



Case report

Laparoendoscopic assisted surgery for a gastrointestinal stromal tumor (GIST): A case report

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ABSTRACT

Introduction: Gastrointestinal stromal tumors (GIST) are infrequent, and clinical presentation varies between asymptomatic and diffuse symptoms such as abdominal pain and dyspepsia. Surgical approach depends on location and size of the tumor. There are some reports of the specific surgical approach for GIST located at the gastroesophageal junction. This is a case report of a patient with a GIST located specifically at the gastroesophageal junction and the surgical approach selected for the treatment.

Presentation of the case: A 70-year-old patient who developed an episode of upper gastrointestinal bleeding with hemorrhagic shock accompanied by elevated troponins that required transfusion therapy and whose endoscopic evaluation showed a subcardial ulcerated lesion of 16 × 5 mm, located 2 cm below the z-line. The lesion was biopsied and was negative for malignancy. A combined surgical approach for resection by combined laparoscopy and submucosal resection by upper gastrointestinal endoscopy was performed by the interventional gastroenterology service and surgical oncology service.

Discussion: Specific management of GISTs depends on the location of the tumor, even though, complete surgical resection remains the gold standard treatment. Minimally invasive techniques can be used to assess these tumors leading to shorter hospital stays and lesser risk of complications. Laparoendoscopic cooperative surgery is a promising approach for managing lesions near the gastroesophageal junction.

Conclusion: GISTs located near the gastroesophageal junction require a complex approach. The laparoendoscopic approach seems to be a feasible approach for GIST in the gastroesophageal junction.

1. Introduction

Gastrointestinal Stromal Tumors (GIST) are the most frequent mesenchymal tumors located in the gastrointestinal tract, in most cases are asymptomatic but some patients can develop associated symptoms such as abdominal pain, dyspepsia, gastric outlet obstruction, and anorexia [1]. The prevalence worldwide is still unknown, but it is believed that GISTs represent <1 % of all gastrointestinal tumors, and its most common place is the stomach (70 %), followed by the small bowel (20–30 %), and colon/rectum (10 %) [1].

Complete resection of the tumor is the cornerstone treatment for patients with GISTs. Its approach and optimal management depend on the size and the location of the tumor [2]. The use of laparoscopic

resection is well established in patients with tumors <5 cm and open surgery if the size of the lesion is >5 cm or if the tumor is vascularized, fragile, and if there are concerns about rupture or hemorrhage [2]. However, the approach represents a challenge when the tumor is placed near the gastroesophageal junction due to a higher risk of deformity, stenosis, and overall post-surgical complications that decrease life quality [3]. Consequently, this kind of approach requires better planning in order to preserve all physiological functions [4]. Some surgical procedures have been proposed, such as combinations of laparoscopic and endoscopic techniques, and even esophagectomy [4].

This case presents a man in his 7th decade, with a history of upper gastrointestinal hemorrhage, who attended the service and was diagnosed with a gastrointestinal stromal tumor located in the

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gastroesophageal junction, who underwent a complex surgical approach with adequate outcomes. Here, we discuss the methodology used through this surgical approach and the follow-up outcomes.

2. Presentation of the case

After ethical and institutional approval, prior informed consent was filled following SCARE guidelines [5]. We present a case of a 70-year-old male patient with a history of previous hospitalization in 2020 secondary to upper gastrointestinal tract hemorrhage due to a 9 mm subcardial lesion.

In 2022, the patient returned to the service because of a new episode of upper gastrointestinal bleeding with consequent hemorrhagic shock accompanied by elevated troponins that required transfusion therapy and whose endoscopic ultrasonography showed a subcardial ulcerated lesion of 16 × 5 mm, located 2 cm distal to the z-line, with mixed echogenicity, stigmata of recent bleeding and irregular borders that required management by sclerotherapy and adrenaline. The lesion was biopsied and was negative for malignancy. However, due to the hemodynamic compromise of the patient and the need for blood transfusions, the patient's case was presented to the institutional committee board of gastrointestinal tumors where a combined surgical approach was defined for the performance of combined laparoscopy and submucosal resection by upper gastrointestinal endoscopy performed by the interventional gastroenterology service and oncologic surgery service.

Subsequently, a 2 mm incision was made in the supraumbilical region and dissected until the peritoneal cavity was reached. A 12 mm trocar was placed for diagnostic laparoscopy. A 12 mm trocar was added in the right upper quadrant, a 5 mm trocar in the right upper quadrant, and a 5 mm subxiphoid trocar.

Endoscopy was performed, thus evidencing a raised subcardial lesion <1 cm from the gastroesophageal junction as shown in Fig. 1, so a window was made in the gastroepiploic arcade and pars flaccida and a clamp was placed to avoid insufflation of intestinal loops. Clamping the ligament of Treitz with a laparoscopic bowel clamp prevents the pass of air because of the endoscopic insufflation to the small bowel, creating distention of the bowel and making the laparoscopic approach unsafe and almost impossible. Low intragastric pressure was used to avoid any type of complication during the insufflation of the stomach. The clamping of the proximal jejunum or distal stomach allows to continue to have excellent visibility and perform the procedures in a safe manner. Subsequently, endoscopic access to the lesion was gained and saline solution, methylene blue, and adrenaline were injected to lift the lesion and initiate endoscopic submucosal resection. The lesion was incised but

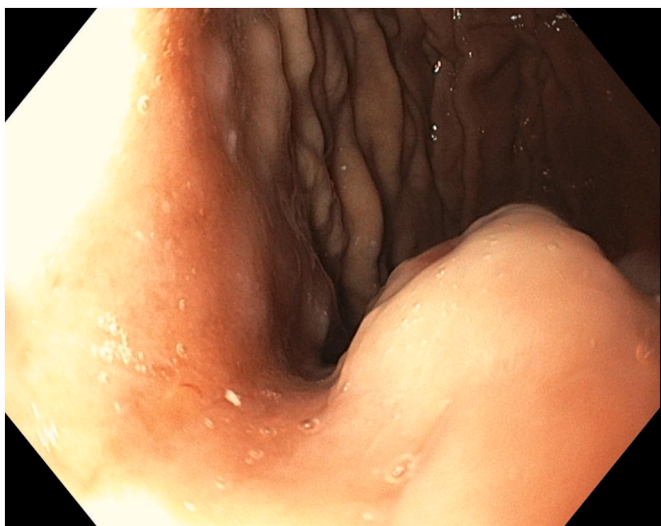


Fig. 1. Endoscopic view of intragastric GIST.

due to its complex location it was not possible to achieve complete resection, therefore laparoendoscopic assistance was performed.

Then, a 5 mm trocar with advanced fixation was passed, a gastrostomy was performed, and the trocar was introduced into the stomach as shown in Fig. 2. Given the potential risk of gastroepiploic arcade risk bleeding and critical vessel compromise a place anterior to the arcade far from the individual vessels was chosen, so as the gastrostomy was performed in the greater curvature, care was taken to protect the gastroepiploic arcade vessels.

In conjunction with the endoscopic approach, the lesion was elevated and combined circumferential resection of the entire lesion measuring approximately 1.5 cm was performed as shown in Fig. 3, which was extracted and sent to pathology.

5 mm clips were used to perform direct hemostasis of the bleeding blood vessel. Endoscopic sclerotherapy was performed, and endoscopic clips were placed to close the mucosal defect. Finally, the trocar was removed from the greater curvature and the gastrostomy was closed. The proximal lesser curvature was dissected to evaluate the integrity of the resection, the endoscope was advanced again, and an air leak test was performed, which was negative with adequate partial gastrectomy suture. The resected product was removed, and clear margins were achieved.

The pathology report showed a gastrointestinal stromal tumor (GIST) with intense and diffuse tumor cell reactivity for CD117 (C-KIT) and DOG-1, with occasional CD34+ expressing cells, and a ki67 cell proliferation index <1 %.

Subsequent follow-ups at 15 and 50 days showed no complications, the patient came to private practice with surgical wounds in adequate conditions, tolerating diet, and with appropriate intestinal transit. The patient is currently under follow-up with the oncologic surgery service.

3. Discussion

Specific management of GISTs depends on the location of the tumor, even though complete surgical resection remains the gold standard treatment, because of their malignant potential. These tumors can be resected through thoracoscopic, laparoscopic, robotic, or an open approach depending on the location, yet there is no defined strategy to guide surgeons in choosing a particular technique.

The majority of GISTs, when benign, are usually limited to the submucosa, which offers a great opportunity for surgeons to opt for a minimally invasive approach [6]. The National Comprehensive Cancer Network (NCCN) guidelines establish that partial gastrectomy, which preserves organ function and integrity, is the first-choice procedure since it does not require local lymph node excision [7]. Lymphadenectomy is not recommended because most of GISTs metastasis are in the liver or peritoneum, but node metastasis is extremely rare, so lymph node dissection should only be done if metastasis is clinically suspected [8]. In our case, lymph nodes were dissected at the origin of the left gastric artery because metastasis was suspected as nodes were enlarged.

Various investigators compared the laparoscopic and open resection of GISTs, showing that a laparoscopic approach is safe, feasible, and associated with less intraoperative blood loss, shorter hospital stay, and a lower rate of complications [9,10]. Initially, the NCCN established that the use of laparoscopy in GISTs should be limited to tumors that were <2 cm in size because of the risk of tumor rupture, seeding of the peritoneum, and the ability to achieve clear oncologic margins [11]. A retrospective review of 34 patients who had a laparo-endoscopic resection for their tumors by Yahya et al. [17], pointed out that laparo-endoscopic resection of junctional and pyloric tumors with low metastatic potential is technically feasible and that this approach shows great results, with clear margins and acceptable perioperative and longer-term outcomes, which is consistent with our results [17]. The surgical technique described in this case report is comparable to the one described in this retrospective review; with gastrostomies made on the greater curvature with ample room for closure without compromising

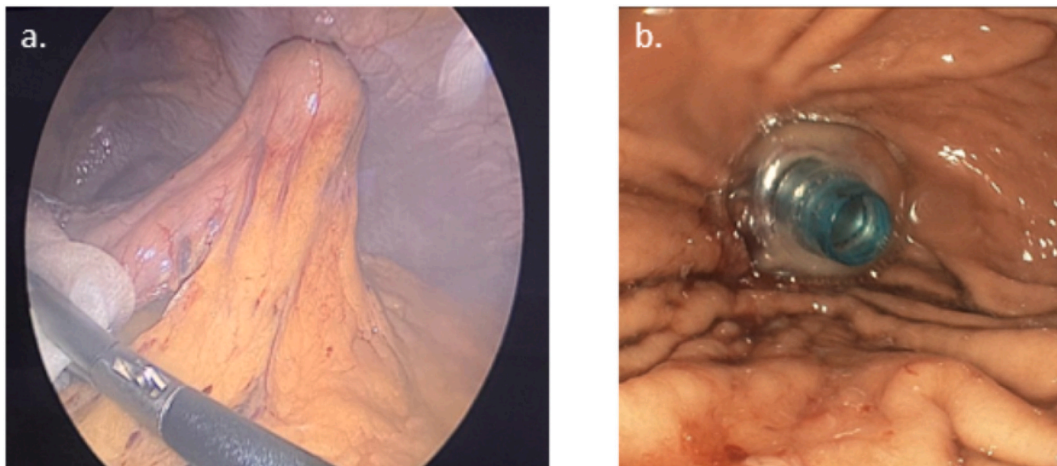


Fig. 2. a) Laparoscopic view of gastrostomy trochar placement through greater curvature. b) Endoscopic view of trochar's placement.

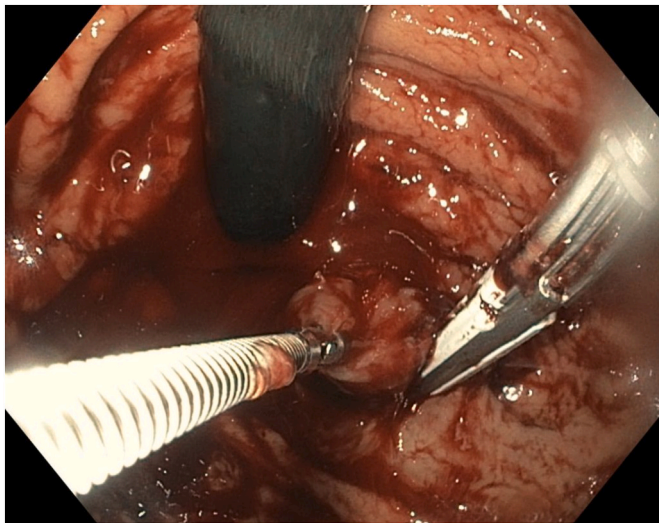


Fig. 3. Circumferential resection of entire lesion of GIST by endoscopic and laparoscopic approach.

the GEJ, by being entirely self-contained, minimizing the risk of tumor cell spillage into the abdominal cavity compared to other approaches, and by using intragastric insufflation, flattening the rugal folds, and allowing precise localization and resection of the target site [17]. Choi et al. [10] proposed that in lesions located in the lesser curvature near the pylorus or the GEJ a laparoscopic-assisted proximal or distal gastrectomy should be done carefully, so as not to compromise the lumen of the stomach. Hiki et al. [12] reported an endoscopic and laparoscopic combined approach (LECS) as an alternative for gastric wedge resection independent of tumor location and size. Posterior reports of this approach showed successful results for removing GISTs even near the GEJ [6,16].

As for the safety profile, many researchers have reported successful and safe removal with a laparoscopic approach of tumors up to 5 cm [4,7,12,13]. However, some concerns were raised about GISTs located near the gastroesophageal junction (GEJ) because of the high risk of causing deformity and complications such as leakage of the staple line [14,15]. Yahya et al. [17], reported that in their series of 34 cases 5 patients presented complications. The principal risk of this surgical approach was post-operative bleeding, which presented in 4 of these patients and a minor leak with post-operative collection, which occurred in one patient [17]. These complications need to be taken into account

when considering this approach, individualizing each patient, evaluating specially their risk of bleeding, and taking meticulous care and inspection intraoperatively ensuring hemostasis.

As described in this case report, the preferred approach for this tumor was LECS. This is one of the combined laparo-endoscopic techniques available, minimizing the risk of unintentional large resection resulting in deformity and malfunction of the remaining stomach, damaging the nerves, and causing prolonged gastric emptying. Nonetheless, this technique allows the achievement of completely clean margins because of better visualization of the lesion. Thus, showing that a combined laparo-endoscopic approach could be a promising approach for these tumors. Larger multi-institutional prospective studies with long-term follow-up and comparison studies need to be performed in order to standardize the approach for complex location GISTs, based on size, location, and dissemination. There are few reports of combined laparoscopic and endoscopic approach for GE junction GISTs. This report aims to help surgeons facing the difficult decision of how to approach small GEJ GISTs avoiding the potential of morbidity from larger anatomical resections, providing the surgeon with additional tools to tackle these difficult tumors.

4. Conclusion

The majority of GISTs can be resected through a minimally invasive technique. However, GISTs in a complex location such as near the gastroesophageal junction can augment the need for a more complex technique. The laparoscopic combined approach seems to be, despite its complexity, a feasible approach for GIST in the gastroesophageal junction.

Consent

Written informed consent was obtained from the patient to publish this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Ethical approval

Ethical approval of the institutional committee was made previous publication.

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Author contributions

Ricardo E. Núñez-Rocha, MD: Participated in drafting the article and revising it critically for important intellectual content.

Valentina Pérez: Made substantial contributions to conception and design, acquisition of data, analysis, and interpretation of data.

María Lorena Urango: Participated in drafting the article and revising it critically for important intellectual content.

Mario Latiff: Made substantial contributions to conception and design, acquisition of data, analysis, and interpretation of data.

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To our patient.

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