

## Case Report

# Synchronous of gastric adenocarcinoma and schwannoma: report of a case and review of literatures

Lian-He Yang<sup>1</sup>, Jin-Ou Wang<sup>2</sup>, Shuang Ma<sup>3</sup>, Zhi Zhu<sup>4</sup>, Jia-Xing Sun<sup>5</sup>, Si-Lu Ding<sup>6</sup>, Guang Li<sup>6</sup>, Hong-Tao Xu<sup>1</sup>, Liang Wang<sup>1</sup>, Sun-Dong Dai<sup>1</sup>, Yang Liu<sup>1</sup>, Yuan Miao<sup>1</sup>, Gui-Yang Jiang<sup>1</sup>, Chui-Feng Fan<sup>1</sup>, En-Hua Wang<sup>1</sup>

<sup>1</sup>Department of Pathology, First Affiliated Hospital and College of Basic Medicine Sciences, China Medical University, China; <sup>2</sup>Department of Pathology, Shengjing Hospital of China Medical University, China; <sup>3</sup>Department of Neurology, Shengjing Hospital of China Medical University, China; <sup>4</sup>Department of Surgical Oncology, First Affiliated Hospital, China Medical University, China; <sup>5</sup>Department of Ultrasound, Shengjing Hospital of China Medical University, China; <sup>6</sup>Department of Radiotherapy, First Affiliated Hospital, China Medical University, China

Received November 5, 2014; Accepted December 23, 2014; Epub January 1, 2015; Published January 15, 2015

**Abstract:** We presented a case of 80-year-old male with long term stomachache, marasmus and anaemia. Endoscopic evaluation suggested the malignant ulcerative tumor on the Gastric antrum, and biopsy confirmed the diagnosis of gastric adenocarcinoma. Surprisingly, in resected specimen the pathologist found a nodule just below the ulcer with clear boundary and gray-yellow section. Histologically, the whole lesion was composed with adenocarcinoma area and spindle tumor cells area. In the spindle tumor cells area, the cells with round or oval nuclei, eosinophilic cytoplasm, and these cells showed bundle or fence-like arrangement. Immunohistochemistry study presented positive expression of vimentin, S-100 and GFAP, negative expression of SMA, desmin, CD34, CD117 and Dog-1, which suggested the diagnosis of co-occurrence of gastric adenocarcinoma and schwannoma. To our knowledge, it is an extremely rare case that only two cases have been reported.

**Keywords:** Gastric, adenocarcinoma, schwannoma, pathology, histological

## Introduction

Adenocarcinoma is the most common histological type of gastric tumor, and some accompany another synchronous tumor of a different histological type [1-3]. Synchronous occurrence of gastric adenocarcinoma and gastric mesenchymal tumor is uncommon. Gastrointestinal schwannomas (GIS) are rare tumors of the gastrointestinal tract [4, 5]. GIS are considered to be distinct entities from other nonepithelial tumors of the gastrointestinal tract, including leiomyoma, leiomyosarcoma, gastrointestinal autonomic neurogenic tumors (GANT) and gastrointestinal stromal tumors (GIST) [6, 7]. To the best of our knowledge, only two cases synchronous gastric adenocarcinoma and schwannoma has been previously reported [8, 9]. Here, we present an extremely rare case of the combination of a synchronous gastric adenocarcinoma and schwannoma in an 80-year-old male in China.

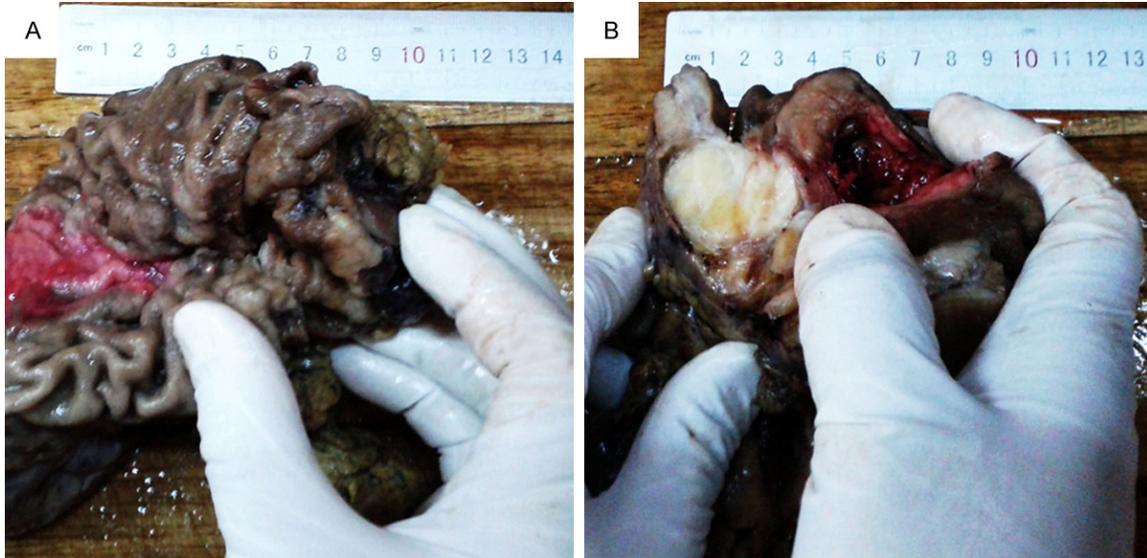
## Case presentation

An 80-year-old male was admitted to the hospital for long term stomachache and marasmus. The patient looked pale and underfed. When he came to the hospital, he was in no acute distress and his abdomen was soft.

## Clinical history

The patient has the history of hypertension. The physical examination of the abdomen was unremarkable. However, laboratory findings revealed anaemia. Red blood cell count was 3.33/ml (reference range 4.7-6.16/ml), haemoglobin 9.4 g/dl (reference range, 13-18 g/dl) and hematocrit was 33.2% (reference range 42-52%). The patient underwent an endoscopic evaluation, which revealed a huge ulcer located on the Gastric antrum. The mucosa around the ulcer uplifted, the bottom seemed roughness and contamination. These features suggested the malignant gastric tumor. So the patient under-

## Synchronous of gastric adenocarcinoma and schwannoma



**Figure 1.** Gross features of the gastric adenocarcinoma and schwannoma. A. The gray-red ulcer with diameter 3.5 cm located on gastric antrum, the mucosa around the ulcer uplifted, the bottom of the ulcer seemed roughness and contamination. B. Below the thickened stomach wall (1.0 cm), there is a nodule (diameter 3.2 cm) showed gray-yellow section, strong but pliable texture and clear boundary.

went endoscopic biopsy. The specimen taken from the lesion was diagnosed to be adenocarcinoma. Surgery was determined to be the best treatment option, and the patient underwent total gastrectomy. Surprisingly, the pathologist found a nodule just below the ulcer, the nodule showed gray-yellow section, strong but pliable texture and clear boundary.

### Materials and methods

The resected specimens were fixed with 10% neutral-buffered formalin and embedded in paraffin blocks. Tissue blocks were cut into 4- $\mu$ m slides, deparaffinized in xylene, rehydrated with graded alcohols, and immunostained with the following antibodies: cytokeratin (CK, AE1/AE3, 1:50, DAKO), cytokeratin 7 (CK 7, 1:200, DAKO), Vimentin (1:200, DAKO), carcinoembryonic antigen (CEA, 1:100, DAKO), glial fibrillary acidic protein (GFAP, 1:100, DAKO), S-100 (1:100, Santa cruz), CD34 (1:100, DAKO), CD117 (1:100, DAKO), Dog-1 (1:100, DAKO), SMA (1:200, DAKO), Desmin (1:200, DAKO) and Ki67 (1:200, DAKO). Sections were stained with a streptavidin-peroxidase system (KIT-9720 Ultrasensitive TM S-P, MaiXin, China). The chromogen used was diaminobenzidine tetrahydrochloride substrate (DAB kit, MaiXin, China), slightly counterstained with hematoxylin, dehydrated and mounted.

For the negative controls, the primary antibody was replaced with PBS. This study was prospectively performed and approved by the institutional Ethics Committees of China Medical University and conducted in accordance with the ethical guidelines of the Declaration of Helsinki.

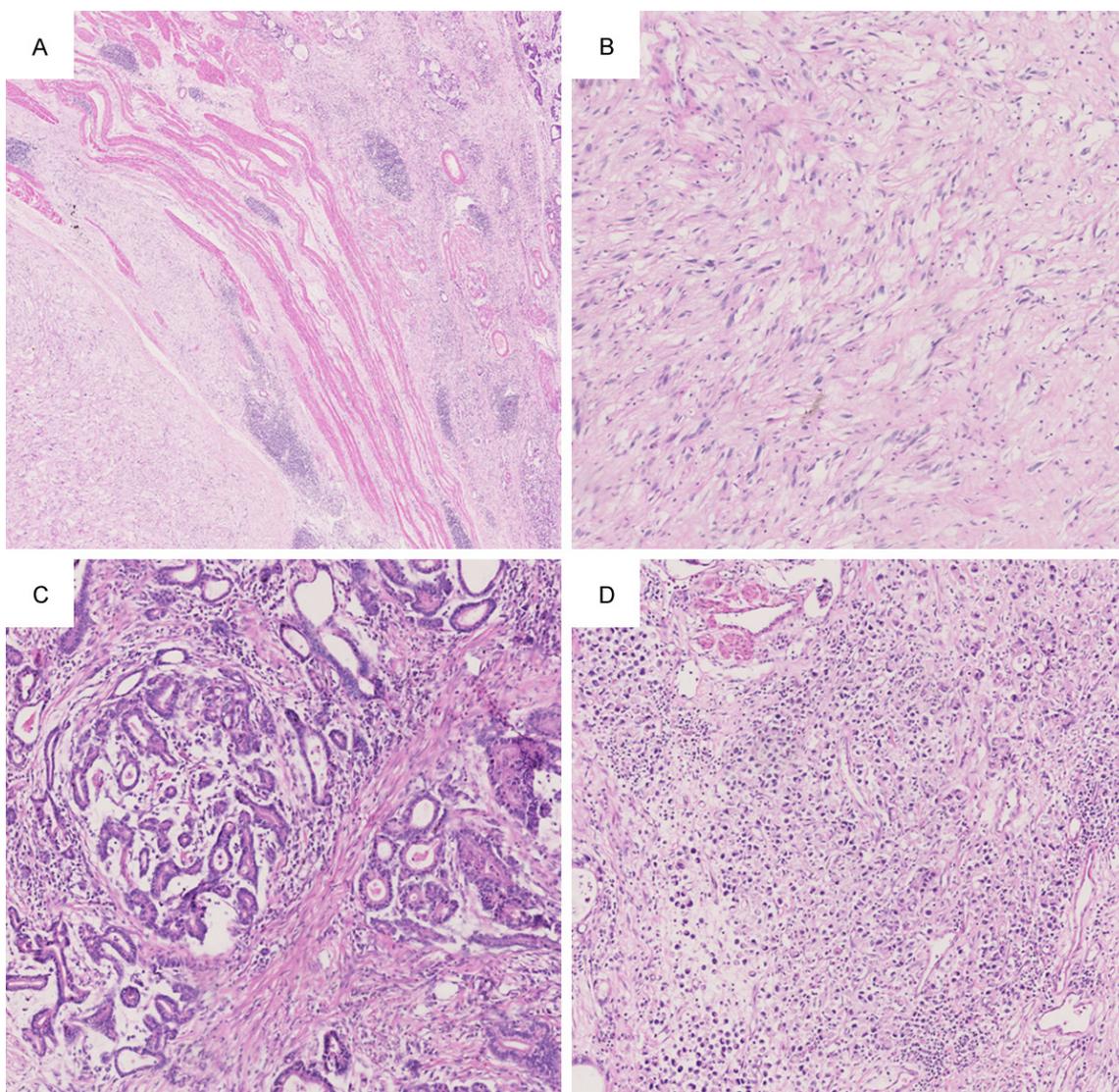
### Results

#### Gross and microscopic features

Grossly, the huge ulcer (diameter 3.5 cm) located on gastric antrum, the mucosa around the ulcer uplifted, the bottom of the ulcer seemed roughness and contamination (**Figure 1A**). On the section of the lesion, thickened stomach wall could be found (**Figure 1B**), and there is a nodule just below the malignant ulcer, the nodule (diameter 3.2 cm) showed gray-yellow section, strong but pliable texture and clear boundary (**Figure 1B**).

Histologically, the tumor cells of gastric showed adenocarcinoma glandular arrangement. These glands varied in size and irregular, infiltrated into the muscle layer of gastric wall (**Figure 2A**). Below the muscle layer of gastric wall, spindle tumor cells showed bundle or fence-like arrangement, these tumor cells with round or oval nuclei, eosinophilic cytoplasm

## Synchronous of gastric adenocarcinoma and schwannoma



**Figure 2.** Histological features of the lesion. A. The muscle layer is the boundary between adenocarcinoma tissue and schwannoma tissue. B. Schwannoma cells showed bundle or fence-like arrangement, these tumor cells with round or oval nuclei, eosinophilic cytoplasm. C. Adenocarcinoma cells showed gland arrangement, these glands varied in size and irregular. D. In the poor differentiation area of adenocarcinoma, signet ring cells present solid growth pattern (A. HE  $\times$  40. B. HE  $\times$  100. C. HE  $\times$  100. D. HE  $\times$  100).

which presented mild morphology, interstitial edema could be found as a feature. Mitosis was hard to find in the area of spindle cells (**Figure 2A, 2B**). In the adenocarcinoma area, most of the tumor cells presented the gland arrangement, we could also see some signet ring cells present solid growth pattern (**Figure 2C, 2D**).

### *Immunohistochemistry*

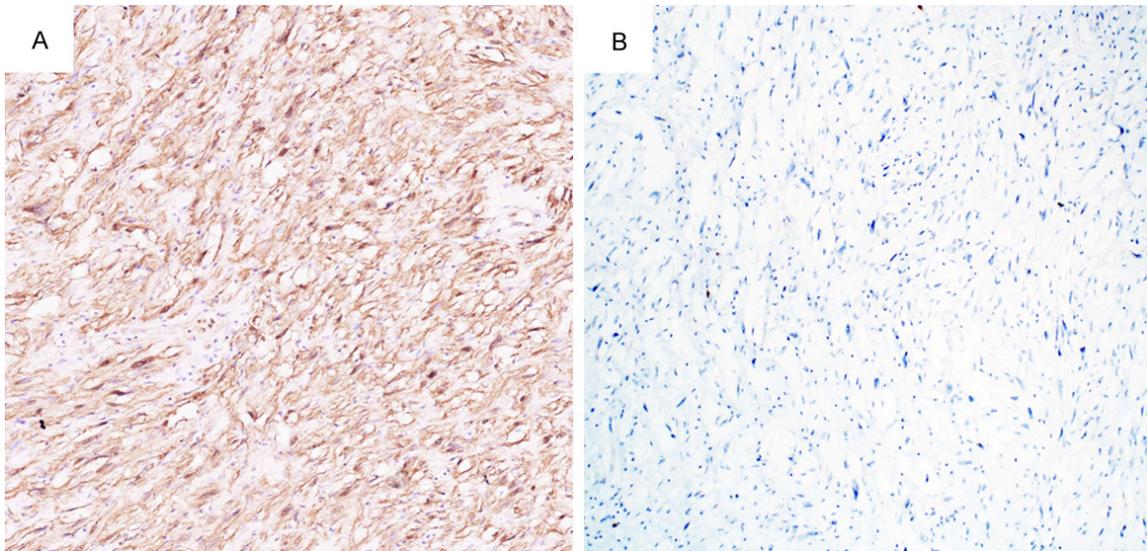
Immunohistochemical staining showed that the adenocarcinoma tumor cells were diffusely

positive for CK, CK7 and CEA, negative for vimentin, CD34, S-100, desmin, SMA, CD117, Dog-1 and GFAP. The spindle tumor cells were positive for Vimentin, S-100 and GFAP, negative for CK, CK7, CEA, CD34, SMA, desmin, CD117 and Dog-1 (**Figure 3A, 3B**). Ki67 index was approximate 15% for adenocarcinoma tumor cells and 2% for spindle tumor cells.

### **Discussion**

Gastric adenocarcinomas accounted for approximately 95% of all malignant gastric

## Synchronous of gastric adenocarcinoma and schwannoma



**Figure 3.** Immunohistochemical staining of schwannoma area. A. Schwannoma cells were strong positive for S100. B. The schwannoma cells were negative for CD117 (A. S-100,  $\times 100$ . B. CD117,  $\times 100$ ).

tumors [1]. It may co-exist with synchronous tumors of a different histologic type. Specifically, gastric adenocarcinomas co-exist most commonly with lymphomas and less commonly with carcinoid tumors. GIS are classified as nonepithelial tumors of the stomach and colon/rectum, yet are considered to be a distinct, homogeneous entity separate from leiomyoma, leiomyosarcoma, GANT and GIST [2-6]. Most GIS occur in the stomach, Gastric schwannomas probably arise from Schwann cells of the neural plexus within the gastric wall. The incidence is similar in both men and women, with a mean age in the sixth to seventh decade of life.

GIS appear grossly as rubbery, well-circumscribed yellow-white to tan ovoid nodules that are not encapsulated and ranging in size from 0.5 cm to 12 cm (mean 2.8 cm) [4, 5]. Histologically, these moderately cellular neoplasms appear as interlacing woven nests or bundles of spindle cells. Multinodular patterns of growth have been recorded. GIS may show only vague rudimentary nuclear palisading and compact cell bundles, unlike the distinct Antoni A, Antoni B and Verocay bodies of soft tissue schwannomas [2-8, 12]. Individual cells have eosinophilic cytoplasm without coarse fibrillar material or discernible cell walls. The nuclei are typically thinner than smooth muscle cell nuclei. Most GIS show minimal or no mitotic activity. These features could be seen in our case.

Immunohistochemically, GIS show diffuse strong positivity for S-100 and vimentin, and variable positivity for GFAP, while they are typically negative for CD34, CD117, desmin, c-Kit and actin [10]. This immunostaining pattern differentiates GIS from GIST, GANT and smooth muscle tumors of the gastrointestinal tract. Smooth muscle tumors do not have a lymphoid cuff and express smooth muscle markers including desmin, actin, and calponin, which differ from schwannomas [11, 12]. GIST might be the most important and difficult differential diagnosis because of the different therapy and prognosis. Typically, GIST showed diffuse strong positivity for CD117, Dog-1, negative expression for S-100 and GFAP [13]. Our immunostaining results support the diagnosis of schwannoma very well. Whether or not such a co-occurrence is a simple incidental association or the two lesions are connected by a causal relationship need further study. According to the extremely low occurrence rate of the gastric cancer and schwannomas, we suppose the co-occurrence is incidental.

### Conclusion

We presented an 80-year-old male with gastric adenocarcinoma and schwannoma in China. The histological and immunochemistry support the diagnosis very well. To our knowledge, the case is very rare that only two cases of occurrence of adenocarcinoma and schwannoma have been reported.

## Acknowledgements

This work was supported by grants from National Natural Science Foundation of China to LH Yang (No. 81301930), Z Zhu (81302129), HT Xu (81372497), L Wang (81302197), Y Liu (81302312), SD Dai (81401881), CF Fan (81472599), Social Development Foundation of Liaoning Provincial Science and Technology Department (2012225016), Shenyang Science and Technology Bureau Foundation (F12-227-1-57) to Dr G Li.

## Disclosure of conflict of interest

None.

**Address correspondence to:** Dr. En-Hua Wang, Department of Pathology, First Affiliated Hospital and College of Basic Medicine Sciences, China Medical University, Shenyang 110001, China. E-mail: tom012017@163.com

## References

- [1] Terada T. Well differentiated adenocarcinoma of the stomach composed of chief cell-like cells and parietal cells (Gastric adenocarcinoma of fundic gland type). *Int J Clin Exp Pathol* 2011; 4: 797-798.
- [2] Xu F, Feng GS, Wang ZJ, Zhang KN. Synchronous double cancers of colonic large cell neuroendocrine carcinoma and gastric squamous-cell carcinoma: a case report and review of literature. *Int J Clin Exp Pathol* 2014; 7: 5177-5180.
- [3] Maiorana A, Fante R, Maria Cesinaro A, Adriana Fano R. Synchronous occurrence of epithelial and stromal tumors in the stomach: a report of 6 cases. *Arch Pathol Lab Med* 2000; 124: 682-686.
- [4] Levy AD, Quiles AM, Miettinen M, Sobin LH. Gastrointestinal schwannomas: CT features with clinicopathologic correlation. *Am J Roentgenol* 2005; 184: 797-802.
- [5] Hou YY, Tan YS, Xu JF, Wang XN, Lu SH, Ji Y, Wang J, Zhu XZ. Schwannoma of the gastrointestinal tract: a clinicopathological, immunohistochemical and ultrastructural study of 33 cases. *Histopathology* 2006; 48: 536-545.
- [6] Cameron S, Gieselmann M, Blaschke M, Ramadori G, Füzési L. Immune cells in primary and metastatic gastrointestinal stromal tumors (GIST). *Int J Clin Exp Pathol* 2014; 7: 3563-3579.
- [7] Qian T, Gao F, Chen MZ, Meng FH, Li XJ, Liu YJ, Yin HB. Collision tumor of the esophagus: report of a case with mixed squamous cell carcinoma and gastrointestinal stromal tumor. *Int J Clin Exp Pathol* 2014; 7: 1206-1211.
- [8] Jang KY, Park HS, Chung MJ, Moon WS, Kang MJ, Lee DG, Kim YK, Kim CY. Synchronous occurrence of primary adenocarcinoma and schwannoma in the stomach: a case report. *Pathol* 2009; 41: 286-289.
- [9] Go JH. Collision of Adenocarcinoma and Schwannoma of the Stomach: A Case Report. *Korean J Pathol* 2012; 46: 373-376.
- [10] Katsoulis IE, Bossi M, Richman PI, Livingstone JI. Collision of adenocarcinoma and gastrointestinal stromal tumour (GIST) in the stomach: report of a case. *Int Semin Surg Oncol* 2007; 4: 2.
- [11] Li P, Yang S, Wang C, Li Y, Geng M. Presence of smooth muscle cell differentiation in plexiform angiomyxoid myofibroblastic tumor of the stomach: a case report. *Int J Clin Exp Pathol* 2014; 7: 823-827.
- [12] Zheng L, Wu X, Kreis ME, Yu Z, Feng L, Chen C, Xu B, Bu Z, Li Z, Ji J. Clinicopathological and immunohistochemical characterisation of gastric schwannomas in 29 cases. *Gastroenterol Res Pract* 2014; 2014: 202960.
- [13] Steigen SE, Eide TJ. Gastrointestinal stromal tumors (GISTs): A review. *APMIS* 2009; 117: 73-86.