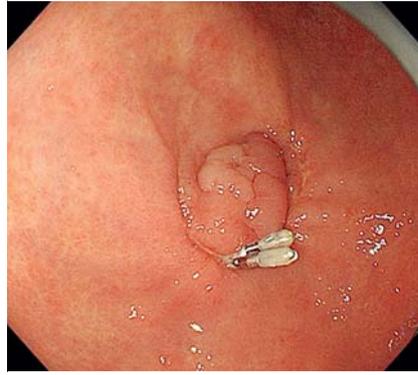


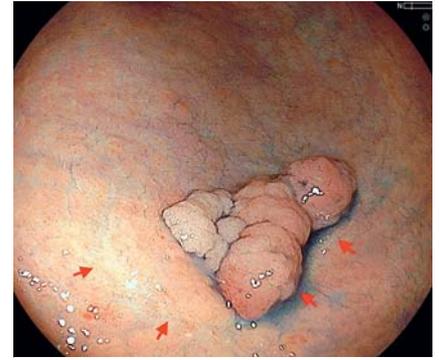
Underwater endoscopic mucosal resection for remaining early gastric cancer after endoscopic submucosal dissection

Salvage treatment for any remaining early gastric cancer after endoscopic resection is a challenge. Conventional endoscopic mucosal resection (EMR) is difficult for such lesions because severe submucosal fibrosis prevents lifting of the mucosa during submucosal injection. Endoscopic submucosal dissection (ESD) is an option in such cases but requires considerable expertise. Underwater EMR (UEMR), which was proposed by Binmoeller et al. in 2012 for the resection of colorectal polyps, involves filling the lumen with water instead of using a submucosal injection [1,2]. UEMR has also been adapted for recurrent lesions after piecemeal resection of colorectal polyps and duodenal lesions because of its safety and simplicity [3,4].

An 84-year-old woman was admitted to her local hospital for treatment of early gastric cancer. ESD was attempted but was interrupted because of an intraoperative perforation. The patient was referred to our hospital for treatment of the remaining early gastric cancer (► Fig. 1). We performed UEMR, with the patient under deep sedation, as salvage treatment for a 15-mm protruding lesion in the greater curvature of the gastric angle (► Fig. 2; ► Video 1). Upper gastrointestinal endoscopy with the waterjet function was used. The lumen was filled with normal saline instead of air. Water immersion enabled us to float the lesion and identify its base (► Fig. 3 a). Moreover, it became easier to secure the operating space. We achieved en bloc resection with a 25-mm snare (Snare Master Plus; Olympus Co., Tokyo, Japan) and an electrosurgical unit (VIO300D; ERBE, Tübingen, Germany) which was set at Endocut Q mode (effect 3) and Forced Coag mode (effect 2) (► Fig. 3 b). The procedure was completed within 3 minutes without adverse events. No apparent residual tumor was seen around the resected area (► Fig. 3 c).



► Fig. 1 Endoscopic image taken 2 weeks after incomplete endoscopic submucosal dissection showing an arcuate scar and two endoclips on the side of the protruding lesion at the greater curvature of the gastric angle.



► Fig. 2 Endoscopic image taken just before endoscopic resection, 6 months after incomplete endoscopic submucosal dissection (red arrows show the arcuate scar on the side of the lesion).



► Video 1 Underwater endoscopic mucosal resection (EMR) was performed as salvage treatment for the remaining early gastric cancer after endoscopic submucosal dissection (ESD).

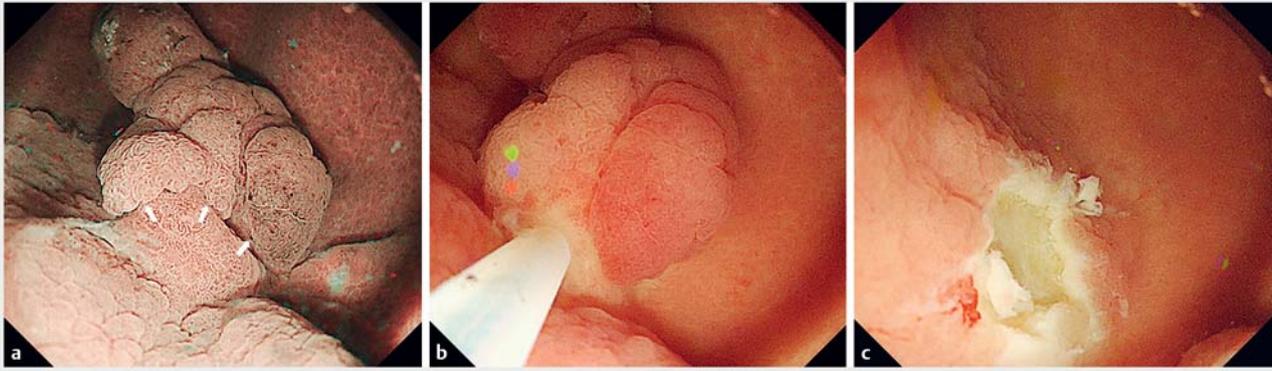
Pathological examination showed an intramucosal, well differentiated tubular adenocarcinoma with clear resection margins (► Fig. 4).

UEMR can be an effective salvage treatment for lesions with submucosal fibrosis.

Endoscopy_UCTN_Code_TTT_1AO_2AG

Competing interests

None



► **Fig. 3** Endoscopic images taken during underwater endoscopic mucosal resection showing: **a** floating of the lesion being facilitated by water immersion (white arrows show the lesion boundary); **b** the base of the lesion being snared with a 25-mm snare; **c** no evidence of residual tumor around the resected part of the lesion.



► **Fig. 4** Pathology of the resected specimen on: **a** macroscopic view; **b** histologic view, revealing a well differentiated tubular adenocarcinoma confined to the mucosa, with clear resection margins.

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