Endoscopic line-attached clipping closure with laparoscopic suturing for duodenal defects involving the medial wall post-endoscopic submucosal dissection

Duodenal endoscopic submucosal dissection (ESD) is difficult to perform owing to a high incidence of complications, including intra/post-ESD perforation and bleeding. A complete closure of the post-ESD mucosal defect can prevent post-ESD perforation, but the success of a complete endoscopic closure depends on the size and location of the defect [1]. Although laparoscopic seromuscular suturing is the most reliable closing method [2], it cannot be used for duodenal lesions over the medial wall.

A 50-year-old man was endoscopically diagnosed with a duodenal adenoma, which was a flat, elevated, 3-cm lesion located near the ampulla and extended from the medial wall to the anterior wall of the second portion of the duodenum (▶Fig.1). This lesion was judged as an indication for ESD, but it was difficult to achieve a complete closure with endoscopic clipping. Hence, duodenal ESD was planned, followed by a combined closure method including endoscopic line-attached clipping and laparoscopic suturing. Endoscopic pancreatic stenting was performed to visualize the position of the ampulla and to prevent post-ESD pancreatitis before ESD (▶Fig.2). A duodenal adenoma was successfully resected en bloc with ESD. The post-ESD mucosal defect extended from the medial wall to the anterior wall. The anterior-wall defect was visualized with a transparent laparoscopic light, whereas no laparoscopic light was observed in the medial defect (▶Fig.3). Subsequently, the anterior-wall defect was laparoscopically sutured from the serosal side, and the medial-wall defect was closed with line-attached clipping. Finally, the post-ESD mucosal defect was completely closed (▶Fig.4). The resected tumor was pathologically diagnosed as high-grade dysplasia (▶Fig.5). No adverse events were observed after the treatment. The pancreat-
A stent was endoscopically retrieved 2 months later. 
Endoscopic line-attached clipping closure with laparoscopic suturing is a useful closure technique for duodenal post-ESD defects involving the medial wall (▶Video 1).

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**Competing interests**

The authors declare that they have no conflict of interest.

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