CASE REPORT

Laparoscopic Gastric Tailoring for Huge Subcardial Gastrointestinal Stromal Tumor

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ABSTRACT

Background: A 67-year-old woman with a gastrointestinal stromal tumor (GIST) of the stomach presented to our outpatient clinic. Preoperative computed tomographic scans and endoscopic examination revealed a spherical submucosal tumor (7.7 x 6.1 x 6 cm) in the posterior wall of the stomach less than 1cm away from the cardia, on the small curvature side.

Methods: The tumor, which endosonographically had a volume of 282 cm^3, was completely resected by a full-thickness laparoscopic wedge excision without discontinuous gastric resection. The whole procedure was performed using 4 working ports (one 12-mm and three 5-mm ports) and 1 camera port (12 mm). Because the resection margins were tumor free on frozen sections and the distance between the resection margin and cardia was wide enough not to compromise food passage, there was no need for total gastrectomy or upper discontinuous gastric resection. The patient was discharged on the fourth postoperative day after an uneventful clinical course.

Results: Histological examination revealed a malignant gastrointestinal stroma tumor of the stomach. The patient was therefore enrolled for Imatinib adjuvant therapy. Careful and long-term follow-up of 21 months showed no signs of local or distant tumor recurrence. However, further follow-up is needed to monitor for signs of possible recurrence or distant metastases.

Conclusion: The described technique prevented proximal gastric resection and a risk of anastomosis without compromising the food passage and radicality.

Key Words: Gastrointestinal stromal tumor, Laparoscopic surgery, Stomach.

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INTRODUCTION

Gastrointestinal stromal tumors (GIST) are pathologically defined as tumors consisting of spindle-shaped cells of mesenchymal origin, developing in the gastrointestinal tract.[1,2] Most of these tumors have been considered to be of smooth muscle, and include leiomyoma, leiomyosarcoma, and leiomyoblastoma.[3]

Surgical resection of the primary tumor is the treatment of choice when cure is sought[4] for patients with GISTs. Only a decade has passed since the introduction of laparoscopic surgery for gastric tumors, and the concept of GIST is of even shorter duration. Although it is too early to reach any definitive conclusions, the evidence is growing that the laparoscopic approach for gastric GIST is a valuable alternative for these patients. Although a conclusive randomized-controlled trial with a proper number of cases remains to be done, laparoscopic surgery for gastric tumors is now an accepted modality for curative surgery.[5] The goal of surgery for GIST is complete resection of visible and microscopic disease, avoiding capsule rupture and intraabdominal spillage of tumor cells. Because GIST rarely metastasizes to local regional lymph nodes, lymphadenectomy is warranted only for evident nodal involvement. These findings suggest that wedge resection with a clear surgical margin is the most suitable procedure for the surgical treatment of gastric GIST. In the case of large subcardial tumors, especially located at the small curvature, a discontinuous resection is often warranted.

In the following case report, we present a laparoscopic technique that leaves the gastric passage intact.

CASE REPORT

A 67-year-old woman was admitted to the University Medical Center Hamburg - Eppendorf with a history of epigastric pain and anemia. The results of physical and laboratory examinations were essentially normal, except for mild anemia. Preoperative CT scan and endoscopic examination revealed a spherical submucosal tumor with central depression in the posterior gastric wall less than 1cm away from the cardia on the small curvature side **(Figure 1)**. After routine preoperative preparations the tumor, which endosonographically had a volume of 282 cm^3 (6.1 x 7.7 x 6 cm), was

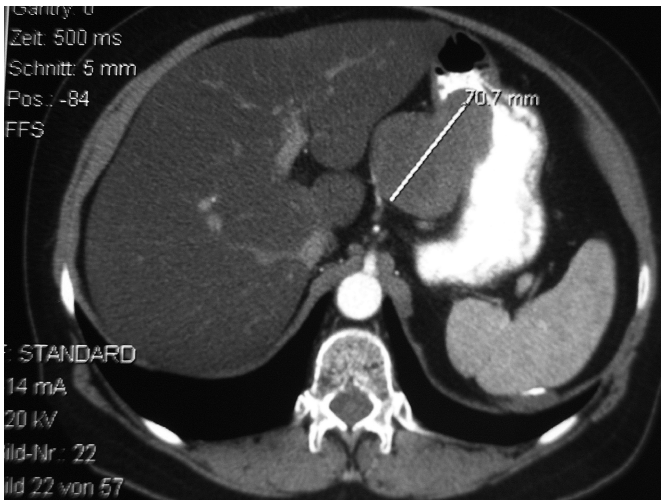

Figure 1. Preoperative CT-scan detecting a large gatstric submucosal gastrointestinal stromal tumors on a small curvature side.

resected laparoscopically. Four working ports (one 12-mm and three 5-mm ports) and 1 camera port (12 mm - periumbilical) were used. Intraoperative laparoscopy revealed no lymph node swelling or serosal invasion of the tumor. The location of the tumor was confirmed by intraoperative gastroscopy. The tumor was removed by creating a sleeve along the small curvature, resecting both layers of the stomach (whole thickness) using an Endo-GIA linear stapler and then oversewing the staple line, without disturbing the gastrointestinal continuity **(Figure 2)**. The left gastric artery was included in the specimen, and the vagal innervation was preserved. The hiatal dissection was necessary, but we did not consider the fundoplication to diminish the risk of a postoperative stricture formation. After completion of the resection, additional intraoperative gastroscopy was performed to exclude possible stenosis and stricture formation. Total gastrectomy or upper discontinuous gastric resection was not considered because the resection margins were tumor free on frozen sections and a sufficient distance to cardia was obtained, thus not hampering the food passage. The postoperative course of the patient was uneventful. The gastric tube was removed on the first, and feeding of the patient started on the second postoperative day. Stool was also obtained on the second postoperative day, and the patient was discharged on the fourth postoperative day. After the final pathology diagnosis was confirmed, we considered that a gastrectomy was not indicated. The patient is currently well with no clinical sign of local or distant tumor recurrence (endoscopy, CT, and postoperative series of upper gastrointestinal tract with Gastrographin swallow; **Figure 3**) 21 months after the initial operation. The patient does not have any problems and tolerates a regular diet.

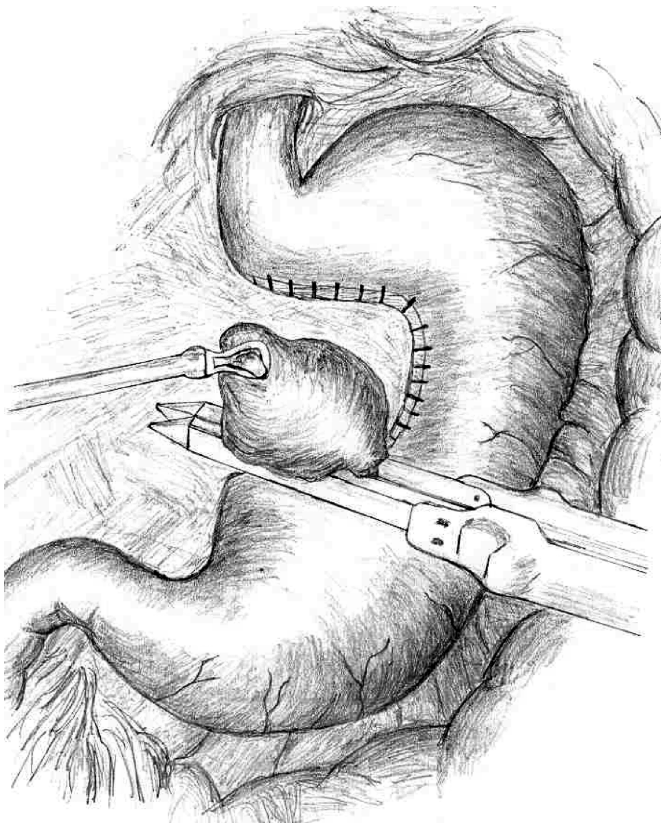

Figure 2. Laparoscopic gastric tailoring for huge subcardial gastrointestinal stromal tumors.

Pathology Findings

The locally resected tumor was 8.0 x 5.5 x 5.8 cm in size, elastic, and hard in consistency, and its cut surface was yellowish-white without hemorrhagic or necrotic foci. Eight lymph nodes were dissected during the laparoscopic surgery, and none of them was positive on routine histology. The resection margin was free of tumor, and the distance to the tumor was 1.4 cm. Histologically, the tumor was composed of elongated spindle-shaped cells, with elongated nuclei with central necrosis. The Ki-67-Labeling-Index was 10% to 20%. The mitotic activity of the tumor cells was determined by counting the number of apparent mitotic figures in 50 consecutive high-power fields (HPF, 3400), in which only 10 mitoses on 50 HPF were found. Formalin-fixed and paraffin-embedded specimens were immunostained by a modified avidin-biotin peroxidase complex method. Most of the tumor cells showed immunoreactivity for CD34, but not for á-smooth muscle actin (áSMA), desmin, or S-100 protein. The Kit Mutation analysis of Exon 9, 11, and 13 revealed a mutation in Exon 11. Because the necrosis, large tumor size,

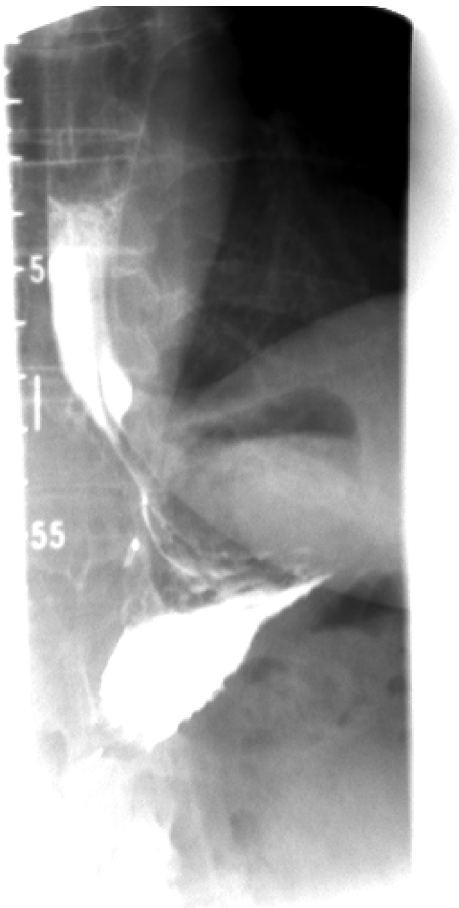

Figure 3. Postoperative series of upper gastrointestinal tract (Gastrographin swallow) without a stricture 21 months after the initial operation.

and relatively high proliferation activity were present, and mutation in Exon 11 was detected, the tumor was classified as a malignant GIST of the stomach. The patient was therefore enrolled for Imatinib adjuvant therapy.

DISCUSSION

The cause, biology, and optimum management of GIST remain largely unknown. The patients should be treated in an organ-sparing and appropriately careful manner. Only a decade has passed since the introduction of laparoscopic surgery for gastric tumors, and the concept of GIST is of even shorter duration. Although it is too early to reach any definitive conclusions, the evidence is growing that the laparoscopic approach for gastric GIST is a valuable alternative for these patients. Even the medical management of gastrointestinal stromal tumors (GIST) has evolved rapidly. Recently developed immunohistochemical staining methods allow the differentiation of GIST from myogenic, neurogenic, and other mesenchymal tumors.[6] A tyrosine kinase receptor antagonist (imatinib mesylate) has shown excellent results in patients with unresectable or metastatic GIST,[7] but surgical resection of the primary tumor is the treatment of choice when cure is sought.[4]

Although a conclusive randomized-controlled trial with a proper number of cases remains to be done, laparoscopic surgery for gastric cancer is now an accepted modality for curative surgery.[5,8] The goal of surgery for GIST is complete resection of visible and microscopic disease, avoiding capsule rupture and intraabdominal spillage of tumor cells. As GIST rarely metastasizes to local regional lymph nodes, lymphadenectomy is warranted only for evident nodal involvement. These findings suggest that wedge resection with a clear surgical margin is the most suitable procedure for the surgical treatment of gastric GIST.

More recently, GISTs were classified into the 4 following categories based on immunohistochemical and ultrastructural criteria[1]: tumors showing differentiation towards smooth muscle cells, classified as leiomyomas or leiomyosarcomas[2]; tumors showing apparent differentiation toward neural elements, classified as autonomic nerve tumors or myenteric plexus tumors[3]; rare tumors showing dural differentiation toward smooth muscle and neural elements; and[4] tumors lacking differentiation toward any cell type.[9] Some studies restricted the term "GIST" to refer only to tumors belonging to the fourth category.

The National Comprehensive Cancer Network (NCCN) task force report[10] states that "laparoscopic or laparoscopic-assisted resection may be used for small (<2 cm) GISTs when the risk of intraoperative tumor rupture is low. However, the use of laparoscopic resection is generally discouraged for GIST." Another report of the consensus meeting for the management of gastrointestinal stromal tumor under the sponsorship of the European Society of Medical Oncology (ESMO)[11] declares that "laparoscopic surgery should be avoided, owing to the higher risk of tumor rupture and subsequent peritoneal seeding. A laparoscopic resection might be accepted in cases of small (<2 cm) intramural tumors." According to these reports, laparoscopic surgery for GIST is recommended only for cases of very small size because of the risk of tumor cell seeding and subsequent peritoneal recurrence. In Western countries, most GIST patients first present at an outpatient clinic with complaints of vague abdominal discomfort or anemia due to a large bulky GIST,[12] and the size of the tumor is already too big to follow the NCCN and ESMO guidelines. In Japan and some other Asian countries, however, asymptomatic incidental GIST is

common and usually is detected in screening.[13,14] The negative perception of laparoscopic surgery for GIST may have arisen partly as a result of these background differences.

Nowadays, gastric submucosal tumors are generally resected by partial or total gastrectomy with lymphadenectomy. In fact, a very few patients will die due to distant metastasis, despite an initial diagnosis of a benign tumor. The recurrent or metastatic form of the usual type of gastric cancer is lymph node metastasis, whereas most malignant submucosal tumors exhibit distant metastasis.[15] This finding suggests that lymphadenectomy is not necessary for malignant gastric submucosal tumors. Considering these tumor characteristics, local resection might be the first choice of treatment.

Our work is only a small contribution to the treatment of these patients. We were able to show that the dimensions (smaller than 2 cm) are not the crucial criteria for the laparoscopic approach in patients with gastric GIST, because the largest diameter of tumor in this patient was 8cm (total volume of 255 cm^3). Furthermore, we also showed that although the minimal margin to the cardia was 1cm, there was no need for classic (formal) gastric resection with violation of the GI tract continuity. The benefit for the patient was therefore double. First, although the tumor was greater than the maximal size anticipated for laparoscopic surgery by the National Comprehensive Cancer Network (NCCN), we were able to perform this resection in a laparoscopic way. Secondly, the patient was spared total gastrectomy and D-II lymphadenectomy as proposed by NCCN, especially for proximal gastric tumors, and furthermore the continuity of the gastric tract was preserved, so the feeding of the patient started on the second postoperative day, and it was excellently tolerated. Twenty-one months after the operation, the patient was still free of local and distant tumor recurrence and no stenosis or stricture was observed **(Figure 3)**. Although the patient was enrolled for Imatinib adjuvant therapy, careful follow-up should be conducted considering the possibility of distant metastasis.

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