

Case Report

Primary squamous cell carcinoma of the stomach: a case report and literature review

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Abstract: Primary squamous cell carcinoma (SCC) of the stomach is rare. Its pathogenesis is also unclear and there are conflicting reports about it in the past. Only about 100 cases have been reported so far in the literature. The current study discusses a new case of gastric squamous cell carcinoma, from a 50-year-old Chinese male patient diagnosed via subtotal gastrectomy with Roux-en-Y reconstruction and D2 lymphadenectomy. In the stomach, an ulcerated mass in the antrum, measuring 12×8×6 cm, was observed. Further, pathological examination of the resected specimen revealed a well-differentiated SCC. Observations indicated tumor cell invasion into the serosa, and encroachment into perigastric regional lymph node. A follow-up abdominal CT scan three months later revealed tumor invasion into the ascending colon. We assume that this invaded mass was transferred from the gastric squamous cell carcinoma. Interestingly, the patient is still alive.

Keywords: Squamous cell carcinoma, stomach

Introduction

Most of the gastric cancer cases include adenocarcinoma. Squamous cell carcinoma (SCC) of the stomach is an extremely rare entity, with an annual incidence rate of 0.04 to 0.07% [1]. The first SCC case was described in 1905 [2]. Since then, less than 100 cases have been reported in the literature [3]. Despite the available diagnostic criteria, SCC pathogenesis is still unclear and different hypotheses have been proposed for its diagnosis. In addition, no effective systemic standardized treatment options are available and the prognosis usually seems less favorable. In terms of its occurrence, SCC is mostly prevalent in males with a male-to-female ratio of 5:1 and is usually diagnosed in the sixth decade of life when it has already progressed to an advanced stage [4].

Case report

A 50-year-old Chinese male with a two-month history of upper abdominal pain was admitted to the First Affiliated Hospital of Wenzhou Medical University. Initially, the patient did not show any symptoms of nausea, vomiting, dys-

phagia or melena. The physical examination and routine laboratory tests upon admission did not show any abnormal signs and appeared normal. However, the upper gastrointestinal endoscopy revealed a protruding mass located in the antrum. This mass was approximately 12 cm in diameter and displayed surface bleeding (as seen in **Figure 1**). Subsequently, the patient underwent subtotal gastrectomy with Roux-en-Y reconstruction and D2 lymphadenectomy. As a result, an ulcerated mass measuring 12×8×6 cm, was observed in the gastric antrum. The tumor had apparently infiltrated into the serosal layer, pancreas head, transverse mesocolon and partial lymph node of the stomach. Further pathological examination of the resected specimen revealed SCC characteristics, displaying a typical keratin pearl formation and intracellular bridges (as observed in **Figure 2**). Immunohistochemical staining was positive for cytokeratin as seen in **Figure 3**. Interestingly, the tumor had not invaded the mucosa of the esophagogastric junction. Also, no squamous cells were identified in the normal portion of the stomach. Based on the TNM classification of UICC 2010, the tumor was diagnosed as stage IIB (T4bN3aM0). Surgery was performed and

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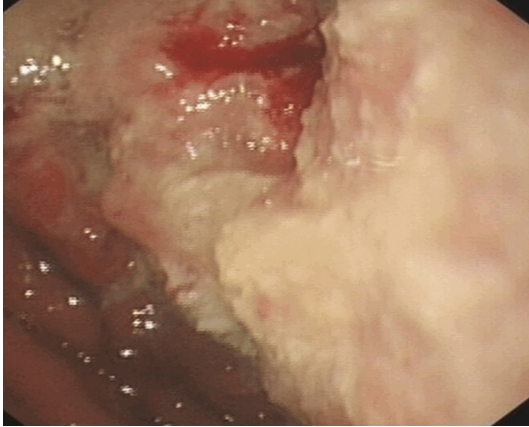


Figure 1. Endoscopic image of the large tumor predominantly located in the antrum without involving the gastroesophageal junction.

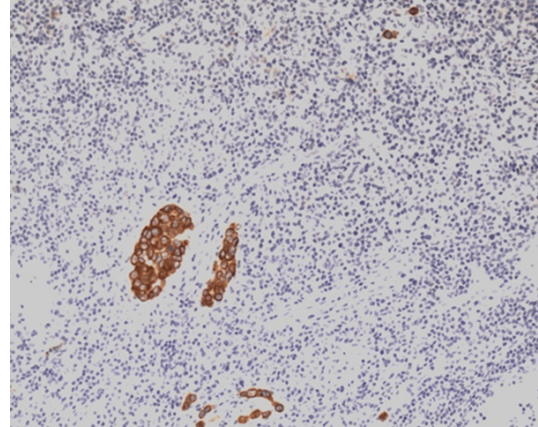


Figure 3. Immunohistochemical staining of cytokeratin (magnification, 40 \times).

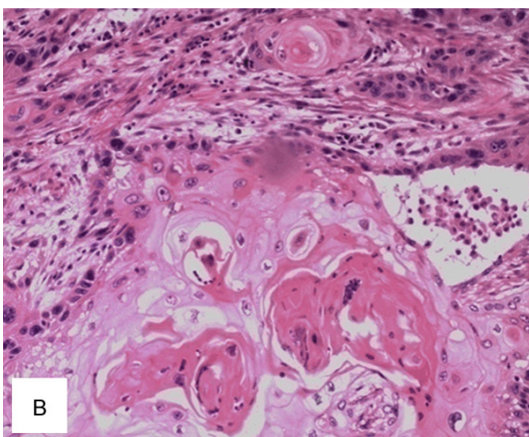
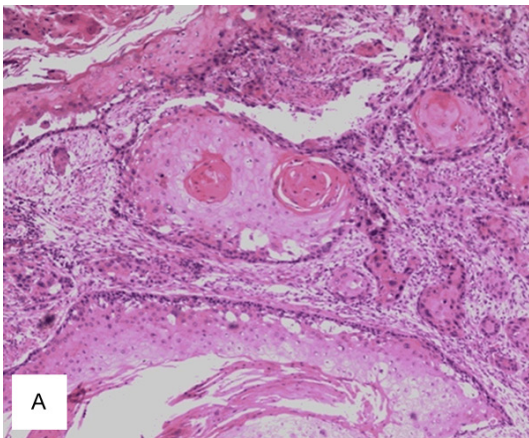


Figure 2. A. HE staining of the tumor showing tumor nests (40 \times , magnification). B. HE staining showing the typical keratin pearl formation and intracellular bridges, characteristic of SCC, at a higher (magnification of 100 \times).

one month post-surgery, a combination chemotherapy consisting of cisplatin (200 mg) and docetaxel (100 mg) was administered for four

days after every 35 days. In total, the patient received three cycles of the chemotherapy regimen. A follow-up abdominal CT scan, three months later, revealed tumor invasion into the ascending colon as illustrated in **Figure 4**. We assume that this invaded mass originated from the gastric squamous cell carcinoma. The patient is still alive today.

Discussion

Several diagnostic criteria exist for squamous cell carcinoma. According to the Japanese classification of gastric carcinoma [5], the diagnostic criteria include: 1) all tumor cells are SCC cells, and 2) there is distinct evidence supporting the origin of SCC directly in the gastric mucosa. However, Parks RE [6] proposed another set of following criteria: 1) the tumor should not be located in the cardia, 2) the tumor should also not extend into the oesophagus, and 3) there should be no evidence of SCC elsewhere in the body.

Consistently, the patient described in our study also had the tumor located in the antrum as detected by endoscopy and laparotomy, indicating that the cardia was intact and the tumor proximity was normal. In addition, we did not find any SCC in other organs of the body upon clinical examination that included abdominal CT, endoscopic examination, pulmonary imaging and radiological studies. Therefore, the patient was diagnosed with a primary SCC of the stomach.

Boswell and Helwig [1] also defined four histopathological features to diagnose a primary gastric SCC. They include the presence of kera-

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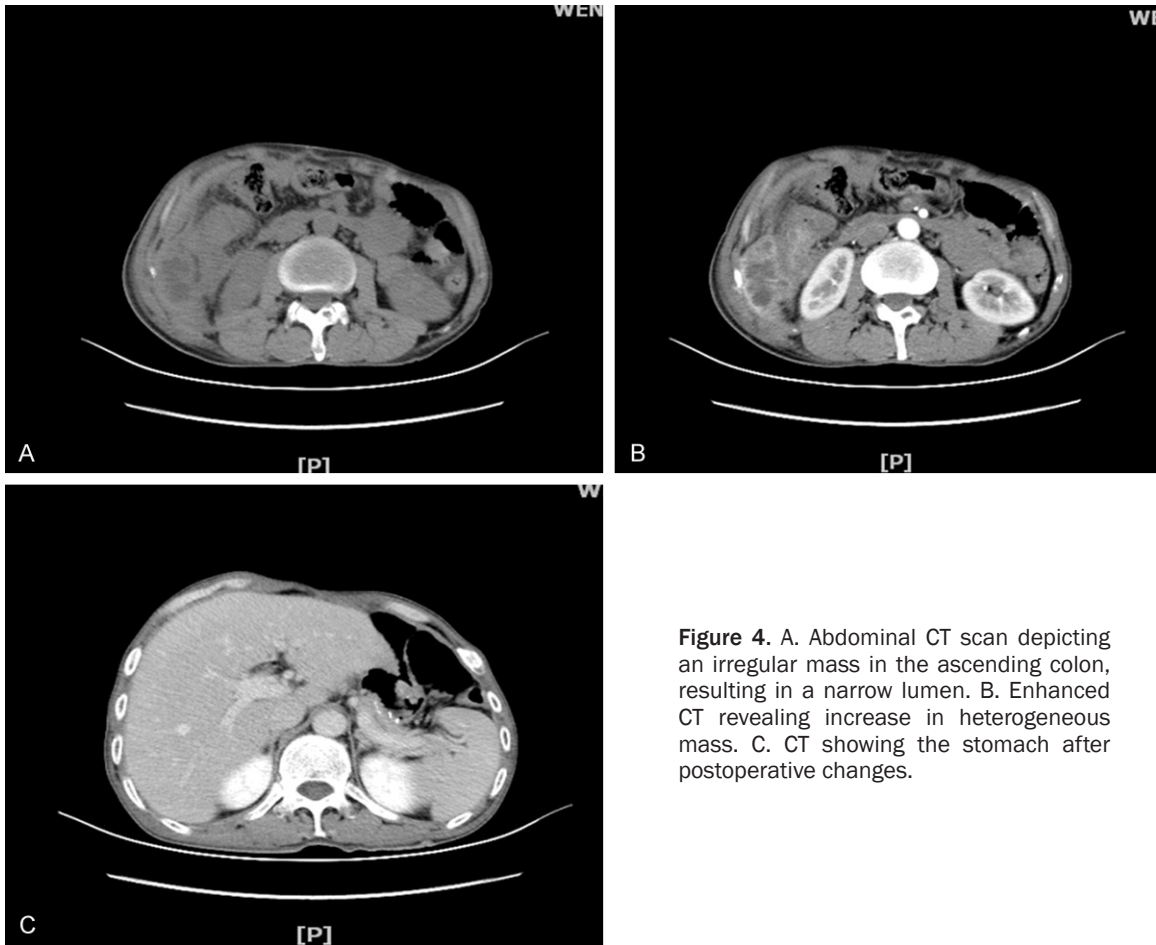


Figure 4. A. Abdominal CT scan depicting an irregular mass in the ascending colon, resulting in a narrow lumen. B. Enhanced CT revealing increase in heterogeneous mass. C. CT showing the stomach after postoperative changes.

tinizing cell masses with pearl formation, a mosaic pattern of cell arrangement, intercellular bridges and high concentrations of sulfhydryl or disulfide groups indicative of keratin production. Similarly, we also detected typical keratin pearl formation and intercellular bridges in the tumor sections, which further reinforced the SCC diagnosis.

In addition, the pathogenesis of gastric SCC is still very obscure. Several mechanisms underlying its diagnosis include: 1) differentiation of the squamous from pre-existing adenocarcinoma, 2) squamous metaplasia of the gastric mucosa preceding malignant transformation, 3) pluripotent stem cells capable of developing into any cell type, and 4) the presence of ectopic squamous epithelial nests in the gastric mucosa [7-9]. Mori *et al.* [10] hypothesized that neoplastic pluripotent cells first transform into adenocarcinoma followed by squamous metaplasia, which eventually results in SCC. In addition, Takita *et al.* [11] suggested that Epstein-

Barr virus (EBV) infection may also be involved in the pathogenesis of gastric SCC. They used immunohistochemistry and liquid hybridization assays for detection of human papilloma virus (HPV) infection, and polymerase chain reaction method for Epstein-Barr virus (EBV) infection.

Wakabayashi *et al.* [12] reviewed 56 cases of gastric squamous cell carcinomas that have been reported in Japan. The median age of onset was between 29 and 81 years (mean, 64.7 ± 1.7 years), and the male-to-female ratio was 44:12. The frequency of tumor location in the upper, lower and middle portions of the stomach were 57.1%, 21.4% and 19.6%, respectively and the tumor diameters ranged from 2.1 to 13 cm (mean, 6.6 ± 0.3 cm). In this study, we also reviewed the clinical features of 11 SCC patients based on literature search (English language studies), which are summarized in **Table 1**. The mean age of the patients was 63.8 years and the tumor size ranged between 4 and 18 cm (mean- 8.2 cm).

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Table 1. Clinical features of 11 SCC patients

Author	Year	Age (yr)	Sex	Chief clinical presentation	Position	Size (cm)	Survival (mo)
Raju et al [13]	1987	59	M	Abdominal pain	ps	12	ND
Dursun et al [4]	2003	65	M	Abdominal pain	lc	4	3
Hara et al [14]	2004	85	M	Abdominal pain	gc	8	17 ¹
Choi et al [15]	2007	40	M	Without any symptoms	gc	7	12 ¹
Callacondo et al [3]	2009	83	M	Abdominal pain, vomiting weight loss	Antrum	18	24 ¹
Guttmann et al [16]	2012	81	F	Abdominal pain, weight loss	lc	4	ND
Tokuhara et al [17]	2012	67	M	Difficulty swallowing	lc	6	13
Hwang et al [18]	2014	61	M	Weight loss	Fundus	6.5	6
Wakabayashi et al [12]	2014	69	M	Difficulty swallowing	lc	9	36
Mardi et al [19]	2015	42	M	Abdominal pain, vomiting	Antrum	4	ND
Present case	2015	50	M	Abdominal pain	Antrum	12	3 ¹

¹Alive patients; ps: posterior wall of the stomach; lc: the lesser curvature of the stomach; gc: the greater curvature of the stomach; ND: Not described.

Depending on the stage of diagnosis, the prognosis for primary gastric SCC has been reported to be either more favorable [20] or less favorable [21] than gastric adenocarcinoma. However, usually due to the late diagnosis of gastric SCC, it is already in an advanced stage, with a poor prognosis. To date, no standard chemotherapy regimen for gastric SCC has been defined. Previous reports suggested that radical surgical excision was the best option to potentially cure the localized disease. However, aggressive surgery plus adjuvant chemotherapy was appropriate for advanced-stage SCC of the stomach in some patients [2, 9]. The overall survival rates of the patient range from 7 months to 8 years [2]. A high incidence of stomach SCC is observed in the sixth decade of life, although 17-year-old patients have also been reported [22]. Interestingly, Marubashi *et al.* [23] reported a case of gastric SCC in a 70-year-old male who responded effectively to neoadjuvant and low-dose FP chemotherapy.

To conclude, in this study, we have reported a patient who underwent subtotal gastrectomy with Roux-en-Y reconstruction and D2 lymphadenectomy. Based on the pathological characteristics, the patient was diagnosed with gastric SCC. Post-surgery, the patient received definitive chemotherapy with docetaxel and cisplatin to manage lymph node metastasis. Although the prognosis is somewhat controversial, the disease stage and surgical resectability are the key determinants of outcomes in gastric SCC.

Disclosure of conflict of interest

None.

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