

# Incidental finding of Gastrointestinal Stromal Tumors (GISTs) during Laparoscopic Sleeve Gastrectomy

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Gastrointestinal Stromal Tumors (GISTs) are rare stromal tumors found throughout the GI tract, but most commonly located in the stomach (mainly fundus and cardia) (50%), small bowel (25%) and less common in the colon (10%), omentum/mesentery (7%), and esophagus (5%). Although the true incidence of GISTs is unknown, some reports have stated it to be about 0.68/100,000. They arise from the interstitial cells of Cajal, an intestinal pacemaker cell with characteristics of both neural and smooth muscle differentiation and are distinct from leiomyoma and leiomyosarcoma, which arise from smooth muscle. Immunohistochemical analysis demonstrates that nearly all GISTs express the c-KIT protein (CD117) (95%), protein kinase C theta (80%) and CD34 (60%-70%), and smooth muscle actin (30%-40%); almost all smooth muscle tumors express actin and desmin. These markers can often be detected by specimens obtained by fine needle aspiration. This differentiation is crucial given that GISTs have a more aggressive clinical course when compared with other GI mesenchymal tumors. Gross differentiation between benign and malignant GISTs can be difficult, but the subset of GISTs that have a high likelihood of malignant behavior is generally identified by increased mitotic activity and larger tumor size. However, the prediction of malignant behavior may be difficult because even small tumors with low mitotic activity may still metastasize. Nearly one-third of GISTs are asymptomatic, and even if symptomatic, symptoms are often

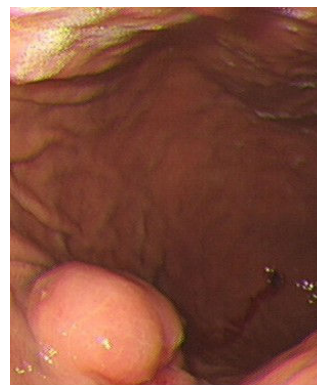
vague and nonspecific. Asymptomatic GISTs are often found incidentally at the time of radiographic, endoscopic or surgical evaluation, but the true incidence may be higher, as incidental cases may go unreported. Surgery is the mainstay of therapy for primary GISTs with the goal of achieving negative microscopic margins. Lymphadenectomy is unnecessary because lymph node metastases are rare. Next to the National Comprehensive Cancer Network (NCCN) and European Society for Medical Oncology (ESMO) guidelines, GISTs 2 cm in size or greater should be resected. Management of incidentally encountered small GISTs less than 2 cm in size remains controversial in the literature, whereas the Canadian guidelines indicate that even small GISTs <1 cm should be resected because of the risk of metastasis. Due to the worldwide epidemic of obesity, bariatric procedures are increasing and are among the most commonly performed gastrointestinal operations today. In a study done in 2014, LSG was found to be the more common bariatric procedure, with very good results in short terms as compared to Laparoscopic RYGB. Increasing data is being published on Minigastirc Bypass (MGB) surgery and has been reported to give equivalent results to RYGB in the long run as well as being a safe and effective procedure. The incidence of GIST has been suspected to be more in obese patients undergoing bariatric surgery (0.6%-0.8%) in comparison to the general population (0.0006 to 0.0015%). The bariatric surgeon has to inspect the stomach during laparoscopy for such tumors and manage the incidentally encountered during a laparoscopic bariatric operation.

**Keywords:** Gastrointestinal stromal tumors; laparoscopic sleeve gastrectomy; protein kinase

## CASE REPORT

In 2015, a 46-year-old female with a Body Mass Index (BMI) of 36.05kg/m<sup>2</sup> presented to our bariatric clinic for elective bariatric surgery. She had tried losing weight by having a healthy diet and exercise but failed due to lack of compliance. Past surgical history was significant for abdominoplasty in 2014. She had no other medical comorbidities. As per the hospital protocol, pre-operative investigations were done for her including upper gastrointestinal endoscopy that showed the stomach to have multiple erosions in the antrum with a big raised lesion in the corpus from which biopsy was taken (Figure 1). There was a suspicion of GIST or polyp, the duodenum had normal mucosa and CLO test was negative [1-5]. As per the biopsy, the stomach submucosa showed a spindle cell lesion. There was mild to moderate chronic follicular gastritis but no hyperplasia or atrophy. Giemsa special stain for H. pylori organisms was negative. There was no evidence of intestinal metaplasia or glandular dysplasia either. Immunohistochemistry (IHC) for the following markers (CD117, CD34, DOG1, SMA, h-caldesmon and S-100 protein) was performed and the cells came out to be positive for CD117 and for CD34 and DOG1. The spindle cells were negative for SMA but appear to be positive for h-caldesmon. S-100 showed nonspecific staining (was also positive for muscularis mucosae cells i.e. technical artifacts). IHC results

were therefore suggestive of the Gastrointestinal Stromal Tumor (GIST) [6-10].



**Figure 1** Upper gastrointestinal endoscopy showing big raised lesion in the corpus of the stomach.

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Endoscopic ultrasonography was also done that showed normal esophagus and one homogenous hypoechoic submucosal lesion  $1.9 \times 1.5$  cm originating from the muscularis propria in the midbody of the stomach, suggestive of GIST with no obvious lymph node enlargement (Figure 2). Small raised gastric erosions were seen in the antral part and biopsy was taken from them [10-13].



**Figure 2** Endoscopic ultrasound showing one homogenous hypoechoic submucosal lesion  $1.9 \times 1.5$  cm originating from the muscularis propria seen in the midbody of the stomach.

## Treatment

The patient was admitted and laparoscopic sleeve gastrectomy was performed under general anesthesia. The patient received pneumoperitoneum of 15 mmHg via visi-port first trocar insertion (periumbilical). Standard placement of three more trocars was done. Intraoperatively a small lesion approximately 1.5 cm along the posterior surface of the body of the stomach was seen. The abdominal cavity was inspected to rule out any signs of metastasis [14,15]. The greater curvature of the stomach was devascularized using Liga-Sure, starting 5cm proximal to the pylorus. The angle of His defined and the stomach was sleeved over a 34Fr calibration tube using staples; the polypoidal lesion was incorporated in the resected specimen achieving a good free margin of >2 cm. Staple line integrity checked with methylene blue dye and no leak was seen. The stomach was retrieved in Endo-bag. Drain placed and secured. Camera port, used for retrieval of the stomach was closed with Vicryl and Ethilon was used for skin closure.

The resected specimen was sent for histopathology. Upon gross description the specimen was a linear segment of the stomach, stapled at one margin, measuring  $17.5 \times 4 \times 3.4$  cm. In the mid portion of the stomach segment, beneath the mucosa, a pale-yellow nodular tumor was seen measuring  $2.1 \times 1.8 \times 1.5$  cm, slicing of which showed pale-yellow colored whorled surface. A tumour was seen 0.5 cm away from the stapled margin. The rest of the mucosa was unremarkable and showed normal rugae with attached scanty blood clots. Microscopically the GIST tumor was of the spindle cell subtype with a mitotic rate of 0-3/50 high power field and margins were negative for GIST. No regional lymph nodes were identified either.

Immunohistochemical study was done that showed diffuse strong positivity for DOG-1, CD34 and CD117 (C Kit) by the tumor cells. S100 gave a negative reaction (no stained tumor cells seen). The conclusion being that the histomorphological features and immunoprofile were consistent with Gastrointestinal stromal tumor (GIST) of the Stomach; Low-grade (G-1); pT2.

The biopsy was reported based on AJCC/UICC TNM, 7<sup>th</sup> edition.

## Outcome and follow up

There were no intraoperative or postoperative complications and bleeding was minimal. The patient remained vitally stable during her hospital admission and was discharged three days later. She was later followed up

in the bariatric clinic routinely and routine investigations and imaging came out to be normal with no evidence of recurrence or metastasis [16].

## DISCUSSION

Due to the worldwide epidemic of obesity, bariatric procedures are increasing and are among the most commonly performed gastrointestinal operations today. GISTs of the stomach are one of the most important submucosal tumors, becoming more frequently encountered because of the rising incidence bariatric procedure that also requires a pre-operative workup including upper gastrointestinal endoscopy and endoscopic ultrasound.

In most of the literature, GIST tumors were found incidentally in asymptomatic patients at the time of surgery for whom preoperative endoscopy had failed to identify these tumors. GIST is difficult to diagnose via endoscopy, given that they are not always present within the mucosal layer and usually seen at the serosal layer. A thorough examination of the stomach including the posterior surface during laparoscopic surgery is therefore needed before initiation of resection. This is also aided by the magnified images that are seen on laparoscopy.

The incidence of GIST is reported to be high in obese individuals with an incidence of 0.6%-0.8% in the literature. Yuval et al., reported an incidence of 0.6% with 5 GIST in 827 patients undergoing LSG [11], and Sanchez et al., described an incidence of 0.8% with 4 GIST in 517 patients undergoing RYGB [16]. A case series by Chiappetta et al., with 2603 patients found to have 8 patient diagnosed with GIST representing an incidence of 0.31% (3 per 1000) [17].

As per the National Comprehensive Cancer Network (NCCN) and European Society for Medical Oncology (ESMO) guidelines, GISTs 2 cm in size or greater should be resected and that gastric GISTs 5cm or less may be removed by laparoscopic wedge resection [1,2,18]. Management of incidentally encountered small GISTs of less than 2 cm in size remains controversial in the literature. The National Comprehensive Cancer Network guidelines treat gastric GISTs <2 cm as benign, even suggesting they may be managed with endoscopic surveillance rather than resection. The benign course of gastric GISTs <2 cm was discussed in a review of 1765 cases of gastric GISTs with long-term follow-up in which there was no recurrence or progressive disease and 0% tumor-specific mortality in tumors <2 cm [13]. The Canadian guidelines, on the other hand, indicate that even small GISTs <1 cm should be resected because of the risk of metastasis [8].

LSG is thought to be the best choice for obese patients combined with GISTs as a tumor can be resected along with resecting the stomach within the same procedure. It is difficult to predict the malignancy potential of GISTs solely based on clinical and pathological findings other than the presence of obvious metastasis at surgery [14,15]. Size and mitotic count are the most useful predictors of the malignant behavior [15]. Endoscopic ultrasonography and CT scan are important in the detection of recurrence and metastasis. The patient should be followed up with an abdominal/pelvic CT scan every 3 to 6 months for 5 years and yearly after that. Imatinib should be added if the systemic spread is detected [5].

According to the ESMO guidelines, very low/low-risk tumors may not require routine follow up and the NCCN guidelines suggest that less frequent follow up is appropriate for patients with very/low-risk disease [1,2,19].

In our patient, no local recurrence and metastasis were found on routine follow-ups.

## CONCLUSION

With the increasing trend of bariatric procedures, there has been a subsequent increase in incidentally finding GIST tumors in asymptomatic individuals. Laparoscopic sleeve gastrectomy has found to give 100% cure rate with no evidence of recurrence after resection of a tumor if done with negative margins. A laparoscopic approach to surgical resection of gastric GIST during bariatric surgery is associated with low morbidity and patient have a normal hospitalization postoperatively. Examining the

whole stomach before resection can easily be done during an LSG which is not the case in gastric bypass surgery. Keeping this in mind pre-operative endoscopy has been questioned as a routine for bariatric patients. Although it might not add to the diagnosis of such lesions preoperatively it may, however, change the planned bariatric procedure. A study done in the Netherlands in 2006 on the value of preoperative endoscopy before RYBG on 159 patients found to have an incidence of a GIST tumor in one patient (0.7%) for whom a laparoscopic near-total gastrectomy was performed in addition to a planned gastric bypass. It concluded that preoperative endoscopy is essential in the diagnosis of gastrointestinal diseases including tumors, ulcerations, or hiatal hernias that modify the medical and surgical management of patients undergoing bariatric procedures. 19 Lastly, it is essential that patients undergo routine post-operative follow up including abdominal/pelvis CT scans to ensure a long term disease-free interval.

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