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TECHNICAL NOTE

Laparoscopic transgastric resection for intraluminal gastric gastrointestinal stromal tumors located at the posterior wall and near the gastroesophageal junction

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KEYWORDS
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transgastric resection

Summary *Objective:* Intraluminal gastric gastrointestinal stromal tumors (GISTs) located at the posterior wall and near the gastroesophageal junction represent a surgical challenge. We present our experience of laparoscopic transgastric resection for gastric GISTs of such location.
Methods: Data of seven patients undergoing laparoscopic transgastric resection were identified and retrospectively reviewed with regard to procedural steps and patient outcomes.
Results: Seven patients (4 men; mean age 64.1 ± 14.6 years) with gastric GISTs underwent laparoscopic transgastric resection from January 2010 to May 2015. Three of the seven GISTs were located near the gastroesophageal junction and the rest were found in the posterior wall of the stomach. All seven patients underwent successful laparoscopic resection without any conversions. There were no mortalities and no significant postoperative complications. Intraoperative endoscopy was performed for all patients. The mean operative time was 164.0 ± 59.1 minutes. Regular diet was resumed within 3 days on average and mean postoperative stay was 3.6 ± 1.3 days. All patients achieved complete R0 resection with a mean tumor size of 5.5 ± 1.1 cm. At a mean follow-up of 48.0 ± 13.4 months, all patients were recurrence free.
Conclusions: GISTs of the posterior wall and in close proximity to the gastroesophageal junction can be safely resected laparoscopically using such an approach. Standard technique is required to achieve good oncological outcomes.

Conflicts of interest: All contributing authors declare no conflicts of interest.

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1. Introduction

Gastrointestinal stromal tumors (GISTs) are rare, accounting for < 1% of gastrointestinal tumors. However, they are the most common mesenchymal tumors of the gastrointestinal tract, with an estimated annual incidence of 10—20 cases per one million of the population.[1] The concept of GISTs was first coined by Mazur and Clark in 1983,[2] and the interstitial cells of Cajal were thought to be the origin. The stomach is the most common site of GISTs, occurring in more than half of patients.[3,4] Upper gastrointestinal bleeding and abdominal pain are the most common primary presenting symptoms.[4,5] However, most of the patients are asymptomatic, with diagnosis incidentally discovered during endoscopic assessment for unrelated presentation.[4,5] At present, surgical resection remains the only chance for cure. Both open and laparoscopic approaches have been described. The feasibility and safety of laparoscopic approaches have been established, with systematic review and meta-analysis showing the advantages of laparoscopic approaches in terms of intraoperative blood loss, overall postoperative complications, length of hospital stay, passing of first flatus and resumption of oral intake.[6,7]

Laparoscopic approach to resection of gastric stromal tumors is tailored to the location of tumor in the stomach. In most circumstances, wedge resection is typically performed,[4,8] especially for tumors in the anterior wall, lesser curvature, and greater curvature. However, the difficulty in accessing such tumors located in the posterior wall and gastroesophageal junction (GEJ) requires alternate approaches. Transgastric resection is one of the approaches advocated. However, there are limited reports on such a technique as the clinical entity occurs rarely. The objective of this article is to assess feasibility and oncological outcomes of this laparoscopic approach for intraluminal gastric GISTs located in the posterior wall and near the GEJ.

2. Materials and methods

2.1. Patients

This study reviews seven consecutive adult patients (age > 18 years) with intraluminal gastric GISTs located at the posterior wall or within 3 cm of the GEJ who underwent laparoscopic transgastric resection at the Department of Surgery, Sarawak General Hospital, between January 2010 and May 2015 (Table 1). The data were retrieved from a prospectively maintained database and included patient demographics, clinical presentation, endoscopic and imaging findings, operative outcomes, length of hospitalization, histopathological characteristics of the tumor, and cancer status at follow-up review. The study was conducted with the approval of our hospital ethical committee and the Director General of Malaysia. Six patients presented with clinical features suggestive of upper gastrointestinal hemorrhage and one had dyspepsia. Prior to surgery, all patients underwent upper endoscopy, followed by computed tomography (CT) scan to confirm the diagnosis of gastric submucosal tumor and to exclude adjacent organ involvement that precludes consideration for a laparoscopic approach. All the surgeries were performed by a consultant surgeon with experience in advanced laparoscopy and endoscopic suturing.

The term *near the GEJ* is defined as a distance of 3 cm from the GEJ along the lesser curve and the angle of His. Intraluminal gastric GIST is defined as GIST with a significant intragastric component. The malignant potential of GISTs is categorized as very low, low, intermediate, or high risks according to Fletcher's risk classification.[9] Mitotic rate is defined according to the number of mitoses per 50 high-power fields, and tumor size is defined as the maximum diameter of the resected tumor. Predicted biological behavior is defined as percentage of metastasis rate or tumor-related mortality.[10]

2.2. Surgical technique

The surgery was performed with the patient under general anesthesia and placed in a modified lithotomy position. The surgeon stood between the patient's legs with the camera surgeon on the patient's right side and the assistant on the left. The endoscopist stood at the patient's top right side, while the endoscopy cart with its monitor was positioned on the contralateral side of the endoscopist. A five-port technique was employed in the upper abdomen: subumbilical 10-mm trocar, left midclavicular 12-mm trocar, right midclavicular 5-mm trocar, subxiphoid 5-mm trocar and left anterior axillary line 5-mm trocar. Carbon dioxide insufflation was maintained at a pressure of 12 mmHg. Nathason liver retractor was used in selected cases especially for GEJ tumors when the upper part of the stomach was overlapped by bulky liver.

The surgery consisted of six steps. Firstly, diagnostic laparoscopy was performed to exclude peritoneal and liver metastases using a 30° telescope after inserting an infraumbilical 10-mm port via open technique. A second 12-mm port was placed along the left mid-clavicular line and a third port, sized 5 mm, was placed along the right mid-clavicular line, under direct vision. Secondly, the endoscopist, standing at the head of the patient, introduced the gastroscope (GIF-160; Olympus, Tokyo, Japan) into the stomach to identify the exact location of the tumor and transilluminate the anterior stomach wall. Thirdly, anterior gastrotomy was made with ultrasonic shears (Harmonic Scalpel; Ethicon Endo-Surgery, Cincinnati, OH, USA). Fourthly, the submucosal mass with its surrounding mucosal was delivered into the gastrotomy opening either by using

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