

## Case Report

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## Hybrid endoscopic and laparoscopic En-bloc resection for the minimally invasive management of gastrointestinal stromal tumors: A case report

### Abstract

**Background:** Among mesenchymal tumors arising in the gastrointestinal tract, gastrointestinal stromal tumors are the most common. GISTs that do not have metastatic spread are treated surgically. Our case report aims to describe a newer & less invasive approach for resection of GISTs & early gastrointestinal tumors.

**Case Presentation:** An Iranian woman 41 years old with stomach stromal tumor is presented. Her complaint was minor epigastric discomfort. Tumor en-bloc resection was performed using a hybrid endoscopic-laparoscopic approach. She was doing very well & discharged the day after the operation.

**Conclusion:** GISTs and early gastrointestinal tumors can be treated with hybrid endoscopic and laparoscopic en-bloc resections instead of invasive surgery.

**Keywords:** Gastrointestinal stromal tumors, Endoscopy, Laparoscopy, Neoplasms.

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The term GIST refers to gastrointestinal, mesentery and retroperitoneal mesenchymal tumors. In the gastrointestinal tract, GISTs can occur anywhere (1). The majority of them are found in the stomachs and intestines, but they can also develop in other parts of the body such as esophagus, duodenum, and colons (2-4). In the United States, four to six thousand new GIST cases are estimated to occur each year. (5-7). Most GIST patients are over the age of 53, and only 5% are under 30 (8). A GIST may be a small, accidentally discovered tumor that has an excellent outcome or a more aggressive sarcoma. GISTs with overt signs of malignancy are found in 20-35% of cases (9, 10). As GIST progresses, it can progress intraluminally, extrinsically, or bidirectionally within the gastric wall. Endoscopic examinations and fluoroscopic imaging typically reveal submucosal (or subepithelial) tumors (SMTs) covered by the normal mThe pathological specimens may not always be obtained by conventional endoscopic biopsy because GIST cannot be visualized directly by endoscopy without the use of endoscopic ultrasound (EUS). A diagnosis of GIST prior to surgery is challenging due to its location and neoplastic behavior (11).

Even though targeted inhibitors such as imatinib can be used as either an adjuvant or a neoadjuvant therapy for patients with localized cancers, surgery remains the standard treatment (12, 13). In the treatment of gastric GISTs today, laparoscopic wedge resection utilizing a linear stapler is widely accepted, particularly in exophytic tumors associated with the curve of the stomach, as the preferred treatment method (14, 15). There is no difference in recovery times between these approaches and open procedures, and they have equivalent outcomes (16). There are some major drawbacks to the procedure, even though it's not complicated. For example, the lesion cannot be identified, the linear stapler can rupture the capsule, excess normal tissue is removed, and it is difficult to reach the cardia, fundus, lesser curvature, or peripyloric (14, 15, 17-19).



Therefore, laparoscopic and endoscopy techniques are necessary for correct treatment of these lesions, especially if they are located in inconvenient places (20, 21). In line with these goals, the authors describe a hybrid surgery technique using endoscopy & laparoscopy simultaneously. This case report presents the case of a 41-year-old patient, whose lesser gastric curvature was found to have a GIST tumor. An endoscopy and laparoscopy hybrid procedure were used to completely remove the tumor. Patient follow-ups show that he is doing well.

### Case Presentation

Babol University of Medical Sciences' research ethics committee approved this case report under code IR.MUBABOL.REC.1401.108. An Iranian woman, 41, presented to our hospital with epigastric discomfort. She did not lose weight and had a good appetite. The patient did not experience vomiting, bowel changes, or melena. There were no notable medical or family histories in her file. Previously, she had not undergone abdominal surgery. Her examination revealed no clinical abnormalities. Abdominal examination was normal. Laboratory data was unremarkable. At upper gastrointestinal endoscopy, a subepithelial lesion of about 2 cm was seen at lesser gastric curvature (figure 1).



**Figure 1. Upper gastrointestinal endoscopy view of the lesser gastric curvature. A subepithelial lesion is about 2 cm in diameter was seen**

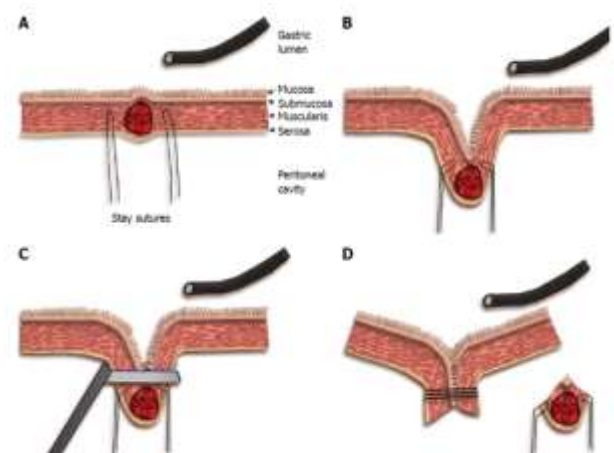
After consultation with surgeon and the patient, we decided to perform a hybrid surgery technique with simultaneous using laparoscopy and endoscopy. In the operating room, she was prepared for surgery. Three laparoscopic ports were placed in the peritoneal cavity

while the patient was supine under general anesthesia (figure 2).



**Figure 2. Endoscopic ultrasonography of the 25\*19 mm lesion at lesser gastric curvature. This lesion occurred in the muscularis propria layer without any obvious lymph nodes, suggesting that it may be GIST**

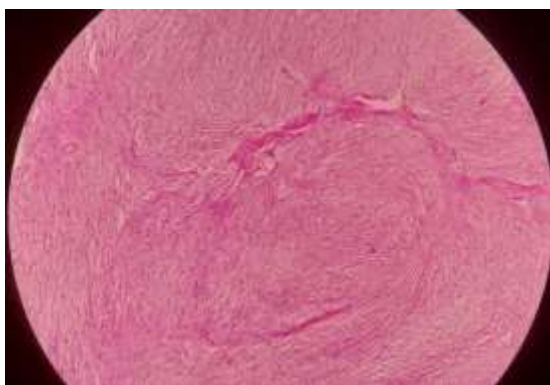
After entering the peritoneal cavity, and primary evaluation and making sure there is no pathologic lesion at peritoneum, mesentery, omentum & liver, the endoscope was inserted through the oral cavity. Simultaneously with transillumination by the endoscopic guide, the lesion was seen at lesser curvature which had protruded outwards. The exact margins of the lesion were determined, then using the stapler the lesion was removed with a margin of about 2 cm and sent for histopathological assessment. The next day the patient was discharged in good general condition without any symptoms (figure 3).



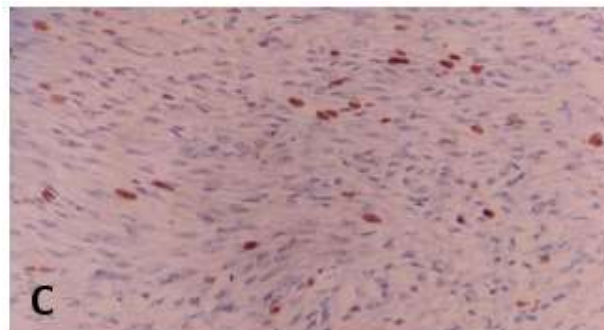
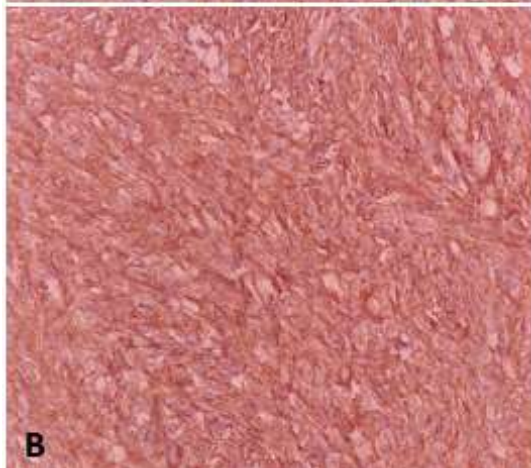
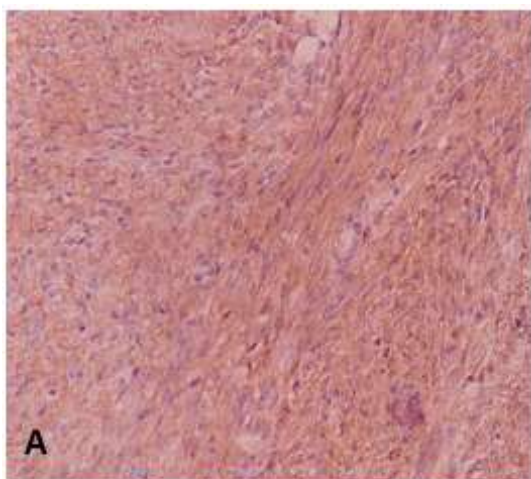
**Figure 3. Endoscope-assisted laparoscopic e-bloc resection. A) A laparoscopy and endoscopy are used to locate the tumor; a pair of stay sutures are placed laparoscopically on the tumor; B) When the stay sutures are tractioned, the gastric wall is tented by the**

sutures; C) A stapler is used under endoscopic control to enclose the tumor; D) The stomach is fully resected with everted staples (22).

The cytoplasm of the spindle cell lesion was characterized by faintly eosinophilic cytoplasm and elongated nuclei, without significant nuclear pleomorphism (figure 4). Mitoses rate is less than 1/5 mm<sup>2</sup>. Immunohistochemistry study showed strongly diffuse positive results for C-kit (CD117) and CD34 in tumoral cells, whereas  $\alpha$ -smooth muscle actin (SMA), Desmin and S-100 protein were negative (figure 5A, 5B). Ki-67 expression showed low proliferative index (less than 5%) (figure 5C). The findings confirmed the diagnosis of low-grade GIST.



**Figure 4. Microphotograph of gastric mass; Spindle cell lesion arranged in fascicles, (H&E stain x100)**



**Figure 5. A) Immunohistochemistry indicated strongly diffuse staining for C-kit; and B) CD34 while C) negative results were observed for S-100, SMA and Desmin, low ki 67 proliferative index, less than 5%.**

## Discussion

The standard of treatment for non-metastatic GISTs is surgery. To produce a sufficient resection margin, the tumor and its pseudo-capsule should be removed together. The ideal tumor-free margin width has not been established. Since GISTs hardly ever result in lymph node metastases, regional lymph node excision is of unknown benefit. Extensive lymphadenectomy is not advised. The likelihood of developing peritoneal implants is enhanced in cases of tumor rupture (23). A notable advancement in the minimally invasive therapy of benign and borderline benign tumors of the upper gastrointestinal tract has happened over the past ten years. More choices than ever before exist for the excision of these tumors because of the development of novel operating instruments and operative procedures (22).

With methods like endoscopic submucosal dissection (ESD) and endoscopic full-thickness resection (EFTR), the interventional endoscopist now has access to local excision options that, in the past, were limited to surgery (24, 25). Parallel to this, gastrointestinal surgeons can now provide precise and minimally invasive segmental resections, which, in contrast to more aggressive resections, favor a more functional outcome and a quicker recovery of the patient (26). Each of these two strategies has its advantages and disadvantages. However, a third strategy is beginning to emerge the cooperative laparoscopic and endoscopic strategy, also known as the hybrid laparoscopic strategy. This category of methods seeks to combine the advantages of intraluminal and intraperitoneal treatments while simultaneously minimizing their drawbacks (22).

It is interesting to note that interest in precise, segmental, and minimally invasive resection techniques has increased over the past ten years as a result of our improved understanding of the biological behavior of GIST and early gastric cancer, in addition to the more frequent detection of these two pathologies (22). In this paper, we discussed laparoscopic en-bloc resection of mass lesions including the deeper layers of the stomach using endoscope assistance. In a selected patient population, this strategy has proven to be very successful. This hybrid approach could offer a secure, minimally invasive option for the removal of fourth-layer malignancies, particularly those that are mostly endophytic or that develop in difficult anatomical sites. Additionally, compared to surgical techniques alone, this approach leads to fewer problems, shortens hospitalization, and lowers expenses.

When done by professionals, laparoscopic resection of stomach GISTs less than 5 cm was proven to be safe. Most studies excluded a tumor size of more than 5 cm from the indication criteria. However, there was no restriction on tumor size in hybrid techniques. Even though this procedure is safe to use when the resected specimen is larger than 5 cm, deformation of the remaining stomach may frequently happen, leading to postoperative stenosis or gastroparesis (27). This hybrid approach is effective because of the exact localization of the tumor and the possibility of a safe, full-thickness resection. Follow-up after surgery was uneventful, and the patient discharge was discharged after 2 days. A GIST with a clean margin was confirmed by a pathological test. In this case, the use of a novel technique requires proper timing between different part of the treatment process (for example Coordination between the two departments), which is one of the limitations of this study. Also, the articles to review and compare this case have been limited. In conclusion, this method can be considered as an alternative to invasive surgeries in the treatment of early gastrointestinal tumors and can be used more.

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