

## Laparoscopic and endoscopic cooperative surgery for difficult resection of posterior esophagogastric junction gastrointestinal stromal tumors

The esophagogastric junction (EGJ) is a rare location for gastrointestinal stromal tumors (GIST) and resection remains challenging in posterior/fundic lesions [1]. Laparoscopic and endoscopic cooperative surgery (LECS) is a new combined minimally invasive method [2–4]. Recently, a large series of 126 patients who underwent LECS for gastric submucosal tumors (86 GISTs) was published showing a high rate of feasibility and less than 5% morbidity [5]. We report our experience in difficult gastric GIST resections.

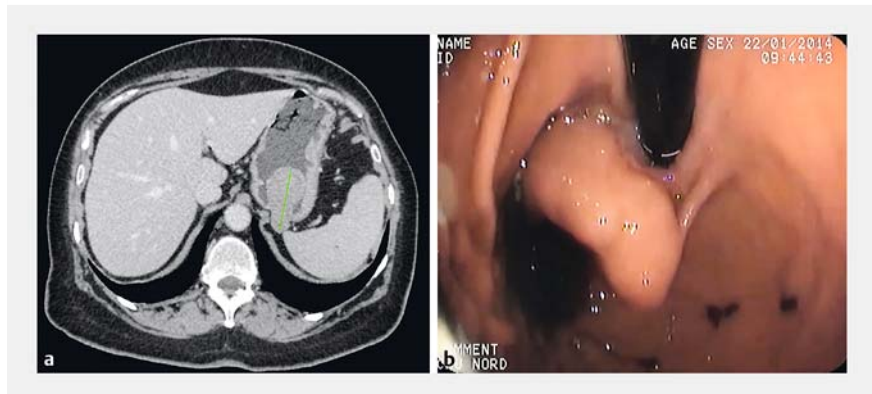
Three patients underwent the procedure for posterior EGJ GISTs with various symptomatology. The absence of metastasis and the location of the GIST were confirmed by esophagogastros-copy and computed tomography scan (►Fig. 1). All procedures were performed under general anesthesia and with orotracheal intubation. The LECS steps were (►Fig. 2, ►Video 1): 1) exposing the esophagus and liberating the angle of His by laparoscopy; 2) full-thickness incision around the tumor by endoscopy (Hook knife; Olympus, Tokyo, Japan); 3) exposure of the tumor pedicle to the surgeon (forceps); 4) laparoscopic resection with linear stapler; 5) gastrotomy suturing.

All LECS procedures were performed successfully in a mean time of 107 minutes (range 90–120 minutes). The blood loss was very low and did not require any blood transfusion. There were no immediate perioperative complications such as spleen wound, pneumothorax, vagus nerve injury, or any other adverse event. The mean tumor size was 5.3 cm, with the largest diameter measuring 5.5 cm, 4.5 cm, and 6 cm, respectively, and with Miettinen grade considered as low or very low risk of recurrence. The mean fasting duration, including nasogastric

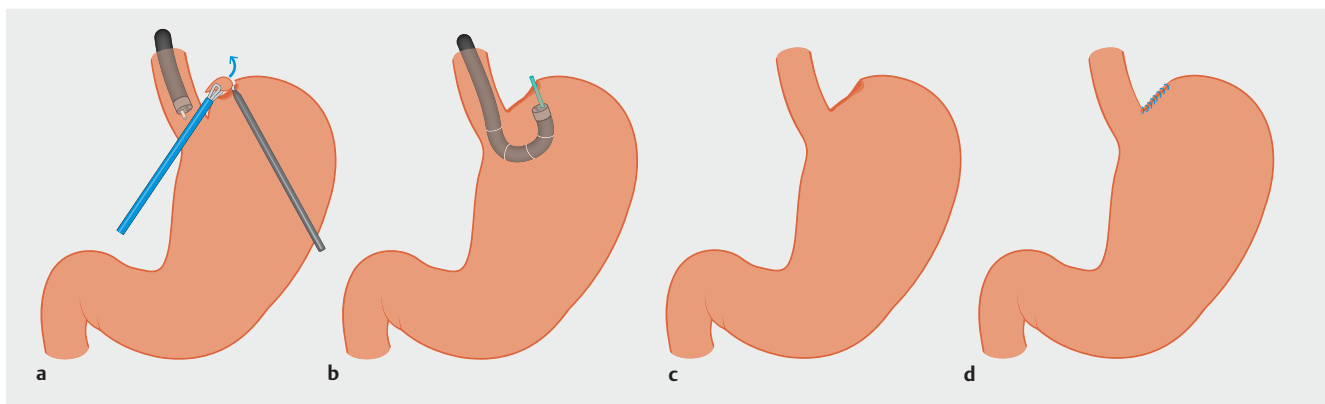
tube time, was 5 days (range 2–8 days), and the median hospital stay was 9.3 days (range 5–14 days). No rehospitalization or latest complications were reported during a mean follow-up of 14 months. There was no recurrence of the tumors.

LECS following a rigorous surgical protocol is safe, and offers easiest accessibility and lower morbidity for complicated gastric GIST resection.

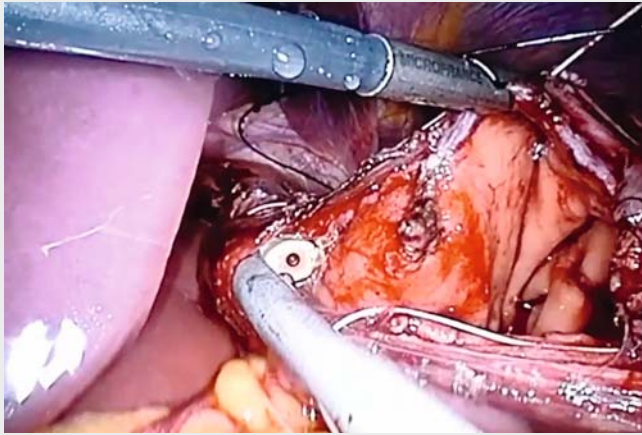
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► Fig. 1 Radiological and endoscopic view of a fundic gastrointestinal stromal tumor. **a** Computed tomography scan showing a stromal esophagogastric junction tumor of 5.2 cm. **b** Endoscopic retrograde view of the intraluminal part of the tumor.



► Fig. 2 Steps of laparoscopic and endoscopic cooperative surgical technique for esophagogastric junction (EGJ) gastrointestinal stromal tumor resection. **a** Tumor location. **b** Endoscopic intraluminal resection using monopolar electrocoagulation and retrograde view. **c** Laparoscopic intraperitoneal final resection of the tumor using a linear stapler. **d** Gastrotomy laparoscopic interrupted suture ends the procedure.



**Video 1** Endoscopic intraluminal dissection of the tumor using carbohydrate gas. Transmural dissection of all layers of the stomach around the tumor was progressively and carefully performed using a diathermic electro-surgical knife. Laparoscopic resection of the tumor using a linear stapler. Tumor could then be removed in a bag and extracted by one of the port orifices.

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#### Competing interests

Professor Barthet is a consultant for Boston Scientific.

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