



# Laparoscopic Transgastric Resection of Intraluminal Gastric Gist with Concurrent Mesh Repair of Large Sliding Hiatus Hernia: A Case Report

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## Abstract

Gastrointestinal Stromal Tumours (GISTs) are rare and most commonly found in the stomach. Depending on their size and location, laparoscopy is the preferred technique as the tumour can be easily removed by simple wedge excision of the gastric wall. However, if the GIST is located in the posterior gastric wall or near the cardio-Oesophageal Junction (COJ) where complete excision might be particularly difficult to achieve, such lesion can still be safely managed laparoscopically through a tailored transgastric approach, with excellent long-term results.

We present the case of a 77-year-old female with a large (>5 cm) sliding hiatus hernia diagnosed with the presence of an associated gastric GIST, located close to the COJ, and that had migrated into the mediastinum. She underwent successful combined laparoscopic transgastric excision of the tumour with mesh repair of her hiatus hernia, and anterior partial fundoplication. The patient was discharged 3 days later on a soft diet and subsequently made a swift recovery with complete resolution of her pre-operative symptoms. Final histopathology report confirmed the diagnosis of low malignant potential well-circumscribed gastric GIST and margins were clear (R0). A surveillance gastroscopy and CT-scan at one-year post surgery were normal. She is at almost 2-years postoperative and remains asymptomatic.

In this instance, an adapted surgical approach was necessary to facilitate safe and complete removal of the gastric GIST, following reduction of her large hiatus hernia. We believe that such proposed sequential approach can be safely performed with minimum risk, irrespective of the patient's age.

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## Introduction

Gastrointestinal stromal tumours (GISTs) are rare and most commonly found in the stomach. Local surgical resection- with histologically verified negative margins (R0), but without routine lymphadenectomy - is the treatment of choice [1]. Depending on its size and location (anterior wall or greater curvature), laparoscopy is the preferred technique as the tumour can be easily removed by simple wedge excision of the gastric wall. This approach promotes significantly reduced morbidity and equivalent long-term oncological outcome when compared to open resection [2,3]. However, if the GIST is located in the posterior gastric wall or near the cardio-oesophageal junction (COJ) where complete excision might be particularly difficult to achieve and may lead to postoperative stricture or leakage, such lesion can still be safely managed laparoscopically through a tailored transgastric approach, with excellent long-term results [4].

## Case Presentation

We present the case of a 77-year-old female with past medical history of high blood pressure, dyslipidaemia and type 2-diabetes, investigated for iron deficiency anaemia along with abdominal bloating and reflux symptoms. A gastroscopy demonstrated the presence of a large (>5 cm) sliding hiatus hernia associated with a solid submucosal mass projecting into the lumen from the fundus of the stomach and located in close proximity (<3 cm) to the COJ that had migrated into the mediastinum (Figure 1). The rest of the endoscopy was unremarkable. This lesion was entirely intra-thoracic on CT-imaging, situated in the posterior mediastinum and suggestive of gastric GIST (Figure 2). There were no associated lymphadenopathies or evidence of distant metastasis. The mass was irregular and heterogeneous, measuring 5.5 cm × 4.2 cm on endoscopic ultrasound (US). US-guided biopsy confirmed the diagnosis of submucosal gastric GIST (CD117 +++).

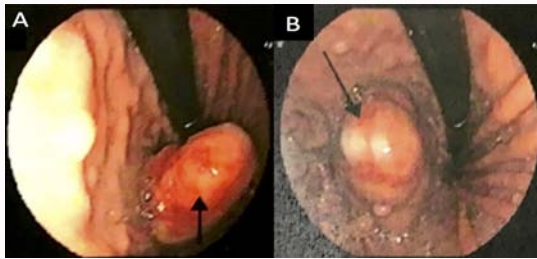


Figure 1: A+B) Endoscopic views of gastric GIST (<3 cm from COJ).

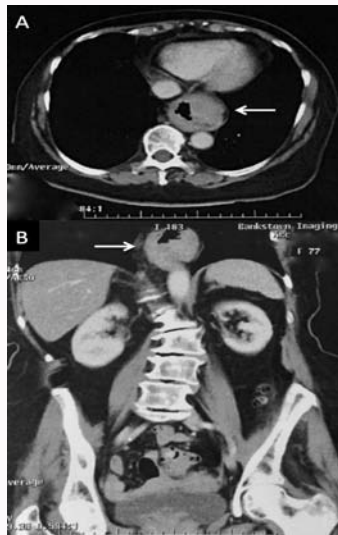


Figure 2: A) Axial chest view of gastric lesion (arrow) within sliding hiatus hernia; B) Coronal view same intra-gastric mass (arrow) located in posterior mediastinum.

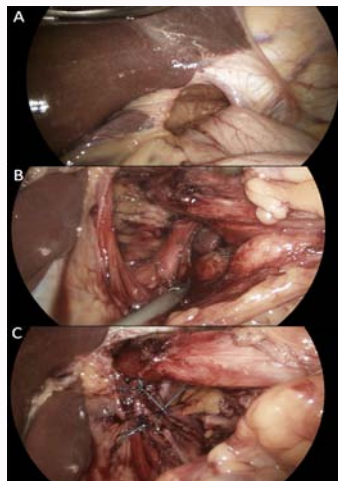


Figure 3: A) Hiatus hernia defect exposed; B) Complete mobilisation distal oesophagus (hernia sac already excised); C) Posterior cruroplasty with interrupted 1 Ethibond sutures (at least 3 cm of the distaloesophagus is intra-abdominal).

The patient was scheduled for an elective combined laparoscopic transgastric excision of the tumour with mesh repair of her hiatus hernia and anterior partial fundoplication. Prior to surgery, she was given Optifast for one week to reduce her liver size and improve access to the diaphragmatic hiatus. She was positioned in supine reverse Trendelenburg position with the primary operator standing

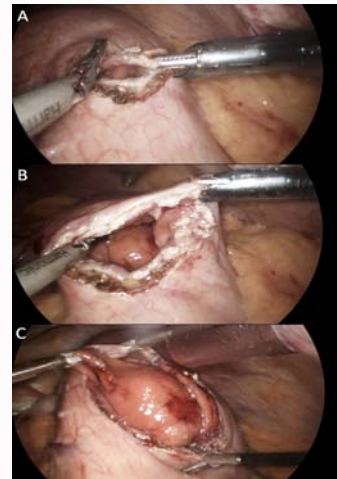


Figure 4: A+B) Anterior gastrotomy with ultrasonic shears; C) Mobilisation and "eversion" endophytic gastric GIST.

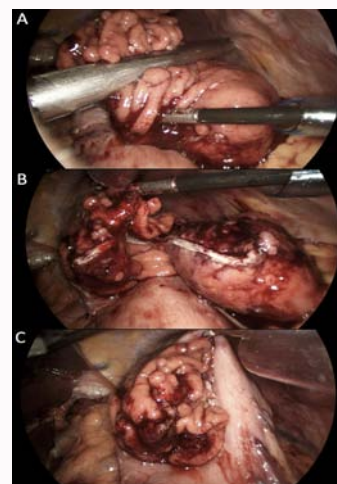
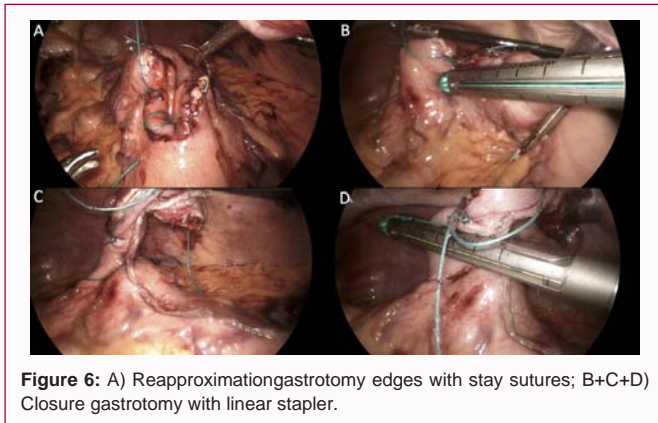


Figure 5: Tumour elevation and stapler placement; B) Control haemostasis staple line; C) "inversion" spared normal gastric mucosa.

between her legs and the first assistant on the patient's left side. A pneumoperitoneum maintained at 12 mmHg was initially achieved via a Verress needle inserted at Palmer's point. A standard four trocars technique was employed in the upper abdomen and a Nathanson liver retractor was inserted under direct vision. First step of this procedure consisted of a complete mobilisation and reduction of the hiatus hernia with excision of the hernia sac; "abdominalisation" of the lower oesophagus along with posterior cruroplasty using non-absorbable interrupted 1Ethibond Excel® Polyester sutures (Ethicon Endo-Surgery, Cincinnati, OH, USA), as shown in Figure 3. The second step included creation of an anterior gastrotomy with ultrasonic shears (Harmonic Scalpel, Ethicon Endo-Surgery), identification and exteriorisation of the gastric GIST through the gastric opening (Figure 4), complete excision of the lesion using an articulated size 60 mm endoscopic linear stapler (Echelon Flex™, Ethicon Endo-Surgery) taking care not to finish too close to the COJ with the stapling device (Figure 5), and closure of the gastrotomy after careful control of intragastric haemostasis using the same endoscopic linear stapler (Figure 6). The final step involved cruroplasty reinforcement with placement of a small size CruraSoft™ Patch mesh (Bard®, Davol Inc., Warwick, RI, USA) fixed with human fibrin glue



**Figure 6:** A) Reapproximation of gastrotomy edges with stay sutures; B+C+D) Closure of gastrotomy with linear stapler.

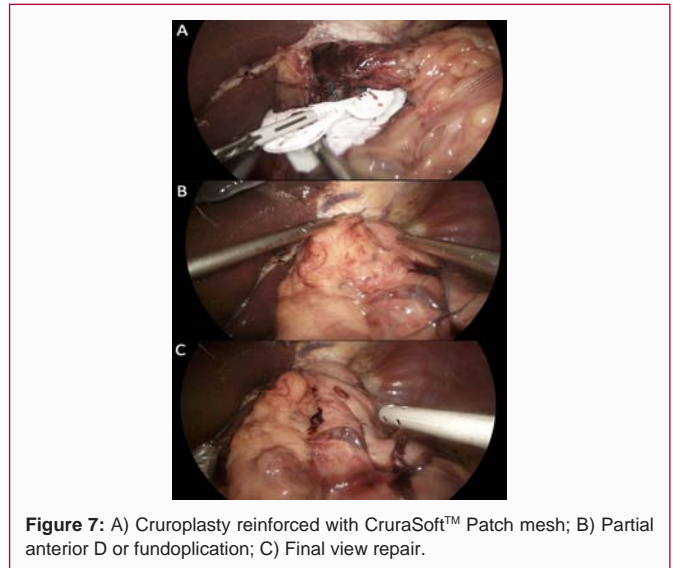
(Tisseel, Baxter, Deerfield, IL, USA) and partial 180° anterior Dor fundoplication using interrupted 2/0 Ethibond sutures (Figure 7).

The resected gastric GIST was placed in a specimen retrieval bag (Inziii® Retrieval System, Applied Medical, Rancho Santa Margarita, CA, USA) and safely removed from the abdominal cavity via a transverse left upper quadrant incision using an Alexis® O Wound Protector (Applied Medical). A small drain was left next to the anastomosis for 2 days and a nasogastric tube maintained overnight. Clear fluids were allowed on the first postoperative day and the patient was discharged 3 days later on a soft diet. Final histopathology report confirmed the diagnosis of low malignant potential well-circumscribed gastric GIST with no mitosis, vascular or perineural invasion, and margins were clear (R0). The patient subsequently made a swift recovery with complete resolution of her pre-operative symptoms. A surveillance gastroscopy and CT-scan at one-year post surgery were normal. She is at almost 2-years postoperative and remains asymptomatic.

## Discussion

In 1996, Geis et al [5,6] were the first to describe the technique of laparoscopic transgastric resection of gastric GIST, followed up one month later by Watson and coll. This approach is particularly useful for endophytic lesions situated in the posterior gastric wall or near the COJ, where a simple wedge excision is unfeasible and endoscopic resection is not an option due to their size and/or location. Since then, several variations of this technique have been described and well summarized in a recent article [7]. In our case, the tumour was relatively large and arising from the proximal gastric fundus that had migrated into the chest, making its excision quite challenging as it could easily lead to an excessive amount of normal gastric wall being incorporated into the resection, thus risking involving the COJ in the process, or even worse, ending up with a microscopically inadequate tumour clearance. To minimize those risks, we were able to use an “eversion” technique where the GIST was safely exteriorised through the gastric opening and divided under direct vision, preserving as much normal gastric tissue as possible with total control of the tumour edges, whilst maintaining adequate distance between the staple line of the endo-GIA and the COJ [8].

The associated large sliding hiatus hernia added significant difficulty to this case as both pathologies required simultaneous repair. This procedure was therefore divided into three chronological steps: The first “hiatus hernia reduction” step was important to subsequently allow safe access into the stomach via an anterior gastrotomy. Once the gastric GIST was completely excised and the gastrotomy closed,



**Figure 7:** A) Cruroplasty reinforced with CruraSoft™ Patch mesh; B) Partial anterior fundoplication; C) Final view repair.

mesh reinforcement of the cruroplasty with anterior fundoplication offered extra protection to the tumour excision bed as the fundus positioned over the top of the oesophagus is secured superiorly to the diaphragm, therefore theoretically minimizing the potential risk of leak at this level.

Anterior 180° Dor fundoplication is the author’s preferred anti-reflux operation as it generally offers better overall outcome to the patients when compared to Nissen technique [9]. It also seems to provide a stronger repair, as a significant part of the gastric wall is utilized to reinforce the diaphragmatic hiatus. The prosthetic used in this case was a PTFE/ePTFE dual-side mesh. Recently, the author has changed to a new synthetic and totally bioabsorbable scaffolding made of polyglycolide and trimethylene carbonate (Gore BioA Tissue Reinforcement™, Flagstaff, AZ) to reinforce the crural closure, as it may potentially decrease the risk of erosion through the oesophagus [10]. The choice of routinely securing the mesh with non-traumatic fibrin glue in large hiatus hernia was mainly for safety, but also driven by the fact that there is a small but well recognized risk of inflicting iatrogenic life-threatening cardiac tamponade from tacker or even suture usage [11].

A very similar case of a 68-year-old female with a 3.5 cm × 2 cm GIST located 2cm from the COJ and associated with a hiatus hernia was previously described [12]. The tumour resection was completed using a combined laparo-endoscopic approach with endoscopic removal of the lesion. In our case, the lesion was significantly larger and transgastric retrieval was therefore the only option available. To our knowledge, this is the first case report of an elderly patient undergoing concurrent laparoscopic transgastric GIST excision with mesh repair of a large sliding hiatus hernia. The main advantage of such an approach over laparotomy is multifactorial, and mainly consists in reduced overall morbidity and faster recovery, with very low risk of developing delayed incisional hernia. This is particularly the case when the main opening for specimen retrieval is off-midline in a transverse blunt muscle-splitting incision [13].

In this instance, an adapted surgical approach was necessary to facilitate safe and complete removal of the gastric GIST, following reduction of the hiatus hernia, with limited resection of normal gastric mucosa. As already mentioned by others, “there is no gold-standard method for tailored resection, and the surgical technique



is chosen at the discretion of the surgeon” [7]. We believe that such proposed sequential approach for combine treatment of large sliding hiatus hernia with intragastric GIST, can be safely performed with minimum risk, irrespective of the patient’s age.

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