DOI: http://dx.doi.org/10.12996/gmj.2025.4573

Gastric Schwannoma Masquerading as a Gastrointestinal Stromal Tumor: A Case Report and Diagnostic Challenges

Gastrointestinal Stromal Tümörü Taklit Eden Gastrik Schwannoma: Bir Olgu Sunumu ve Tanısal Zorluklar

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ABSTRACT

Gastric schwannomas (GSs) are rare, benign mesenchymal tumors originating from Schwann cells of the nerve sheath, accounting for approximately 0.2% of all gastric tumors. These tumors pose diagnostic challenges due to their resemblance to gastrointestinal stromal tumors (GISTs) and other submucosal neoplasms. We present the case of a 47-year-old male with a history of GI bleeding who was initially diagnosed with suspected GIST based on an enhanced abdominal computed tomography scan. The scan revealed a 7.4 × 5.6-cm exophytic mass with homogeneous enhancement in the gastric antrum. Laparoscopic distal gastrectomy with Roux-en-Y gastrojejunostomy was performed, revealing a tumor with purple-red discoloration, serosal invasion, omental involvement, and suspected metastatic infra-pyloric nodules. Histopathological examination confirmed a GS, characterized by spindle-shaped cells with Antoni A and B patterns, Verocay bodies, and strong S-100 protein immunoreactivity, while negative for CD117, DOG-1, CD34, SMA, and desmin. The patient recovered uneventfully and was discharged on postoperative day 6. This case underscores the diagnostic complexity of GSs, emphasizing the critical role of histopathological and immunohistochemical analysis in distinguishing them from other mesenchymal tumors. Minimally invasive surgical resection offers both diagnostic confirmation and effective treatment, with favorable oncologic and functional outcomes.

Keywords: Gastric schwannoma, schwann cells, s-100 protein, gastric submucosal tumors, laparoscopic distal gastrectomy, immunohistochemical analysis

ÖZ

Gastrik schwannomalar (GSs), nöral kılıfın Schwann hücrelerinden köken alan, tüm gastrik tümörlerin yaklaşık %0,2'sini oluşturan nadir, benign mezenkimal tümörlerdir. Bu tümörler, gastrointestinal stromal tümörlere (GISTs) ve diğer submukozal neoplazilere benzerlik göstermeleri nedeniyle tanısal zorluklar oluşturmaktadır. GI kanama öyküsü olan 47 yaşında erkek hastada, kontrastlı abdominal bilgisayarlı tomografi taramasına dayanarak başlangıçta GIST şüphesiyle tanı konulan bir olguyu sunuyoruz. Taramada gastrik antrumda homojen kontrastlanma gösteren 7,4 × 5,6 cm'lik ekzofitik bir kitle saptandı. Laparoskopik distal gastrektomi ve Roux-en-Y gastrojejunostomi uygulandı; mor-kırmızı renkli, serozal invazyon, omental tutulum ve metastatik infra-pilorik nodül şüphesi olan bir tümör görüldü. Histopatolojik inceleme, Antoni A ve B paternleri olan iğsi hücreler, Verocay cisimcikleri ve güçlü S-100 protein immünreaktivitesi ile karakterize, CD117, DOG-1, CD34, SMA ve desmin için negatif olan gastrik schwannomayı doğruladı. Hasta sorunsuz iyileşti ve postoperatif 6. günde taburcu edildi. Bu olgu, GS tanısal karmaşıklığını vurgulamakta ve bunları diğer mezenkimal tümörlerden ayırt etmede histopatolojik ve immünohistokimyasal analizin kritik rolünü öne çıkarmaktadır. Minimal invaziv cerrahi rezeksiyon hem tanısal doğrulama hem de etkili tedavi sağlar ve olumlu onkolojik ve fonksiyonel sonuçlar sunar.

Anahtar Sözcükler: Gastrik schwannoma, schwann hücreleri, S-100 proteini, gastrik submukozal tümörler, laparoskopik distal gastrektomi, immünohistokimyasal analiz

Cite this article as: Türkoğlu MA, Remenar L, Zeren YK, Alabaş S, Türkmen Şamdancı E. Gastric schwannoma masquerading as a gastrointestinal stromal tumor: a case report and diagnostic challenges. Gazi Med J. [Epub Ahead of Print].

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Received/Geliş Tarihi: 25.10.2025
Accepted/Kabul Tarihi: 18.12.2025
Epub: 10.03.2026

Introduction

Schwannomas (neurilemmomas) are rare tumors that originate from Schwann cells of peripheral nerves, which are surrounded by a fibrous sheath. Schwannomas are uncommon in the gastrointestinal (GI) tract, accounting for only 2–7% of mesenchymal GI tumors, 0.2% of all gastric tumors, and 4% of benign gastric neoplasms (1). Patients typically present with non-specific symptoms such as upper abdominal pain, dyspepsia, bleeding, and abdominal masses. These symptoms generally correlate with the tumor's size and location. Gastric schwannomas (GSs) characteristically present as submucosal or intramuscular lesions, posing considerable difficulty in distinguishing them from GISTs, leiomyomas, and leiomyosarcomas (1,2).

We report a case of a 47-year-old male who presented with GI bleeding. Preoperative diagnosis suggested a GI stromal tumor (GIST); however, postoperative histopathological examination definitively identified the lesion as a GS.

Case Report

A 47-year-old male patient presented to an external medical facility with hematemesis. Upper GI endoscopy was performed but yielded inadequate visualization due to the presence of a blood coagulum. Subsequently, an enhanced abdominal computed tomography (CT) scan incidentally identified a gastric tumor with exophytic extension located in the gastric antrum, measuring approximately 7.4 × 5.6 cm in diameter. The lesion was preliminarily diagnosed as a GIST (Figure 1). The scan also identified perigastric lymphadenopathy, with the largest lymph node measuring 3 cm in diameter. Following spontaneous resolution of the tumor-related bleeding and transfusion of two units of packed red blood cells, the patient was referred to our institution for further evaluation and management. On admission, laboratory findings revealed a hemoglobin level of 9.1 g/dL and an elevated C-reactive protein level of 124 mg/L, with all other laboratory parameters within normal limits. Tumor markers, including carcinoembryonic antigen at 2.9 ng/mL and carbohydrate antigen 19-9 (CA19-9) at 15 U/mL, were within normal ranges. Physical examination yielded unremarkable findings. The patient's complex medical history included prior coronary artery bypass grafting necessitating long-term anticoagulation therapy, type 2 diabetes mellitus, hypertension, and morbid obesity (body mass index 43.2 kg/m²).

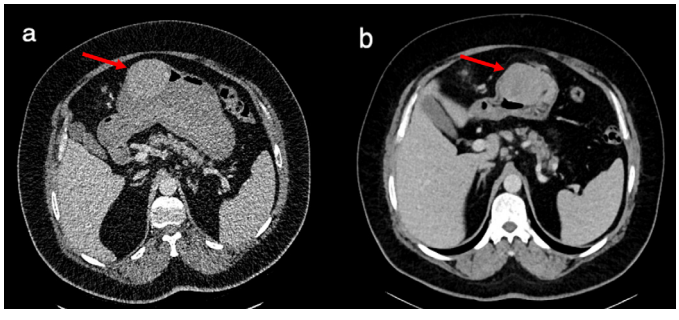

Figure 1. (a) and (b). An enhanced abdominal computed tomography scan showing a mass with an exophytic growth pattern and homogeneous enhancement located at the gastric antrum, measuring approximately 7.4 × 5.6 cm. (red arrows).

A laparoscopic distal gastrectomy with Roux-en-Y gastrojejunostomy was performed. The surgical technique has been previously described in detail (3). Upon gross examination, an endophytic-exophytic mass measuring 7 × 5 cm was identified, characterized by irregular margins and an ulcerated, nodular surface. The solid lesion displayed purple-red discoloration, suggestive of areas of necrosis and hemorrhage. Serosal invasion was evident, with apparent involvement of the omentum and the presence of suspected metastatic nodules (Figure 2).

Postoperatively, the patient was initiated on a clear-liquid diet and was gradually advanced to a regular diet by postoperative day 3. The surgical drain was removed on postoperative day 6, and the patient was discharged without complications.

Pathology

Macroscopically, the tumor measured 6.5 × 5 × 4.5 cm and exhibited an ulceration on the gastric mucosal surface. The cut surface of the tumor was off-white and fibrous. Tissue samples subjected to routine follow-up were stained with hematoxylin and eosin and examined by light microscopy. Histopathologically, the lesion is typically well-circumscribed and encapsulated. The gastric mucosa was ulcerated. Two characteristic histological patterns, known as Antoni A and Antoni B areas, are observed. Antoni A areas are hypercellular, consisting of spindle-shaped Schwann cells arranged in interlacing fascicles with prominent nuclear palisading and forming Verocay bodies. In contrast, Antoni B areas are hypocellular, exhibiting a loose, myxoid stroma with microcystic degeneration and less organized cellular architecture (Figure 3). Mitosis and necrosis were not detected. Immunohistochemically, tumor cells show strong, diffuse positivity for S-100 protein (Figure 4). The tumor cells were negative for antibodies to CD117, DOG-1, CD34, smooth muscle actin (SMA), and Desmin.

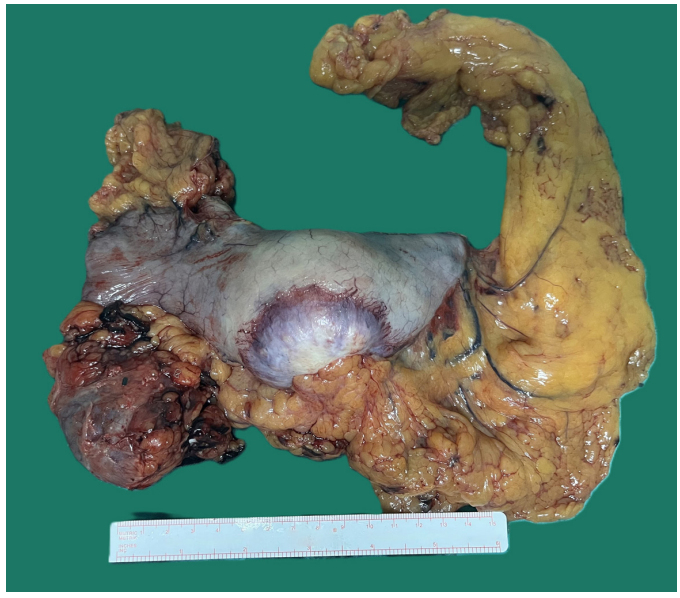

Figure 2. Intraoperative image showing a tumor with purple-red discoloration, serosal involvement, and adjacent infra-pyloric nodules. These nodules were initially suspected to be metastatic intraoperatively but were later confirmed by histopathology to be reactive lymph nodes.

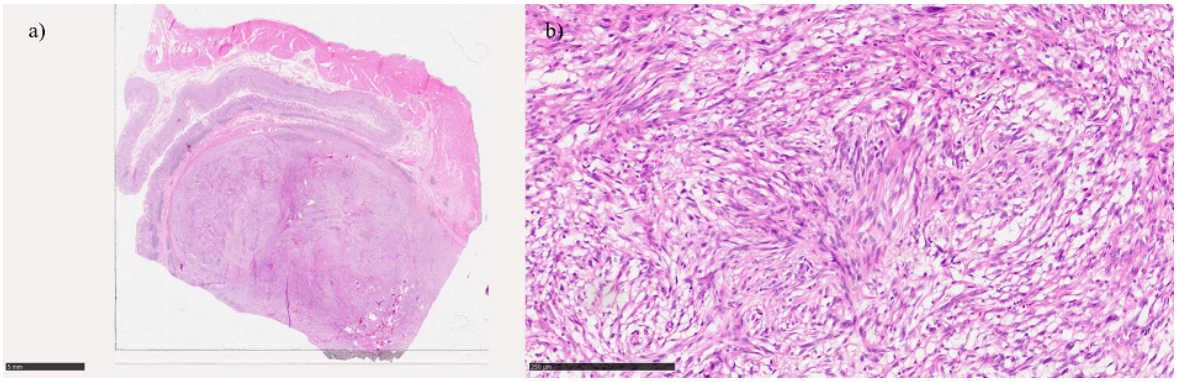

Figure 3. (a) The tumor is well-circumscribed and located under the gastric mucosa. Hematoxylin and eosin (H&E) x1. (b) The tumor cells are narrow, elongated, and wavy, with ill-defined cytoplasm and dense chromatin. H&E x100.

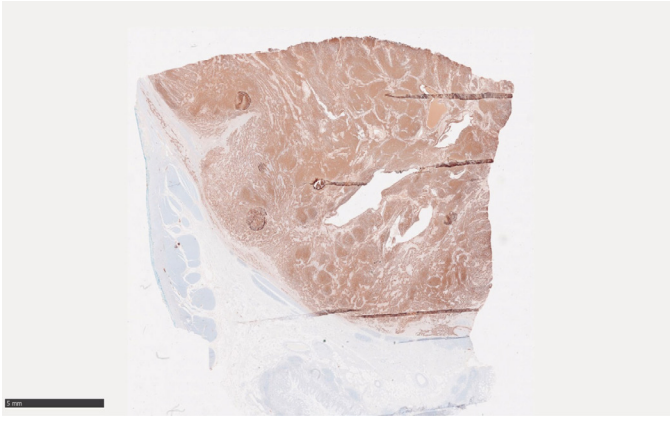

Figure 4. Strong S100 protein immunoreactivity in the tumor cells. Hematoxylin and eosin x1.

Discussion

Gastric submucosal tumors (SMTs) are classified into three categories: myogenic tumors (comprising leiomyomas and leiomyosarcomas), neurogenic tumors (including schwannomas, granular cell tumors, and neurofibromas), and GISTs, each with unique histopathological and immunohistochemical characteristics (1). GSs are uncommon tumors that most frequently arise in the stomach (2,4). Anatomically, GSs primarily occur in the gastric body and less frequently in the antrum and fundus, in that order (1). These GSs originate from the nerve sheath of Auerbach's plexus or, less commonly, Meissner's plexus (5). They are characterized as slow-growing, encapsulated neoplasms composed of Schwann cells embedded within a collagenous matrix. As the tumor expands, it displaces the nerve toward its periphery, thereby preserving neural function (4).

GSs predominantly affect individuals in the fifth to sixth decades of life, with a marked female preponderance. These neoplasms frequently remain clinically silent and may be discovered incidentally during radiological investigations or exploratory laparotomy. In symptomatic cases, GI hemorrhage is the most common clinical manifestation, followed by abdominal pain or discomfort (2,4,5). Hemorrhage may occur in the setting of deep ulceration, and a mass may be palpable in the epigastrium when exophytic tumor growth is present. Our patient's presentation with GI bleeding corroborates findings documented in the existing literature.

Preoperative differential diagnosis remains challenging; the primary difficulty is accurately distinguishing GSs, GISTs, and smooth muscle neoplasms (1). On CT imaging, GSs appear as intraluminal masses with exophytic or mixed growth patterns; they typically lack hemorrhage, necrosis, cystic degeneration, or calcification and demonstrate homogeneous enhancement on contrast-enhanced studies (1,2,6). Notably, smaller GISTs may manifest as hypervascular masses with pronounced enhancement on CT imaging, complicating their distinction from GSs. Gastric leiomyomas typically present on CT as homogeneous, hypoattenuating masses characterized by an endoluminal growth pattern and mild-to-moderate contrast enhancement. A distinguishing feature of leiomyomas is their predilection for the gastric cardia and esophagogastric junction.

Fluorodeoxyglucose positron emission tomography may show moderate uptake in GS, but it is not specific and cannot reliably distinguish GS from GIST, which often demonstrates higher metabolic activity (4). Endoscopic examination reveals a submucosal, elevated lesion with smooth, intact mucosa; central ulceration, due to ischemic changes, occurs in 25–50% of cases. Nevertheless, standard endoscopic biopsy techniques frequently fail to yield definitive histological diagnoses. This diagnostic limitation stems from the fact that SMTs are covered by normal epithelium, resulting in superficial biopsy specimens that demonstrate only normal mucosal tissue rather than the underlying pathology. endoscopic ultrasound–guided fine needle aspiration biopsy is established as a reliable and suitable method for obtaining histological diagnoses of SMTs, such as GISTs (7). Despite this utility, the time-intensive nature of the procedure meant it could not be performed on our patient, who presented with tumor-related bleeding.

Schwannomas present as distinct, encapsulated, nodular masses originating from the nerve sheath. Microscopically, they are spindle cell tumors characterized by an admixture of two classic patterns: compact, cellular Antoni A areas, often containing Verocay bodies (nuclear palisading), interspersed with hypocellular Antoni B areas (8). Features such as focal nuclear atypia and mitotic activity may be observed. The frequent presence of prominent thick-walled, hyalinized blood vessels is another diagnostic clue. By immunohistochemistry, schwannoma cells exhibit strong,

diffuse positivity for S100 protein. A negative immunoprofile for CD117, DOG1, CD34, SMA, and desmin is critical for distinguishing schwannomas from other common GI mesenchymal tumors. This negative immunophenotype readily differentiates schwannomas from GISTs, which express the KIT protein (CD117) and DOG-1, and from leiomyomas, which are typically positive for the smooth muscle markers SMA and desmin (9).

Malignant transformation of GI schwannomas is exceedingly rare, with only isolated cases of metastasis documented in the literature (10,11). Therefore, GSs are treated definitively by either en bloc resection or partial resection. A literature analysis showed satisfactory long-term outcomes and no statistically significant differences between patients undergoing local resection and those undergoing extended surgery (subtotal or total gastrectomy) (1). Small tumors can also be removed endoscopically. Cai et al. (12) reported 12 successful endoscopic cases, most of which were located in the gastric body, with a mean tumor size of 1.73 ± 1.10 cm. During a mean follow-up of 4 years, no recurrence or metastasis was detected (12). In our case, the intraoperative finding of suspected metastatic infrapyloric nodules highlights a diagnostic pitfall. While GSs are overwhelmingly benign, they can incite a significant peri-tumoral inflammatory or desmoplastic reaction. This can manifest as enlarged, firm perigastric lymph nodes or as adherent omental tissue, mimicking metastatic disease on gross inspection. Histopathological examination is crucial to differentiate these reactive changes from true malignancy.

Surgical resection remains the cornerstone of treatment for symptomatic or large GSs. Given their benign nature, organ-preserving and minimally invasive approaches are preferred when technically feasible. Laparoscopic resection of benign gastric tumors, including schwannomas, has been shown to be safe and effective, offering advantages of reduced postoperative pain, shorter hospital stays, and improved cosmetic outcomes compared with open surgery (13,14). For our patient, a laparoscopic distal gastrectomy was selected due to the tumor's large size and antral location, which precluded local excision. This approach also accommodated the need for a Roux-en-Y reconstruction in a patient with morbid obesity, providing a durable surgical solution while minimizing laparotomy-related morbidity in a high-risk patient with multiple comorbidities.

Consequently, definitive preoperative diagnosis of GSs remains challenging. Surgical resection can be performed safely via a minimally invasive approach, providing acceptable postoperative GI function while ensuring both a definitive histopathological diagnosis and curative treatment.

Ethics

Informed Consent: It was obtained from all patients.

Footnotes

Authorship Contributions: Surgical and Medical Practices: M.A.T., L.R., Y.K.Z., Concept: M.A.T., E.T.Ş., Design: M.A.T., Data Collection or Processing: M.A.T., L.R., S.A., Y.K.Z., E.T.Ş., Analysis or Interpretation: M.A.T., Literature Search: M.A.T., L.R., S.A., Y.K.Z., E.T.Ş., Writing: M.A.T., L.R., E.T.Ş.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

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