Concomitant gastric carcinoid and gastrointestinal stromal tumors: A case report

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INTRODUCTION
Gastrointestinal neuroendocrine tumors are derived from the diffuse neuroendocrine system of the gastrointestinal (GI) tract, composed of amine- and acid-producing cells with different hormonal profiles, depending on their site of origin[2,3]. Gastrointestinal stromal tumors (GISTS) are mesenchymal tumors arising from interstitial Cajal cells of the wall of the GI tract[2,3]. GISTs can be distinguished from other mesenchymal tumors by optimal immunostaining for CD117, and a prognostic classification is based on tumor size, mitotic score, and MIB-1 grade[4]. Gain-of-function mutation of the c-Kit gene, and immunoreactivity of the c-kit protein (CD117) in many GIST support the idea that GIST is a biologically distinct entity. Both carcinoid tumors and GISTs are malignant or potentially malignant tumors, and are considered to have a specific molecular pathogenesis. Herein we report a gastric carcinoid tumor concomitant with a gastric GIST, and also provide a review of the literature.

CASE REPORT
In October 2005, a 65-year-old Asian female came to our hospital for a routine physical examination. She had no history of peptic ulcer, epigastralgia, abdominal pain, diarrhea, flushing, or palpitations. Esophagogastroduodenoscopy showed an approximately 0.8 cm sessile polyloid lesion, with superficial reddish striation, on the posterior wall of the upper gastric corpus (Figure 1). A biopsy sample was taken and eight specimens were acquired. Histological studies showed a gastric mucosa tumor. The tumor demonstrated uniform ovoid cells with cordal and small nestic patterns within the lamina propria. After immunohistochemical examination of the tumor; Wei CK performed the operation of the gastric carcinoid tumor; Chen CW collected the data; Tseng CE made the pathological diagnosis of the tumor; and YL and Tsen CE wrote the paper.

Author contributions: Lin YL performed the endoscopic examination of the tumor; Wei CK performed the operation of the tumor; Chiang JK, Chou AL, and Chen CW collected the data; Tseng CE made the pathological diagnosis of the tumor; and YL and Tseng CE wrote the paper.

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Abstract
A gastric carcinoid tumor concomitant with gastrointestinal stromal tumor (GIST) is rarely encountered in clinical practice. We report a 65-year-old female who had a 0.8 cm gastric carcinoid tumor on the posterior wall of the upper gastric corpus detected during an esophagogastroduodenoscopy at a routine physical examination, and a concomitant 1.1 cm GIST on the anterior wall of the upper gastric corpus incidentally found during surgery of the gastric carcinoid tumor. Normal serum gastrin level and histological findings suggested that she had a type III gastric carcinoid tumor and a GIST which were categorized a very low risk of malignancy, based on their small size and lack of mitosis. Both tumors were treated successfully by surgical excision. The patient had an uneventful recovery. Neither recurrence nor metastasis was found after a 28-mo follow-up.

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Key words: Gastric carcinoid tumor; Gastrointestinal stromal tumor; Esophagogastroduodenoscopy; Digestive system
Gastric carcinoids are classified into three subtypes, all of which originate from gastric enterochromaffin-like cells in the gastric mucosa. The first subtype is combined with chronic atrophic gastritis (type I). The second subtype, Zollinger-Ellison syndrome, is nearly a part of the multiple endocrine neoplasia-1 (MEN-1) syndrome (type II). Clinically, these two subtypes are linked to a hypergastrinemic state. The third sporadic subtype (type III) occurs without hypergastrinemia but takes an aggressive course, with 54%-66% metastasis[8]. As stated by Shinohara and colleagues, even a 0.5-cm carcinoid tumor can present with metastasis[8]. On account of neither atrophic gastric mucosa nor elevated serum gastrin level in our case, a small type III carcinoid tumor was favored. The potential for metastasis cannot be ignored and demands close follow-up.

Gastric carcinoids may have different clinical features in different locations of GI tract, including abdominal pain, vomiting, and anemia[9]. Carcinoid tumor associated with vascular malformation may cause massive gastric bleeding[10]. Carcinoid syndrome with symptoms of flushing, diarrhea, abdominal pain, cutaneous edema, and bronchoconstriction is uncommon. Due to a small nonfunctional carcinoid, our case never experienced any GI symptom or carcinoid syndrome.

Since 1999, GISTs have been considered to be a group of mesenchymal neoplasms arising from interstitial Cajal cells of the gastrointestinal walls[2,3]. GISTs are now preferentially defined as tumors with c-kit (CD117) positive mesenchymal spindle cells or epithelioid neoplasms, found primarily in the GI tract, omentum, and mesentery[11]. The most important manifestation of this tumor is its indolent, slow-growing nature. This tumor is generally found within the deeper stroma and the submucosa, and incidentally during an imaging study and surgery. In our case, a GIST protruding to the serosal side of the gastric wall was found incidentally during a surgical procedure. Histologically, it arose from the muscularis propria of the gastric wall.

Patients with GIST often present with nonspecific symptoms, such as nausea, vomiting, abdominal pain, GI bleeding, and may have metastatic disease. Bleeding is the most common symptom. The tumor size and mitotic score are considered important diagnostic criteria and prognostic predictive indicators[12]. Our case was asymptomatic and diagnosed as GIST with a very low risk of malignancy based on its small size and lack of mitosis and was positive for CD117 after IHC staining.
Treatment modalities for non-metastatic small carcinoid tumors include endoscopic mucosal resection, minimally invasive laparoscopic wedge resection, and surgery. To date, surgery is the mainstay and the only potentially curative therapy for carcinoid tumors.

Treatment modalities for metastatic carcinoid tumors include orthotopic liver transplant, hepatic artery embolization, and somatostatin analog, adjuvant indium-111 octreotide-receptor targeted therapy. Therapeutic options for GISTs include surgery and...
In conclusion, we report a rare case of small gastric carcinoid tumor concomitant with a small gastric GIST with no clinical symptoms and positive \( H_\text{pylori} \) infection. More studies are required for evaluating the relation between \( H_\text{pylori} \) infections and tumorigenesis of concomitant gastric carcinoid and gastric GIST. A long term follow-up period of all carcinoids and GISTs is greatly needed, due to their potential for metastasis.

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