

## Case report

# A squamous cell carcinoma of the gastric cardia showing submucosal progression

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We report a case of squamous cell carcinoma (SCC) of the gastric cardia showing submucosal progression with direct invasion of the liver. A 71-year-old man was admitted with dysphagia. Esophagogastrosocopy showed a protruding tumor covered with normal gastric mucosa in the anterior wall of the gastric cardia, although no abnormal findings were detected in the esophagus, including the esophagogastric junction. Serum SCC-related antigen level was elevated (6.6 ng/ml; normal level, less than 2.5 ng/ml). Endoscopic biopsy specimens taken from this tumor did not show malignant cells. Based on these findings, the preoperative diagnosis was a submucosal tumor of the stomach. Laparotomy was done; however, the tumor was not resected because it had direct invasion to the left lateral segment of the liver and adjacent tissues. As the tumor showed continuous bleeding from the stomach after surgery, total gastrectomy, combined with transhiatal lower esophagectomy, left lateral segmentectomy of the liver, splenectomy, and distal pancreatectomy was performed. Because histologic findings showed poorly or moderately differentiated SCC with direct invasion of the liver, the final diagnosis was SCC of the gastric cardia showing submucosal progression with hepatic invasion. Such a case of SCC of the gastric cardia showing submucosal progression is rare, and accurate preoperative diagnosis was very difficult. However, it may be important to consider SCC of the gastric cardia in such a situation.

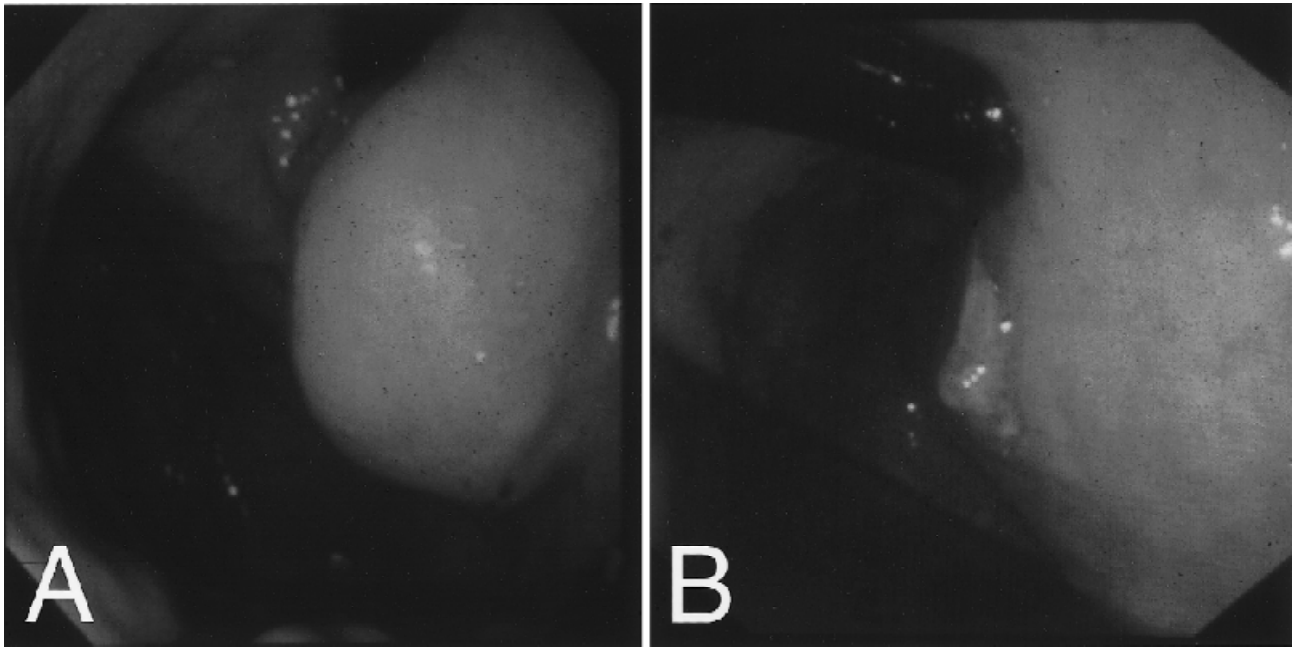
**Key words:** gastric cardia, squamous cell carcinoma, extragastric growth, submucosal progression, hepatic invasion

## Introduction

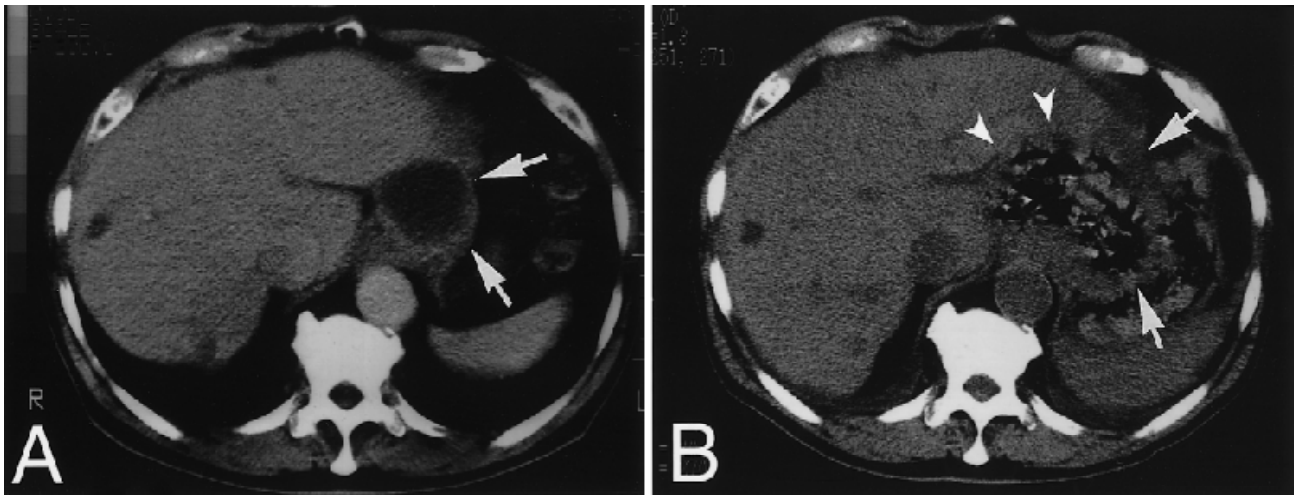
Tumors of the gastric cardia include adenocarcinoma and squamous cell carcinoma (SCC) of the lower esophagus and/or the stomach. As the gastric cardia constitutes only a small area above and below the esophagogastric junction (EGJ), many problems in the diagnosis and treatment of gastric cardia tumors remain to be solved.<sup>1,2</sup> Herein, we report a patient with resected SCC of the gastric cardia showing submucosal progression and extragastric growth associated with direct invasion of the liver; the tumor was indistinguishable from a submucosal tumor (SMT) on preoperative endoscopic examination.

## Case report

A 71-year-old man visited the Nagano Red Cross Hospital with dysphagia, which had lasted for a month. Esophagogastrosocopy on December 15, 1997, showed a protruding lesion covered with the normal gastric mucosa on the anterior wall just below the gastric cardia (Fig. 1A). Abdominal computed tomogram (CT) showed a solid mass in the gastric cardia, with extragastric growth measuring 4 cm in diameter (Fig. 2A). Based on these findings, SMT of the stomach, such as leiomyoma or leiomyosarcoma, was strongly suspected. When esophagogastrosocopy was performed again, on March 4, 1998, the SMT in the gastric cardia was enlarged and showed a dellen on its top (Fig. 1B). Biopsy specimens taken from the dellen of the SMT revealed necrotic tissue, but no evidence of malignancy. Endoscopic ultrasonogram (EUS) showed that the tumor was located between the submucosal and proper muscle layers. Although serum SCC-related antigen level was elevated (6.6 ng/ml; normal level, less than 2.5 ng/ml), no abnormal lesions in the esophagus, including the EGJ, were detected by endoscopic biopsy and lugol staining.



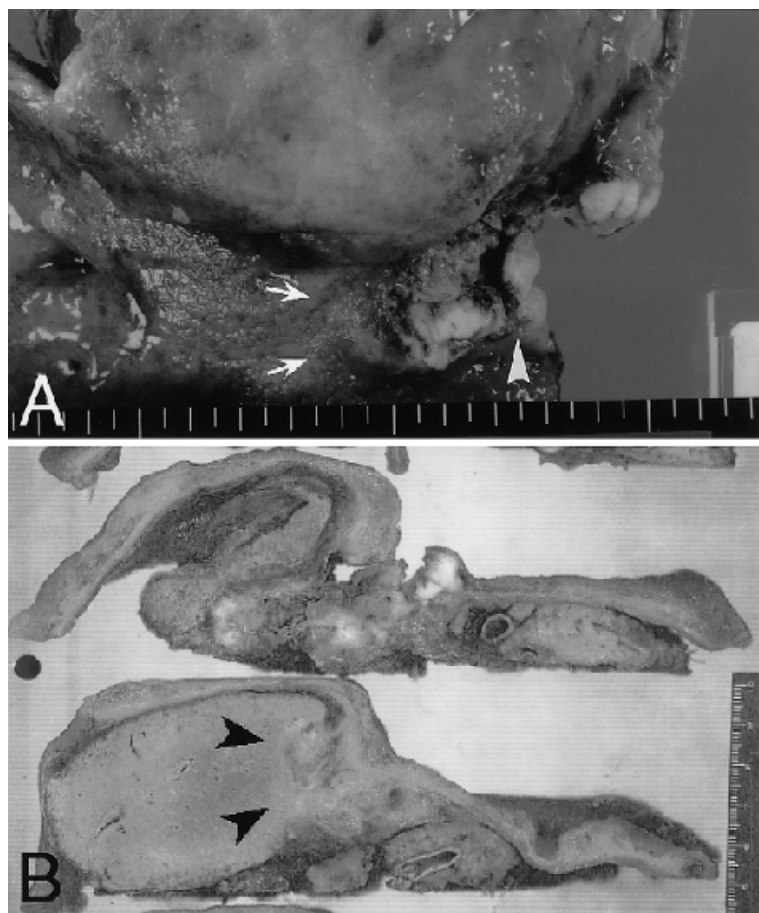
**Fig. 1A,B.** Endoscopic photographs of the gastric cardia. **A** On December 15, 1997, on the anterior wall just below the gastric cardia, a submucosal tumor covered with normal gastric mucosa was observed. **B** A shallow depression (delle) on the top of the tumor was newly observed on March 4, 1998



**Fig. 2A,B.** Findings of abdominal computed tomogram. **A** On December 31, 1997, the tumor (4 cm in diameter), showing low density, was located between the gastric cardia and the left lateral segment of the liver (*arrows*). **B** On April 10, 1998, the tumor showed extragastric growth and was enlarged to 8.5 cm in diameter; cystic change in the tumor was also observed (*arrows*). The tumor had directly invaded the left lateral segment of the liver (*arrowheads*)

The patient was diagnosed as having a gastric SMT, and underwent a laparotomy, on March 19, at the Nagano Red Cross Hospital. However, the tumor could not be resected because of the severe direct invasion of the left lateral segment of the liver and adjacent tissues. One month later, CT showed enlargement of the tumor in the gastric cardia, to 8.5 cm in diameter, with invasion of the liver (Fig. 2B). On April 13, the patient had

circulatory shock caused by massive hemorrhage from the gastric tumor. Blood transfusion and percutaneous transcatheter embolization of the left gastric artery, to stop the bleeding, were performed repeatedly. Celiac angiography showed that tumor vessels from the left gastric and splenic arteries and the celiac and splenic arteries were involved by the tumor. The patient was transported from the Nagano Red Cross Hospital to the



**Fig. 3A,B.** Macroscopic findings of the resected specimen. **A** An elevated lesion with an ulceration on its top was detected in the gastric cardia, and it showed submucosal progression on its skirt (*arrows*). The tumor showed slight invasion of the esophagogastric junction (*arrowhead*). **B** On the cut surface of the specimen, the tumor revealed extragastric progression, and direct invasion of the liver was shown (*arrowheads*)

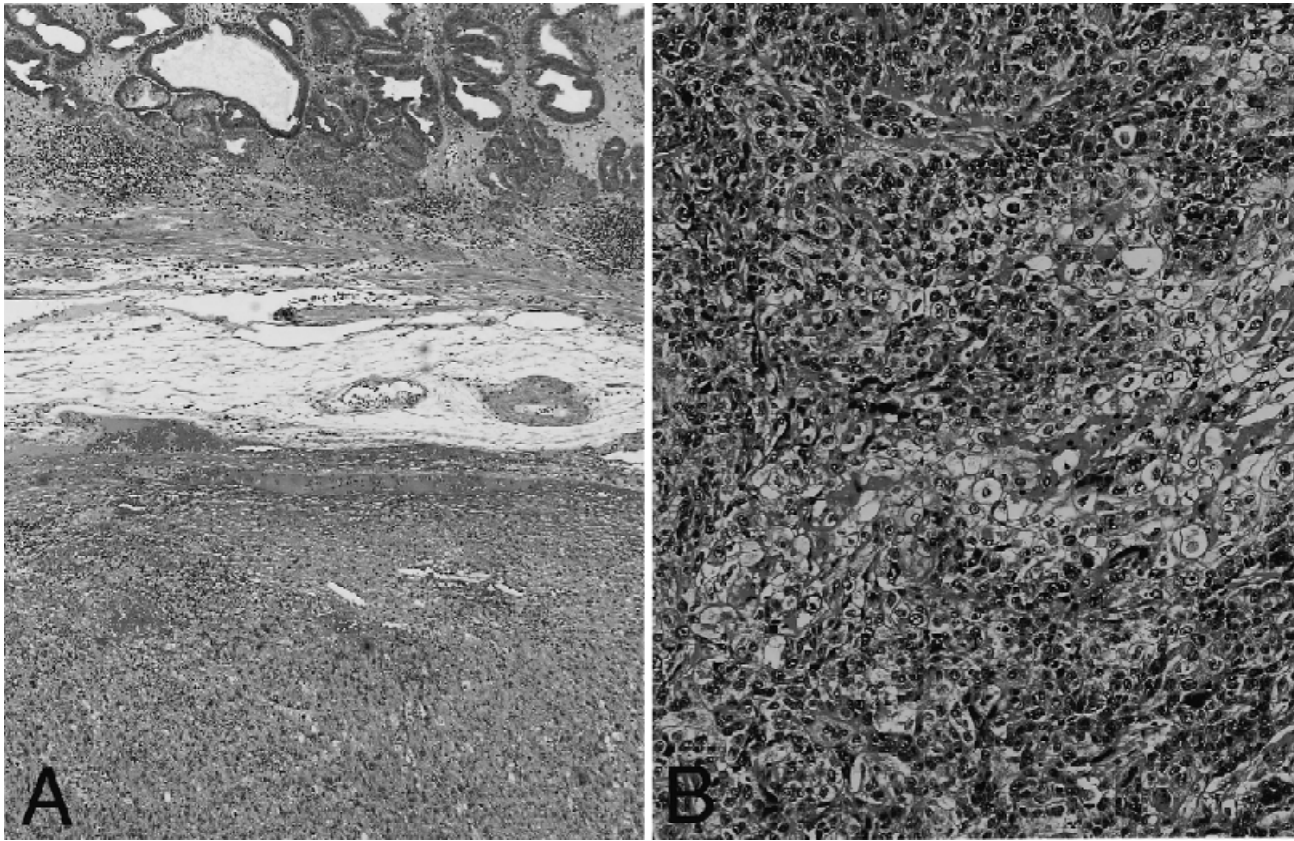
Shinshu University Hospital to attempt removal of this bleeding tumor. A second operation was performed, on April 30, 1998. The tumor was located at the lesser curvature of the gastric cardia, showing extraluminal progression and direct invasion of not only the left lateral segment of the liver but also the pancreas tail and the left diaphragm. Total gastrectomy, combined with transhiatal lower esophagectomy, left lateral segmentectomy of the liver, distal pancreatectomy, splenectomy, partial resection of the left diaphragm, and regional lymph node dissections was performed. The celiac artery was ligated and cut because the celiac and splenic arteries were involved by the tumor, and the common hepatic artery branched from the superior mesenteric artery. The digestive tract after these resections was reconstructed by a Roux-en-Y-fashion esophagojejunostomy. The postoperative course of the patient was uneventful.

In the resected specimen, an elevated lesion, with an ulceration on its top and covered by the normal gastric mucosa on its skirt, was observed in the lesser curvature of the gastric cardia, with only slight invasion of the EGJ (Fig. 3A). On the cut surface of the specimen, the

tumor showed extraluminal progression and invaded the liver (Fig. 3B). The microscopic findings were moderately and poorly differentiated SCC with direct invasion of the liver (Fig. 4A,B) and positive lymphatic and venous invasions; however, lymph node metastasis was not evident. Adenocarcinoma was not detected histologically in any area of the cancer. The tumor was located mainly under the submucosal layer of the stomach, with very slight involvement of the esophageal epithelium. Therefore, this tumor was diagnosed as SCC of the gastric cardia. Two months after the second operation, multiple metastases of the liver and enlargement of the paraaortic lymph nodes were detected on CT. Combination chemotherapy, using cisplatin and 5-fluorouracil, was administered; however, the patient died of progression of the recurrent tumors, on October 18, 1998.

## Discussion

Gastric carcinoma showing extragastric growth was first described by Knoflach and Eichelter,<sup>3</sup> and has been re-



**Fig. 4A,B.** Microscopic findings of the resected specimen. **A** The tumor was located mainly below the submucosal layer, and showed extragastric growth. **B** The tumor consisted of poorly and moderately differentiated squamous cell carcinoma. **A** HE,  $\times 40$ ; **B** HE,  $\times 200$

ported to account for approximately 0.1% of resected gastric carcinomas in Japan.<sup>4</sup> Concerning the clinicopathologic features of this type of gastric carcinoma, histologically, the tumors show scanty stroma (medullary type in cancer stroma), and are often associated with direct invasion of other organs.<sup>5,6</sup> However, for SCC of the gastric cardia, little information about the clinicopathologic features concerning the extraluminal progression is available, probably because of its rarity.<sup>7</sup> Thus, it may be difficult to determine the correct preoperative diagnosis in patients with SCC of the gastric cardia. Also, as occurred in our present patient, because the tumor was revealed endoscopically to be covered by normal gastric mucosa, the initial preoperative diagnosis was SMT of the stomach, such as leiomyoma or leiomyosarcoma.

In our previous report of a patient with SCC of the gastric cardia,<sup>8</sup> the tumor of the gastric cardia revealed submucosal progression endoscopically and macroscopically as in our present patient; the skirt of the tumor was covered with normal gastric mucosa. These findings suggest that SCC of the gastric cardia is likely to be misdiagnosed as SMT of the stomach if esophago-

gastroscopy alone is used. Furthermore, in the present patient, although we tried to obtain biopsy specimens from the dells of the SMT, unfortunately, SCC tissue could not be taken. Therefore, for the correct diagnosis of SCC of the gastric cardia with submucosal progression or extragastric growth, it may be necessary to carry out various examinations, including not only esophagogastrosopy but also EUS and CT. In addition, it may be important to keep SCC of the gastric cardia in mind when we encounter a SMT of the gastric cardia.

Of note, the present patient showed an increase in serum SCC-related antigen before the initial operation. In patients with esophageal SCC, a high level of SCC-related antigen is frequently observed, and it is helpful to measure this antigen for diagnosis and for the monitoring of therapeutic effects, in combination with other examinations,<sup>9,10</sup> although its elevation is also detected in other cancers; for example, SCC of the lung<sup>10,11</sup> and the uterine cervix.<sup>10,12</sup> In a search of the literature on SCC of the stomach, we found no studies concerning serum SCC-related antigen. Our observations suggest that a high serum level of SCC-related antigen may be helpful for reaching a preoperative diagnosis in patients

with SCC of the gastric cardia, in combination with findings of other examinations.

In the differential diagnosis in the present patient, we may speculate that this case was a primary SCC of the liver with direct invasion to the stomach. However, this possibility can be ruled out because primary hepatic SCC is reported to be very rare,<sup>13,14</sup> and the feeding artery to the tumor branched from the left gastric and splenic arteries. Indeed, histological findings also supported this clinical information: the tumor cells had invaded the lateral segment of the liver in a diffuse and scattered manner, while the tumor showed expansive growth in the gastric wall.

In conclusion, although SCC of the gastric cardia resembling a stromal tumor endoscopically or radiologically is rare and is difficult to diagnose correctly, it is important to take note of invasion into other organs with regard to its diagnosis and treatment.

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