

A successful case of endoscopic submucosal dissection using the water pressure method for early gastric cancer with severe fibrosis



Kurato Miyazaki, MD,^{1,2} Motohiko Kato, MD, PhD,^{1,2} Takanori Kanai, MD, PhD,¹ Naohisa Yahagi, MD, PhD²

The water pressure method (WPM) is an endoscopic submucosal dissection (ESD) technique that uses a water stream from the working channel of an endoscope.¹⁻⁴ In addition to the floating force and magnification effect provided by underwater ESD, WPM allows us to flip up and get under the mucosal flap easily. Also, by vibrating the submucosa with the water stream, the submucosa and lateral edge that should be dissected can be precisely identified. Here, we report a case of gastric cancer with severe fibrosis due to previous ESD, which was successfully treated by ESD with WPM (Video 1, available online at www.giejournal.org).

A 63-year-old man was referred to our hospital for treatment of gastric cancer. He had a history of gastric cancer 3 years earlier, which was curatively resected by ESD at another hospital. This time, an early gastric cancer of 15 mm in size was found on the posterior wall of the lower stomach, located on the previous ESD scar (Figs. 1 and 2).

We sedated the patient with dexmedetomidine hydrochloride and flunitrazepam and used a therapeutic endoscope with a water jet function (GIF-H290T; Olympus, Tokyo, Japan). Submucosal injection was performed using a 25G sharp needle (NeedleMaster, Olympus), and a submucosal injection of 10% glycerin solution (Glyceol; Chugai Pharmaceutical Co, Ltd, Tokyo, Japan) was administered. For the energy device, we used a needle-

type knife with injection function (DualKnife J, Olympus) powered by a high-frequency electrosurgical unit (VIO 3, ERBE Elektromedizin, Tübingen, Germany), which supported lesion marking (soft coagulation function, effect 3.3), hemostasis with the knife tip (spray coagulation function, effect 1.2), mucosal incision (dry cut function, effect 2.5), and submucosal dissection (swift coagulation, effect 3.5). This setting was not specially set for WPM.

After we identified the area of the lesion by magnifying endoscopy with narrow-band imaging and placed cautery points around the lesion (Fig. 3), we started mucosal incision on the anal side. The posterior side, which was located on the previous ESD scar, was poorly lifted owing to severe fibrosis (Fig. 4). It was difficult to get under the flap, so we switched from conventional ESD to WPM. We filled the lumen with saline solution and hit the water stream under the flap so we could identify the edge of the excision line (Fig. 5). The hood attached to the tip of the endoscope was replaced with a tapered hood specifically designed for therapeutic use (Fig. 6A) so that we could get under the flap sufficiently. Although it was quite difficult to identify the dissection layer, recognition of the direction of muscle running along the short axis of the stomach enabled us to distinguish strong fibrotic tissue from the proper muscle layer (Fig. 6B). By using WPM, we kept a clear view of the

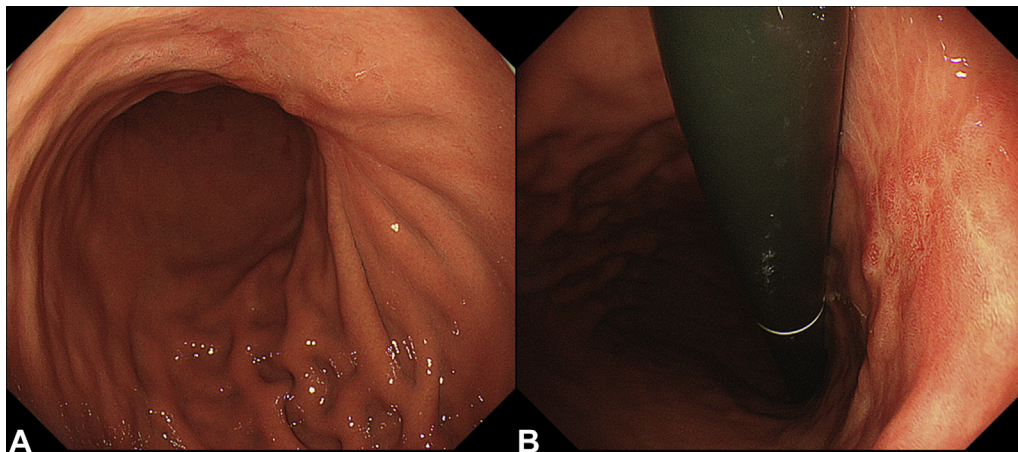


Figure 1. The white-light image of the lesion and the scar due to previous endoscopic submucosal dissection. **A**, An image viewed from the oral side. **B**, An image viewed from the anal side.

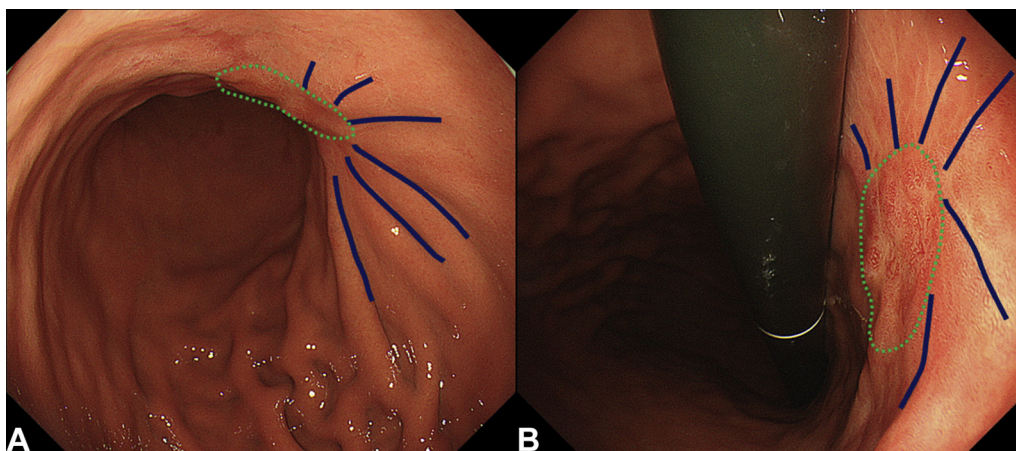


Figure 2. The white-light image of the lesion (surrounded by *green dotted line*) and the scar due to previous endoscopic submucosal dissection (*blue solid line*). **A**, An image viewed from the oral side. **B**, An image viewed from the anal side.

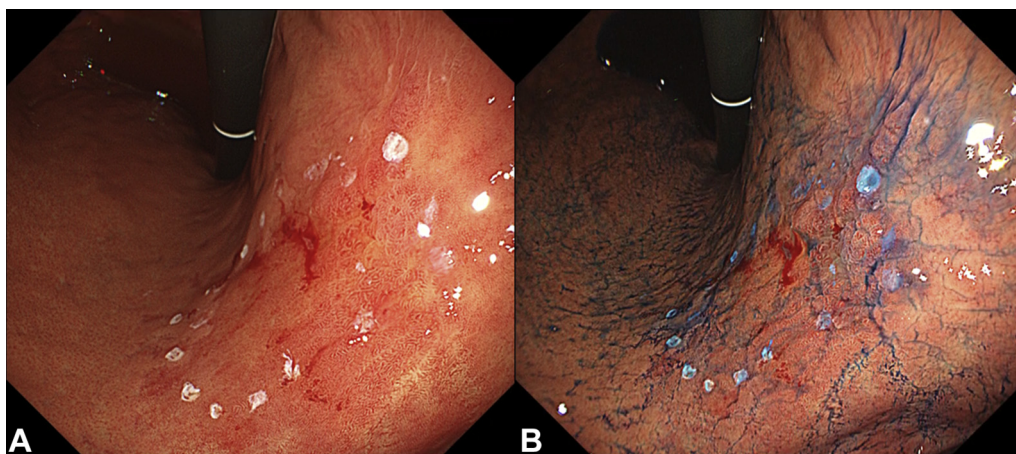


Figure 3. The white-light image after marking dots around the lesion. **A**, The posterior side of the lesion was located on a previous endoscopic submucosal dissection scar. **B**, We sprayed indigo carmine.

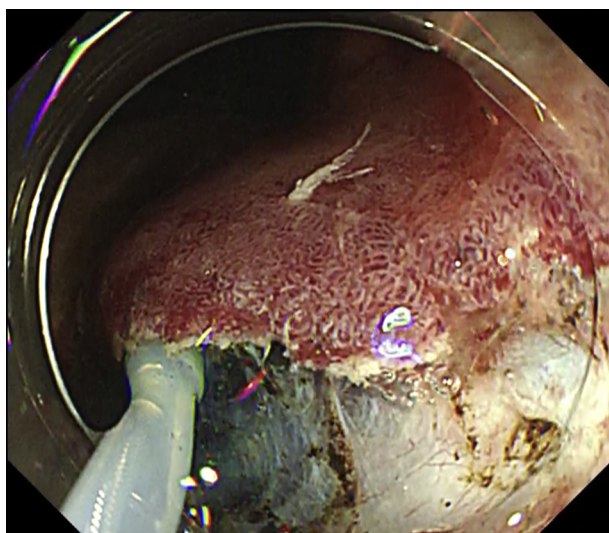


Figure 4. The white-light image during submucosal injection with Dual-Knife J. The posterior side of the lesion was poorly lifted because of severe submucosal fibrosis, whereas the anterior side was sufficiently lifted.

dissecting layer; en bloc resection was achieved in 72 minutes without any adverse events, although the submucosa was highly fibrotic (Figs. 7 and 8).

After ESD, the patient was hospitalized for 4 days as initially planned. Although WPM had a risk of aspiration pneumonia in this case because this ESD was not performed with the patient under general anesthesia with endotracheal intubation, aspiration pneumonia did not occur because the amount of water in the stomach was appropriately controlled. The final pathology was poorly differentiated adenocarcinoma and moderately differentiated tubular adenocarcinoma with an invasion depth of mucosa and negative horizontal and vertical margins, without lymphovascular invasion.

WPM enabled us to perform safe and precise submucosal dissection by improving the visibility of the dissecting layer. WPM improves outcomes even in challenging cases with severe fibrosis after previous treatment, although there is a risk of aspiration if the procedure is not performed with the patient under general anesthesia.

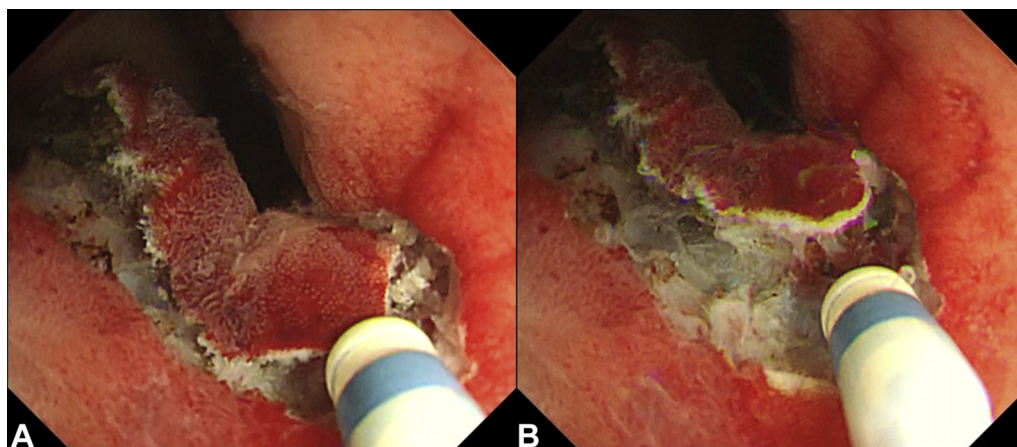


Figure 5. The white-light image during submucosal dissection. **A**, We filled the lumen with saline solution but could not identify the edge of the excision line. **B**, We hit the water stream under the flap by waterjet function, so we could sufficiently identify the edge of the excision line.

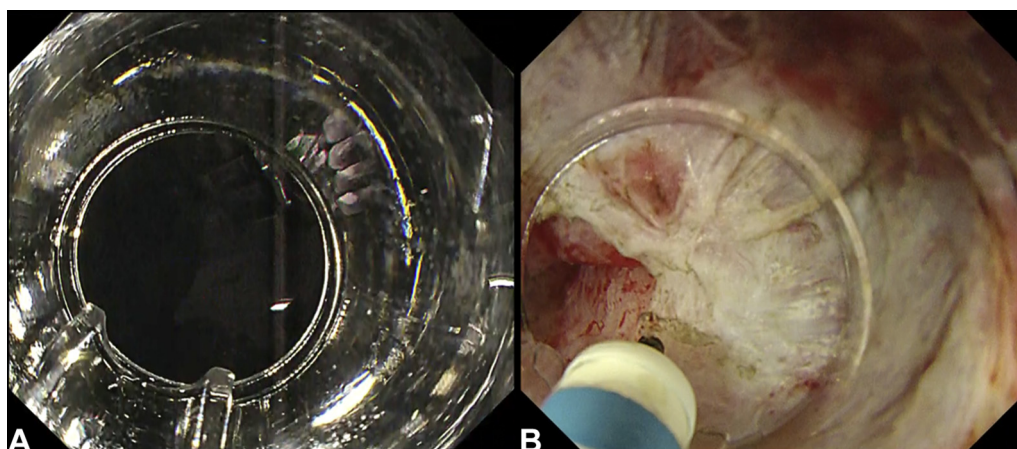


Figure 6. The tapered hood specifically designed for therapeutic use. **A**, The tip is relatively long and tapered, and devices such as knives can be set steadily. **B**, We could get under the flap sufficiently and improve visualization of the excision line.

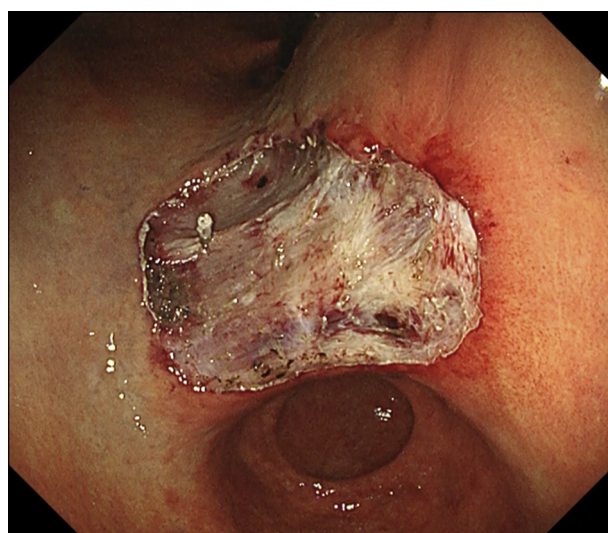


Figure 7. White-light image of the post-endoscopic submucosal dissection ulcer. We completed endoscopic submucosal dissection without any adverse events.

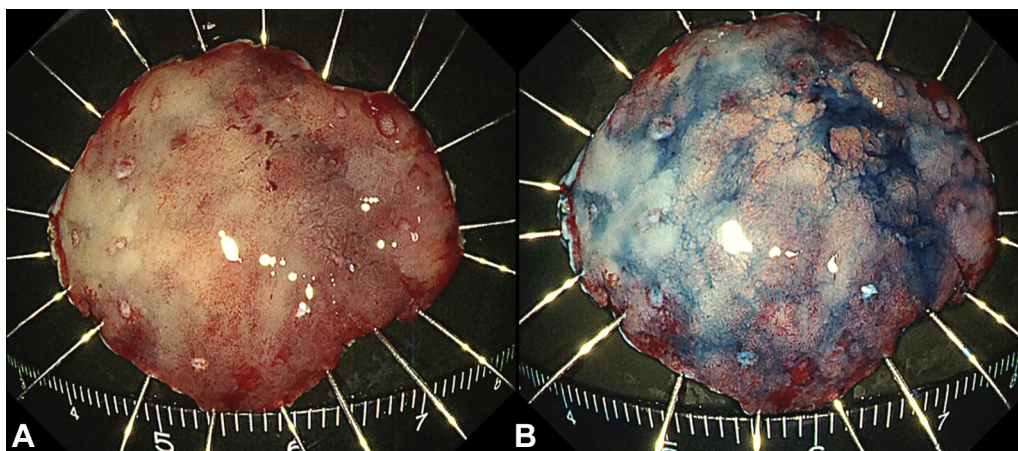


Figure 8. The white-light image of the specimen. **A**, En bloc resection was achieved. **B**, We sprayed indigo carmine and identified that the horizontal margin was negative.

DISCLOSURE

All authors disclosed no financial relationships.

Abbreviations: ESD, endoscopic submucosal dissection; WPM, water pressure method.

REFERENCES

1. Yahagi N, Nishizawa T, Sasaki M, et al. Water pressure method for duodenal endoscopic submucosal dissection. *Endoscopy* 2017;49: E227-8.
2. Kato M, Takatori Y, Sasaki M, et al. Water pressure method for duodenal endoscopic submucosal dissection (with video). *Gastrointest Endosc* 2021;93:942-9.
3. Masunaga T, Kato M, Yahagi N. Successful endoscopic submucosal dissection using the water pressure method for cervical esophageal cancer. *Dig Endosc* 2021;33:e93-4.
4. Masunaga T, Kato M, Yahagi N. Water pressure method overcomes the gravitational side in endoscopic submucosal dissection for gastric cancer. *VideoGIE* 2021;6:457-9.

Division of Gastroenterology and Hepatology, Department of Internal Medicine, Keio University School of Medicine, Tokyo, Japan (1), Division of Research and Development for Minimally Invasive Treatment, Cancer Center, Keio University School of Medicine, Tokyo, Japan (2).

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