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Clinical feasibility of endoscopic full-thickness resection and closure using O-ring and over-the-scope clip system

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Endoscopic full-thickness resection (EFTR) has been developed to treat gastrointestinal stromal tumors (GISTs) of <3 cm [1]. The challenges were to secure the surgical field and to establish a reliable endoscopic closure method [2]. Therefore, we have developed a novel strategy of traction-assisted EFTR followed by O-ring band [3] and over-the-scope clip closure through an animal study [4]. We describe a clinical case in which this strategy was feasible (▶ **Video 1**).

A man in his 40 s presented with an intra-extraluminal mixed-growth type GIST (22 mm in diameter) located in the middle stomach. First, a single port aimed at pneumoperitoneal control was created. Then, a whole circumferential submucosal incision was performed around the lesion, followed by 5-mm perforations at both central ends. A 4-cm loop of suture was anchored on the muscle–serosal layer at both perforation sites (▶ **Fig. 1**). After EFTR of the distal half, the proximal half was resected using clip-line traction (▶ **Fig. 2**). After the lesion was retrieved orally, the anchored loop was grasped and pulled into the endoscopic variceal ligation hood (MD-48720U; Sumius, Tokyo, Japan), and then the anchor clips at both ends were ligated with an O-ring band [3] and an endoloop snare (HX-400U-30; Olympus, Tokyo, Japan) (▶ **Fig. 3**). This procedure enabled the full-thickness defect to be reduced and the surgical field to be secured. After the two defects around the band ligation were approximated using Twin Grasper forceps (Ovesco Endoscopy, Tübingen, Germany), full-thickness inverted closure was completed by deploying the over-the-scope clips (▶ **Fig. 4**). Laparoscopic observation revealed no leakage on indigo carmine air leak test and confirmed inverted full-thickness closure (▶ **Fig. 5**). The procedure time was 80 minutes for traction-assisted EFTR and 35 minutes for O-ring and over-the-scope clip closure. No complications occurred. Histological examination confirmed curative resection of low risk GIST. Traction-assisted EFTR followed by O-ring and over-the-scope clip closure were clinically feasible.

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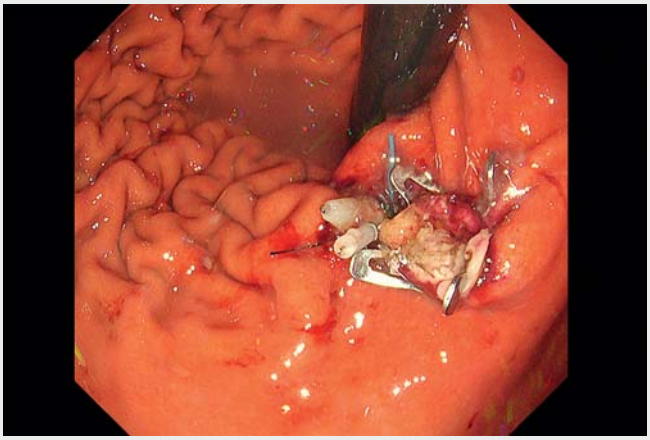
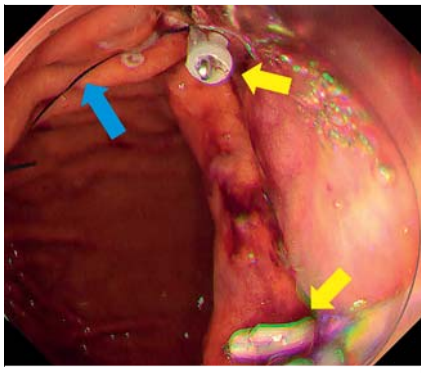
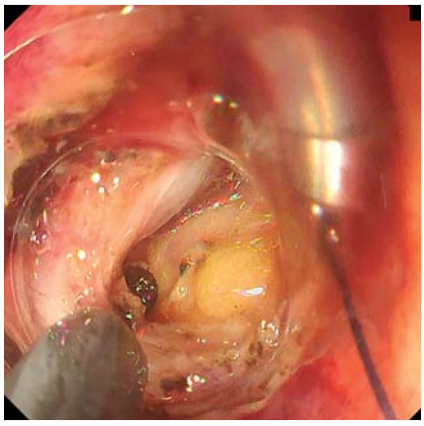


Video 1 Demonstration of the clinical feasibility of O-ring band and over-the-scope clip closure in endoscopic full-thickness resection.



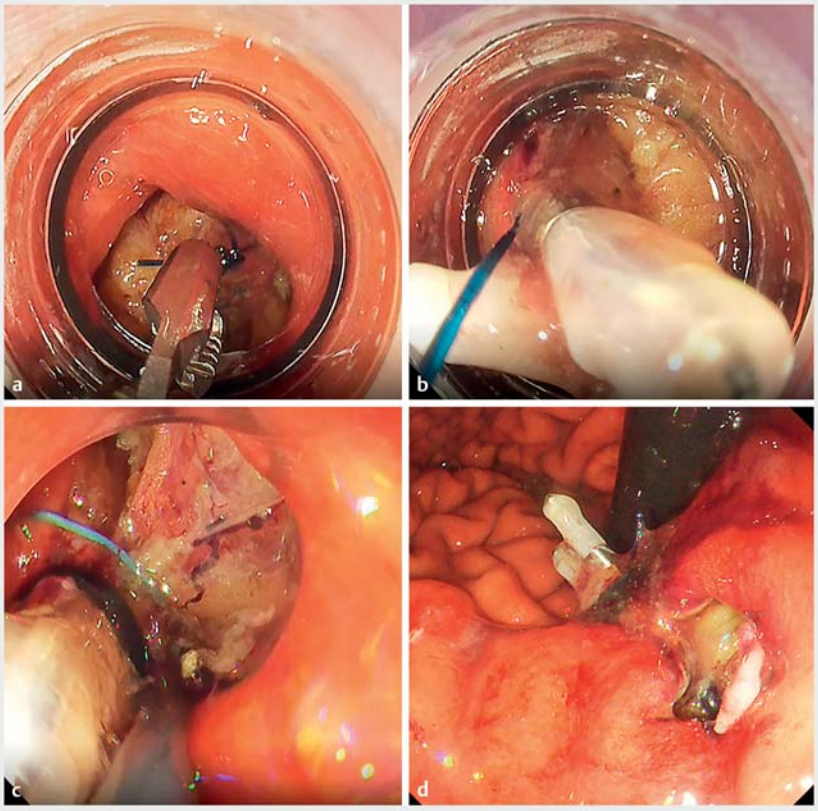
▶ **Fig. 1** A 4-cm loop of suture (blue arrow) was anchored by two clips (yellow arrows) on the muscle–serosal layer at both perforation sites.



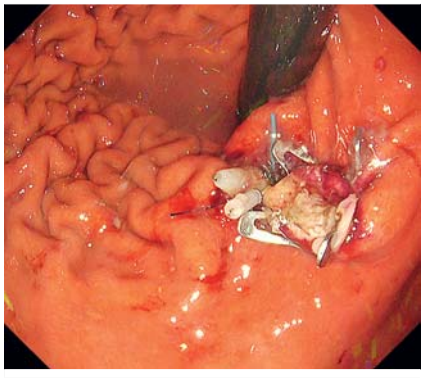
▶ **Fig. 2** Clip-line traction facilitated the proximal full-thickness resection.

Competing interests

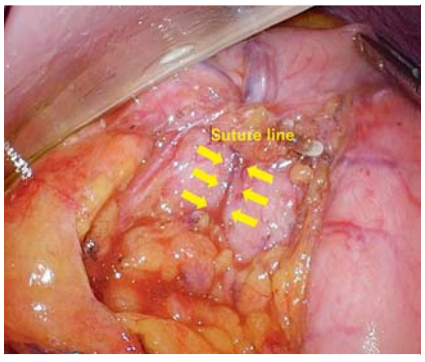
The authors declare that they have no conflict of interest.



▶ **Fig. 3** The procedure of defect approximation. **a** Grasping the prepared suture loop using hemostatic forceps. **b** Capturing two deployed clips into the endoscopic variceal ligation hood by pulling the thread. **c** Reinforcing the O-ring by applying a detachable snare below the O-ring. **d** Successful defect approximation.



▶ **Fig. 4** The two defects were completely closed by Twin Grasper (Ovesco Endoscopy, Tübingen, Germany)-assisted over-the-scope clip deployment.



▶ **Fig. 5** Laparoscopic observation revealed no leakage and confirmed inverted full-thickness closure (yellow arrows).

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