

Laparoscopic Surgery for a Small Gastrointestinal Stromal Tumor in the Posterior Upper-third of the Stomach

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Abstract: An abdominal tumor was detected in the upper-third of the stomach of a 73-year-old male by health screening. Computed tomography and endoscopic examination revealed a 25 mm spherical submucosal tumor in posterior upper-third of the stomach. The tumor was highly suspected to be a gastrointestinal stromal tumor (GIST). The tumor was resected without stenosis by laparoscopic partial gastrectomy. The patient's post operative course was uneventful and the hospital stay after the operation was 10 days. The tumor was Cajal type of GIST and had intermediate mitotic activity. The patient has no symptoms and a barium enema at one year after surgery and has showed no recurrence and only minimal changes in the remnant stomach.

Key words : Gastrointestinal stromal tumor, Laparoscopic surgery, Submucosal tumor, Stomach

Case

An abdominal tumor was detected in the posterior upper-third of the stomach of a 73-year-old male during a health screening and he was referred to the hospital for a detailed evaluation of the tumor. The patient was 170 cm tall and weighed 60 kg, with a normal body temperature (36.3 degree), normal blood pressure (120/ 68 mmHg), and normal pulse rate (78 beat/ min). The patient was asymptomatic, and his hematological parameters of inflammatory markers were within the normal range. A barium enema and gastroendoscopy showed a submucosal tumor that was covered with normal mucosa in the posterior upper-third of the stomach (Fig. 1). The tumor diameter was 25 mm. Endoscopic ultrasonography revealed a hypoechoic lesion from the third to the fourth layer and normal first and second layers (Fig. 2). The submucosal tumor was highly suspected to be a gastrointestinal stromal tumor (GIST).

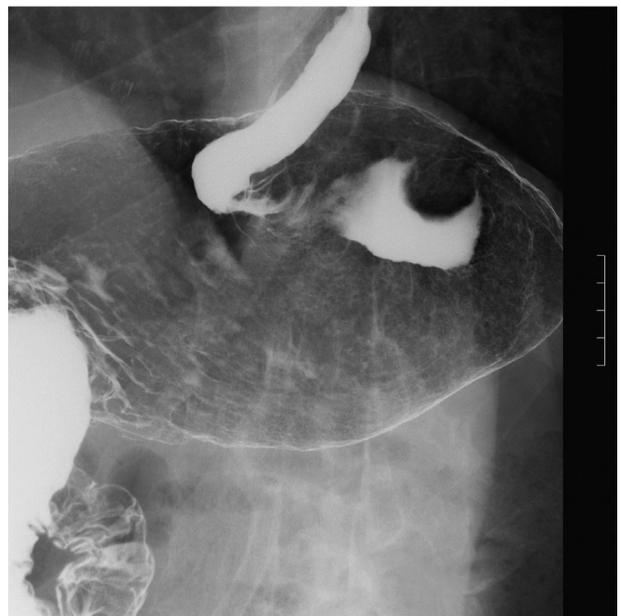


Fig. 1 Double-contrast radiograph showing an elevated lesion in the posterior upper-third of the stomach. The diameter of the contrast defect was 25 mm.

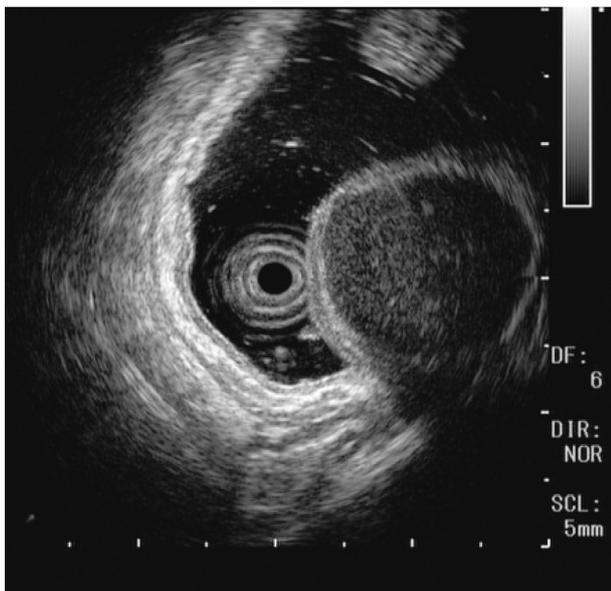


Fig. 2 Endoscopic ultrasonography showing a hypoechoic lesion in the third to the fourth layer.

The whole procedure was performed using 4 working ports and 1 camera port. A 2 cm umbilical incision was made for the first trocar port and the laparoscope was inserted from this port. The short gastric vessels were divided from the greater curvature using ultrasonic coagulation shears. The location of the tumor was confirmed by intraoperative gastroscopy. The tumor was located in the posterior upper-third wall and no serosal invasion was revealed by laparoscopy. Two suture anchors were made on the wall near the tumor for traction. A linear stapler (Tristapler 60, Covidien Japan) was inserted in the planning excision line, which was separated a few micrometers from the tumor using suture anchors (Fig. 3). Intraoperative gastroscopy was performed to exclude possible stenosis and stricture formation. The tumor was resected using an endoscopic linear stapler without opening the gastric cavity. The specimen was placed in a specimen bag and subsequently removed via the umbilical port. The umbilical port was closed to prevent the occurrence of an incisional hernia and the skin was closed with absorbable sutures.

Resection of the submucosal tumor using laparoscopic surgery was successfully completed. The operation time was 120 min and blood loss was minimal. The tumor measured 25 mm in diameter. The resection margin was free of tumor, and the distance to the tumor was from 5 mm to 20 mm. The tumor was composed of elongated spindle-shaped cells. Immunohistochemical

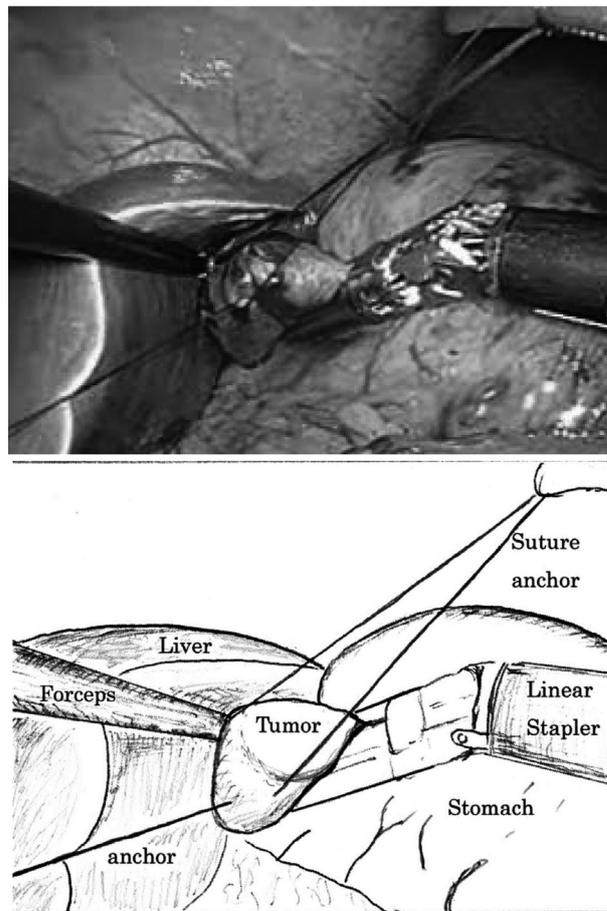


Fig. 3 Laparoscopic surgery; the tumor was observed in the upper-third posterior wall, with no serosal invasion. Two suture anchors were made on the wall close to the tumor for traction. A linear stapler was inserted on the planning excision line which was separated by a few micrometers from the tumor using suture anchors and tumor was resected.

staining indicated the tumor a Cajal type of GIST. The Ki-67-Labeling-Index was about 5%. The mitotic activity of the tumor cells was intermediate, with 12 mitoses in 50 consecutive high-power fields (12/50 HPF). The evaluated biological malignant potential was group 5 based on the Miettinen classification¹⁾.

The post-operative course was uneventful. The patient started feeding on the third postoperative day. The postoperative hospital stay was 10 days. The patient is currently doing well with no clinical signs of local or distant tumor recurrence and no stenosis was detected by a barium enema which was performed 1 year after the operation (Fig. 4).



Fig. 4 Double-contrast radiographs at one year after surgery showing no stenosis and no deformation. Barium liquid was passed without stasis and no paradoxical flow was observed.

Discussion

GIST belongs to a group of mesenchymal neoplasms of the gastrointestinal tract and about 60% of them occur in the stomach. The standard treatment for GIST is complete excision without lymphadenectomy because lymph node metastasis is rare²⁾. It is important to avoid rupturing the tumor capsule and thus prevent the intraabdominal spillage of tumor cells during resection of GIST. A huge tumor must be handled very carefully. Laparoscopic wedge resection of the stomach for such tumors was established as a less-invasive procedure. Laparoscopic resection for a gastric GIST was first reported in 1992³⁾. In 2004, the National Comprehensive Cancer Network (NCCN) task force report stated that laparoscopic or laparoscopic-assisted resection might be used for small GISTs (< 2 cm) when the risk of intraoperative tumor rupture is low⁴⁾. The several recent studies support the feasibility of laparoscopic resection⁵⁾⁻⁷⁾. Studies based on small series of patients and retrospective analyses have shown that laparoscopic or laparoscopic-assisted resections are not only possible but are also associated with low recurrence rates, short hospital stay, and low morbidity^{5), 6), 8)}. The NCCN task report in 2010 stated that the laparoscopic approach can be applied to tumors smaller than 5 cm, depending on their location and

shape⁹⁾. The Japanese Clinical Practice Guidelines for GIST recommend that laparoscopic resection is indicated for tumors measuring 5 cm or smaller in diameter¹⁰⁾.

Excessive resection of the gastric wall causes stenosis and deformation. It is difficult to perform resection of a tumor located close to the esophagogastric junction without stenosis. Several authors have described a technique of gastric resection for submucosal tumors located near the esophagogastric junction. Hiki et al. reported the successful application of laparoscopic and endoscopic cooperation surgery (LECS)¹¹⁾. Gastric submucosal resection was performed using an IT-Knife endoscopically, and gastric seromuscular resection was done laparoscopically using a vessel sealing system. Sakamoto et al. reported gastric wall resection which was performed using a vessel sealing system laparoscopically while confirming the location of the tumor by endoscopy¹²⁾. Both procedures are effective to prevent stenosis and deformation. However, both procedures have a possibility of intraabdominal spillage because the gastric cavity is opened. Resection of a tumor with ulceration, which has a high possibility of intraabdominal spillage, is not indicated for either procedure. LECS or fundectomy may also be performed when a tumor is closer to the esophagogastric junction in this situation. It is important to select a safe and effective procedure according to the tumor location.

Laparoscopic partial gastrectomy using a linear stapler is therefore considered to be a potentially useful procedure for performing GIST in the posterior upper-third of the stomach. In the above described case, the tumor in the posterior stomach wall could be extracted by dissecting the surrounding blood vessels and tissues, and by also achieving adequate traction of the stomach wall.

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