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Laparoscopic management of stomach gastrointestinal stromal tumours

Iqbal Saleem Mir, Mudasir Farooq, Abdul Qayoom, Asif Iqbal, Sheikh Viqar, Tajamul Rashid

ABSTRACT

Introduction: Stomach is the most common site of gastrointestinal stromal tumours (GIST) (40–70%) followed by small bowel and colorectum, respectively. The most definitive treatment is the surgical resection. We present our experience with eleven cases who were managed with laparoscopic resection.

Methods: Patients who underwent laparoscopic resection of stomach GIST between January 2012 and January 2014 in a single surgical unit of Department of Surgery at Government Medical College Srinagar are presented here. The data obtained and analysed included the following characteristics: age, sex, length of postoperative hospital stay, operative time, tumour location, tumour size, histopathological assessment of resection margins, intraoperative blood loss, and incidence of perioperative complication.

Results: Out of eleven patients ten patients were completely managed with laparoscopy. One patient was converted to surgery because of a large size, thus creating difficulty in manipulation. All the patients were between 50 and 65 years of age. Four tumours were located on lesser curvature, 3 on the fundus, one over anterior body, one over posterior body, and one over gastroesophageal junction. All resected specimen had tumour-free margins. Intraoperative blood loss was below 150 ml in all the patients and blood transfusion was not required in any patient. The median duration of surgery was 125 minutes (range 90-185 minutes) and median postoperative stay was 5 days (range 4-8 days). There were no immediate or late postoperative complications. There was no recurrence or distant metastasis over a median follow-up of 24 months.

Conclusions: Laparoscopic resection of stomach GIST can be safely done with minimal intraoperative and postoperative complication. Besides short term benefits of minimally invasive surgery, it sticks to the principles of oncology.

Key words: *Laparoscopic transgastric resection, stomach, GIST*

Introduction

Gastrointestinal stromal tumours (GIST) although rarely malignant are the most common sarcoma of the gastrointestinal (GI) tract, representing 0.2% of all GI tumours [1,2]. Stomach is the most common site of GIST (40–70%), followed by small bowel (20–40%) and colorectum (5–15%) [3]. Presentations of disease include mass lesion, abdominal pain, and bleeding or may present with metastasis (15–50%) [3,4]. Risk classification of GIST by Flecher et al is based on their size and mitotic count 1 (Table 1).

Surgery remains the apt and appropriate treatment for all resectable nonmetastatic tumours with the resectability rate for localized primary GIST. The

Author affiliations : [1]*Department of Surgery, Government Medical College, Srinagar, India*
Correspondence : *Mudasir Farooq, MD, Department of Surgery, Government Medical College, Srinagar, India. e-mail: mudasirfarooq@gmail.com*
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Table 1. Classification of primary gastrointestinal stromal tumours by risk of metastasis [1].

Risk category	Size	Mitotic count
Very low	<2 cm	<5 per 50 HPFs*
Low	2–5 cm	<5 per 50 HPFs
Intermediate	<5 cm	6–10 per 50 HPFs
	5–10 cm	<5 per 50 HPFs
High	>5 cm	>5 per 50 HPFs
	>10 cm	Any mitotic rate
	Any size	>10 per 50 HPFs

reported resectability rate for localized primary GIST is 70–80% [4-6]. Endoscopic resection of small lesions remains controversial because of the associated risk of incomplete oncologic resection and tumour spillage [7,8]. Systematic lymphadenectomy is not indicated for GIST as it does not metastasize to lymph nodes [5]. We present a case series of patients who underwent laparoscopic resection of stomach GIST at our centre.

Materials and Methods

All the patients who underwent laparoscopic resection of stomach GIST between January 2012 and January 2014 in a single surgical unit of Department of Surgery at Government Medical College Srinagar are presented here. The patients who were preoperatively diagnosed as cases of stomach GIST with perioperative metastasis ruled out using preoperative computed tomograpy as staging investigation were included (Figure 1,2). Histological diagnosis was not a necessary inclusion criterion. After the resection the specimen was sent for histopathological diagnosis by means of hematoxylin and eosin staining and for the immunological assays for CD 117, CD 34, and desmin. All the patients were sent to the medical oncologist and imatinib (Imalak, Sunpharma, Mumbai, India) therapy was given after surgery as per his discretion.

The data obtained and analysed included the following characteristics: age, sex, length of postoperative hospital stay, operative time, tumour location, tumour size, histopathological assessment of resection margins, intraoperative blood loss, and incidence of perioperative complication.

All the patients with histopathologically proven GIST were followed up regularly every 3 months for first year and 6 months in the second year with follow-up by upper GI endoscopy in 6 months for the first year and then annually for the next two years and abdominal CT scan annually for 2 consecutive years in intermediate and high risk groups only.

Figure 1. Endoscopic view of stomach GIST.

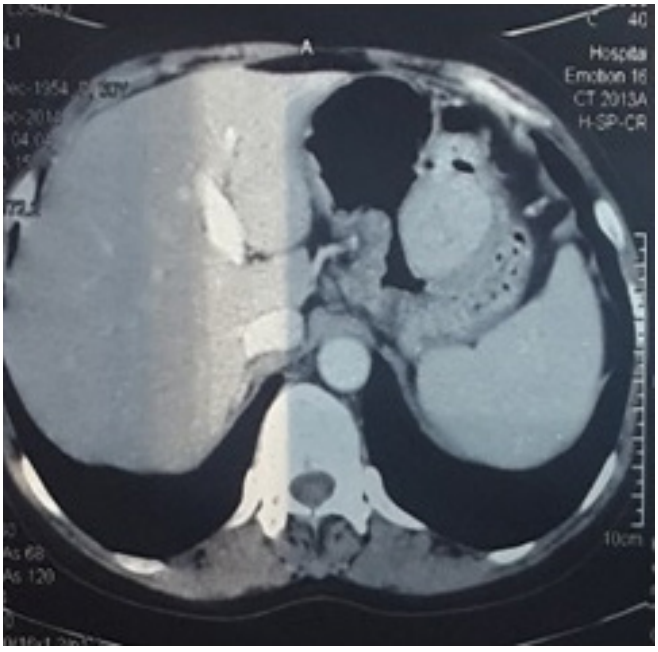

Figure 2. CECT abdomen showing the presence of GIST in the stomach anteriorly towards lesser curve.

All laparoscopic resections were performed by a single surgical team in a standardised manner. The patient was placed supine and four-port technique was used, with 10 mm umbilical port, one 5 mm right upper quadrant port, one 10 mm left upper quadrant port, and one 10 mm epigastric port. After performing diagnostic laparoscopy to rule out metastatic disease the tumour was identified and localised through visualisation and palpation (Figure 3). Only one lesion required intraoperative endoscopy. The rest of the lesions were palpable as well as grossly visible. No patient received

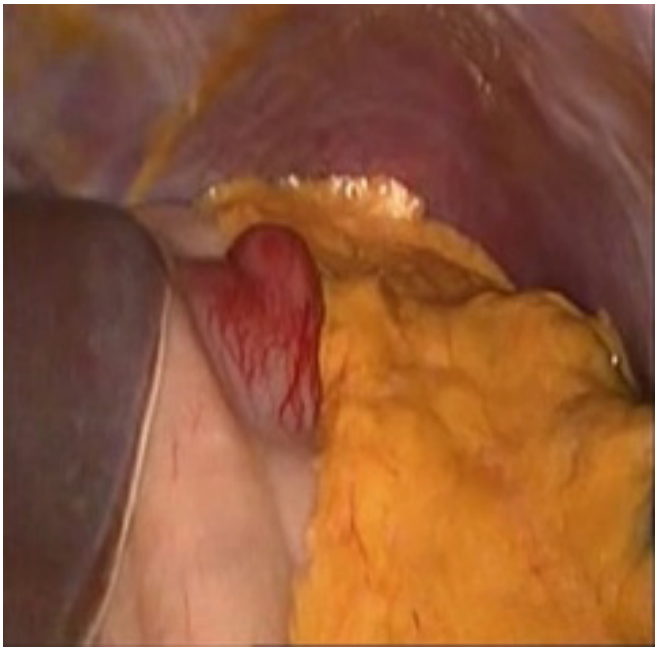

Figure 3. Laparoscopic view of stomach GIST.

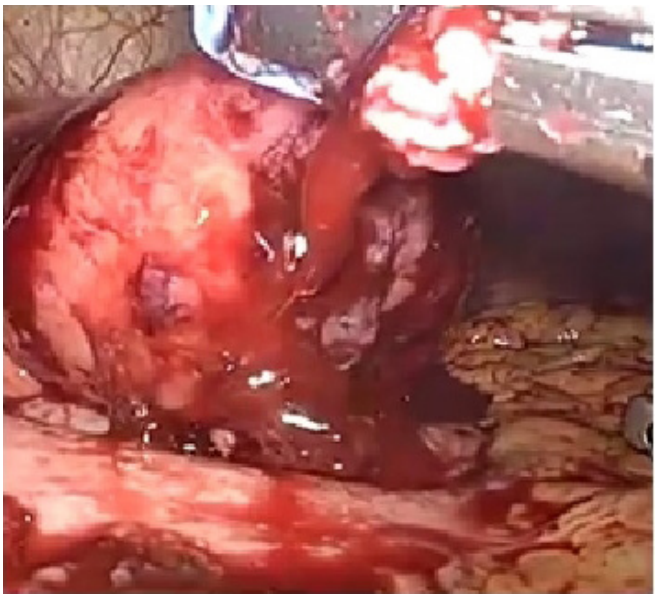

Figure 4. Laparoscopic transgastric resection of gastrooesophageal GIST.

preoperative imatinib. In 8 patients laparoscopic wedge resection (Figure 4) was done using linear staplers after applying a stay suture near the tumour and lifting it .This was done for tumours located on lesser curvature and fundus of the stomach. There was one conversion to open laparotomy in view of large size and difficulty in laparoscopic manipulation. For posteriorly placed tumours and tumour located on gastroesophageal junction, anterior gastrostomy was done followed by resection (Figure 5). Manual resection using ultrasonic coagulating shears with the resection margin paralleling the round edge of the tumour was done. The defects were closed using 3, 0 vicryl running sutures (Figure 6). The mass was placed in an endoscopic specimen retrieval bag and removed through the 12 mm port, which sometimes needs to be increased (Figure 7). A mixture of water and methylene blue was instilled through a nasogastric tube to achieve gastric distention. No evidence of gastric leakage was observed and the solution was removed via the nasogastric tube. The abdomen was thoroughly irrigated and suctioned. All instruments and ports were removed, pneumoperitoneum deflated, and the port sites were closed in the usual fashion. Nasogastric suction was done for two postoperative days. Orals sips were started on third

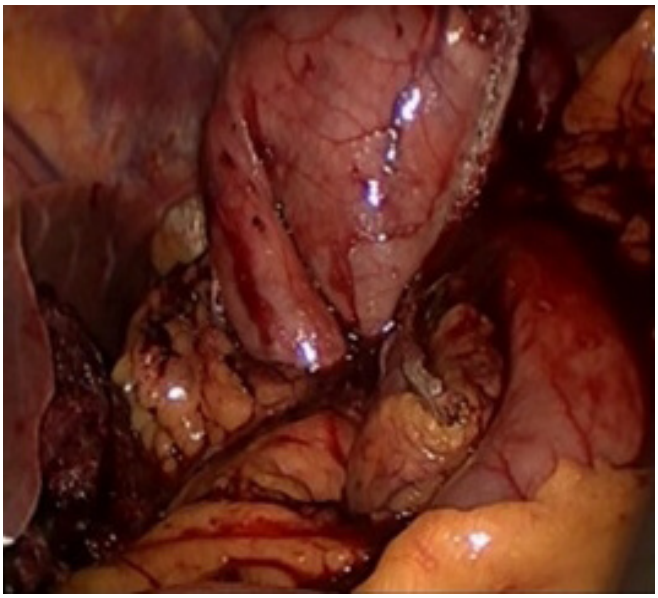

Figure 5. Laparoscopic wedge resection of stomach GIST.

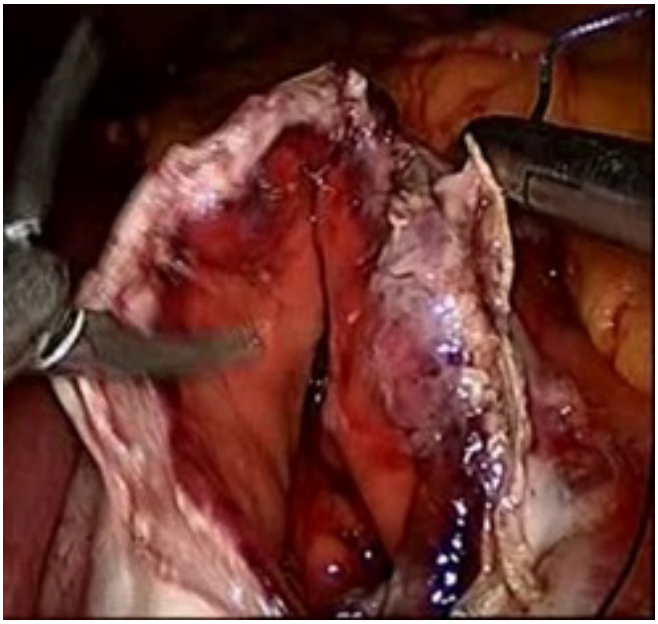

Figure 6. Intracorporeal suturing using 3,0 polyglactin 910 (vicryl).

Figure 7. Gross specimen of stomach GIST with central ulceration.

postoperative days and tube drain removed on 4th postoperative days unless suspecting a leak.

Results

11 patients were planned to undergo laparoscopic resection for stomach GIST. There was one conversion to open surgery. Ten cases were completed successfully with laparoscope. Laparoscopic resections include 8 wedge resections and 2 transgastric resections. After median follow-up of 24 months there was no recurrence or distant metastasis (Table 2).

GIST was confirmed by histopathology in all the patients. Out of 11 patients, 7 were males and 4 females. The patient who was converted (malignant pathology) was not included for data analysis. One patient that turned out to be malignant was treated postoperatively with imatinib. Most of the patients were between 50 and 65 years of age. All resected specimen had tumour-free margins. Intraoperative blood loss was below 150 ml in all the patients and blood transfusion was not required in any patient. The median duration of surgery was 125 minutes (range 90-185 minutes) and median postoperative stay was 5 days (range 4 -8 days). There were no immediate or late postoperative complications. There was no recurrence or distant metastasis over a median follow-up of 24 months (range 18-29 months). Table 3 mentions the immunohistochemistry. Molecular biology for KIT and PGDFA mutation was seldom done in any patient.

Discussion

The term "gastrointestinal stromal tumour" was given by Mazur and Clark to describe different kind of intestinal sarcomas [9]. Surgery is the mainstay treatment of stomach GIST [4-6]. The age of the patients in our series ranged from 45 to 65 years. The median age of 60-65 years with a wide range is reported in the literature [10].

In our series all the patients were diagnosed with upper gastrointestinal endoscopy. Preoperative biopsy was not performed in any of the patients. There was a direct referral of these patients to a single surgical unit from the Department of Gastroenterology and all of them underwent laparoscopic resection. All the treated patients had lesion above 2 cm in size and were considered for excision directly without biopsy. The excision/biopsy is considered standard approach to nodules > 2cm in size because if is GIST they are associated with high risk [10].

Presence of necrosis or ulceration is other histologic

Table 2. Operative data and tumour characteristics of the patients.

Patient	Sex	Age	Localisation of tumour	Operative procedure	Diameter of tumour	Mitotic count/50 HPF	Risk classification	Duration of surgery (minutes)	Hospital stay
1.	M	45	Anterior corpus	Wedge resection	5.5	3	Intermediate	130	7
2.	M	57	Lesser curvature	Wedge resection	4	2	Low	90	4
3.	M	51	Lesser curvature	Wedge resection	5	4	Low	138	5
4.	F	70	Anterior corpus	Wedge resection	5.5	<5	Intermediate	125	6
5.	M	65	GE junction	Transgastric resection	5	<5	Intermediate	185	8
6.	M	80	Fundus	Wedge resection	7	<5	Low	100	5
7.	F	55	Posterior corpus	Transgastric resection	4	3	Low	160	7
8.	F	60	Fundus	Wedge resection	2.5	3	Low	90	5
9.	M	49	Lesser curvature	Wedge resection	3	2	Low	112	5
10.	F	67	Fundus	Wedge resection	3.5	2	Low	123	5

Table 3. Immunohistochemistry.

Immunohistochemistry and tumour characteristics	Present in number of patients
CD 117 +	6
CD 34 +	5
Desmin	0
Ulceration	1
Necrosis	1

features of importance [11,12]. Association between coagulative necrosis and malignancy has been shown [13]. Segmental or wedge resection is the treatment of choice for tumours whose size and location technically allow for it [14,15]. DeMatteo et al. [5] showed that tumour size determines survival and not negative microscopic surgical margins. Gross negative margins only [5,16] without routine lymphadenectomy should be the motive of surgery [5]. Avoidance of seeding and spillage is very important [17]. In our series necrosis was associated with malignancy in one case (converted case).

In harmony with the previously published literature [18-20] our results also support the application of laparoscopic resection in stomach GIST. We were able to achieve tumour-free margin in all the patients with no incidence of intraoperative tumour rupture or spillage. So laparoscopy, apart from passing on benefits of minimally invasive surgery, sticks to the principle of oncological surgery and can be safely applied for surgical resection of stomach GIST. However laparoscopic approach is discouraged in patients with large tumour size because of the higher risk of rupture and relapse [10].

Conclusions

Laparoscopic resection GIST, apart from proving all the benefits of minimal access surgery like less pain, cosmesis, and less hospital stay, does not compromise on standard oncological excision guidelines. Difficult location of tumour should not be considered strict contraindication for laparoscopic excision. The threshold for converting to open surgery should be low if the tumour is locally adherent or if there is difficulty in manipulating it in view of large size or location so as to avoid its rupture and spillage. With our experience of laparoscopic resection of GIST, we advocate that laparoscopy can be safely and effectively applied for the surgical stomach GIST.

Conflict of interest statement

The authors have no conflicts of interest to declare.

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