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Case report

Metastatic gastric tumor from renal cell carcinoma

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Abstract
Metastatic tumors of the stomach are rare, with an incidence of 0.2%–0.7%, and they have been reported to result mainly from primary breast cancers, lung cancers, and melanoma. Further, among such metastatic tumors, the metastasis of renal cell carcinoma (RCC) to the stomach is an extremely rare disease, and it is usually reported in autopsy series. We report a rare case of metastatic gastric tumor derived from right renal carcinoma. Gastric endoscopy confirmed a large, polypoid, friable mass (type 1 tumor, about 7 cm in diameter) in the middle part of the stomach body. The mass was surgically excised and pathological examination showed that the gastric tumor was derived from a metastasis from the right kidney, because it was composed of malignant cells that were identical to those from the removed RCC. In addition, the tumor cells were immunoreactive for CD10, CD15, E-cadherin, early membrane antigen (EMA), and vimentin, but no reactivity was observed for cytokeratins 7 and 20 or c-KIT. Although gastric metastatic tumor derived from renal carcinoma is rare, the precise pre- and postoperative diagnosis may be important; thus, investigation for such metastatic tumors should be performed routinely in the follow up of patients who have been treated for RCC.

Key words Renal cell carcinoma · Metastasis · Stomach

Introduction

The age-adjusted incidence of renal cell carcinoma (RCC) has been increasing at an annual rate of around 3%. A quarter of patients with RCC present with advanced disease, including locally invasive or metastatic cancers. Metastatic disease to the lung (in up to 60% of patients with metastases) and bone (in up to 40% of patients with metastases) represent the two most common sites of advanced disease. However, unusual sites of metastasis are characteristic of RCC, and virtually any organ site can be involved, including the thyroid, pancreas, skeletal muscle, and skin or underlying soft tissue. Among metastatic sites, metastasis of RCC to the stomach is quite rare [1–10], and such metastases are usually reported in autopsy series. Here, we present and discuss a case of a large tumor found in the stomach that had metastasized from a clear cell carcinoma of the right kidney.

Case presentation

A 74-year-old man, who was diagnosed with clear cell carcinoma of the right kidney by ultrasound, underwent curative nephrectomy in 2003, followed by interferon therapy. According to the TNM classification, the tumor was T3bN0M0, and stage III. In 2008, brain metastases were identified in this patient and he was treated by partial resection of the brain. One month later, he had a melena, and his hematocrit level was 20. Nasogastric intubation revealed a fresh blood clot in the stomach. Urinalysis and liver function tests were within normal limits, and serum creatinine was 1.34 mg/dl; chest and abdominal films were normal. Three units of packed blood cells were transfused at this time. An abdominal computed tomography (CT) scan showed a well-defined, heterogeneous mass (7 cm × 6 cm) that was located in the middle part of the stomach body. Gastric endoscopy confirmed a large, polypoid, friable mass with bleeding that measured about 7 cm in diameter (Fig. 1). Biopsies of this lesion revealed characteristics of RCC; thus, we diagnosed this case as gastric metastasis, because the histological findings of the biopsy specimen were similar to those of the RCC that had been removed previously. No other metastatic lesions in other organs were found by abdominal ultrasonography or CT scan. Therefore, we diagnosed his condition as gastrointestinal bleeding

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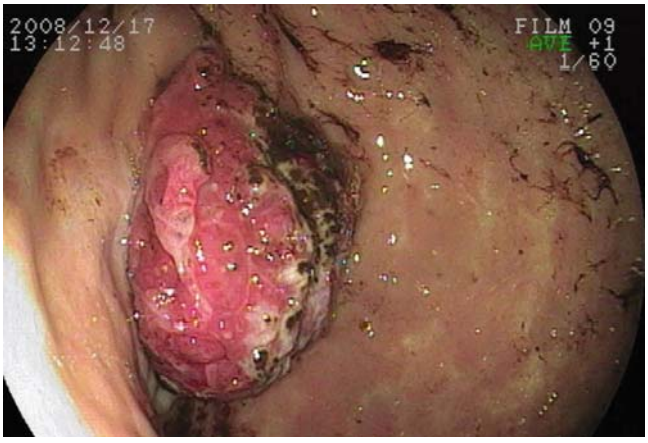

Fig. 1. Gastric endoscopy confirmed a large, polypoid, friable mass, with bleeding, that measured about 7 cm in diameter

from gastric metastasis of RCC, and surgery was scheduled.

During the course of the patient's preoperative evaluation, low-grade gastrointestinal bleeding persisted, necessitating the additional transfusion of two units of packed red blood cells prior to surgery. During the operation, a large tumor was identified in the middle of the stomach; the tumor had infiltrated the subserosa of the stomach (SS), but there was no other evidence of metastatic disease in the intraabdominal cavity. Subsequently, wedge resection of the gastric wall was performed. On gross examination, the tumor appeared as a red mass measuring 8 cm × 6 cm × 4 cm. Focal hemorrhagic and cystic areas were present (Fig. 2). Histopathological examination showed that the gastric tumor was derived from a metastasis from the right kidney, and the surgical margin was free of tumor (Fig. 3B, C). Further, immunohistochemistry indicated negative results for cytokeratin (CK) 7 (Fig. 3D) and CK20 (Fig. 3E), and c-KIT (Fig. 4F), but strong staining was observed for CD10 (Fig. 4A), vimentin (Fig. 4B), CD15 (Fig. 4C), early membrane antigen (EMA; Fig. 4D), and E-cadherin (Fig. 4E). These findings confirmed the diagnosis of RCC metastasis to the stomach. The patient died 1 month after the surgery, due to worsening of pneumonitis.

Discussion

Metastatic cancer to the stomach is uncommon, and some studies have systematically addressed this rare finding. Primary sites most frequently reported include lung and breast cancers, as well as malignant melanoma [1–10]. Metastases are more common in the gastric body and fundus, and are more likely to be single rather than multiple. Metastatic involvement of the stomach

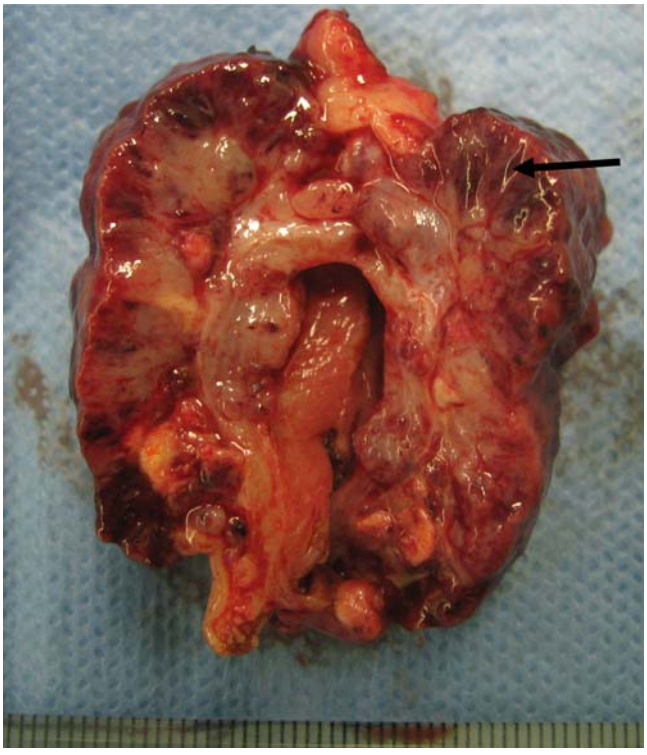

Fig. 2. Macroscopic appearance of resected specimen is shown. The tumor appeared as a red mass measuring 8 cm × 6 cm × 4 cm. Focal hemorrhagic and cystic areas were present (*arrow*)

is usually considered as an extraordinary event and accounts for only 0.2%–0.7% of gastric neoplastic diseases [1]. Further, gastric metastasis from RCC is extremely rare; only 22 cases, including the present one, have been described [11–13]. In addition, gastric metastasis of RCC is usually found after a significantly longer interval from the diagnosis of primary RCC compared with the interval between the diagnosis of the primary tumor and the diagnosis of metastatic gastric tumors that have arisen from other organs. According to Campoli et al. [5], the mean interval between the diagnosis of the primary tumor and the diagnosis of gastric metastasis from other organs, except for RCC, is 1.3 years, with half of the patients having gastric tumor recurrence within a year. Thus, gastric metastasis seems to be a late event in patients with RCC, similar to the occurrence of secondary pancreatic and thyroid involvement. While the cause of this phenomenon has remained unexplained, immunological mechanisms may be involved [9–13]. In fact, in our patient, the interval between the diagnosis of the primary RCC and the diagnosis of the gastric metastasis was 5 years. In this patient, no additional metastasis was observed in any other organ after the resection of the stomach metastasis. Because the solitary lesion in the stomach was limited, limited resection was performed.

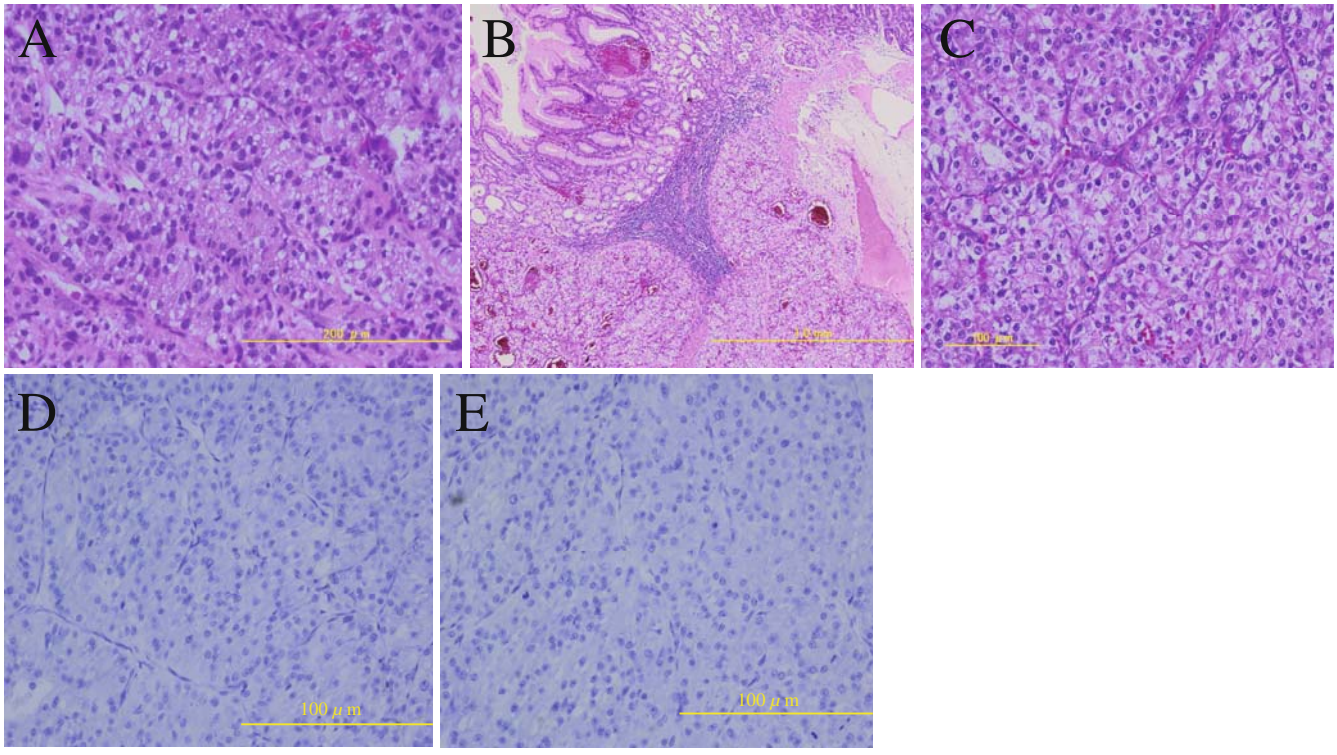

Fig. 3A–E. Microscopic examination of the tumor demonstrated typical histological findings of renal cell carcinoma in the stomach (**A** biopsy specimen; **B** and **C** resected specimen). Further, immunohistochemistry indicated negative results for cytokeratins 7 and 20 (**D** and **E**)

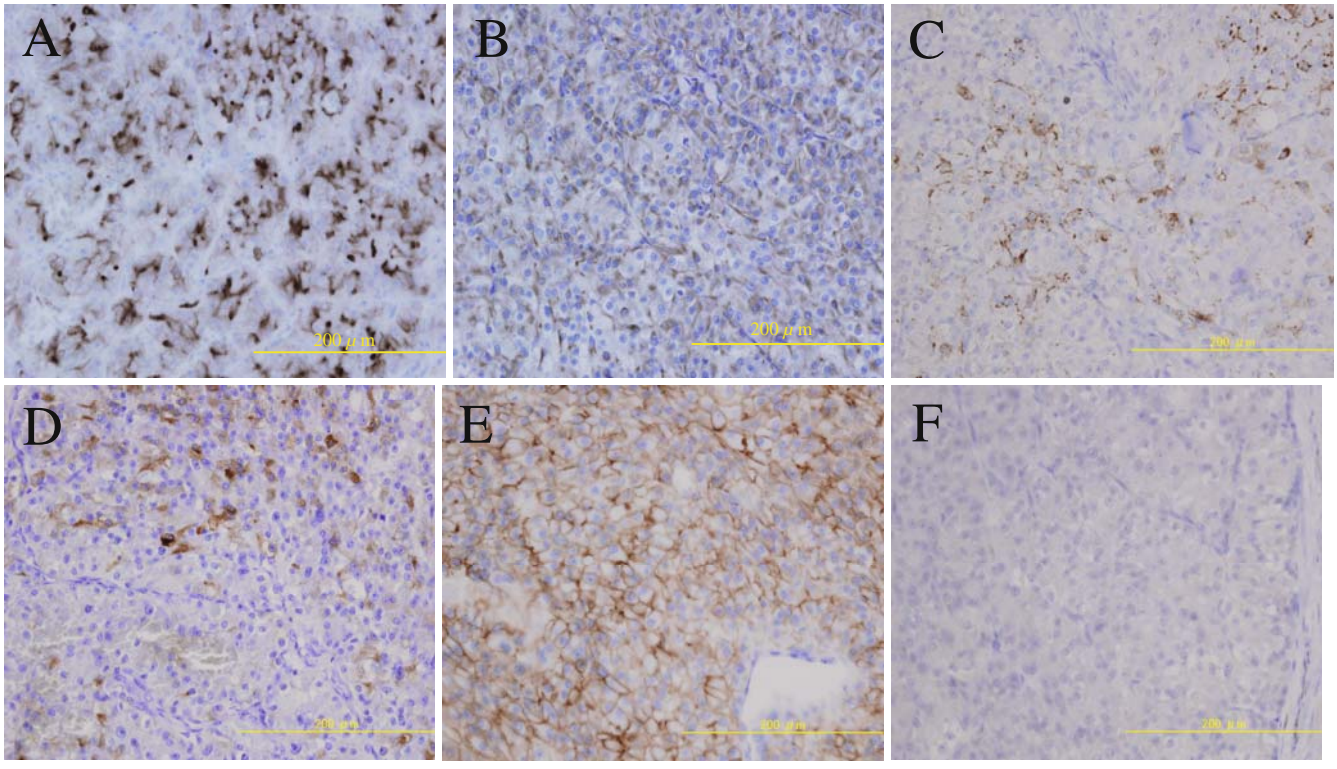

Fig. 4A–F. Immunohistochemistry indicated strong staining for CD10 (**A**), vimentin (**B**), CD15 (**C**), early membrane antigen (EMA; **D**), and E-cadherin (**E**). In addition, a negative result was observed for c-KIT (**F**)

Immunohistochemical studies are useful as differential diagnostic tools. CD10 (common acute lymphoblastic leukemia antigen; CALLA) is a cell surface enzyme expressed in several types of normal cells, including early lymphoid progenitor cells, breast and salivary gland myoepithelial cells, and the brush border of renal tubular epithelial cells. Positivity for this marker is seen in more than 90% of renal clear cell carcinomas [14, 15]. Vimentin is an intermediate filament protein expressed in normal renal tissues and in 87% of clear cell RCCs. Virtually all salivary gland tumors, except for purely myoepithelial tumors, express CK7 [16].

In our patient, RCC-associated markers, including CD10 and vimentin, showed strong staining, as expected. In addition, CK7 and CK20 were also negative, and these markers are usually positive in salivary gland tumors.

In addition, there is an important differential diagnosis between clear cell RCC and chromophobe RCC. In the present study, as expected, the markers CD15, EMA, and E-cadherin showed strong staining, and c-KIT was negative. Therefore, the immunostaining of CD15, EMA, E-cadherin, and c-KIT is useful and we were able to confirm the histological diagnosis by using these markers.

Accordingly, the diagnosis of metastatic RCC may require histochemical and immunohistochemical as well as clinical information in order to be appropriately determined.

Although gastric metastatic tumor derived from RCC is rare, the precise pre- and postoperative diagnosis may be important; thus, investigation for such metastatic tumors should be performed routinely in the follow up of patients who have been treated for RCC.

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