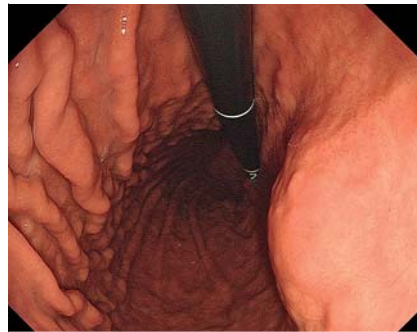


## Traction-assisted endoscopic full-thickness resection for extraluminal type gastrointestinal stromal tumor ▶

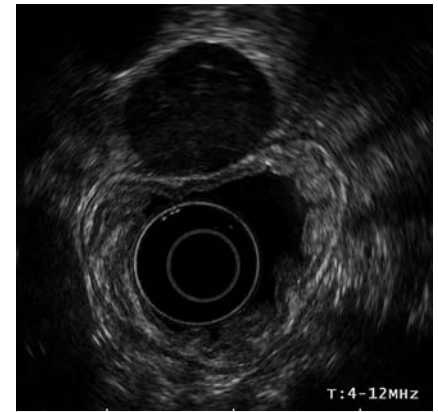


Endoscopic full-thickness resection (EFTR) was developed to treat upper gastrointestinal submucosal tumors (SMT) originating from the muscularis propria (MP) [1, 2]. However, EFTR for extra-luminal type SMT is difficult because this requires intraperitoneal manipulation. A clip-and-line traction method is useful for reduction of procedure time during endoscopic submucosal dissection of early gastric cancer [3] and EFTR of gastric SMT [4]. Recently, we have found that clip-and-line traction method is also useful for EFTR of extra-luminal type gastrointestinal stromal tumors (GISTs).

A woman in her 70s underwent a chest computed tomography scan for anterior chest pain, which identified an exophytic tumor in the stomach. Esophagogastroduodenoscopy revealed an SMT in the gastric body (▶ **Fig. 1**). Echoendoscopy revealed the 24-mm tumor connected to the muscularis propria and protruding into the peritoneal cavity (▶ **Fig. 2**). EFTR was performed under general anesthesia with a double-channel multi-bending scope (GIF-2TQ260M; Olympus Medical Co., Ltd., Tokyo, Japan) using an IT knife 2 (KD-611L; Olympus) and a Flush Knife BT-S 2.0 (DK2620J-B20S; Fujifilm Medical, Co., Ltd., Tokyo, Japan) as follows (▶ **Video 1**): 1) mucosal incision and submucosal dissection to expose the border between the tumor and the MP circumferentially around the tumor; 2) muscularis incision along the tumor margin (▶ **Fig. 3a**); 3) A clip was tied with 3–0 polyester suture to the mucosa overlying the tumor (▶ **Fig. 3b**); 4) The tumor was pulled into the gastric lumen, facilitating peritoneal dissection and a remnant MP incision without pseudo-capsule injury (▶ **Fig. 3c**); and 5) purse-string closure of the gastric wall defect using multiple clips (SureClip ROCC-D-26-165-C; Micro-Tech, Nanjing, China) and endoloops (HX-400U-30; Olympus) was performed (▶ **Fig. 3d**) [5]. The procedure took 110



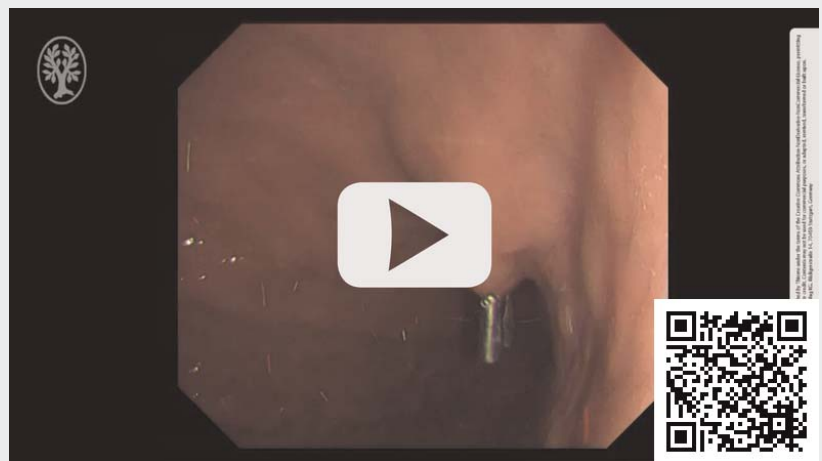
▶ **Fig. 1** Esophagogastroduodenoscopy showing a submucosal tumor at the lesser curvature of the mid-gastric body.



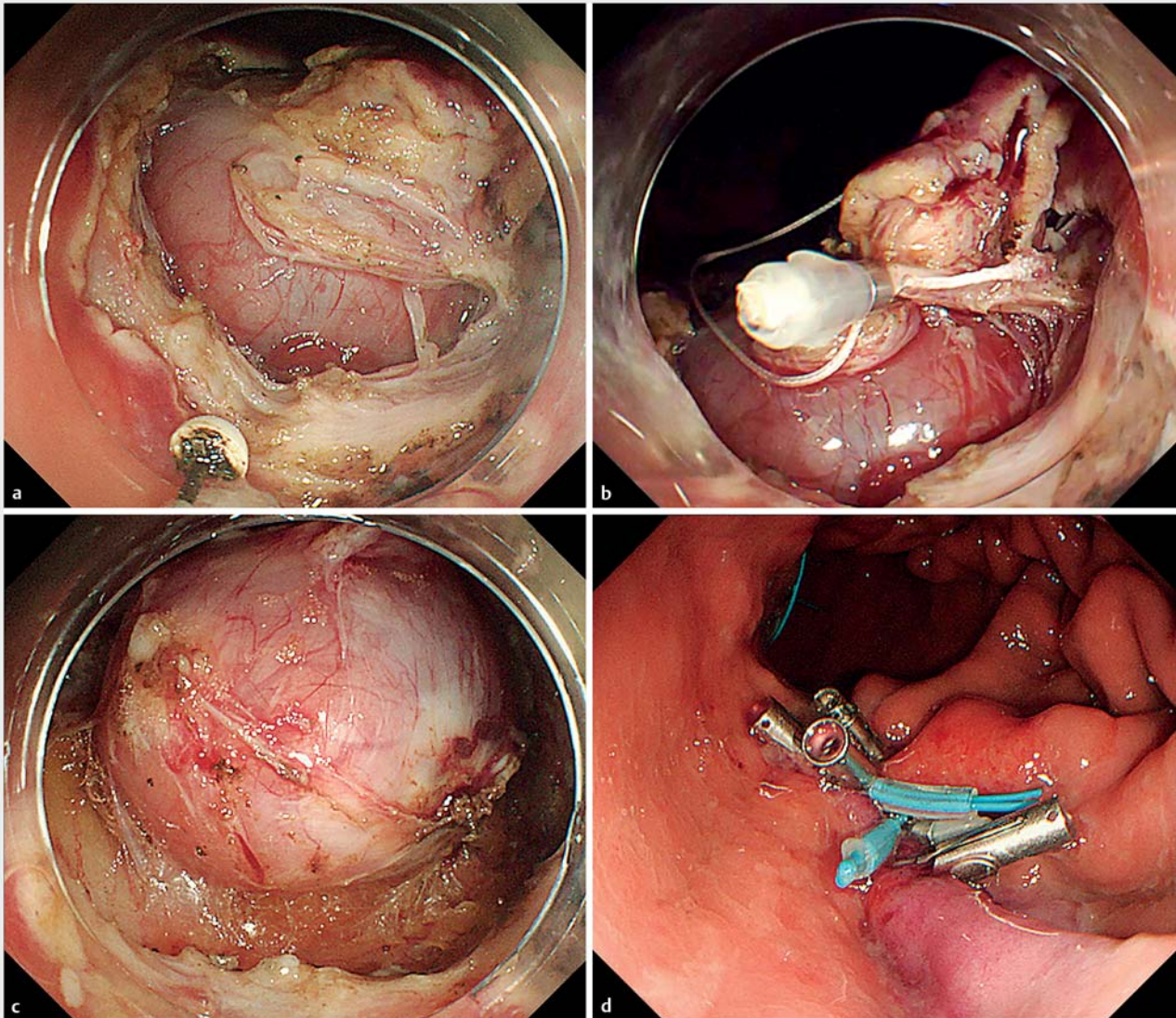
▶ **Fig. 2** Echoendoscopic image showing the exophytic low-echoic tumor measuring 24 mm, connected to the muscularis propria.

min. Histological examination showed that the lesion was an intermediate-risk GIST. The patient began a liquid diet 4 days after the procedure and was discharged on day 8.

### ▶ VIDEO



▶ **Video 1** Only a small amount of solution is injected into the submucosa because use of too much fluid makes recognition of tumor extent in the mucosa difficult. The mucosal incision is made about no more than 5 mm above the base of the tumor to create a mucosal defect of adequate size. During deep mucosal incision (trimming), muscularis incision, and serosal dissection, recognition of the tumor surface is important to avoid pseudo-capsule injury. The clip-and-line traction method facilitates identify the border between the tumor and surrounding tissue, thus enabling preservation of the pseudo-capsule. Circumferential exposure of the muscularis attachment makes completion of the muscularis incision easy. An endo-loop and four to six clips are applied to the mucosa around the gastric wall defect for purse-string closure, which is repeated until the closure is complete.



► **Fig. 3** **a** Muscularis incision along the margin of the tumor using the IT knife 2. **b** Applying a clip with a suture to the mucosa overlying the lesion. **c** Providing traction using the clip-and-line facilitates identification and dissection of the peritoneal plane underneath the tumor. **d** Completing the closure as a purse-string using multiple clips and endoloops.

### Competing interests

The authors declare that they have no conflict of interest.

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*Endosc Int Open* 2021; 09: E1243–E1245

DOI 10.1055/a-1483-9776

ISSN 2364-3722

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70469 Stuttgart, Germany

