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Schwannoma of the Transverse Mesocolon: A Neurogenic Rarity

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Patient: Male, 67-year-old
Final Diagnosis: Schwannoma
Symptoms: N/A
Clinical Procedure: —
Specialty: Surgery

Objective: Rare disease

Background: Colonic schwannomas are rare benign neurogenic tumors originating from Schwann cells of the peripheral nerve sheath, and account for a very small proportion of gastrointestinal mesenchymal neoplasms. Their non-specific clinical and radiological appearance often leads to diagnostic dilemma. Definitive diagnosis relies on histopathological and immunohistochemical evaluation. Preoperative diagnosis remains particularly challenging because colonic schwannomas may mimic other mesenchymal or cystic lesions, including gastrointestinal stromal tumors (GISTs) and duplication cysts.

Case Report: We present the case of a 67-year-old asymptomatic male patient with a schwannoma of the transverse colon wall diagnosed only after surgical excision, through histopathological and immunohistochemical examination. After upper and lower endoscopy revealed no mucosal abnormalities, computed tomography suggested a duplication cyst, while magnetic resonance imaging favored a GIST arising from the transverse colon. Due to the uncertain preoperative diagnosis and the size and location of the lesion, transverse colectomy with primary anastomosis was performed. Histopathological examination demonstrated a spindle-cell tumor with very low mitotic activity and no necrosis. Immunohistochemistry showed positivity for S-100 and SOX10 and negativity for CD117, CD34, and DOG1, confirming the diagnosis of schwannoma. Complete R0 excision was achieved, and the patient remained recurrence-free 2 years later.

Conclusions: This case emphasizes the diagnostic challenge and the importance of considering schwannoma in differential diagnosis of colonic intramural masses extending into the transverse mesocolon. The predominantly intramural and exophytic growth pattern may account for both the normal endoscopic findings and the misleading radiological appearance. Complete surgical excision with negative margins is associated with an excellent prognosis for benign colorectal schwannomas.

Keywords: Colon, Transverse • Colorectal Neoplasms • Gastrointestinal Diseases • Peripheral Nerves • Schwann Cells

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Introduction

Schwannomas of the gastrointestinal tract are uncommon, slow-growing tumors from the Schwann cells of the autonomic nervous system that were first described by Daimaru in 1988 as generally benign tumors [1]. Although rarely seen in the gastrointestinal system, they constitute about 2% to 6% of intramural mesenchymal tumors of the gastrointestinal tract [2]. They occur in decreasing frequency in the stomach (83%), small bowel (12%) and finally, the colon and rectum [2,3]. Regarding small intestinal and esophageal schwannomas, they have been very rarely reported [4]. Gastrointestinal schwannomas occur most frequently in middle-aged to older adults with a median age of onset in the fifth and sixth decades of life with a characteristic female predominance [5,6]. Colonic localization is rarely seen, and there are few cases reported in the literature.

Clinical presentation is highly variable and nonspecific. Although many patients remain asymptomatic and are diagnosed incidentally during endoscopic or radiological investigations, others may present with abdominal pain, gastrointestinal bleeding in case of mucosal involvement, altered bowel habits, or symptoms of intestinal obstruction, depending on tumor size and location. Diagnostic imaging findings including computed tomography (CT) and magnetic resonance imaging (MRI) are often inconclusive, and preoperative diagnosis remains challenging because these tumors frequently mimic more common mesenchymal lesions such as gastrointestinal stromal tumors (GISTs), duplication cysts, or adenocarcinomas [2,7]. Preoperative diagnosis is extremely difficult and the definitive diagnosis is usually made with histopathology and immunohistochemical analysis of the resected specimen.

Herein we report an incidentally diagnosed schwannoma of the transverse colon wall, presented as a mass in the transverse mesocolon despite normal endoscopy and differing CT and MRI impressions, and the decisive role of histopathology and immunohistochemistry.

Case Report

A 67-year-old White male patient was admitted to the surgical department for a scheduled resection of a reported mass in the transverse mesocolon. The tumor had been diagnosed incidentally during an abdominal ultrasound examination 3 months prior to his admission. Upon admission, physical examination was without significant findings and he was asymptomatic. The patient's family history was unremarkable. He had undergone colon endoscopy 4 years earlier with endoscopic removal of 4 benign hyperplastic polyps. There were no signs or symptoms indicative of colonic tumor (eg, hematochezia, obstipation, abdominal pain, weight loss, anorexia, or fatigue). During preoperative work-up, endoscopic examination did not show any abnormalities of the stomach, duodenum, or colon. There were no abnormal findings from his blood analysis, metabolic/coagulation panel, or the tumor biomarkers serum carcinoembryonic antigen (CEA) and serum cancer antigen 19-9 (CA19-9): CEA < 1.73 (normal level, < 5), CA 19-9 < 2.0 (normal level, 0-37). Abdominal CT scan revealed a well-defined tumor in the epigastrium with broad contact with the superior wall of the transverse colon and interposed between the colon and the stomach. The tumor measured 7 × 5 cm with homogenous density as a cystic-like lesion, and raised the suspicion of a duplication cyst (**Figure 1**). Therefore, an MRI scan

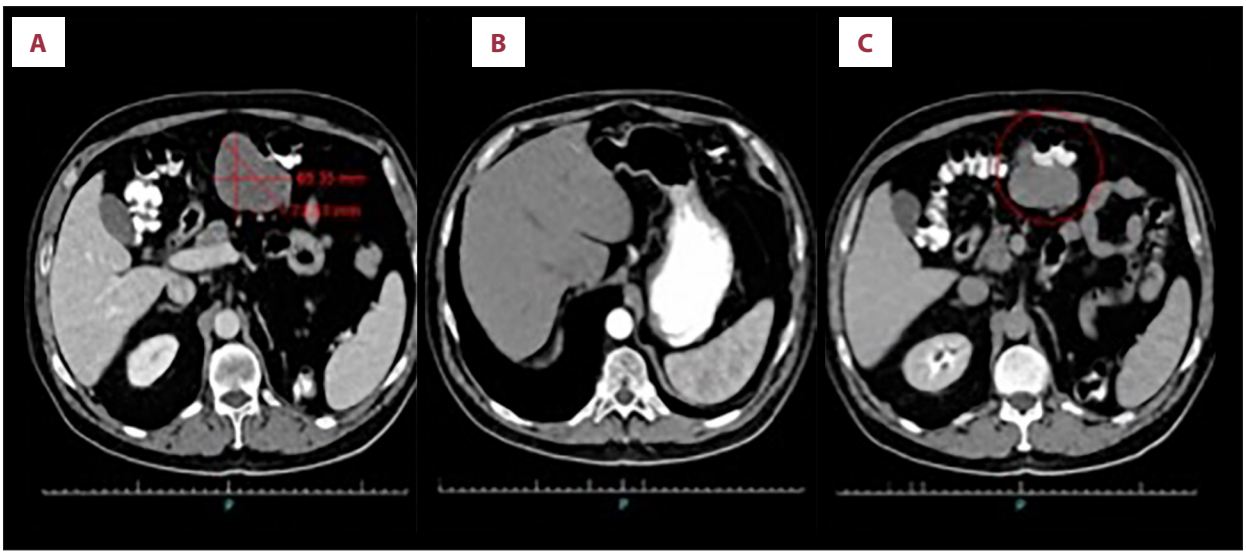


Figure 1. Abdominal CECT scan. (**A**) A well-defined lesion with homogenous density located in the epigastrium. The maximum diameter was 7 cm. (**B**) Normal visualization of the gastric wall and lumen. (**C**) Close apposition of the mass to the transverse colon without apparent communication with the colonic lumen (red circle). CECT, contrast-enhanced computed tomography.

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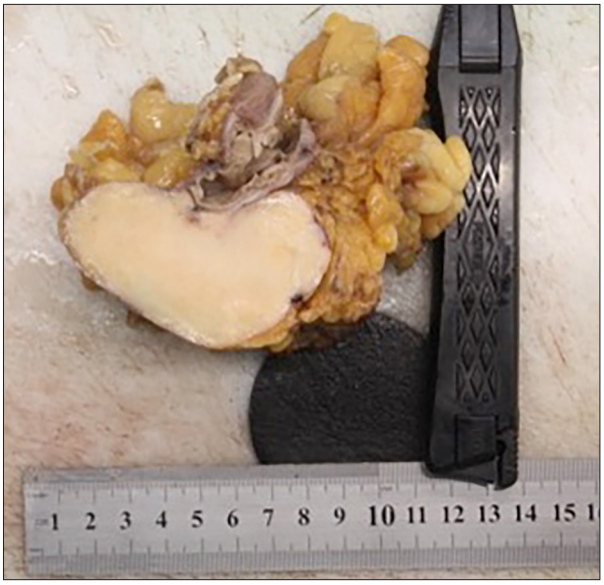


Figure 2. Gross appearance of the resected transverse colon schwannoma. The surgical specimen demonstrated a well-circumscribed, firm, whitish-tan submucosal mass arising from the transverse colon, measuring approximately 7 cm in maximum diameter, with a homogeneous cut surface and without evidence of hemorrhage, cystic degeneration, or necrosis.

was performed, which revealed an epigastric mesenteric tumor located between the transverse colon and the stomach, with intratumoral cystic change suggestive of a GIST arising from the transverse colon as the most likely diagnosis.

Following an uncertain diagnosis after a thorough preoperative work-up and a multidisciplinary team approach, the patient was scheduled for an exploratory laparotomy 1 week after his admission. Through a midline abdominal incision, the peritoneal cavity was exposed. A meticulous evaluation of the peritoneal cavity revealed no evidence of metastasis. The tumor was identified in the transverse mesocolon originating from the transverse colon wall. Due to the tumor size, origin from the colonic wall, mesocolic extension, and absence of a secure benign preoperative diagnosis, a transverse colectomy with end-to-end anastomosis was performed. The patient tolerated the procedure well and was transferred to the floor. After discharge from the surgical unit, the patient remained under surveillance with clinical evaluation every 6 months and colonoscopy and follow-up CT imaging every 12 months up until the writing of this report. There was no evidence of recurrence or distant disease after 2 years of follow-up.

Two weeks after the patient's discharge from the hospital, the pathology report with histopathological and immunohistochemical findings was consistent with a benign peripheral nerve sheath tumor (schwannoma) arising from the transverse

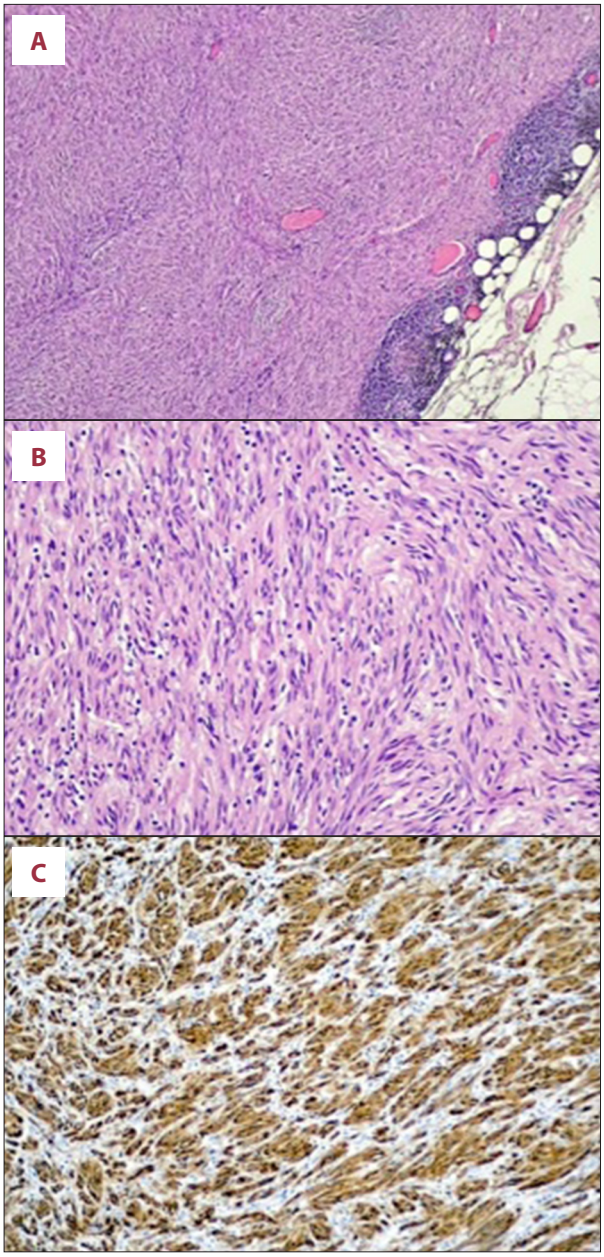


Figure 3. Histopathological and immunohistochemical findings of the transverse colon schwannoma. (**A**) Low-power hematoxylin and eosin (H&E) staining demonstrating a well-circumscribed spindle-cell neoplasm arising from the submucosal mesocolon wall, composed of intersecting fascicles of elongated cells with focal peripheral lymphoid aggregates. (**B**) High-power H&E view showing bland spindle cells with elongated nuclei arranged in fascicles and focal nuclear palisading, without significant atypia, necrosis, or increased mitotic activity. (**C**) Immunohistochemical staining showing diffuse and strong positivity for S-100 protein, confirming Schwann cell differentiation and supporting the diagnosis of schwannoma.

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colon and involving the mesocolon. The surgical specimen included a well-circumscribed, firm, whitish-tan submucosal mass arising from the transverse colon (**Figure 2**). The pathology report of the tumor showed spindle-shaped cells with mild atypia, very low mitotic activity (less than 1 in every 10 high-power fields, with a Ki67 score of 3%), and no necrosis. Immunohistochemistry was positive for S100 and SOX10 (**Figure 3**), confirming neural differentiation, while markers such as CD117, CD34, DOG1, SMA, and desmin were negative. The tumor was mainly located in the muscular layer, not invading the mucosa of the colon. The lesion was completely excised (R0) and there was no evidence of malignancy or dysplasia in the colon specimen, including 5 benign lymph nodes.

Discussion

Schwannoma is a common soft tissue tumor, but is infrequent among spindle-cell mesenchymal tumors of the gastrointestinal tract. The colorectum is the least frequent location for a gastrointestinal schwannoma [8].

The clinical presentation is highly variable and nonspecific, and clinical manifestations mainly depend on the size and location of the tumor. In terms of clinical manifestations, colonic and rectal schwannomas can be asymptomatic (28%) but they can also present with hematochezia (23.2%) or abdominal pain (15.8%) [2]. Symptoms may also result from compression of surrounding organs. These symptoms are nonspecific, and some patients may have no obvious clinical signs [2,9]. Although many patients remain asymptomatic and are diagnosed incidentally during endoscopic or radiological investigations, others may present with abdominal pain, gastrointestinal bleeding, altered bowel habits, or symptoms of intestinal obstruction depending on tumor size and location. In our case, the patient was asymptomatic despite the mesocolic extension of the tumor from the transverse colon wall. This finding is consistent with previous series reporting a substantial proportion of colorectal schwannomas as incidental findings [6,7,10,11]. Interestingly, despite the relatively large size of the tumor in our patient (7 × 5 cm), no obstructive, bleeding, or pain-related symptoms were present. This may be explained by its predominantly intramural and exophytic growth toward the mesocolon, with preservation of the colonic mucosa and lumen.

Colorectal schwannomas may sometimes present with symptoms resembling those of obstructive adenocarcinoma, such as obstruction, bleeding, pain, and tenesmus [10]. Nevertheless, an incidental finding remains the most common diagnosis, accounting for 33% to 53% of patients in large reports [6,7,11].

Radiological findings are often inconclusive, and preoperative diagnosis remains challenging because these tumors frequently mimic more common mesenchymal lesions such as GISTs, duplication cysts, or other mesenteric tumors such as smooth-muscle, desmoid, or lymphoid tumors, or adenocarcinomas [7,12]. On most occasions, diagnosis is not established based on a biopsy but on a surgical specimen [13].

Preoperative biopsy remains challenging when the tumors are intramural and not bulging into the colonic lumen as in our case. Schwannoma is frequently diagnosed as an intramural mass or polyp with a smooth surface, although in rare cases it can ulcerate into the mucosa. Because these lesions originate in the submucosal space, superficial biopsies are frequently inconclusive [10,14,15]. In a study by Inagawa et al, only 15% of the colon schwannomas they investigated were diagnosed on preoperative endoscopic biopsy [16]. Similarly, in a study by Bohlok et al, 24% of the colorectal schwannomas they investigated were diagnosed preoperatively [2]. Our findings are therefore in agreement with these previous reports. In the present case, colonoscopy was completely normal despite the presence of a 7-cm tumor, which can be explained by the predominantly intramural location of the lesion without mucosal invasion. This growth pattern likely accounted for the absence of endoscopic abnormalities and illustrates why conventional endoscopy and superficial biopsy may fail to identify these tumors.

On CT, schwannomas often appear as round or oval masses with clear, low-density borders, and may exhibit cystic and hemorrhagic changes [17]. Exophytic masses with homogeneous enhancement are typically observed on CT scans, while cystic change,

necrosis, or calcification within tumors is rare [18,19]. A tumor size cutoff of 3.9 cm on CT scans has been proposed to distinguish schwannomas from GISTs (area under the curve = 0.808), with high specificity [20]. The tumor in our case measured 7 × 5 cm. On MRI, schwannomas are typically isointense on T1-weighted images, hyperintense on T2-weighted images, and slightly enhanced after contrast administration. Despite the extensive use of CT/MRI, endoscopy, and even endoscopic ultrasound, only small minorities of cases were correctly suspected as schwannomas preoperatively. Most of the lesions are misdiagnosed and are characterized as GISTs, submucosal tumors, or nonspecific masses [5,7,11]. The present case reflects this diagnostic difficulty particularly well, as CT initially suggested a duplication cyst whereas MRI favored GIST. Similar diagnostic uncertainty was reported by Sun et al in a mesocolic schwannoma mimicking a GIST [21]. The discrepancy between imaging modalities in our patient may be related to the unusual mesocolic extension and cystic appearance of the lesion, which obscured its precise colonic origin.

To differentiate schwannomas from GISTs, which is the most common exophytic lesion arising from the wall of the

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gastrointestinal tract, immunohistochemical staining is crucial [4,22,23]. Schwannomas tend to express S-100 as in our case, but not CD117, and only rarely express CD34. In contrast, GISTs typically express CD34 and CD117 but not S-100 [10,15,24]. The immunohistochemical profile in our patient was consistent with these previously reported findings, showing strong positivity for S-100 and SOX10 and negativity for CD117, CD34, and DOG1. In addition, the very low mitotic activity (< 1 in 10 high-power fields), low Ki-67 index (3%), and absence of necrosis supported the benign biological behavior of the lesion. The S-100 protein, a group of low-molecular-weight calcium-binding proteins, is highly conserved in vertebrates and predominantly found in human Schwann cells, Schwann-associated cells, satellite glial cells, and supporting cells in peripheral and paranodal ganglia [25].

Most gastrointestinal schwannomas are benign and have low malignant potential. Although most follow-up studies have not identified malignant variants [1,10,26,27], Bohlok et al reported 3 malignant tumors among 93 colorectal schwannomas (3.1%) [2]. Colorectal schwannomas are documented as benign in over 98% of cases, showcasing a low mitotic rate, the absence of atypical mitotic figures, and nuclear hyperpigmentation [2].

The optimal treatment is complete surgical excision with negative margins, as radical surgery is not required for benign lesions. Limited resection may be possible when schwannoma is diagnosed before surgery. When a preoperative diagnosis is established, schwannomas can be managed by less invasive approaches, including endoscopic excision or wedge resection, with organ-preserving intent [21,28].

Given the rarity and predominantly benign biological behavior of colonic schwannomas, there are currently no established evidence-based guidelines or standardized surveillance protocols following complete (R0) resection. Therefore, postoperative follow-up is usually individualized and based on clinical assessment and periodic imaging, as recurrence after complete excision is exceedingly rare [2,17].

Overall, the present case shares several features with previously reported colorectal schwannomas, including an incidental presentation, difficulty in achieving a preoperative diagnosis, characteristic immunohistochemical findings, and favorable outcome following complete excision. However, the relatively large tumor size, transverse colon origin with prominent mesocolic extension, completely normal colonoscopy, and differing CT and MRI interpretations represent distinctive features. These differences appear to be largely related to the predominantly intramural and exophytic growth pattern of the tumor.

Conclusions

Schwannomas of the colon are rare benign peripheral nerve sheath tumors that may pose a significant diagnostic challenge because of their nonspecific clinical and radiological characteristics and their resemblance to other mesenchymal neoplasms, particularly GISTs. This case highlights the limitations of preoperative imaging and the pivotal role of histopathological and immunohistochemical examination in establishing the diagnosis. Surgical resection with free negative margins is the standard treatment. In our case, postoperative evaluation and surveillance showed a 2-year recurrence-free follow-up.

Patient Consent

Written informed consent was obtained from the patient for publication of this case report and the accompanying images.

Department and Institution Where Work Was Done

2nd Department of Surgery, National and Kapodistrian University, Athens, Greece.

Declaration of Figures' Authenticity

All figures submitted have been created by the authors who confirm that the images are original with no duplication and have not been previously published in whole or in part.

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