

Gastric GIST Treatment by Laparoscopy: Report of 49 Cases and Literature's Review

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Abstract:-

Background: Various aspects of the feasibility of laparoscopic resection of gastrointestinal stromal tumors (GIST's) is being debated. In this paper problems of minimally invasive resection of gastric GIST is being described and compares this experience with an extensive literature review. **Study design:** In a prospective study between Jan 2012 to Aug 2022, 49 consecutive patients undergoing laparoscopic resection of gastric GIST were enrolled. On PubMed literature review of laparoscopic treatment was performed. Using chi square test and t student evaluation statistical analysis was done. **Results:** 49 patients, mean age 50yrs, were submitted to laparoscopic wedge-segmental gastric resections. Mean tumor size was 4cm, 4 days was mean hospital stay, 150 min was mean operative time, 100 ml was mean blood loss. No operative complications or mortalities were reported. Negative resection margins were reported in all lesions. All patients were disease free at a mean follow up of 35 months, disease free without long term morbidity related to gastric resection. Length of stay, morbidity, mortality, and oncological outcomes were comparable to open surgery retrospective evaluation.

Conclusions: Laparoscopic resection is safe and effective in treating gastric GISTS as found in literature review. Minimally invasive approach should be the preferred surgical treatment in patients with small and medium sized gastric GIST'S, given these findings as well as the advantages afforded by laparoscopic surgery.

Keywords:- GIST. Surgery. Laparoscopy.

Abbreviations:- GIST Gastrointestinal Stromal Tumors.

I. INTRODUCTION

Gastrointestinal stromal tumours [GISTS] are very rare tumours. Most of these malignancies were classified as leiomyomas, leiomyosarcomas and leiomyoblastomas⁽¹⁻³⁾ historically. With the advent of immunohistochemistry, electron microscopy, a pleuropotential intestinal pacemaker cell (the interstitial cell of Cajal) was identified as the origin of GISTS⁽⁴⁻⁵⁾. Identification of CD34 and CD117 antigen in the majority of GISTS have led to further cellular characteristics of these neoplasms⁽⁶⁻⁸⁾. The stomach is the site of occurrence in more than half of patients although GISTS are found throughout the GI tract^(2,3,9). Most patients with GIST are asymptomatic and the lesions are discovered incidentally. GI

bleeding and vague abdominal pain can be the symptoms of gastric GIST'S.

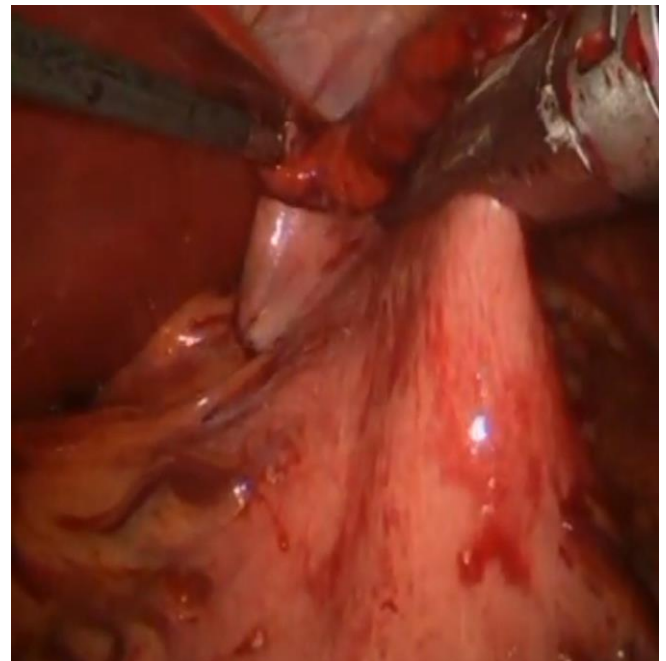


Fig 1: By elevating the gastric wall with a bowel clamp placed under tumor Gastric resection was carried out using linear GI stapler.

Metastatic potential of the GIST is very difficult to predict. Size and grading are the only prognostic factors⁽⁹⁾. For non metastatic GIST standard therapy is surgery. R0 resection should be performed. GISTs rarely give metastases to lymph node therefore lymphadenectomy is not necessary⁽¹⁰⁾. In this study we present our series of 49 laparoscopic ally treated GISTS.

II. MATERIALS AND METHODS

Between Jan 2012 and Aug 2022, 49 consecutive patients undergoing laparoscopic resection of GISTS were undertaken in a prospective data base. Demographic data, clinical features, biochemical investigations and imaging were analysed. Operative times, intraoperative findings, blood loss, surgical technique, morbidity and hospital stay like parameters were collected. HPE was analysed. Wedge segmental resections were utilized to treat all reported cases.

The patient was placed in a supine position with arms abducted and surgeon stood between the patients legs as split leg table was used. Lateral to the patients right shoulder video monitors were placed. In the midline near the umbilicus first trochar was placed. Other two ports were placed in the right and left flank, then patient was placed in reverse trendelenburg's position. There was no direct manipulation of GIST'S .Gastric wall was elevated with a bowel clamp placed under the tumour and gastric resection was carried out by using linear endoscopic GI anastomosis stapler. Manual sutures was used to control bleeding from suture line. Division of gastro colic omentum was done with a bipolar vessel ligation system for posterior gastric tumours.

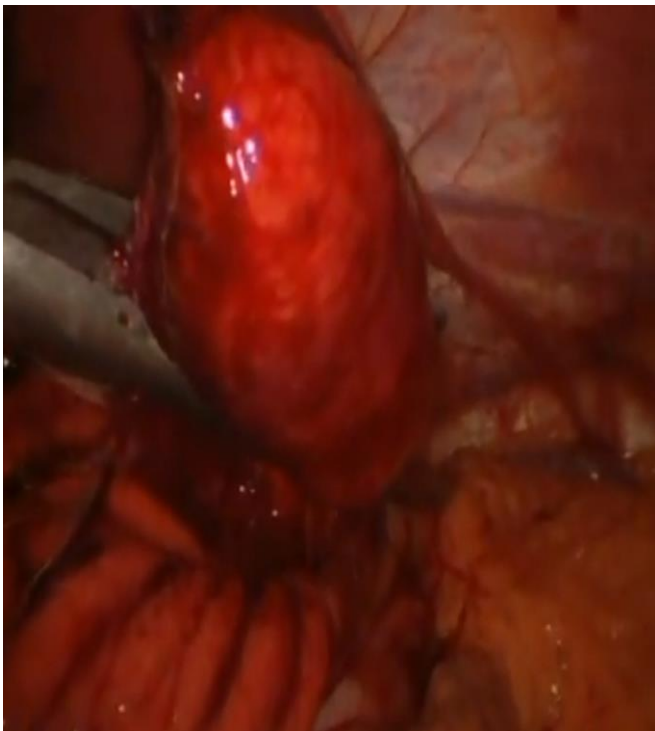


Fig 2:Tumor is fully delivered and examined for resection line.

Division of greater omentum lesser omentum or gastro hepatic ligament was done for lesions nearby curvatures. Nasogastric tubes were used postoperatively in case of gastric paralysis. Patients were discharged as soon as they were of full orals. Follow-up was done every 6 months and after 2 years annually with physical examination, CT, chest radiograph and serum chemistries. Annually upper GI endoscopy was repeated. At one year positron emission tomography scan was performed. All patients were visited by oncology consultant for eligibility in clinical trial for adjuvant therapy. Chi-squared test and t student evaluation was done for statistical analysis.



Fig 3:Specimen is removed from the abdominal cavity, once a tumor is fully resected.

III. RESULTS

From Jan 2012 to Aug 2022 49 consecutive patients undergoing laparoscopic resection of GIST were reviewed. there were 22 men and 27 women .50 years was the mean age .Surgical procedures used were: laparoscopic segmental gastric resection (n=18) and laparoscopic hand assisted segmental gastric resection(n=2).150 min was mean operative time.100 ml was the mean blood loss. There were no conversions to open surgery, no major intraoperative complications, no episodes of tumour rupture .Only twelve patients needed nasogastric tubes postoperatively beyond 48hr period. Postoperative morbidity and mortality was not reported. Mean hospital stay was 4 days.Majority of GIST were localized in the stomach body,3 GIST's were found in antrum ,1 in fundus. Mean tumor size was 4cm.All lesions had negative resection margins.CD117 positivity was found in all patients ,whereas CD34 was noted in 44 patients. All patients are alive at a mean follow up of 35 months, disease free without long term morbidity related to gastric resection.

IV. DISCUSSION

The term “gastrointestinal stromal tumour” was coined by Mazur and Clark in 1983 to identify a particular group of tumors (14).91 to 99% of GISTs expressed C-kit tyrosine kinase (CD117) and it can be used as accurate diagnostic marker. As there is rising incidence of upper endoscopy and endoscopic ultrasound gastric gists are increasingly diagnosed .The only radical therapy for these lesions is surgical treatment, still there is the discussion of role of the laparoscopic approach. This paper describes the the problems of minimally invasive resection of gastric GISTs and compares this experience with an extensive literature review and with the authors experience . Preoperatively all the patients in the present series were marked during ultrasound endoscopy. For the evaluation of sub mucosal lesions of the GI tract endoscopic ultrasound is the key component .High

risk lesions include size greater than 4-5cm, cystic spaces, irregular or invasive border, malignant appearing lymph nodes. For tissue acquisition endoscopic ultrasound guided fine needle aspiration is generally adequate. To differentiate GIST from other cell neoplasm immunohistochemical analysis is performed. In all patients with definitive diagnosis preoperative biopsy was carried out. Endoscopic biopsies uncommonly yield anything more than the normal mucosa, only in 35% of cases sub mucosal representation was achieved with forceps' biopsy during standard endoscopy, although the endoscopist intended to obtain the sub mucosal tissue⁽³⁾. However spindle cells is frequently revealed by ultrasound directed needle biopsy. In addition, highly suspicious for malignant GIST is reported by heterogeneous lesion larger than 4cm and with irregular borders. Complication rate is about 0-2% and the incidence of malignant seeding is relatively low⁽¹¹⁾. An intraoperative pathological examination is mandatory in case of diagnostic doubts. For organizational problems we utilized preoperative marking and not intraoperative endoscopy. Most authors preferred an endoscopic rendezvous and only one author utilized laparoscopic ultrasound in the review of literature. Only two authors used gastrostomy to identify these tumors in case of intramural lesions. We recommend the usage intraoperative endoscopy or preoperative marking, as intraoperative localization and visualisation of tumor can be difficult. 4 cm was mean size of laparoscopically treated GISTs in the present series and the mean size in the literature reported cases was 4.3 cm. So the laparoscopic approach has its best indications for the GISTs lower than 5cm. Hand assisted procedure can be utilized in case of GISTs larger than 5cm to facilitate gentle tumor handling, precise placement of endoscopic staplers, tactile feedback. Although Laparoscopic techniques should be limited to tumors less than 2cm⁽¹²⁻¹³⁾; only one author⁽¹⁴⁾ reported mean tumor diameter lower than 2cm. For best treatment of gastric GISTs surgical resection with negative margins⁽²⁾ without lymphadenectomy is best treatment. It is more difficult to define tumor borders in laparoscopic surgery, but we didn't report infiltrated margins in our series, and we found only two reported cases in the literature review. Most performed procedure is wedge segmental resection and it is the treatment of choice. However tumor size and location may be the indication for a more extensive surgery, including partial and total gastrectomy⁽¹⁵⁾. To achieve oncological safety in resection margins, Enucleation of GIST should be avoided. To eliminate the incidence of tumor rupture it is important to avoid direct tumor manipulation. Spillage of tumor can result in disease progression, recurrence and poor survival⁽¹⁶⁾. Choice between manual or stapled sutures is not relevant with insignificant leakage rate between the two. We treated all our presented patients with stapled sutures without particular problems. There is bleeding of stapled sutures most often that can be easily controlled with glue and manual controlled sutures. Oncological safety of the laparoscopic approach was shown by reported cases series, with survival and recurrence rates similar to historical open surgical controls. Length of stay, morbidity, mortality, and oncological outcomes were comparable to our open surgery retrospective experience. Only four patient died in laparoscopic treatment in the literature review enclosing the

present series and 34 subjects experienced recurrence. For these patients long patients long term follow up is fundamental because there is unpredictable biological behaviour in GISTs. In the present series of 49 consecutive cases and in the reported literature data there was effective control of disease with no mortality, minimal perioperative morbidity and excellent long term survival by laparoscopic wedge segmental resections of gastric GISTs. To conventional chemotherapy and radio therapy GISTs are highly resistant. There is activating mutations in either KIT (75-80%), two closely related receptor tyrosine kinases, plate derived growth factor receptor alpha (PDGFRA; 5-10%) in such tumours. These mutations lead to legend independent activation and signal transduction mediated by constitutively activated PDGFRA or KIT. Imatinib mesilate, a small molecule kinase inhibitor is now being tested as adjuvant (for medium and high risk patients) or neo adjuvant, has proven useful in the treatment of recurrent or metastatic GIST by targeting these activated proteins. Other targeted therapeutics such as sunitinib are available¹⁷ due to resistance to imatinib.

V. CONCLUSIONS

Laparoscopic resection is safe and effective in treating gastric GISTs, as found in literature review. Minimally invasive procedures should be preferred surgical treatment in patients with small and medium sized gastric GIST.

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