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Laparoscopic resection of a gastric schwannoma: A case report



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ABSTRACT

INTRODUCTION: Mesenchymal tumors of the gastrointestinal tract are a group spindle cell tumors which include gastrointestinal stromal tumors, leiomyomas, leiomyosarcomas and schwannomas (Nishida and Hirota, 2000). Schwannomas generally present as a slow and asymptomatic growing mass in the gastrointestinal tract typically arising in the gastric submucosa accounting for up to 0.2% of gastric tumors (Melvin and Wilkinson, 1993; Sarlomo-Rikala M, Miettinen, 1995).

TREATMENT: with negative surgical margin resection (as approached in this case) is considered the standard treatment.

PRESENTATION OF CASE: A 60-year-old woman was referred to our general surgery service for dyspepsia. During her evaluation a gastric mass was incidentally found on upper GI endoscopy which showed a sub-mucosal exophytic neoplasm at the gastric antrum. The patient was discharged following an uneventful recovery from a successful surgical laparoscopic tumor resection.

DISCUSSION: Schwannomas are benign neurogenic tumors that originate from Schwann cells. They commonly occur in the head and neck but are rare in the GI tract (Menno et al., 2010). The differential diagnosis between gastric schwannomas and GISTs can be difficult in the preoperative assessment. With the advent of immunohistochemical staining techniques it is now possible to make a differential diagnosis based on their distinctive immunophenotypes. Gastric schwannomas are consistently positive for S-100 protein and negative for c-kit; conversely, 95% of GISTs are positive for c-kit and negative for S-100 protein in up to 98 to 99% of the cases.

CONCLUSION: Gastric schwannomas should be included in the differential diagnosis of any gastric sub-mucosal mass. Negative margin resection as seen with this patient is the standard surgical treatment as there is low malignant transformation potential.

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1. Introduction

Mesenchymal tumors of the gastrointestinal tract are formed by a group of tumors of spindle cells which include gastrointestinal stromal tumors, leiomyomas, leiomyosarcomas and schwannomas [1]. Among these neoplasms GISTs are the most common, (up to 60–70%) most of them arising in the stomach [2,3]. Schwannomas generally present as a slow and asymptomatic growing mass and they rarely appear in the gastrointestinal tract and when they do, they commonly arise in the gastric submucosa and account for up to 0.2% of gastric tumors [4,5]. Owing their typical presenta-

tion as submucosal neoplasms with spindle cell histology, gastric schwannomas and GISTs are macroscopically alike [2,6]. Both gastric schwannomas and GISTs occur predominantly in middle-aged patients [1,5] and are clinically similar presenting no relevant features [1,4,7]. Gastric schwannomas are benign tumors with an excellent prognosis [5,6,8], whereas 10–30% of GISTs have malignant behavior [1,2,9]. Conventional diagnostic imaging methods will not differentiate between these two common mesenchymal tumors. Indeed, imaging and endoscopic modalities do not provide distinctive hallmarks to make a precise diagnosis [8,10]. There is not enough evidence that imaging features alone can disclose a gastric schwannoma, therefore an immunohistochemical stain should aid the final diagnosis. In this paper, we present a 60-year-old woman with a gastric mass who underwent laparoscopic wedge gastric tumor resection under the suspicion of a GIST preoperatively but confirmed to have a gastric schwannoma postoperatively.

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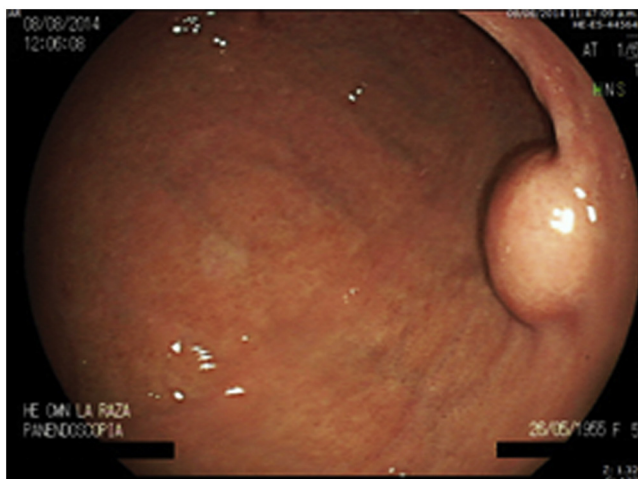


Fig. 1. Upper endoscopy showing a gastric submucosal mass in the antrum.

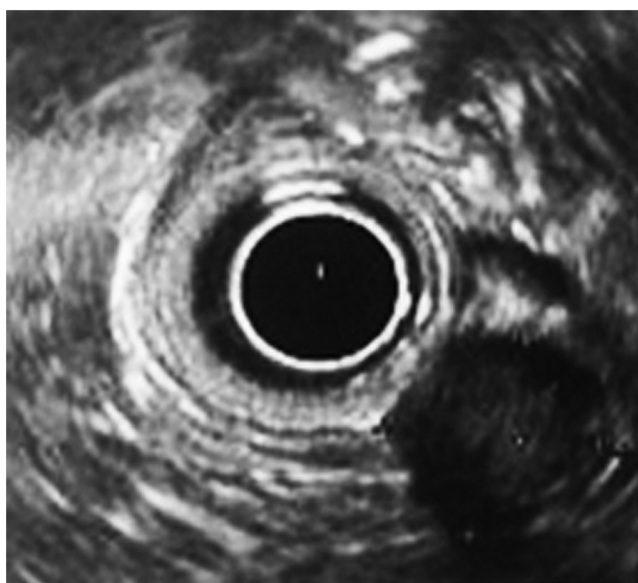
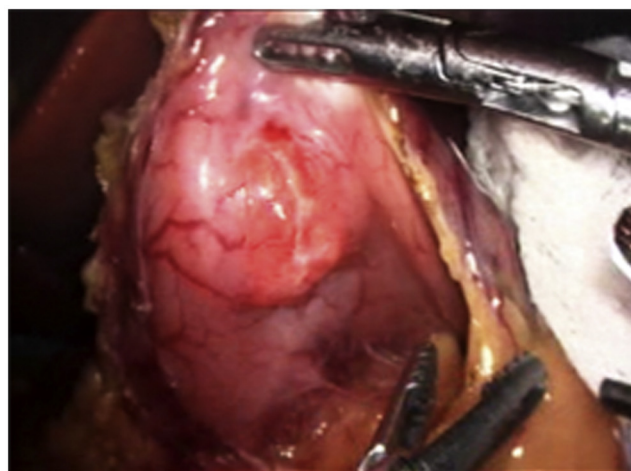


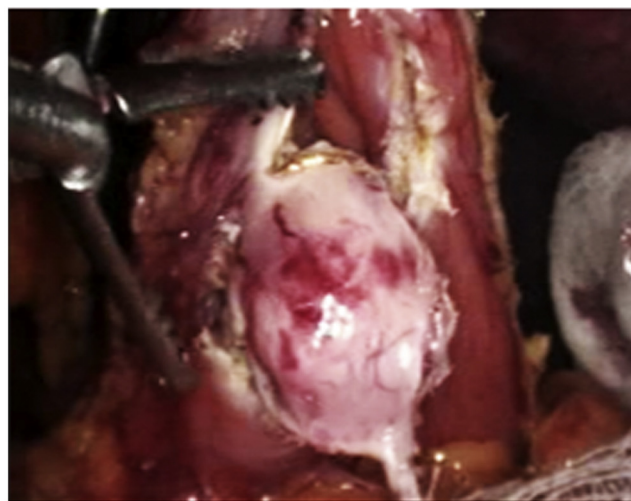
Fig. 2. Endoscopic ultrasound showing a hypo echogenic lesion at the gastric antrum. Features suggestive of GIST.

2. Presentation of case

A 60 year old woman was referred to our general surgery service. The reason for her initial visit was dyspepsia as her only complain was intermittent gastric discomfort in response to solid foods. Her medical history was significant for depression successfully treated with paroxetine with no abnormalities found on physical exam. During her evaluation, a gastric mass was incidentally found on upper GI endoscopy (Fig. 1) which showed a submucosal exophytic mass in the gastric antrum with normal overlying gastric mucosa. Biopsy specimens obtained at the endoscopy yielded only unspecific signs of mild inactive chronic inflammation without evidence of malignancy, no neoplastic or cytological alterations were found. A subsequent endoscopic ultrasound showed an exophytic mass measuring 1.6×1.3 cm arising from the gastric antrum showing low echogenicity (Fig. 2), EUS-guided fine needle aspiration (FNA) was performed. Aspirate smears showed spindle cell tissue fragments consistent with the diagnosis of GIST. An abdominal CT scan was obtained rendering no important diagnostic information. After presenting the case at our gastrointestinal surgical expert team, a consensus was reached to proceed with resection. The patient



A



B

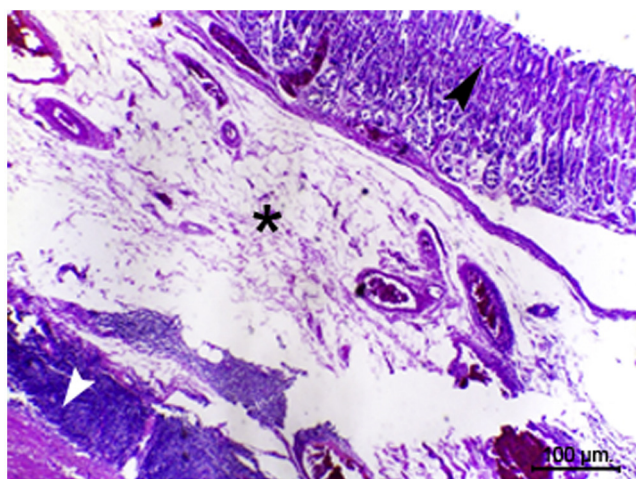
Fig. 3. A. A 2×2 cm gastric tumor seen after dissection of gastrocolic ligament in posterior surface of gastric antrum. B. resection of gastric tumor with harmonic scalpel.

was counseled about the surgical options and offered an elective laparoscopic surgical tumor resection. After informed consent was obtained, the patient was taken to the operating room where she was placed in supine position under general endotracheal anesthesia. The abdomen was prepped and draped in a sterile fashion. Pneumoperitoneum was achieved at 12 mm of mercury, and four additional trocars were placed under direct vision. The stomach was mobilized by opening the gastrocolic ligament. Following mobilization of the greater curvature, a large exophytic mass along in the gastric antrum close to the pylorus was clearly identified. We isolated the mass from the stomach and suspended it with laparoscopic intestinal non traumatic graspers (Fig. 3). Harmonic scalpel was used for dissection; we then retrieved the specimen (the mass with a portion of the gastric wall) through an endocatch bag through the supraumbilical port and was sent to pathology for analysis. Closure of the surgical defect was promptly accomplished in two planes with a deep plane of non absorbable (polypropylene) suture with simple interrupted stitches and a superficial plane with Lembert invaginating stitches, the rest of the abdominal cavity was visualized without any additional abnormalities. The patient had a brief in hospital uneventful recovery. The final pathologic study revealed a neoplastic mass comprised of spindle cells of varying cellularity with a submucosal nature (Fig. 4). There was lympho-

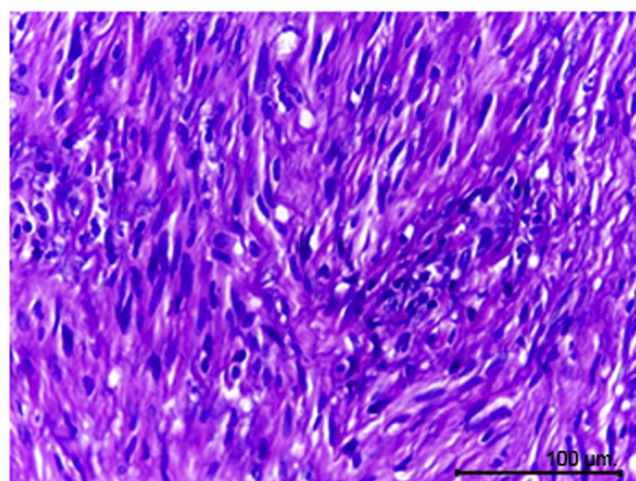
Table 1
Histologic pattern of gastrointestinal mesenchymal neoplasms [14].

Spindle Cell	Epithelioid	Nested	Myxoid	Small Round Blue Cells	Pleomorphic
GIST	GIST	Gangliocytic Paraganglioma	GIST	DSRBCT	Leiomyosarcoma
Desmoid	PEComa	Clear-cell-sarcoma-like tumor of the GI tract	Inflammatory fibroid polyp	Round cell liposarcoma	MPNST
Schwannoma	Schwannoma		Plexiform fibromyxoma		GIST
Leiomyoma/ leiomyosarcoma	Epithelioid vascular tumors		Leiomyosarcoma		Liposarcoma
Inflammatory fibroid polyp	Glomus		IMFT		
Perineurioma	Granyular cell tumor		Neurofibroma		
Neurofibroma	Rhabdoid tumor				
Inflammatory pseudotumors					
IMFT					
SFT					
Plexiform fibromyxoma					
Granular cell tumor					

Abbreviations: DSRBCT, desmoplastic small round blue cell tumor; IMFT, inflammatory myofibroblastic tumor; MPNST, malignant peripheral nerve sheath tumor; PEComa, perivascular epithelioid cell tumor, SFT, solitary fibrous tumor.



A



B

Fig. 4. A. Gastric submucosal tumor confinement without atypia, pleomorphism or apparent mitotic activity. Black arrow showing gastric epithelium, asterisk points out submucosal, white arrow shows submucosal gastric schwannoma B. Characteristic spindle cell arrangement with nuclear palisading seen in schwannomas.

cytic cuffing at the periphery of the tumor and the neoplastic cells lacked immunoreactivity with CD 117 and CD 34, and were positive to S-100 protein (Table 1).

3. Discussion

Schwannomas, also known as neurilemmomas or neurinomas are benign neurogenic tumors which originate from Schwann cells normally located as a wrapping of peripheral nerves. Theoretically, schwannomas can develop anywhere along the peripheral course of nerve. However, they most commonly occur in the head and neck but they are rare in the GI tract [11]. Gastric schwannomas are the most common in the GI tract, however they account for only 0.2% of all gastric tumors and typically involve submucosa and muscularis propria [4–6]. They grow slowly and exophytically as they cause symptoms only in a minority of patients. Because of this silent growth as with the patient presented in our case, these tumors are often discovered as an incidental finding on imaging studies [8,11]. When symptomatic, the most common presenting complain is upper GI bleeding which may be secondary to the growing submucosal mass compromising the blood supply to the overlying mucosa. The overlying mucosa of the neoplasm may give rise to an ulcer due to a reduced threshold to gastric acid [4,10,11]. For a gastric submucosal mass the main differential diagnosis is GIST. Although rare, gastric schwannomas are also a primary GI mesenchymal tumor [6]. After a margin clear surgical resection gastric schwannomas have an excellent prognosis [5,6,8]. Therefore, the differential diagnosis for a gastric submucosal mass should include gastric schwannomas. Nevertheless, owing the low frequency of presentation the diagnostic suspicion is also infrequent. The differentiation between gastric schwannomas and GISTs can be difficult in the preoperative work up. While imaging studies such as ultrasonography, endoscopy, and CT demonstrate extent of invasion, none of these modalities have shown specific features unique to these type of neoplasms [10–13]. Furthermore, due to the rarity of gastric schwannomas, there is limited data about their imaging characteristics. Homogeneous attenuation on CT scan is a commonly shared feature of gastric schwannomas (not usually present in schwannomas in other parts of the body) [12]. In addition, the homogenous enhancement pattern may aid in differentiation of gastric schwannomas from GISTs which frequently show heterogeneous enhancement due to degenerative changes [13]. The neoplasm studied in this case was not clearly

Table 2
Basic panel of immunostains useful in the diagnosis of mesenchymal tumors of the GI tract. [14].

	GIST	Leiomyoma	Leiomyosarcoma	Schwannoma	Desmoid
KIT	95%	Negative	Negative	Negative	Rarely positive
DOG1	~90%	Negative	0.3%	Negative	Negative
CD34	70%	Negative	Negative	Negative	Negative
SMA	30%–40%	~100%	86%	Negative	Negative
Desmin	1%–2%	~100%	50%–80%	Negative	Negative
S100	1%–2%	Negative	Negative	100%	Negative
Cytokeratin	1%–2%	~20% (varies with keratin used)	20%–38%	Rare, focal	Negative

visualized on the patient’s CT scan. Endoscopic ultrasound of our case showed a hypochoic mass. It seemed that spindle cells were responsible of the low echogenicity [10]. Endoscopic tissue biopsies also yielded inconclusive results with a diagnostic aim towards GIST. As shown in this case, endoscopic biopsy may not be adequate for definitive diagnosis because mucosal abnormalities are rarely observed in these submucosal tumors or because an insufficient sample is usually obtained [8,11]. Immunophenotypes of mesenchymal tumors are heterogeneous despite macroscopic morphologic similarities. In the past, gastric schwannomas were included in the GIST category [6]. Schwannomas are successfully identified as a primary GI tumor based on the positive S-100 stain [5,6]. GIST also became a distinct GI cancer diagnostic category when the expression of c-kit protein in GIST cells was discovered [1,2]. Before the recognition of S-100 antigen in gastric schwannomas and c-kit antigen in GISTs, these neoplasms were most often classified as leiomyoma, leiomyosarcoma, or gastrointestinal autonomic nerve tumor [1,2,5,6]. With the advent of immunohistochemical staining techniques it is now possible to make a differential diagnosis based on their distinct immunophenotypes. Gastric schwannomas are positive for S-100 protein in 100% of cases and negative for c-kit; conversely, most GISTs are up to 95% positive for c-kit and negative for S-100 protein in up to 98 to 99% of cases (Table 2). Our case fulfilled the immunohistochemical diagnosis for a gastric schwannoma. Therefore a laparoscopic approach with a margin negative resection was considered the treatment of choice as one of the less invasive modalities available in surgical domain.

4. Conclusion

This case underlines the importance of including gastric schwannomas in the differential diagnosis when preoperative imaging studies reveal a submucosal and exophytic gastric mass. Owing to subclinical tumor growth, diagnosis is usually delayed. However, nowadays there is no clear evidence in current pathology literature to suggest that gastric schwannomas have malignant potential. Thus, recurrent disease has been only observed after incomplete resection [4–6]. Therefore, when diagnosed or suspected complete margin negative surgical resection as seen in this case is the curative treatment of choice.

Conflicts of interest

The authors report no conflicts of interest.

Sources of funding

None.

Ethical approval

None.

Consent

Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review on demand by the Editor in Chief of this journal.

Author contribution

Edgar Vargas Flores: Writing the paper, design and data collection, data analysis and interpretation
 Francisco Bevia Pérez: Design and data collection, data analysis and interpretation.
 Pablo Ramirez Mendoza: Design and data collection, data analysis and interpretation.
 José Arturo Velázquez García: Data analysis and interpretation.
 Oscar Alejandro Ortega Román: Data analysis and interpretation.

Guarantor

Edgar Vargas Flores.

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