

Received: 2020.03.19

Accepted: 2020.04.30

Available online: 2020.05.20

Published: 2020.07.01

Gastric Schwannoma In a Patient Undergoing Sleeve Gastrectomy: Uncommon Gastric Tumor Discovered Incidentally During a Common Gastric Procedure

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Conflict of interest: None declared

Patient: Female, 27-year-old
Final Diagnosis: Schwannoma
Symptoms: Incidental finding
Medication: —
Clinical Procedure: Sleeve gastrectomy
Specialty: Surgery

Objective: Rare disease

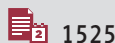
Background: Obesity is a major global health issue associated with significant co-morbidities. Regarding its treatment, the use of bariatric procedures is increasing due to their efficacy in weight reduction and improved management of the associated medical conditions. Although comprehensive preoperative evaluation is essential, routine upper endoscopy is controversial.

Case Report: We present the case of a 27-year-old woman with a history of morbid obesity, hypertension, and diabetes mellitus. She had multiple unsuccessful attempts at lifestyle modification for weight reduction. Accordingly, she was scheduled for sleeve gastrectomy. However, the operation was canceled due to the incidental intra-operative finding of a gastric mass. She was diagnosed as having gastric schwannoma, which is considered a rare gastrointestinal neoplasm.

Conclusions: Comprehensive preoperative evaluation of patients undergoing bariatric procedures is essential. The present case is a good example of the value of upper endoscopy in the evaluation of patients, including those who are asymptomatic.

MeSH Keywords: Endoscopes, Gastrointestinal • Gastrectomy • Neurilemmoma • Obesity

Full-text PDF: <https://www.amjcaserep.com/abstract/index/idArt/924432>



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Background

Obesity is a global healthcare issue that is associated with significant morbidity and mortality [1]. Various therapeutic measures have been developed for the management of obesity. The use of bariatric surgical procedures is increasing owing to their efficacy in weight reduction and improved management of obesity-associated co-morbidities [2]. Sleeve gastrectomy is the most frequently performed bariatric procedure worldwide [3].

Although comprehensive preoperative assessment is essential for patients undergoing sleeve gastrectomy, performing upper endoscopy routinely prior to the operation is a matter of debate [4]. Herein, we describe a case of gastric schwannoma, an uncommon type of gastric neoplasm, discovered incidentally in a patient scheduled for a sleeve gastrectomy procedure.

Case Report

A 27-year-old woman was referred to a bariatric clinic after several attempts at lifestyle modification for weight loss yielded suboptimal outcomes. In addition to class III obesity (height 152 cm, weight 101 kg, and BMI 43.7 kg/m²), her medical records revealed hypertension, diabetes mellitus, and no surgical history. Her hypertension was well-controlled by valsartan and hydrochlorothiazide, and her diabetes mellitus was being treated with metformin, sitagliptin, and insulin therapy. Her physical examination results were unremarkable, and routine laboratory investigations findings were normal. She agreed to undergo laparoscopic sleeve gastrectomy when presented with surgical management options. However, a gastric mass was incidentally discovered during the standard diagnostic exploration.

Hence, the surgery was aborted, and the patient was referred to our institution for further evaluation and management.

Here, upper gastrointestinal endoscopy under conscious sedation was performed and revealed an elevated submucosal mass in the gastric antrum with normal overlying mucosa (Figure 1A). The mass was further characterized by performing an endoscopic ultrasound examination, which revealed a hypoechoic homogenous oval-shaped mass lesion with well-demarcated walls that appeared to arise from the muscularis propria and lacked adjacent lymphadenopathy (Figure 1B). Cytological examination of the biopsy specimens, obtained by fine-needle aspiration using a 19-gauge needle, revealed a spindle cell neoplasm, giving the impression of a gastric gastrointestinal stromal tumor (GIST). However, the tissue sample was not sufficient for further assessment and complete excision was recommended for definitive diagnosis.

Subsequently, contrast-enhanced computed tomography (CT) of the abdomen revealed an exophytic, well-circumscribed, homogeneously hypodense mass bulging into the gastric lumen on the lesser curvature of the pyloric antrum anteriorly (Figure 2). It measured approximately 3.4×5.3×4.0 cm in its maximum dimensions and had no definite invasion. The case was discussed in the oncology multidisciplinary meeting and surgical management in the form of distal subtotal gastrectomy was planned.

The surgery was performed laparoscopically under general anesthesia with the patient in a supine and leg-split position. Five ports were inserted for carrying out the procedure. After establishing pneumoperitoneum and introducing trocars, standard diagnostic exploration was performed. The gastric mass

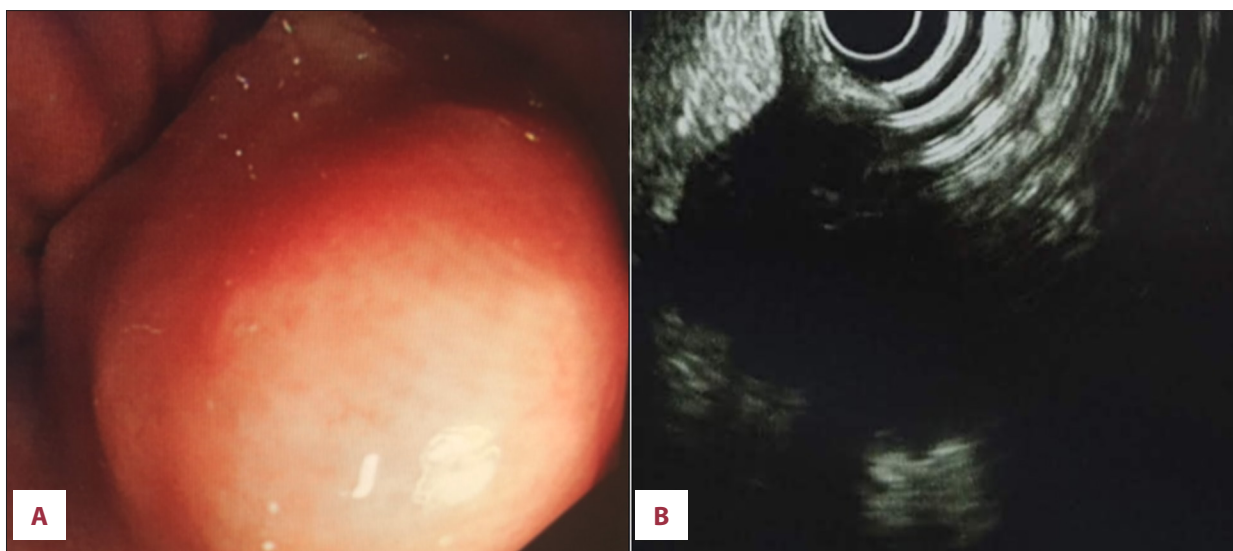


Figure 1. (A) Endoscopic view showing an elevated mass in the gastric antrum with normal overlying mucosa. (B) Endoscopic ultrasound examination showing a hypoechoic, well-demarcated, oval-shaped mass lesion.

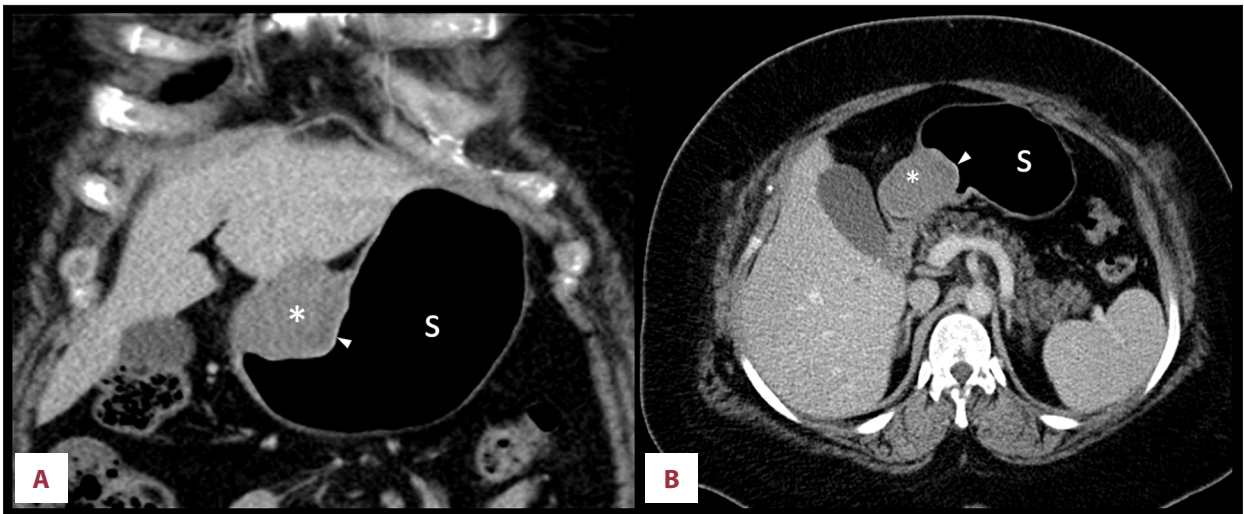


Figure 2. Contrast-enhanced abdominal computed tomography: Coronal (A) and axial (B) images demonstrating the presence of a large, hypodense, homogenous, soft tissue mass (asterisk) on the lesser curvature of the stomach (S), with normal overlying mucosa (arrowhead).

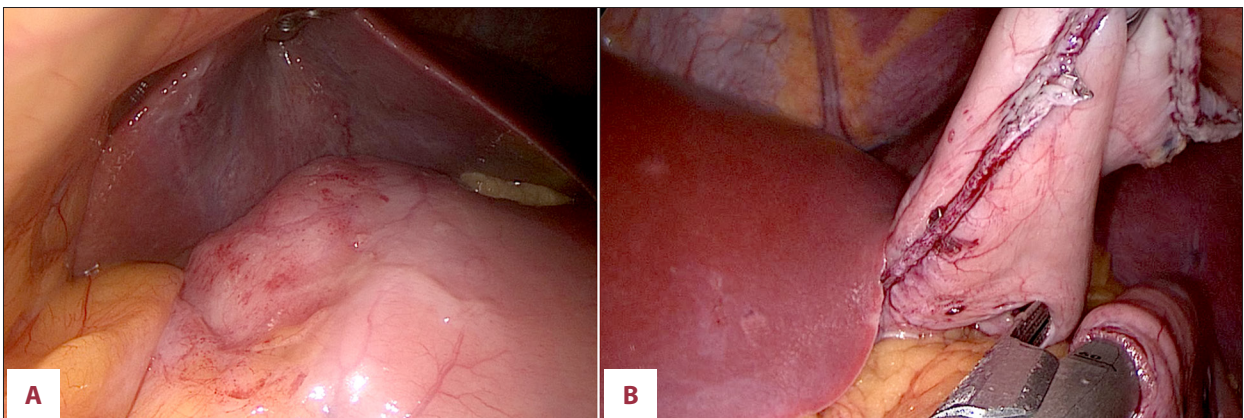


Figure 3. Laparoscopic views showing: (A) the gastric mass on the lesser curvature of the stomach. (B) preparation for Billroth II gastrojejunostomy after the distal gastrectomy.

was identified on the lesser curvature of the gastric antrum, 3 cm away from the pylorus, and measured 5×4 cm (Figure 3). The stomach was mobilized by dividing the gastrocolic ligament. The distal stomach was resected at the level of the first part of the duodenum distally with an endoscopic linear stapler (Ethicon, NJ, USA). The resected part was retrieved using an Endobag (Ethicon, NJ, USA) through extending the supraumbilical port incision, and the specimen was sent for histopathological analysis. Given the small size of the gastric remnant, the gastrointestinal continuity was restored using Billroth II gastrojejunostomy, which is a technically feasible and relatively simple procedure. The lymph nodes along the greater curvature (station 4d) were removed during preparation for the anastomosis. Methylene blue was flushed into the stomach through the nasogastric tube and no leak was seen. The total operative time was approximately 120 minutes and

the estimated blood loss was less than 50 ml. The patient tolerated the procedure well.

The pathological examination of the resected specimen showed a submucosal encapsulated tumor composed of spindle cells arranged in interlacing fascicles, interspersed with collagen fibers microscopically observed (Figure 4). The tumor was infiltrating the muscularis propria. The neoplastic cells had ill-defined eosinophilic cytoplasm and slender or wavy, elongated, bland-appearing nuclei. The surgical margins and all the 15 lymph nodes obtained with the specimen were free of neoplasia. Immunohistochemically, the neoplastic cells were diffusely reactive for S-100 protein (nuclear and cytoplasmic), and vimentin, and focally reactive for GFAP and CD34, but lacked immunoreactivity for c-Kit, DOG-1, smooth-muscle actin, h-Caldesmon, and β -catenin. The histopathologic features

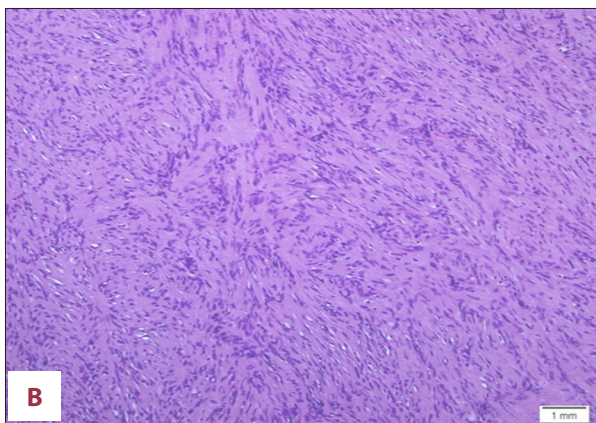
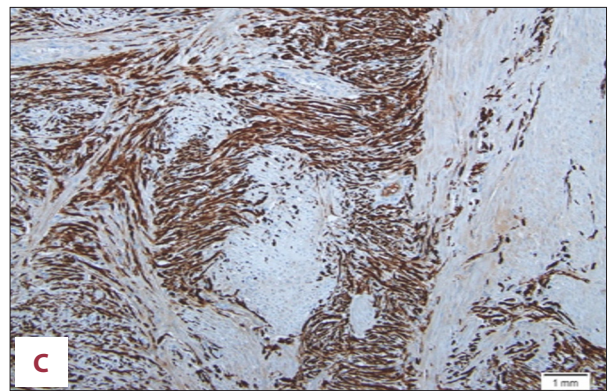
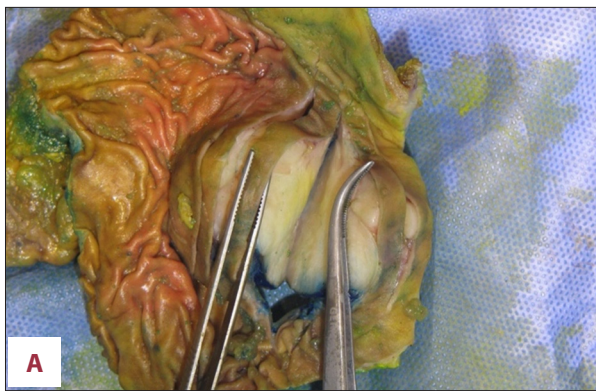


Figure 4. (A) Macroscopic image showing a yellow, solid, and well-circumscribed exophytic tumor with a rubbery surface on the lesser curvature of the stomach. (B) Microscopic view showing neoplastic, wavy spindle cells arranged in fascicles. (C) Immunohistochemistry view showing reactivity for nuclear and cytoplasmic S-100.

and the immunohistochemical staining pattern were consistent with the diagnosis of gastric schwannoma.

On the first postoperative day, the patient had a Gastrografin meal study, which demonstrated no evidence of a leak. The patient started on a liquid diet, which was well-tolerated. The patient was discharged on the sixth postoperative day. During the follow-up visits over 6 months, the patient was asymptomatic and was able to tolerate a regular diet.

Discussion

Schwannoma is a neurogenic tumor originating from Schwann cells, that can occur anywhere along the course of peripheral nerves. However, it is rarely seen in the gastrointestinal tract [5]. The most common site for schwannoma in the gastrointestinal tract is the stomach, where it arises from the sheaths of Auerbach's or Meissner's plexuses, although it accounts for only 0.2% of all gastric neoplasms [6]. It was first described by Daimaru et al. in 1988 in a series of 24 cases [7]. Schwannoma predominantly affects adults above the age of 40 years and it has a female predilection [8].

Gastric schwannoma frequently arises from the gastric body, followed by the gastric antrum and fundus, and rarely in the

gastric cardia [9]. It has a slow growth pattern and is often discovered incidentally, as in our case. If symptomatic, non-specific abdominal discomfort is the most commonly reported symptom [9]. Gastrointestinal bleeding is another frequently reported symptom that is related to ulceration of the gastric mucosa [10]. Rarely, a palpable mass may be observed [6].

Schwannoma is generally a benign neoplasm with an excellent prognosis. Simple complete surgical excision is curative [8]. However, malignant schwannoma has been reported in a few cases. Recurrence is only observed in cases of malignant schwannoma [6].

Gastric schwannoma may be misdiagnosed as a GIST, as in our case. This is due to the lack of distinct features unique to these neoplasms on preoperative investigations. In a CT scan, gastric schwannoma typically manifests as an ovoid, well-circumscribed, exophytic mass with homogenous progressive enhancement [5]. Compared to the GIST, gastric schwannoma usually has oval morphology, extraluminal growth, homogenous enhancement, lack of necrosis, and presence of perigastric lymph nodes [9]. Post-gadolinium sequences show slow but relatively uniform enhancement. Fluorodeoxyglucose positron emission tomography is of limited value in the preoperative evaluation, as various neoplasms can give similar findings, but it may be used to detect recurrence or metastasis of malignant schwannoma [11]. Immunohistochemistry allows the differentiation of gastric schwannoma from other spindle cell neoplasms, as neoplastic cells that are positive for S-100 protein and negative for actin, c-Kit, and CD34 are consistent with the diagnosis of schwannoma [5].

In the present case, schwannoma was diagnosed incidentally during the operation, which led to cancelation of the procedure. Although the role of upper endoscopy prior to bariatric surgeries is controversial, many surgeons advocate its routine use among these patients as it can help in the selection of bariatric procedures appropriate to the patient [4]. For example, the use of restrictive bariatric procedures might worsen gastroesophageal reflux disease, if present. Furthermore, some parts of the gastrointestinal tract might be inaccessible after certain bariatric procedures, and preoperative endoscopy would be useful to rule out any existing pathology. On the contrary, other surgeons consider routine upper endoscopy unnecessary due to cost, sedation, and risk associated with endoscopy; hence, they do not recommend performing upper endoscopy routinely in all patients, including asymptomatic ones. However, there is a poor correlation between endoscopic findings and the presence of clinical symptoms [12]. In our institution, we perform an endoscopic examination in all patients prior to bariatric procedures, and our case is an example of the value of the evaluation, even in asymptomatic patients.

The increase in the number of bariatric surgeries has led to a rise in the discovery of incidental findings. The GIST is among the most frequently encountered lesions [13,14]. Chiappetta et al. [13] reported 8 patients with incidental gastric GIST discovered incidentally during bariatric surgeries.

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Interestingly, all these patients underwent preoperative upper endoscopy, and the tumor was not seen. Thus, the bariatric surgeon should perform a careful inspection during laparoscopy. Crouthamel et al. [14] reported 17 cases of incidental gastric mesenchymal tumors identified during a laparoscopic sleeve gastrectomy, including 2 cases of gastric schwannoma. The surgical plan was not altered because the tumor was within the area of resection in all cases. For tumors located at the cardia or lesser curvature, cancelation of sleeve gastrectomy procedure is required to allow appropriate tumor resection. In our case, the planned sleeve gastrectomy was aborted so that we could discuss treatment options with the patient.

Conclusions

Gastric schwannoma is an uncommon neurogenic neoplasm. The present case should remind physicians of the importance of comprehensive preoperative evaluation in patients planned for bariatric procedures, including the performance of upper endoscopy. In addition, bariatric surgeons should have standard operating procedure protocols for dealing with gastric lesions discovered intraoperatively.

Conflict of interest

None.