, and green wavelengths that facilitate better visualization of bleeding points and deep vessels, which appear as darker yellow with RDI. RDI may reduce the stress experienced by endoscopists, allowing them to avoid vessels and treat bleeding quickly and effectively when it occurs.^{3,4}

Although it has been previously reported that RDI enables a shortened time to achieve hemostasis,^{5,6} its usefulness in helping to prevent bleeding during all steps of ESD has yet to be clarified. In this ESD case, we demonstrated the benefits of full-time RDI, which included not only identifying bleeding points for quick and effective hemostasis but also preventing bleeding by avoiding deep vessels.

In conclusion, RDI appears to be a promising image-enhanced endoscopy technology for reducing risk and facilitating quick treatment of bleeding during endoscopic resections. Widespread use of full-time RDI in the future is expected to reduce the frequency of bleeding adverse events and the procedure time of ESD, other endoscopic resections, and endoscopic bleeding treatment.

DISCLOSURE

Dr Uraoka has received lecture fees from Olympus Co. All other authors disclosed no financial relationships.

Abbreviations: ESD, endoscopic submucosal dissection; RDI, red dichromatic imaging; WLI, white-light imaging.

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