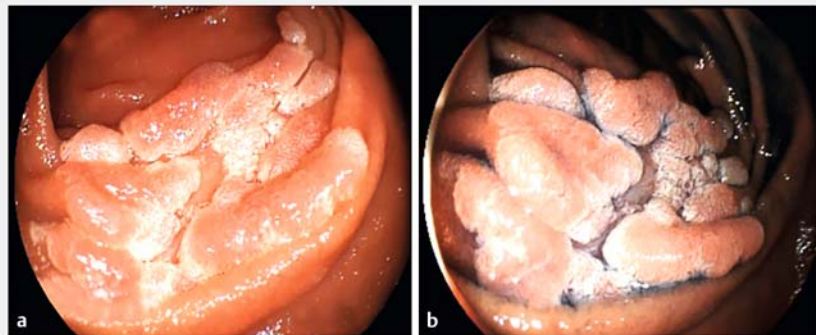


Underwater endoscopic mucosal resection of recurrent duodenal lateral spreading tumor

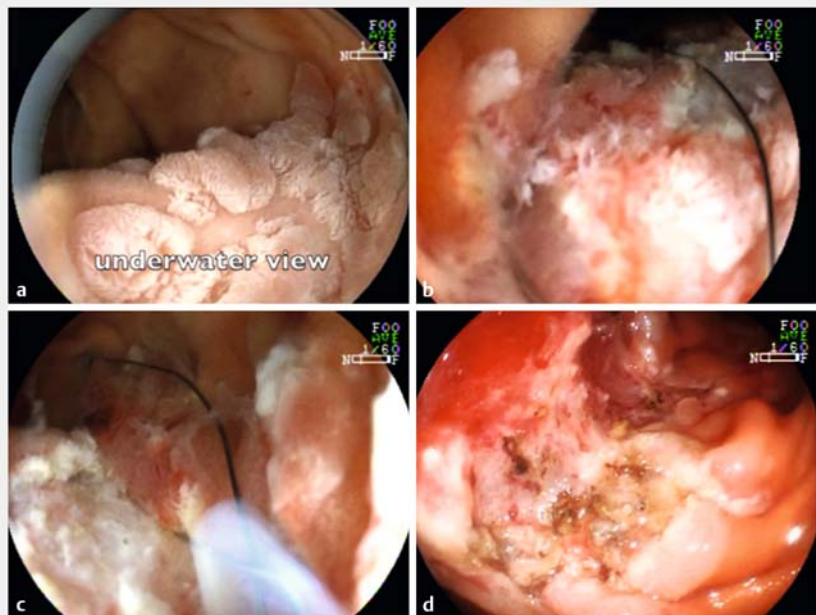
A 57-year-old woman with a history of recurrent duodenal granular laterally spreading tumor (LST-G) was referred to our hospital. The lesion was located in the second portion of the duodenum, opposite the papilla. The patient had undergone two endoscopic mucosal resections (EMRs) in another endoscopy center. Histologic analysis showed a tubular adenoma with low-grade dysplasia; margins were not evaluable.

Conventional EMR of the recurrent tumor would have been difficult because of submucosal fibrosis. Endoscopic submucosal dissection (ESD) for duodenal recurrent tumors carries a high risk of perforation and demands highly advanced skills [1, 2]. We decided to perform underwater EMR (UEMR), which was described first by Binmoeller et al. [3] and subsequently demonstrated its usefulness for residual duodenal lesions [4]. The main advantage of this technique is that it avoids submucosal injection and allows potential resection of fibrotic areas.

The patient consented, and endoscopic procedure was performed under general anesthesia, orotracheal intubation, in left lateral position. A high-definition gastroscope (EG-590ZW; Fujinon, Saitama, Japan) was used. We identified an LST-G 40 mm in length in the duodenum, incorporating three duodenal folds (Pit pattern type III-L) (► Fig. 1). After making diathermic marks with a multifilament snare (Boston Scientific, Tokyo, Japan), CO₂ insufflation was switched off and exchanged for sterile distilled water. A piecemeal UEMR was performed using a monofilament snare (Endoflex, Voerde, Germany) and electro-surgical unit (Endo-cut Q, effect 3, VIO 200; Erbe, Tübingen, Germany). Intra-procedural bleeding was treated with snare tip soft coagulation (Soft Coagulation 80 W, Effect 4, VIO 200) and coagulation forceps (Boston Scientific, Marlborough, Massachusetts, USA). Complete resection was achieved in 45 minutes



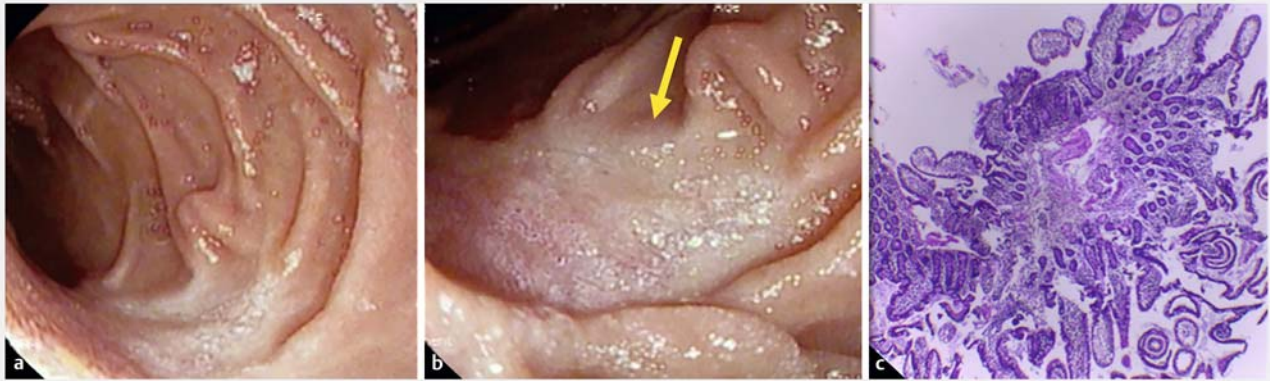
► Fig. 1 Endoscopic images. **a** Duodenal granular laterally spreading tumor. **b** Chromoendoscopy with indigo carmine showed pit pattern III-L.



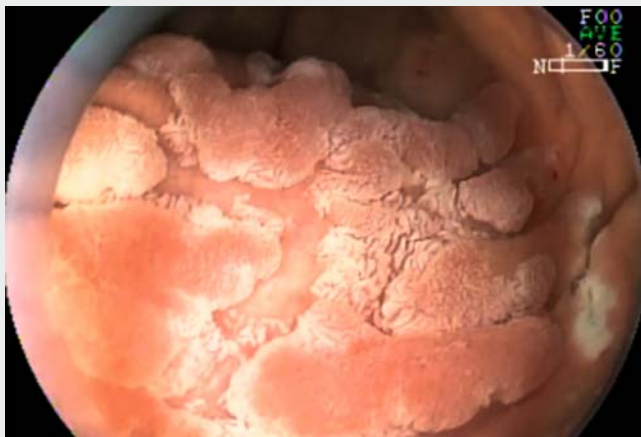
► Fig. 2 Underwater endoscopic mucosal resection. **a** Underwater view of the lesion. **b** Resection with a monofilament snare in a fibrotic area. **c** Snaring ensured that a wide margin of normal mucosa was captured. **d** Post-resection defect.

(► Fig. 2, ► Video 1). The postresection defect was not closed with clips. Most of the specimens were retrieved using a Roth net (US Endoscopy, Mentor, Ohio, USA).

The patient remained hospitalized, started oral feeding on postoperative Day 1, and was discharged on Day 2 without adverse events. Histologic analysis revealed a tubular adenoma with low- and high-grade dysplasia. Upper endoscopy 8



► **Fig. 3** Endoscopic images from follow-up at 8 months. **a** Duodenal lumen free of remnant lesion. **b** Yellow arrow shows resection scar. **c** Histopathologic examination of the scar revealed no adenomatous lesion.



► **Video 1** Underwater endoscopic mucosal resection of recurrent duodenal laterally spreading tumor.

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Competing interests

Dr. Villarroel is a consultant for Boston Scientific.

The remaining authors declare that they have no conflict of interest.

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months later showed no remnant duodenal lesion. Biopsies of the scar revealed no residual adenoma (► **Fig. 3**).

UEMR enables the resection of large laterally spreading duodenal adenomas without submucosal injection, which is beneficial in fibrotic areas. This case demonstrates successful endoscopic management of a recurrent duodenal LST, avoiding unnecessary surgery.

Endoscopy_UCTN_Code_TTT_1AO_2AG