

LAPAROSCOPIC MANAGEMENT OF GASTROINTESTINAL STROMAL TUMORS: A DEVELOPING WORLD HOSPITAL BASED STUDY**Prof. (Dr.) Iqbal Saleem¹, Dr. Ranjeet Singh*², Dr. Younis Ahmad Dar², Dr. Mohit Kumar and Dr. Arshad Kema³**¹Professor; ²PG Scholar; ³Consultant***Corresponding Author: Dr. Ranjeet Singh**

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INTRODUCTION

Gastrointestinal stromal tumors (GISTs) are the most common mesenchymal tumors of the gastrointestinal tract, accounting for 80% of all digestive mesenchymal tumors. It is widely accepted that GISTs arise from the interstitial cells of Cajal, and the term 'stromal tumor' was first introduced by Mazur and Clark in 1983.^[1] The incidence of GISTs has been reported to range between 11 and 15 per million annually^[2-4], and 60% of GISTs are located in the stomach, 30% in the jejunum or ileum, 5% in the duodenum and 4% in the colorectum. Extragastrointestinal GISTs (EGISTs) have been reported in the liver, omentum, mesentery, gallbladder and urinary bladder.^[5-7]

Gastrointestinal stromal tumours (GIST) are the lesions originating from digestive tube walls and have been shown to harbor gain of function mutations in the cell-surface KIT receptor in approximately 90% of cases or in the platelet-derived growth factor receptor alpha (PDGFRA) in 8% cases.^[8-10] They usually present a variable biological behavior, being benign in the majority of cases. Around 30% present as clinically malignant lesions.^[11]

Management of GIST has been very controversial, Japanese guidelines for GIST^[12] recommended that histologically established GIST is an indication for surgery regardless of the size of the tumor. Surgical resections can be performed either laparoscopically or by open conventional method.^[13] Principles of the GIST surgery include complete surgical resection, no injury to the pseudo-capsule, a macroscopically negative margin with an adequate safety margin, and partial resection without prophylactic lymph node dissection.^[12,14]

Since there is paucity of literature in the laparoscopic management of GIST, we therefore performed a study to assess the outcome and follow up of laparoscopic management of GISTs in Kashmir.

AIMS AND OBJECTIVES

To analyse various clinicopathological factors in patients presenting with GIST (i) Site and size on imaging and surgery, (ii) To assess the outcome of laparoscopic GIST excision in terms of:- (a) Operative time, (b) Intraoperative capsule breach and tumor spillage, (c) Anastomotic leak, (d) Hospital stay, (e) Postoperative recovery, (f) Grade, (g) Recurrence:- local port site and systemic and (h) Immunohistochemistry status.

MATERIALS AND METHODS

This was a prospective hospital based study performed in the Postgraduate Department of Surgery, Government Medical College, Srinagar from August 2018 to August 2020. All the patients aged >14 years with tumor size 2-8cm presenting to the surgical OPDs with endoscopically or imaging documented GIST were included in our study. After assessing the patient demographics, the patients were subjected complete blood count, kidney function test, liver function test, ECG, chest X-ray, USG, CECT Abdomen, Upper GI and Lower GI endoscopy and MRI (wherever indicated). After a proper pre-anesthetic evaluation and written informed consent by the patient, the patient was taken for surgery.

The recorded data was compiled and entered in a spreadsheet (Microsoft Excel) and then exported to data editor of SPSS Version 20.0 (SPSS Inc., Chicago, Illinois, USA). Continuous variables were expressed as Mean±SD and categorical variables were summarized as frequencies and percentages. Graphically the data was presented by bar and pie diagrams.

RESULTS

The mean age of our study patients was 62.5±10.71 years with youngest being 50 years and the oldest 85 years. There was male predominance in our study with 18 (69.2%) males versus 8 (30.8%) females. The mean size of tumor was 3.1±0.739cm. Location of tumor in majority of our patients i.e. 19 (73.1%) was stomach, 5 (19.2%) had duodenal tumor while as 2 (7.7%) patients had rectal tumor. The mean intraoperative blood loss was 126.9±36.97ml. Intraoperative capsular breach and tumor spillage was not seen in any patients. The mean operative time was 93.78 (70-180) min. Mean

postoperative hospitalization was 3.2 ± 1.234 days. None of our patients had positive resection margins. Postoperative complications like ileus was observed in 3

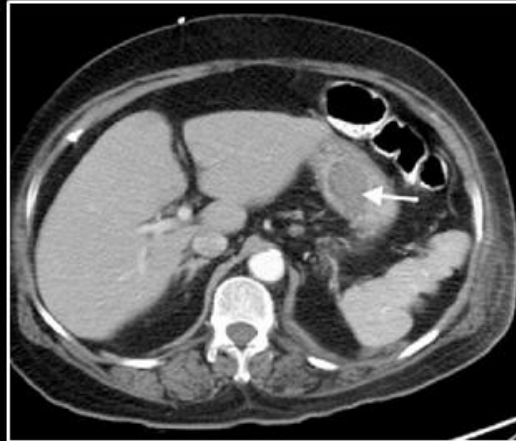
(11.5%) patients followed by bleeding in 2 (7.7%) patients with none of the patients complaining of anastomotic leak and perforation.

Table 1:

		No. of Patients	Percentage
Age in Years	50-59	11	42.3
	60-69	9	34.6
	≥ 70	6	23.1
	Mean \pm SD (Range)= 62.5 ± 10.71 (50-85)		
Gender	Male	18	69.2
	Female	8	30.8
Tumor size (cm)	2-3 cm	12	46.2
	3-4 cm	11	42.3
	≥ 4 cm	3	11.5
	Mean \pm SD (Range)= 3.1 ± 0.739 (2.0-4.5 cm)		
Tumor location	Duodenum	5	19.2
	Rectum	2	7.7
	Stomach	19	73.1
Blood loss (ml)	< 100 ml	2	7.7
	100-149 ml	17	65.4
	150-199 ml	4	15.4
	≥ 200 ml	3	11.5
	Mean \pm SD (Range)= 126.9 ± 36.97 (90-220)		
Operative time (min)	70-80	3	11.5
	80-90	5	19.2
	90-100	8	30.8
	≥ 100	10	38.5
	Mean \pm SD (Range)= 95.9 ± 14.21 (70-120)		
Intraoperative capsular breach and tumor spillage	Yes	0	0.0
	No	26	100

Table 2:

		No. of Patients	Percentage
Hospital stay (Days)	2 Days	9	34.6
	3 Days	13	50.0
	4 Days	4	15.4
	5 Days	2	7.7
	6 Days	2	7.7
	Mean \pm SD (Range)= 3.2 ± 1.23 (2-6 Days)		
Resection margin	Positive	0	0.0
	Negative	26	100
Complications	Bleeding	2	7.7
	Perforation	0	0.0
	Ileus	3	11.5
	Anastomotic leak	0	0
CD 117	Positive	21	80.8
	Negative	5	19.2
Histological Grade	GX	0	0.0
	G1	26	100
	G2	0	0.0



CT images of a patient with gastric GIST



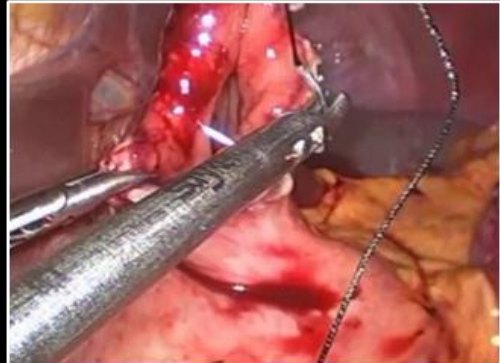
Port Placement



Laparoscopic view of anterior gastric GIST



Laparoscopic View of Gastric GIST



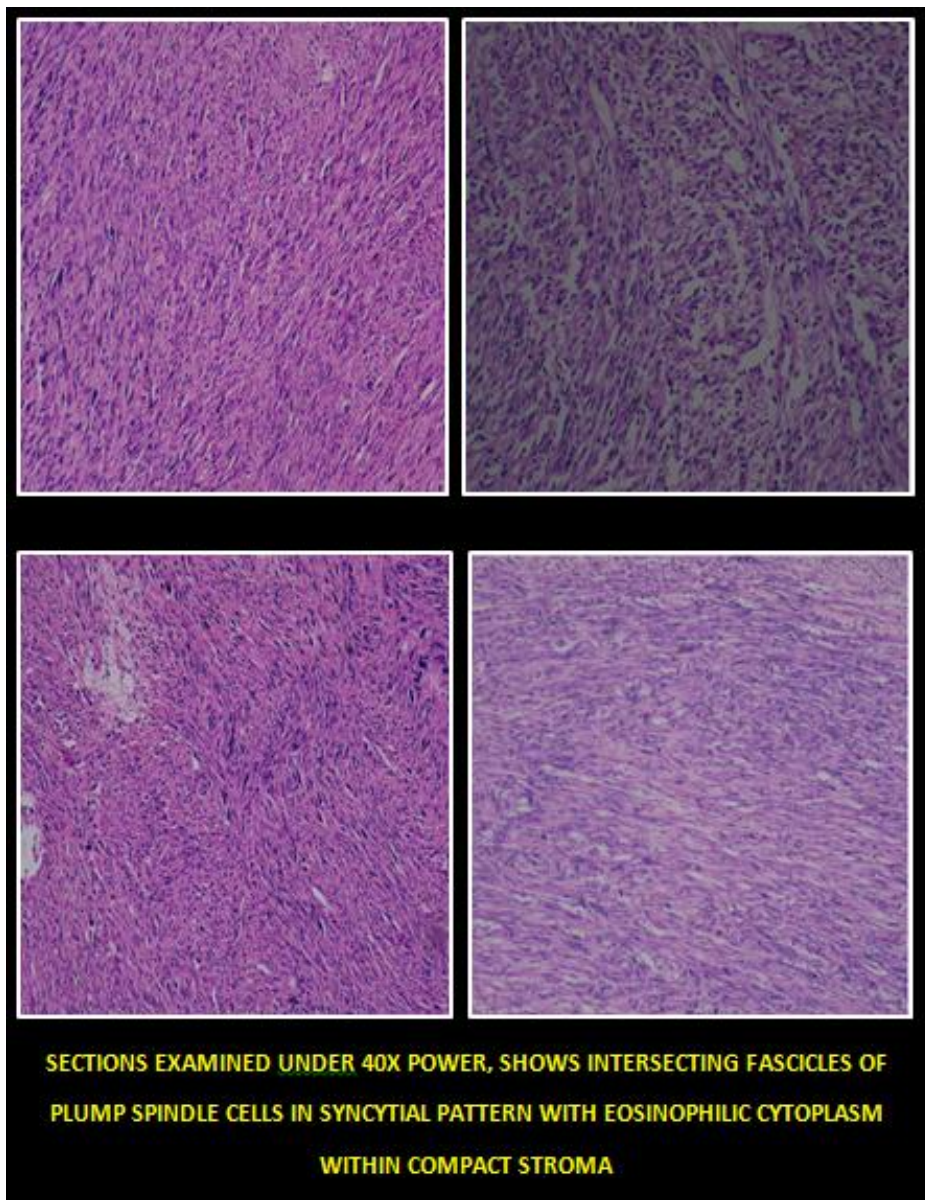
Anterior gastrotomy being sutured laparoscopically

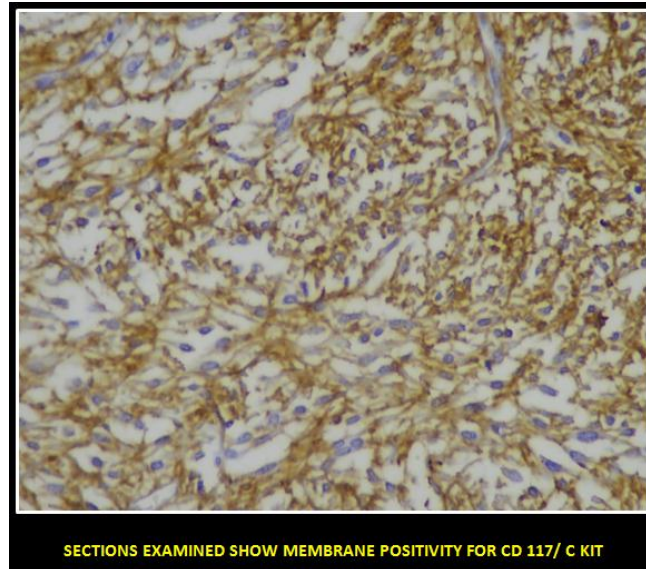


Anterior Gastric GIST with Ulcer Crater



Gastrotomy sutured





DISCUSSION

There are no standard criteria for assessing the aggressive behavior and predicting the clinical prognosis of GISTs, although the NIH and AFIP criteria are widely recommended.^[15] It is commonly accepted that all GISTs are considered to have malignant potential.^[16] Through multivariate analysis, higher mitotic rate and tumor metastasis or local invasion prior to treatment were revealed to be associated with poor survival in GIST patients, and non-gastric disease location was associated with tumor recurrence, which is consistent with the results of previous studies.^[17] Similarly, one British study^[18] identified high mitotic index as an independent poor prognostic factor in these patients. Miettinen and Lasota^[19] also demonstrated that small intestinal GISTs behave more aggressively than gastric GISTs, and small intestinal GISTs tend to be larger and more advanced at diagnosis. Liu Q *et al*^[15] suggested that gastrointestinal bleeding is a prognostic factor. However, preoperative symptoms did not appear to affect the outcome of patients with GIST.

In our study, majority of patients i.e. 11 (42.3%) belonged to age group between 50-59 years, followed by 9 (34.6%) patients who were aged between 60-69 years while as ≥ 70 was the age of 6 (23.1%) patients. The mean age of our study patients was 62.5 ± 10.71 years with youngest being 50 years and the oldest 85 years. There was male predominance in our study with 18 (69.2%) males versus 8 (30.8%) females. Similar results were obtained by Yang ML *et al* (2018)^[20] in a total conducted on 182 patients. The mean age in their study was 60 years with 51.6% males and 48.4% females. Abebe E *et al* (2017)^[21] determined the presentation patterns, types of surgical management, and outcomes of patients operated for intra-abdominal hydatid cyst. In their study majority of patients belonged to 31-50 years i.e. 20 (47.6%) with least number of patients being >60 years of age. Pothare AN *et al* (2017)^[22] conducted a study in which majority of patients belonged to 31-40

years age group with male predominance (60% males versus 40% females).

Tumor size was 2-3cm in majority of our patients i.e. 12 (46.2%) followed by 3-4cm in 11 (42.3%) patients. 3 (11.5%) patients had ≥ 4 cm tumor size. The mean size of tumor was 3.1 ± 0.739 cm. Location of tumor in majority of our patients i.e. 19 (73.1%) was stomach, 5 (19.2%) had duodenal tumor while as 2 (7.7%) patients had rectal tumor. Our results are consistent with the findings of Yang ML *et al* (2018)^[20] who investigated the clinicopathological characteristics and prognostic factors of GISTs in Chinese patients. The preoperative tumor size was 2cm in majority of their patients i.e. 59 patients followed by 5-10cm in 40 patients. Most of the patients i.e. 101 in their study had stomach tumor followed by jejunum and ileum in 21 patients and duodenum in 9 patients. Cassier PA *et al* (2010)^[23] conducted a 3 year study in which mean tumor size was 50cm in 2005, 55cm was mean tumor size in 2006 with an overall mean tumor size was 55cm. Majority of the patients had stomach tumor in 80 patients, followed by small bowel in 36 patients, rectum and pelvis 7 patients. Liu Q *et al* (2017)^[15] conducted a study in which tumor size was ≥ 5 cm in 51 patients and <5 cm in 12 patients. Tumor site was stomach in 28 patients and intestinal in 35 patients.

Out of 26 study patients, 17 (65.4%) had 100-149ml of blood loss, 4 (15.4%) had 150-199ml blood loss. There was ≥ 200 ml blood loss observed in 3 (11.5%) while as 2 (7.7%) patients had <100 ml blood loss. The mean blood loss was 126.9 ± 36.97 ml. Novitsky YW, *et al* (2006)^[24] conducted a study in which the mean blood loss was 85ml (range, 10-450ml), intraoperative blood loss in a study done by Mir IS *et al* (2017)^[25] 150ml. In our study intraoperative capsular breach and tumor spillage was not seen in any patients.

Mean duration of surgery in our study was 95.9 ± 14.21 minutes. 10 (38.5%) patients surgery lasted for ≥ 100 minutes, 90-100 minutes was the duration of surgery in 8

(30.8%) patients. 5 (19.2%) patients surgery lasted for 80-90 minutes while as 70-80 minutes was the duration of surgery in 3 (11.5%) patients. The mean operative time was 93.78 (70–180) min in a study conducted by Samala DS et al (2015)^[26] which is comparable to literature showing mean operative time ranging 52–102 min.^[27-31]

Postoperative hospitalization in majority of our patients i.e. 13 (50%) was 3 days, 9 (34.6%) had 2 day postoperative hospitalization, 4 (15.4%) patients needed postoperative hospitalization for 4 days while as 2 (7.7%) patients each required hospitalization for 5 days and 6 days, respectively with a mean postoperative hospitalization of 3.2 ± 1.234 days. Our results are consistent with the findings of Loureiro M de P (2016)^[32] wherein average length of hospital stay were three days (2-6 days). The mean duration of hospital stay was 3–10 days with an average of 5 days in a study done by Samala DS et al (2015)^[33], 2-3 days in a study done by Chowbey PK et al. (2003)^[28], 4.2 days in a study by Ertem M et al. (2002).^[29]

Postoperative complications like ileus was observed in 3 (11.5%) patients followed by bleeding in 2 (7.7%) patients with none of the patients complaining of perforation and anastomotic leak. All the 5 patients with postoperative complications were managed conservatively. Gluzman MI et al. (2017)^[34] conducted a study to investigate the short-term outcomes of different surgical treatment of GISTs. In their study early complications occurred more in endoscopic group than in open surgery and laparoscopy (13.6% vs. 10.4% and 7.5%). The postoperative complications in laparoscopic group was ileus in 1 patient (2.5%) while as in open surgery staple line bleeding was seen in 2 (4.2%) patients.

Positive immunohistochemistry (CD 117) was observed in 23 (88.46%) patients while as 3 (11.54%) had negative immuno-histochemistry. Similar results were found by Wang M et al (2014)^[3] in their study on 497 patients the positive immunohistochemistry (CD 117) were observed in 434 (87.3%) patients. Yang ML et al (2018)^[20] conducted a study to investigate the clinicopathological characteristics and prognostic factors of GISTs in Chinese patients also confirms positive immunohistochemistry (CD 117) in majority of their patients i.e. 98.4% patients.

CONCLUSION

Laparoscopic gastrectomy will bring about a shorter postoperative healing facility stay, bring down postoperative bleakness, less readmissions, better postoperative quality of life, with comparative mortality and oncologic results, contrasted with open gastrectomy and steps ought to be made toward propelling the utilization of laparoscopy for gastric growth. 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.

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