



ISSN Print: 2394-7500
ISSN Online: 2394-5869
Impact Factor: 5.2
IJAR 2019; 5(6): 53-57
www.allresearchjournal.com
Received: 18-04-2019
Accepted: 20-05-2019

Premananda Pattanaik
Department of Gastrointestinal
Surgery, IMS and SUM Hospital,
Siksha "O" Anusandhan
University (Deemed to be), K8,
Kalinga Nagar, Bhubaneswar,
Odisha, India

Salil Kumar Parida
Department of Gastrointestinal
Surgery, IMS and SUM Hospital,
Siksha "O" Anusandhan
University (Deemed to be), K8,
Kalinga Nagar, Bhubaneswar,
Odisha, India

Satyaprakash Ray Choudhury
Department of Gastrointestinal
Surgery, IMS and SUM Hospital,
Siksha "O" Anusandhan
University (Deemed to be), K8,
Kalinga Nagar, Bhubaneswar,
Odisha, India

Sumit Subhadarshi Mohanty
Department of Gastrointestinal
Surgery, IMS and SUM Hospital,
Siksha "O" Anusandhan
University (Deemed to be), K8,
Kalinga Nagar, Bhubaneswar,
Odisha, India

Perwez Alam Khan
Department of Gastrointestinal
Surgery, IMS and SUM Hospital,
Siksha "O" Anusandhan
University (Deemed to be), K8,
Kalinga Nagar, Bhubaneswar,
Odisha, India

Jatindra Nath Mohanty
Medical Research Laboratory,
IMS and SUM Hospital, Siksha
"O" Anusandhan University
(Deemed to be), K8, Kalinga
Nagar, Bhubaneswar, Odisha,
India

Correspondence

Salil Kumar Parida
Department of Gastrointestinal
Surgery, IMS and SUM Hospital,
Siksha "O" Anusandhan
University (Deemed to be), K8,
Kalinga Nagar, Bhubaneswar,
Odisha, India

Laparoscopic excision of endophytic gastro intestinal stromal tumor (GIST) and GIST like lesion of stomach by a novel technique

Premananda Pattanaik, Salil Kumar Parida, Satyaprakash Ray Choudhury, Sumit Subhadarshi Mohanty, Perwez Alam Khan and Jatindra Nath Mohanty

Abstract

Gastrointestinal stromal tumor is the rare class of neoplasms but most common mesenchymal tumor in the gastrointestinal tract and is most frequently developed in the stomach in the form of submucosal tumor. The malignant potential of these tumors depends upon tumor location, tumor size, mitotic index which are used as risk stratification. Many reports have described the ability to excise small and medium sized GISTs laparoscopically, but laparoscopic resection of GISTs greater than 5 cm is still a matter of debate. So here the aim of the study is to present a distinctive technique and abridged approach for intraoperative identification and excision of such endophytic tumors. Out of six patients 4 male and 2 were female suspected cases of gastric. Mean age group of all patients was 53.8years. All the tumors were less than 5cm in size totally confined within the lumen of stomach without any exophytic component and metastatic disease or lymphadenopathy. Mean size of the tumor was 2.6cms. 4 tumors were located in the body and 2 in antrum. The mean operative duration was 173minutes. Average blood loss was 48ml which ranges 30-80ml. All were symptomatic and during endoscopic evaluation found to have submucosal tumors suspected to be GIST. No biopsy was taken to prevent tumor dissemination. Out of 6 patients two had dyspeptic symptoms and other 4 had evidence gastrointestinal bleeding in the form melena and low hemoglobin. The proper methodology can be controlled by evaluating the anatomical area of every tumor. The appropriate approach can be determined by assessing the anatomical location of each tumor. This novel technique of intraoperative identification and resection of endophytic GIST of stomach in a more simplified manner will certainly give rise new insight in the field of Gastro Intestinal Stromal Tumor (GIST) excision.

Keywords: Endophytic, antrum, GIST, CECT abdomen

Introduction

Gastro intestinal stromal tumors (GIST) are rare tumors of mesenchymal origin. Stomach is the most common site (60-70%), followed by small bowel (20-30%), and esophagus and rectum are the rare locations. Its accounts for 3% of all gastric tumors and with 20-30% incidence of malignant behavior in these tumors. The malignant potential of these tumors depends upon tumor location, tumor size, mitotic index (mitosis in 50 high power field) which are used as risk stratification. The treatment of choice of these tumors are local surgical excision unless is advanced or metastatic at the time of presentation. In the era of minimal invasive surgery, Laparoscopic approach is now considered as the gold standard for tumor less than 5cm in size [1, 2]. GIST in the stomach can be exophytic or endophytic in nature depending upon the tumor growth extending towards serosa or completely intraluminal location. Most of the gastric GIST which are particularly exophytic can be easily identified and tackled during laparoscopic surgery by endoscopic stapled sleeve resection of stomach [3, 4]. But when tumor size is less than 5cms and completely intraluminal (endophytic) with overlying normal serosa it is very difficult to locate the tumor intra operatively. In such cases one require intraoperative endoscopy and sophisticated additional trans gastric trocars for localization and excision of the tumor mass [5]. But sometimes it is not possible to have intraoperative endoscopy because of logistic reason, non-availability of specially designed trocars and complexity of surgery.

So in this study we have presented a unique technique and simplified approach for intraoperative identification and excision of such endophytic tumors. The purpose of this study is to investigate a novel technique of intraoperative identification and resection of endophytic GIST of stomach in a more simplified manner.

Material and methods

This is a single center (Department of Surgical Gastroenterology, IMS & SUM Hospital, Bhubaneswar, Odisha, India) retrospective study between the periods February 2018 to May 2019.

The cohort of patients included in the study were suspected cases of Gastric GIST with only endophytic component without any exophytic extension of the tumor in the serosa of the stomach detected in imaging (computed tomography). All the patients were detected to have gastric GIST either detected incidentally or symptomatic had undergone upper gastro intestinal endoscopy and contrast enhanced computed tomography (CECT) abdomen with oral and intravenous contrast. No preoperative biopsy was done in these cases due to fear of tumor spillage and dissemination. Preoperative diagnosis was solely based upon characteristic endoscopic finding and staging by CECT abdomen. The patients who had localized disease were planned for laparoscopic resection of the tumor after proper anaesthesia evaluation and optimization of comorbid conditions.

Surgical technique

All the surgical procedures were carried out laparoscopically. All attempts were made to localize the tumor endoscopically by injecting 10 to 20ml methylene blue transmurally at the peritumoral area. Either it was done immediate preoperative period or intraoperative period after anaesthesia induction. Patient was placed in semilithotomy with reverse trendelenburg position with both the hand by side of the body. The operating surgeon stood in between the legs and assistant surgeon left of the surgeon and scrub nurse stood right of the surgeon. Another assisting surgeon and scrub nurse stood at the right shoulder of the patient. After scrubbing, painting with betadine solution and draping, access to the abdomen was done in open method technique at the umbilicus. The pneumoperitoneum was created with carbon dioxide keeping the pressure between 12-15 mm Hg with flow rate 3 to 5 liters per minute. In all patients 5 trocar technique was used. Right hand working port 10mm supra umbilical at left mid clavicle line, left hand working port 5mm at right mid clavicle line at the same level. Another 5mm trocar at the epigastrium near xiphoid process was retractor used for liver retraction with the help of fan shaped liver retractor or with the shaft of blunt instrument. One 5mm trocar at the left anterior axillary line was used as retraction for stomach when required a 10mm 30 degree telescope was used in all cases. Tumor location was detected with the help of bluish hue of methylene blue at the serosal aspect of stomach. With the help of harmonic scalpel gastrotomy made at the periphery of the tumor keeping in mind of tumor resection margin.

Then tumor was resected all around with resection margin of at least 5mm with healthy gastric mucosa. At no point during surgery, tumor was handled directly by the instrument to prevent tumor break and spillage. The utmost care was taken to hold the tumor at the healthy margin for manipulation if required during resection of the whole tumor and bagging the specimen for extraction. After tumor was resected it was kept in a plastic bag and removed through the umbilical port site with extension of the incision if required. The gastrotomy defect was closed either in two layers continuous 2-0 poly diaxone (PDS) inner and 2-0 polypropylene outer layer or single layer with 2-0 absorbable barbed suture. The integrity of the gastrotomy closure was routinely checked with under water air insufflation of stomach through nasogastric tube. After satisfactory closure of the gastrotomy, a 24Fr portex drain was placed at the perigastric area through left anterior axillary line port. Then all the port sites are suture closed after deflating the abdomen. All patients were shifted toward if hemodynamically stable and anaesthesia recovery parameters were satisfactory. On post op day (POD) one, In all patients nasogastric (NG) tube removed if output was less than 100ml, foleys catheter were removed, ambulation started and oral liquid diet started on POD 2 and gradually increased to soft diet. Most of the patients were discharged on POD3 to POD 5 if all discharge criteria were met.

Histopathology

All resected specimen sent for histopathological examination. Histopathological results were analysed in the term of R0 resection, mitotic index (number of mitoses per high power field). All tumors were analysed for expression of immuno histochemical markers like CD 34, CD 117, DOG1, Vimentin, Desmin Smooth muscle myosin. Miettinen classification was used for risk stratification of the tumor.

Results

We have operated 6 patients of endophytic GIST and GIST like lesion "between" February 2018 to May 2019. The cohort of patient included in the studies were suspected cases of Gastric out of 6 patients 4 male and 2 were female. Mean age group of all patients was 53.8years (range 36-73years). All were symptomatic and during endoscopic evaluation found to have submucosal tumors suspected to be GIST. No biopsy was taken to prevent tumor dissemination. Out of 6 patients two had dyspeptic symptoms and other 4 had evidence gastrointestinal bleeding in the form melena and low hemoglobin. CECT abdomen done for further evaluation to detect exact location, size and extent of the disease. All the tumors were less than 5cm in size totally confined within the lumen of stomach without any exophytic component and metastatic disease or lymphadenopathy. Mean size of the tumor was 2.6cms (range 1.5-4cm). 4 tumors were located in the body (2 posterior, 1 anterior, 1 greater curvature) and 2 in antrum (1 anterior and 1 posterior wall).

Table 1: Demographic, clinical observed data of the patient.

Age /sex	Clinical presentation	Tumor location	Tumor size	Surgery duration	Blood loss	Complication	Post-operation hospital stay	Resection margin	Histopathology
57/M	Melena	Body Greater curvature	4x4 cm	180 minutes	30ml	Nil	5days	R0	CD117 Positive SMA Negative Ki 67 3% Low risk type
62/F	Dyspepsia	Body Posterior wall	2x1.5 cm	200 minutes	50ml	Nil	6days	R0	CD117 Positive SMA -ve S-100 negative Ki 67 1%
52/M	Melena	Body Posterior wall	3.5x4 cm	160 minutes	60ml	Nil	7days	R0	CD117-ve SMA-ve S100:Strongly positive Schwannoma
73/M	Melena	Antrum Posterior wall	1.5x1.5 cm 1.5x0.5 cm	170 minutes	80ml	Prolonged ascites leakage	10days	R0	Tubulovillous adenoma with high grade dysplasia and brunners gland hyperplasia
43/M	Dyspepsia	Body Anterior wall	4x3 cm	190 minutes	30ml	Nil	7days	R0	CD117 strongly positive SMA strongly and diffusely positive S 100 Negative Ki 67 :1% Low risk type
36/F	Dyspepsia Anaemia	Antrum Anterior wall	1x1 cm	140 minutes	40ml	Nil	7days	R0	Brunners gland hyperplasia

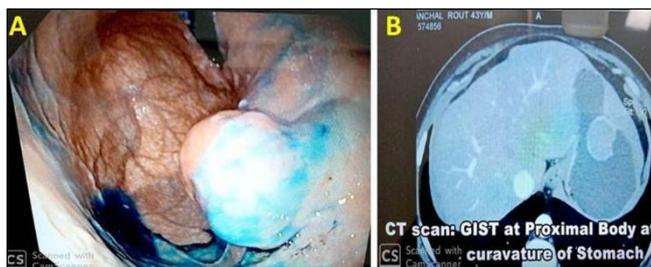


Fig 1: A) Preoperative endoscopy and methylene blue injection at tumor site for easy intraoperative localization. B) CECT abdomen showing complete endophytic GIST in proximal body

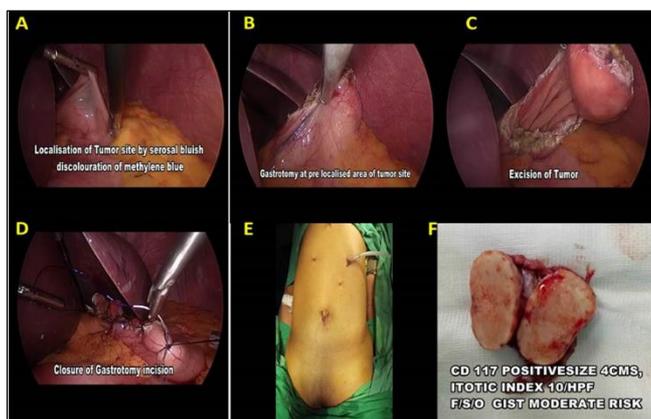


Fig 2: Different stage of excision of endophytic gastro intestinal stromal tumor (GIST), A) Localisation of tumor site by Serosal bluish discoloration of methylene blue, B) Gastrostomy at prelocalization of tumor site, C) Excision of tumor, D) Closure of Gastrostomy incision, E) Post operation image of patient. F) CD 117 Positive size 4cms image

The mean operative duration was 173minutes (range140-200minutes). Average blood loss was 48ml (range 30-80ml). None of the patients were having any operated related complication except one patient who had prolonged ascites leakage in abdominal drain because of associated

cirrhosis of liver and portal hypertension. Mean postoperative hospital stay was 7days (range5-10days). All the resection margins were negative. In final biopsy, 3 were found to have GIST with CD 117 positivity with low risk category, one patient had schwannoma with strong S100 positivity, one had Brunner’s gland hyperplasia and one patient had Brunner’s gland hyperplasia with tubule villous adenoma with high grade dysplasia.

Discussion

Conventional surgical operations may be extremely intrusive for the treatment of endophytic gastro intestinal stromal tumor. Effective laparoscopic wedge resection has been conveyed for 2 to 5 cm gastric GISTs, and confirmed by studies examining long-term surgical outcomes [6, 7, 8]. But, it is sometimes problematic to determine the proper resection line from the outside of the stomach when tumors are positioned intragastrically. There have been several reports on the use of LECS for SMT of the stomach, that including GISTs, leiomyomas, and schwannoma [9, 10, 11, 12]. Table 1 summarizes the clinical variables of patients from a number of studies who underwent surgery in our own series. The use of a surgical technique that promotes careful tissue handling to prevent tumour rupture is mandatory. Tumour spillage or haemorrhage is associated with high loco-regional recurrence rates as well as the development of peritoneal sarcomatosis [13]. A recent study showed that tumour spillage represents a far worse prognostic factor than R1 tumour resection [14]. Here in our study all the surgical procedures were carried out laparoscopically. Advancements in endoscopic and laparoscopic technology have yielded various modified LECS techniques aimed at further minimizing invasiveness. Examples of these improved techniques include the laparoscopy assisted endoscopic full-thickness resection, a full thickness resection method using the non-exposure technique (CLEAN-NET), and non-exposed endoscopic wall-inversion surgery [15-17]. Because LECS has an inherent risk

of peritoneal infection due to the necessity for gastric perforation, CLEAN-NET and NEWS have been developed to prevent the risk of cancer cells seeding during open gastrectomy. These methodology may in this way have potential insignificantly intrusive resections of gastric tumors, even those in an ulcerated state^[17]. In our case, we tried to localize the tumor endoscopically by injecting 10 to 20ml methylene blue transmurally at the peritumoral area. It is possible that it was done prompt preoperative period or intraoperative period after anesthesia enlistment. Persistent was put in semilithotomy with switch trendelenburg position with both the hand by side of the body.

The operating surgeon stood in between the legs and assistant surgeon left of the surgeon and scrub nurse stood right of the surgeon. Another assisting surgeon and scrub nurse stood at the right shoulder of the patient. After scrubbing, painting with betadine solution and draping, access to the abdomen was done in open method technique at the umbilicus. The pneumoperitoneum was created with carbon dioxide keeping the pressure between 12-15 mm Hg with flow rate 3 to 5 liters per minute. In all patients 5 trocar technique was used. Right hand working port 10mm supra umbilical at left mid clavicle line, left hand working port 5mm at right mid clavicle line at the same level. Another 5mm trocar at the epigastrium near xiphoid process was used for liver retraction with the help of fan shaped liver retractor or with the shaft of blunt instrument. One 5mm trocar at the left anterior axillary line was used as retraction for stomach when required. A 10mm 30 degree telescope was used in all cases. Intraoperatively tumor location was detected with the help of bluish hue of methylene blue at the serosal aspect of stomach. With the help of harmonic scalpel gastrotomy made at the periphery of the tumor keeping in mind of tumor resection margin. Then tumor was resected all around with resection margin of at least 5mm with healthy gastric mucosa. At no point during surgery, tumor was handled directly by the instrument to prevent tumor break and spillage. The utmost care was taken to hold the tumor at the healthy margin for manipulation if required during resection of the whole tumor and bagging the specimen for extraction. After tumor was resected it was kept in a plastic bag and removed through the umbilical port site with extension of the incision if required.

In our study, 3 were found to have GIST with CD 117 positivity with low risk category, one patient had schwannoma with strong S100 positivity, one had Brunner's gland hyperplasia and one patient had Brunner's gland hyperplasia with tubule villous adenoma with high grade dysplasia. Mekras *et al* also got a rare but important differential diagnosis of mesenchymal tumors of gastrointestinal tract^[18].

Laparoscopy is now increasingly being used in cases of gastrointestinal stromal tumors (GISTs). While technically possible to resect these tumors laparoscopically, there has been concern that the oncologic outcomes for these patients could be compromised for tumors greater than 5 cm in size. Several studies, demonstrates that a proper oncologic resection can be achieved laparoscopically, even for larger GISTs. In our case, tumor was resected all around with resection margin of at least 5mm with healthy gastric mucosa. At no point during surgery, tumor was handled directly by the instrument to prevent tumor break and spillage. The utmost care was taken to hold the tumor at the healthy margin for manipulation if required during resection

of the whole tumor and bagging the specimen for extraction^[19].

Conclusion

In conclusion, this Laparoscopic excision of endophytic gastro intestinal stromal tumor (GIST) and GIST like lesion of stomach excision found in final biopsy, 3 were having GIST with CD 117 positivity with low risk category, one patient had schwannoma with strong S100 positivity, one had Brunner's gland hyperplasia and one patient had Brunner's gland hyperplasia with tubule villous adenoma with high grade dysplasia. Importantly, the tumor was resected all around with resection margin of at least 5mm with healthy gastric mucosa.

Reference

1. The ESMO/European Sarcoma Network Working Group. Gas-trointestinal stromal tumors: ESMO Clinical Practice Guide-lines for diagnosis, treatment and follow-up. *Ann Oncol.* 2012; 23(7):49-55.
2. Poveda A, Rivera F, Martín J. Spanish Group for Sarcoma Re-search (GEIS). SEOM guidelines for gastrointestinal stromal sarcomas (GIST). *Clin Translate Oncol.* 2012; 14:536-40.
3. Agaimy A, Wunsch PH. Lymph node metastasis in gastrointestinal stromal tumors (GIST) occurs preferentially in young pa-tients ≤ 40 years: an overview based on our case material and the literature. *Langenbeck Arch Surg.* 2009; 394:375-81.
4. De Matteo RP, Lewis JJ, Leung D *et al.* Two hundred gastrointestinal stromal tumors. Recurrence patterns and prognostic factors for survival. *Ann Surg.* 2000; 231:51-8.
5. Gold JS, Dematteo RP. Combined surgical and molecular therapy: the gastrointestinal stromal tumor model. *Ann Surg.* 2006; 244:176-84.
6. Kakeji Y, Nakanoko T, Yoshida R, Eto K, Kumashiro R *et al.* Laparoscopic resection for gastrointestinal stromal tumors in the stomach. *Surg.* 2012; 42:554-558.
7. Hwang SH, Park Do J, Kim YH, Lee KH, Lee HS, Kim HH *et al.* Laparoscopic surgery for submucosal tumors located at the esophagogastric junction and the pre pylorus. *Surg Endosc.* 2009; 23:1980-1987.
8. Honda M, Hiki N, Nunobe S, Ohashi M, Kiyokawa T, Sano T *et al.* Long-term and surgical outcomes of laparoscopic surgery for gastric gastrointestinal stromal tumors. *Surg Endosc.* 2014; 28:2317-2322.
9. Hiki N, Yamamoto Y, Fukunaga T, Yamaguchi T, Nunobe S, Tokunaga M *et al.* Laparoscopic and endoscopic cooperative surgery for gastrointestinal stromal tumor dissection. *Surg Endosc.* 2008; 22:1729-1735.
10. Hiki N, Nunobe S, Matsuda T, Hirasawa T, Yamamoto Y, Yamaguchi T. Laparoscopic endoscopic cooperative surgery. *Dig Endosc.* 2015; 27:197-204.
11. Kawahira H, Hayashi H, Natsume T, Akai T, Uesato M, Horibe D *et al.* Surgical advantages of gastric SMTs by laparoscopy and endoscopy cooperative surgery. *Hepatogastroenterology.* 2012; 59:415-417.
12. Mori H, Kobara H, Tsushimi T, Fujihara S, Nishiyama N, Matsunaga T *et al.* Reduction effect of bacterial counts by preoperative saline lavage of the stomach in performing laparoscopic and endoscopic cooperative surgery. *World J Gastroenterol.* 2014; 20:15763-15770.

13. Gold JS, Dematteo RP. Combined surgical and molecular therapy: the gastrointestinal stromal tumor model. *Ann Surg.* 2006; 244:176-84.
14. McCarter MD, Antonescu CR, Ballman KV *et al.*; American College of Surgeons Oncology Group (ACOSOG), Intergroup Adjuvant GIST Study Team. Microscopically positive margins for primary gastrointestinal stromal tumors: analysis of risk factors and tumor recurrence. *J Am Coll Surg.* 2012; 215:53-9.
15. Abe N, Takeuchi H, Yanagida O, Masaki T, Mori T, Sugiyama M. Endoscopic full-thickness resection with laparoscopic assistance as hybrid NOTES for gastric submucosal tumor. *Surg Endosc.* 2009; 23:1908-1913.
16. Inoue H, Ikeda H, Hosoya T, Yoshida A, Onimaru M, Suzuki M *et al.* Endoscopic mucosal resection, endoscopic submucosal dissection, and beyond: full-layer resection for gastric cancer with nonexposure technique (CLEAN-NET). *Surg Oncol Clin N Am.* 2012; 21:129-140.
17. Mitsui T, Niimi K, Yamashita H, Goto O, Aikou S, Hatao F *et al.* Non-exposed endoscopic wall-inversion surgery as a novel partial gastrectomy technique. *Gastric Cancer.* 2014; 17:594-599.
18. Goettsh WG, Bos SD, Breekveldt-Postma N *et al.* Incidence of gastrointestinal stromal tumors is underestimated: results of nation-wide study. *Eur J Cancer.* 2005; 41:2868-72.
19. Joseph J Kim, James Y Lim, Scott Q Nguyen. Laparoscopic resection of gastrointestinal stromal tumors: Does laparoscopic surgery provide an adequate oncologic resection? *World J Gastrointest Endosc* September. 2017; 16; 9(9):448-455.