

# Gastric Schwannoma, an Unusual Synchronous Tumor with Renal Cell Carcinoma

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## Abstract

Schwannomas, also called neurilemmomas, are neurogenic tumors derived from Schwann cells of nerve sheath. They are relatively common in head, neck, extremities, retroperitoneum, posterior spinal roots and cerebellopontine angle, and are generally benign and slow-growing with rare recurrence or malignant transformation. However, they are rare in the gastrointestinal (GI) tract and mostly located in the stomach. Gastric schwannomas represent about 2% of the gastric mesenchymal neoplasms, and are clinically and grossly nearly indistinguishable from gastrointestinal stromal tumors (GISTs). GISTs are the major primary mesenchymal tumors of the GI tract. They have a variable malignant potential and can be coexistent with renal cell carcinomas (RCCs). In contrast, gastric schwannomas are regarded as benign and no concurrent malignancies have been documented. Here, we report a 54-year-old woman having a right radical nephrectomy for a clear cell RCC, and then received a radical subtotal gastrectomy for a gastric tumor under the impression of GIST four months later. Histopathologically, the gastric tumor was a submucosal spindle cell neoplasm with a particular peripheral lymphoid cuff. The neoplastic cells were immunohistochemically positive for S-100 protein, but negative for CD117 (c-kit), CD34, smooth muscle actin, desmin and Dog1. Eventually, the gastric submucosal tumor was confirmed to be a rare benign gastric schwannoma, which was an unusual synchronous tumor with RCC.

**Keywords:** Schwannoma; Gastrointestinal stromal tumor; Renal cell carcinoma

**Abbreviations:** CP: Cerebellopontine Angle; GI: Gastrointestinal; GIST: Gastrointestinal Stromal Tumor; RCC: Renal Cell Carcinoma; SMA: Smooth Muscle Actin; CT: Computed Tomography; MRI: Magnetic Resonance Imaging

## Introduction

Schwannomas are common tumors in head, neck, extremities, retroperitoneum, posterior spinal roots and cerebellopontine (CP) angle, but rare in the gastrointestinal (GI) tract, where the stomach is the major location [1-3]. They are neurogenic and also known as neurilemmomas, consisting almost exclusively of Schwann cells of nerve sheath [1]. Generally, gastric schwannomas are benign and slow-growing [2,3]. Most of them are clinically asymptomatic, but non-specific epigastric pain, GI bleeding and abdominal palpable mass are sometimes present [2-8]. Because gastric schwannomas represent only 2% of the gastric mesenchymal neoplasms, a gastric submucosal tumor is clinically tended to be considered and treated as a gastrointestinal stromal tumor (GIST), which is the most common tumor of this group [2,3,9,10]. However, GISTs have a variable malignant potential according to the tumor size and mitotic activity [2]. Coexistent presence of GISTs and renal cell carcinomas (RCCs) has also been documented [11,12]. Therefore, when surgical approach is considered, resection or excision for schwannomas is usually appropriate, while radical gastrectomy may be necessary for GISTs.

Here we report a 54-year-old woman, who synchronously had a right renal tumor and a gastric submucosal tumor. The right renal tumor was firstly confirmed to be a clear cell RCC after radical nephrectomy. The gastric submucosal tumor was then removed by radical gastrectomy under the impression of GIST four months later. Eventually, the gastric submucosal tumor turned out to be a benign gastric schwannoma after histopathological and immunohistochemical studies. To our best knowledge, this is the first case of RCC with a

concurrent gastric schwannoma, which is difficult to be differentiated from GISTs pre-operatively.

## Case Report

A 54-year-old married woman had suffered from epigastric pain for several months and intermittent right flank soreness with radiating pain to abdomen for one year. Nocturia, but not hematuria, dysuria or constipation was present. Physical examination revealed right flank knocking pain, while no palpable abdominal mass was found. Under the impression of peptic ulcer and renal stones, she received panendoscopic and abdominal sonographic examinations.

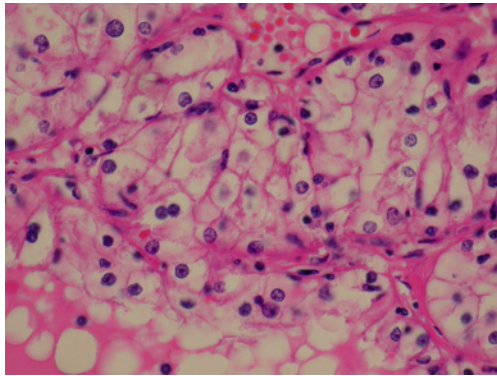
An ulcerative mass measuring 4.0 x 3.0 cm in dimension was noted in the low gastric body, and the simultaneous mucosal biopsy showed no evidence of neoplasia. In addition, a solid mass measuring 9.5 x 7.0 cm in dimension is seen in the right kidney, too. Multiple small necrotic or cystic features in the renal mass were further revealed by abdominal computed tomography (CT) and magnetic resonance imaging (MRI). Because the right renal tumor was highly suspicious for malignancy, a right radical nephrectomy was performed. The renal tumor was then pathologically confirmed to be a clear cell RCC, Fuhrman nuclear grade 2 (Figure 1). Subsequent panendoscopic, abdominal sonographic, computed tomographic and upper GI examinations for the previously found concurrent gastric mass were performed three months later, due

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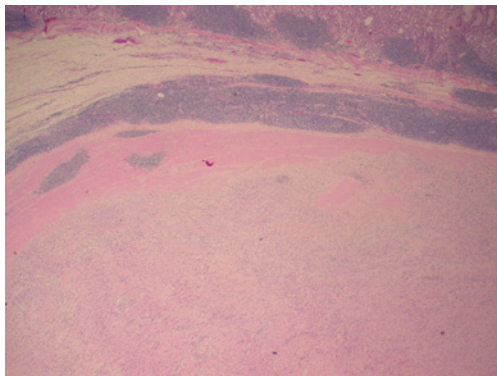
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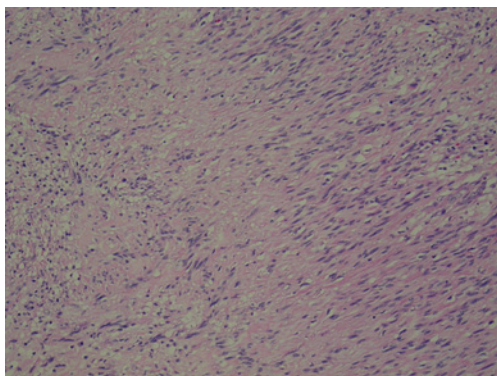
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**Figure 1:** Clear cell renal cell carcinoma. Fuhrman nuclear grade 2 (H&E, 400x).



**Figure 2:** Gastric schwannoma. Characteristic peripheral lymphoid cuff. (H&E, 40x).



**Figure 3:** Gastric schwannoma. Loose nuclear palisading of the neoplastic cells (H&E, 200x).

to the patient's general condition and recovery. The gastric mass was located in the same area. No necrosis, cystic patterns or significant interval changes in size were seen. Consequently, under the impression of submucosal tumor, in favor of GIST, the gastric mass was removed by radical subtotal gastrectomy.

The gastric tumor was solitary, polypoid, submucosal and well-circumscribed in the low body. The cut surface was gray to white and firm. It was located in the submucosa and muscularis propria, and measured 4.5 x 4.3 x 2.1 cm in size. Superficial ulceration was present. Microscopically, the tumor was composed of fascicles of

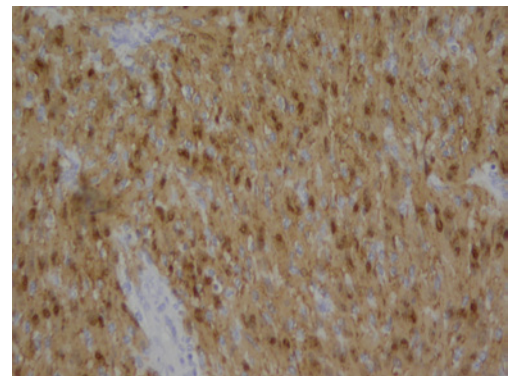
proliferated spindled neoplastic cells. Striking lymphoid cuff with lymphoid follicles and germinal centers at the periphery was noted (Figure 2). Focal loose nuclear palisading is present (Figure 3). Mild nuclear atypia was occasional seen, but mitoses and necrosis were absent. In immunohistochemical study, the spindled neoplastic cells were positive for S-100 protein, but negative for CD117 (c-kit), CD34, smooth muscle actin (SMA), desmin and DOG1 (Figure 4). The overall histomorphology and immunohistochemical results indicated that the gastric tumor was a rare gastric schwannoma. After regular follow-up for thirty months, no recurrent or metastatic neoplasia was found.

## Discussion

Gastric schwannomas were firstly detailed by Daimaru et al in 1988 [13]. Their incidence is about 50 times less than that of gastric GISTs [2]. They consist of Schwann cells of nerve sheath, but nearly have no association with neurofibromatosis type I or II, in contrast to their counterparts in non-GI locations [2,3,8]. Although sporadic cases with malignant transformation have been reported, gastric schwannomas are normally considered benign [14]. To date, gastric schwannomas have never been found to be concurrent with RCCs or other malignancies, which were however revealed in some cases of GISTs [11,12]. Due to the absence of harmful behaviors, therefore, simple excision or resection is usually adequate for gastric schwannomas.

In the present reported case, because 1) the RCC was limited to the kidney and measured 6.7 cm in the greatest dimension (T1 tumor); 2) a gastric metastasis of RCC is extremely rare and usually appears as a late event in the course of RCC; and 3) it was a submucosal tumor and the panendoscopic biopsy revealed no neoplasia, the gastric tumor was supposed to be a primary mesenchymal tumor rather than a secondary one [15-19]. Among gastric mesenchymal tumors, it is usual to take GISTs into first consideration because they are the most common type [2,3,9,10]. Owing to the development of molecular biology and immunohistochemistry, GISTs are thought to differentiate from interstitial pacemaker cells of Cajal with activating c-kit mutations which are commonly immunostained positively with CD117, a c-kit antibody, and Dog1 [9,10,20,21]. According to the tumor size and mitotic counts, gastric GISTs have a variable malignant potential [2]. Therefore, radical gastrectomy could be a necessary surgical treatment.

Except the specific immunohistochemical expression of CD117 (c-kit) and Dog1, GISTs are clinically and macroscopically difficult to be differentiated from other gastric mesenchymal tumors since 1) they are usually asymptomatic, although nonspecific abdominal discomfort, hematemesis and/or palpable masses are sometimes present; 2) the



**Figure 4:** Gastric schwannoma. Strong diffuse immunopositivity for S-100 protein (200x).

growth pattern could be spherical, ovoid, nodular or polypoid; 3) they principally involve the submucosa and muscularis propria with an intact or ulcerative mucosa; and 4) the cut surface is generally gray to white and firm [2-10]. However, gastric schwannomas indeed have a characteristic and important microscopic feature of heavy peripheral lymphoid cuff, which is present in almost all gastric schwannomas but nearly absent in GISTs and other mesenchymal tumors [2-8,13,22]. As the present gastric submucosal tumor showed this peculiar manifestation, a gastric schwannoma was then diagnosed. Subsequent results of immunopositivity for neurogenic markers of S-100 protein but immunonegativity for CD117 (c-kit), Dog1, SMA and desmin further confirmed the diagnosis [2-8,13,21,22].

As mentioned above, even though recent studies on sonography and radiology have obtained some conclusions that a better contour and homogeneous features could arouse the possibility of schwannomas rather than GISTs, it is still difficult to confidently tell the differences between them pre-operatively [23-26]. Such as in this presented case, the coexistent RCC would further make the situation more complicated. Consequently, it could be worth to set up a feasible pre-operative procedure, say a combination of imaging examination and microscopic frozen section, to ensure a more accurate surgical decision.

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