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Safe resection of gastrointestinal stromal tumor adjacent to the esophagogastric junction: Endoscopic transgastric wedge resection

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ABSTRACT

Introduction: Gastrointestinal (GI) tumors are submucosal lesions with malignant potential, most commonly found in the stomach.

Materials and Methods: Between 2017 and 2023, patients with a pre-diagnosis of GI stromal tumors (GISTss) located adjacent to the gastroesophageal junction, exophytic growth into the stomach and masses below 5 cm were excised with endoscopic stapler placed transgastrically under endoscopic vision. The gender, age, length of hospitalization, post-operative complications, and pathology results of the patients were recorded retrospectively.

Results: 58 patients with a pre-diagnosis of GIST were operated. 19 of them were located adjacent to the esophagogastric junction. 2 of 19 patients underwent total gastrectomy and 3 underwent proximal gastrectomy. 14 patients underwent transgastric resection and 2 of these patients were excluded from the study because the pathology result could not be GIST. No significant complications were observed in any of the 12 patients included in the study.

Conclusion: Transgastric wedge resection under endoscopic visualization is a safe and organ-sparing surgical method for GISTs below 5 cm located adjacent to the esophagogastric junction.

Keywords: Endolaparoscopic surgery, Esophagogastric junction, Gastrointestinal tumor, Minimally invasive surgery

Introduction

Gastrointestinal stromal tumors (GIST) are lesions arising from Cajal cells located in the myenteric plexus of the muscular layer of the gastrointestinal (GI) tract.[1] GISTs are the most common premalignant subepithelial lesions and are most commonly located in the stomach (60%).[2] Approximately 10–30% of GISTs have the potential to be malignant. Malignancy risk is classified according to size and mitotic index.[1] GISTs usually present with nonspecific GI symptoms such as bleeding, abdominal pain, and distension. However, up to 30% of patients may be completely asymptomatic and are incidentally detected during other GI tract surgery or autopsy.[3,4]

Surgical resection is performed in GISTs over 2 cm or in

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those with a risk of malignancy. Since the possibility of lymph node metastasis is very low, lymph node dissection is not required. The surgical margin was previously set as 1 cm, but, nowadays, removal of the mass with a clear surgical margin seems to be sufficient.[5,6]

The most commonly preferred surgical procedure for gastric GISTs is laparoscopic wedge resection, but depending on the location of the mass, wedge resection cannot be performed and wider resections can be performed. Total or subtotal resections, especially in GISTs located adjacent to the gastroesophageal junction, will both increase early complications and impair the patient's comfort in the remaining period of life.[3] Therefore, combinations of endoscopic and laparoscopic surgical methods have been described in the literature for these premalignant lesions which may require extensive organ resections due to their location.[7] In our clinic, we aimed to state that endoscopically assisted transgastric wedge resection is a safe and organ-sparing method in patients with a pre-diagnosis of GIST located adjacent to the gastroesophageal junction.

Materials and Methods

We conducted our study with the decision of the ethics committee of Antalya Training and Research Hospital (Ethical number is 2023-178). Patients who were endoscopically detected, evaluated with cross-sectional imaging method or endoscopic ultrasound (EUS), and operated with a pre-diagnosis of GIST between 2017 and 2023 were retrospectively reviewed. None of the patients underwent EUS sampling and GIST was diagnosed by radiologic evaluation. Patients who were not suitable for laparoscopic surgery in the pre-operative evaluation, who had a location other than adjacent to the gastroesophageal junction, who were not considered to have GIST in the pre-operative evaluation, who were larger than 5 cm, who had suspicion of metastasis, and who did not have a mass probe into the lumen in the endoscopy performed peroperatively were excluded from the study. The gender, age, pathology results, removal methods, and post-operative complications of the patients included in the study were evaluated retrospectively.

Surgical Technique

In all patients, one 10 mm trocar was inserted through the umbilicus and the abdomen was inflated with CO2 insufflation. Then, one 5 mm and 1 12 mm trocars were inserted. Endoscopy was performed into the stomach and a gastrotomy of approximately 1 cm from the anterior aspect of the stomach was performed and a 12 mm long balloon trocar was inserted into the stomach. After the trocar balloon was inflated, an endoscopic stapler was inserted through the trocar placed into the stomach under endoscopic visualization and the mass was manipulated and resected with instruments placed through the channels of the gastroscope if necessary (Fig. 1). If the mass could be removed endoscopically by oral route, it was removed by endoscopy and if it was thought that it could not be removed by endoscopic method, it was removed from the abdomen through the gastrotomy area with the help of an endobag placed through a 12 mm trocar into the stomach. The gastrotomy area was closed with v-lock suture. No intra-abdominal drain or nasogastric catheter was placed into the stomach in any of the patients.

All of the patients started oral on post-operative day 1. Patients who tolerated oral were discharged on post-operative day 3.

Results

Between 2017 and 2023, a total of 58 patients with a pre-diagnosis of GIST were operated in the Gastroenterology Surgery Clinic of Antalya Training and Research Hospital. Of these, 39 were located adjacent to the gastroesophageal junction and 19 were located adjacent to the esophagogastric junction. 2 of 19 patients underwent total gastrectomy and 3 underwent proximal gastrectomy. 14 patients underwent transgastric resection and 2 of these patients were excluded from the study because the pathology result could not be GIST. The gender, age, length of hospitalization, post-operative complications, size, Ki 67, mitotic index, and surgical margin neighborhood of the 12 patients were recorded retrospectively.

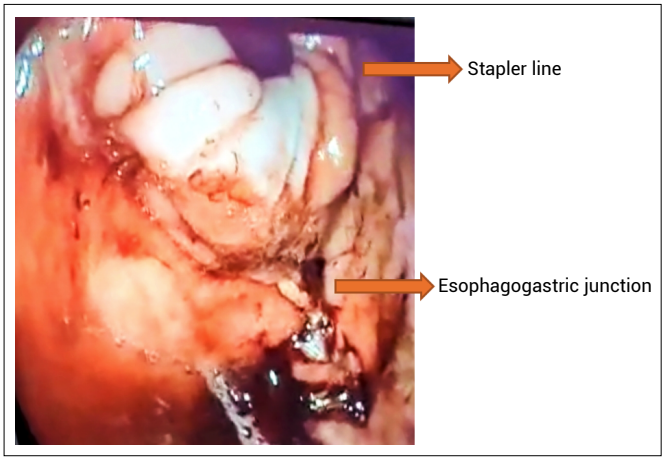

Figure 1. Esophagogastric junction and stapler line.

Of the 12 patients, 7 were female and 5 were male. The mean age of the patients was 54.7 (34–70) years. When the pathology results were evaluated, the mean size of the diameters was 3.41 (3–5) cm. There was 1 patient in whom the closest neighborhood to the clean surgical margin was <0.1 cm. In this patient, the diameter of the mass was measured as 5 cm in the pathology report.

The median duration of hospitalization was 3.7 (2–5) days. None of the patients required post-operative intensive care unit hospitalization. In 3 patients, post-operative complications were encountered. In 1 patient, erythrocyte suspension and endoscopic sclerotherapy were required due to hemorrhage, and in one patient, there was prolonged hospitalization due to instrument ectasia. In 1 patient, there was purulent discharge from the wound. No leakage was detected on imaging and medical treatment was applied (Table 1).

In 7 of 12 patients, the pies were removed orally by endoscopy, while in 5 patients, the pies were removed abdominally. In the evaluations of these patients, the mean size of the pies was 3.2 (3–3.5) cm in patients with oral removal and 3.7 (3–5) cm in patients with abdominal removal (Table 2).

Discussion

When the diagnosis is confirmed, surgical resection should be the first option for GISTs without metastasis.[1] Although GISTs smaller than 2 cm have a low incidence of metastasis, close follow-up or early aggressive treatment should be considered, especially for patients with difficult localization and obstruction. Endoscopic procedures or hybrid (laparoscopic-endoscopy) techniques have recently shown favorable clinical results, especially for difficultly located GISTs.[3,4] We found that endoscopy-

Table 1. Demographic characteristics of the patients, pathological data, and post-operative hospital process

	Case												
	1	2	3	4	5	6	7	8	9	10	11	12	Mean (min.-max.)
Gender	F	F	M	M	F	F	F	M	F	M	M	F	
Age (years)	45	51	63	59	70	34	69	55	58	70	29	54	54.75 (34–70)
Additional illness	0	HT	DM	HT	HT, CAD	0	KAH	Ast	0	0	0	DM	
ASA	I	II	II	II	III	I	II	II	I	II	I	II	
Complaint	0	Pain	Bloating	Bleeding	Bleeding	0	Bloating	0	0	Dysphagia	0	0	
Mass Removal Methods	A	O	A	O	A	O	O	A	O	A	O	O	
Diameter (cm)	5	3	4	3.5	3	3	3	3	3.5	3.5	3	3.5	3.41 (3–5)
Mitotic index	3	1	1	1	5	1	3	1	1	1	2	4	2
Ki 67 (%)	4	1	5	5	5	1	3	1	1	1	2	4	2.75 (1–5)
Surgical margin (cm)	0.1	1.1	1	1.5	0.7	1	1.2	0.9	1	0.8	1.5	1.9	1.05
Duration of hospitalization (day)	3	3	4	3	5	2	5	4	4	5	2	4	3.7 (2–5)
Morbidity/ Mortality	0	0	0	0	Hemorrhage	0	0	0	0	0	0	0	

M: Average; F: Female; M: Male; HT: Hypertension; DM: Diabetes Mellitus; CAD: Coronary Artery Disease; Asthma: Ast; A: Abdominal; O: Oral.

Table 2. Resin removal methods and diameters

Way of removal	Number	Average diameter
Abdominal	5	3.7 (3–5) cm
Oral	7	3.2 (3–3.5) cm

assisted transgastric wedge resection is a minimally invasive organ-sparing method that can be preferred instead of extensive resections in patients with a pre-diagnosed GIST mass located close to the esophagogastric junction.

For tumors close to the EGJ, early resection is necessary to avoid total or proximal gastrectomy.[8] After wedge resections in these patients, the possibility of stenosis or deformity at the gastric inlet is high. Therefore, total laparoscopic proximal gastrectomy has been recommended by surgeons in some publications.[9] Nevertheless, this procedure is considered too aggressive for GIST resection.[10,11] To solve this problem, Tagaya et al. reported the intragastric resection technique in 2002. In this technique, the mass was resected through the stomach with gastrotomy, but difficulties were encountered due to equipment and surgical deficiencies.[12-15] Although the method described in 2002 is similar to the hybrid surgical methods applied today, it has been moved to a minimally invasive form with the increase in available surgical technology. In our method, we resected the masses with a pre-diagnosis of GIST in the neighborhood of the esophagogastric junction with safe and clean surgical margins with the help of endoscopic stapler placed into the stomach under endoscopic visualization. With this technique, especially the integrity of the stomach was preserved and we were able to apply traction to the mass with the instruments placed through the channels of the endoscope.

There are many advantages of performing surgery under endoscope vision. The most important of these is that the distance between the mass and EGJ is widened after air insufflation and resection is performed more safely. Determination of the surgical margin under direct vision is another advantage of the endoscope's simultaneous involvement in the surgical procedure. In addition, complications such as bleeding or leakage that may occur in the stapler line after resection can be seen and intervened simultaneously with the endoscope. In addition, since the endoscope is on the EGJ line, stenosis that can be created with a stapler in this area becomes impossible.

The use of stapler with endoluminal method in exophytic growth masses outside the stomach is not recommended since resection of more intact gastric tissue will be performed and it will be difficult to maintain the safety of the EGJ. A similar situation exists in pylorally located masses with exophytic growth. One of the most important complications in these tumors is stenosis in these important anatomical regions after wedge resections performed abdominally.[16,17] In line with our experience, we recommend simultaneous endoscopic evaluation even if wedge resection is performed abdominally near the pylorus or EGJ to minimize possible strictures.

The uncertainty of adequate surgical margins in GISTs has persisted for years. Especially with the publication of the results of studies showing close surgical margins in resections performed with the help of a stapler during laparoscopic surgery, the views on the surgical margin were revised and the adequacy of a clear surgical margin was accepted. Later, with the introduction of gastric GIST resections with endoluminal methods, the concept of surgical margin was further clarified and the adequacy of negative margin was fully accepted.[18] The method we use is based on the principle of applying the wedge resection method, which is performed from outside the stomach, from inside the stomach, especially for GISTs that grow into the stomach. The most important advantage of this technique is mass resection with secure surgical margins under endoscopic visualization. However, with the increase in the size of the mass, inadequate opening of the stapler opening may cause surgical margin closeness. In our series, we believe that surgical margin security decreased in lesions of 5 cm or more.

Our study has some limitations. The most important of these is the small number of patients. The other is that there is no data other than the pathology result evaluating the size of the mass as an obstacle to the surgical procedure.

Conclusion

Endoscopic transgastric wedge resection is a reliable method for GISTs located at the esophagogastric junction instead of total gastrectomy or proximal gastrectomy which severely impairs the quality of life of the patient. It can be preferred especially in the resection of masses below 5 cm with a pre-diagnosis of GIST, which is a premalignant lesion with a tendency to grow into the lumen. However, further studies with larger series and longer follow-up periods are needed.

Disclosures

Ethichs Committee Approval: We conducted our study with the decision of the ethics committee of Antalya Training and Research Hospital (Ethical number is 2023-178).

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Conflict of Interest: None declared.

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