

Laparoscopic and endoscopic cooperative surgery for duodenal tumor resection

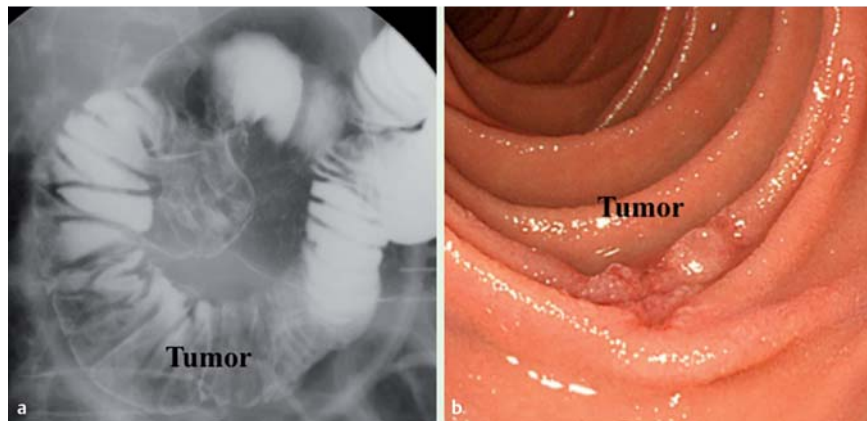


Fig. 1 Tumor location. **a** Barium image shows the third portion of the duodenum. **b** The tumor was confirmed by intraluminal endoscopy.

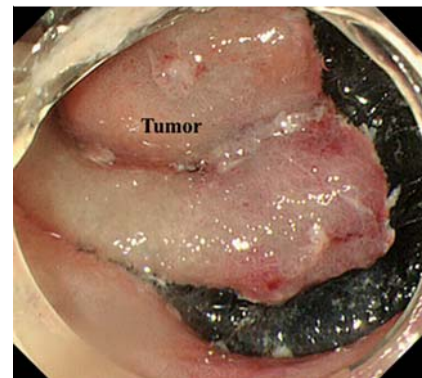


Fig. 2 Endoscopic submucosal dissection around the tumor. Three-quarters of the marked area was cut circumferentially using an insulation-tipped diathermic electro-surgical knife.

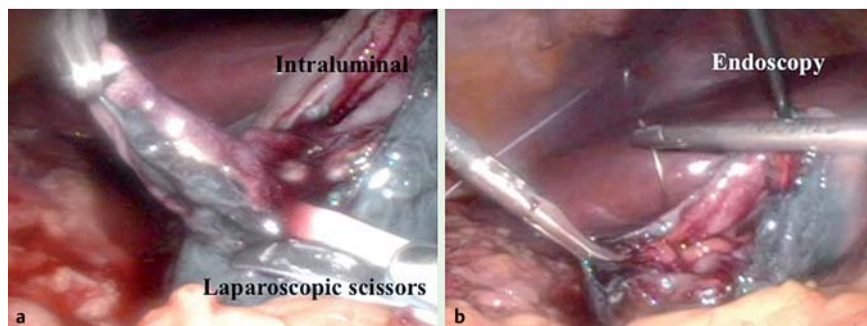


Fig. 3 Laparoscopic seromuscular dissection and suturing of duodenal defect. **a** The portion of duodenum that was everted into the abdominal cavity was dissected using laparoscopic bipolar scissors while tension was applied to the duodenum with an endoscope. **b** The duodenal incision was closed laparoscopically, with appropriate tension provided by the endoscope.

A 66-year-old man was diagnosed with early duodenal cancer in the third portion of the duodenum (► Fig. 1 a, b). Surgical removal of the tumor was performed. The patient was placed in a left semi-lateral position and the tumor location was confirmed by both endoscopy and laparoscopy. First, the tissues surrounding the tumor were incised to the submucosal layer with an insulation-tipped electro-surgical knife, maintaining a 10-mm surgical margin. After full-thickness dissection of three-quarters of the circumference of the tumor from the duodenal lumen (► Fig. 2), the tumor was everted toward the abdominal cavity. An assistant

elevated the nonresected part of the tumor with forceps while tension was applied to the duodenum with an endoscope. The nonresected portion was dissected using laparoscopic bipolar scissors (► Fig. 3a). The incision was closed laparoscopically, with maintenance of adequate lumen diameter (► Fig. 3b). Duodenal tumors are occasionally removed surgically to avoid perforating the duodenal wall by endoscopic mucosal resection, or when the tumor is not elevated by saline injection of the submucosal layer. However, when the tumor is removed surgically from the exterior of the duodenum, identifying the resection range is

difficult and there is the risk of duodenal stenosis resulting from excessive resection. The laparoscopic and endoscopic cooperative surgery (LECS) technique, which was designed to dissect gastric submucosal tumors from the gastric lumen, was first reported by Hiki et al. [1]. When the LECS technique is applied for duodenal tumors, an exact cut line is achieved. Moreover, applying appropriate tension to the duodenum with an endoscope facilitates laparoscopic suturing. In conclusion, LECS is a useful method for full-thickness duodenal tumor resection.

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