Solitary Synchronous Metastatic Gastric Cancer Arising from T1b Renal Cell Carcinoma: A Case Report and Systematic Review

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Metastasis to the stomach from renal cell carcinoma (RCC) is extremely rare. Usually, gastric metastasis seems to be a late event in patients with RCC and is accompanied by disseminated tumor spread to other organs. Solitary synchronous gastric metastasis from small, localized RCC has rarely been reported. We report a case of 79-year-old man with synchronous gastric metastasis presenting with a single erosive lesion from pT1 RCC. The patient underwent radical nephrectomy and endoscopic resection for metastatic gastric cancer. The resected specimen showed an ill-defined tumor, approximately 0.6 cm long, with a clear resection margin. The morphologic features of the tumor cells were consistent with those of metastatic RCC of the clear cell type. At 6 months’s follow-up, the patient did not show local recurrence or additional metastasis on upper endoscopy and computed tomography scan. *(Gut Liver 2012;6:388-394)*

**Key Words:** Stomach neoplasms; Carcinoma; Renal cell; Neoplasm metastasis

**INTRODUCTION**

Renal cell carcinoma (RCC) has a propensity to metastasize along the hematogenous route. About 20% to 25% of patients with RCC have distant metastases at presentation, and another 50% develop distant metastases or local recurrence after nephrectomy. Metastasis can occur at any time, and the most frequent sites include the lungs, bones, liver, and brain. However, RCCs can also metastasize to unusual sites, including the pancreas, thyroid, adrenal gland, skeletal muscle, and skin. Clinical courses vary among patients with RCC who initially present with metastatic disease or who develop tumor dissemination during follow-up.

RCC metastases to the stomach, including solitary synchronous gastric metastases from small, localized RCCs, are extremely rare. We here describe a patient with a solitary synchronous metastatic gastric cancer originating from a small RCC who was treated with endoscopic resection. We also review the clinical characteristics of, therapeutic modalities for, and clinical outcomes of, patients with this disease.

**CASE REPORT**

A 79-year-old man presented with abdominal pain. He had previously undergone surgery for a duodenal ulcer as well as an open cholecystectomy. He had smoked for 30 years. On physical examination, we did not detect abdominal tenderness or a mass, and laboratory tests revealed no abnormal findings. Upper endoscopy showed an erosive lesion, approximately 0.6 cm in length, in the anterior wall of the midbody (Fig. 1). A biopsy of the lesion showed tumor cells, consistent with metastatic RCC of the clear cell type. Computed tomography (CT) showed a mass, approximately 5 cm long, in the right kidney, but there was no evidence of lymph node enlargement or metastatic lesions in the abdomen (Fig. 2A). Positron emission tomography showed an isometabolic mass (maximum standardized uptake value [maxSUV], 2.7) in the right kidney (Fig. 2B and C), but no hypermetabolic lesions in other organs. The patient underwent radical nephrectomy. The resected specimen showed a well-defined lobulated mass, 5.2×3.8×3.5 cm in size, in the lower pole of the right kidney. The tumor cells had clear cytoplasm and round monotonous nuclei, both typical of clear cell carcinoma (Fig. 3). The tumor was confined to the renal parenchyma, and no lymphovascular or renal vein invasion was apparent. The
RCC was staged as T1bN0M1.

The patient subsequently underwent endoscopic submucosal dissection of the metastatic gastric lesion (Fig. 4). Microscopic examination of the resected specimen showed an ill-defined tumor, about 0.6 cm long, with clear resection margins, a finding consistent with metastatic RCC (Fig. 5). Upper endoscopy and a CT scan performed 6 months later showed no evidence of local recurrence or additional metastasis.

DISCUSSION

Although metastatic gastric cancers are uncommon, those observed are frequently metastases of lung cancer, breast cancer, and malignant melanoma.5-8 The clinical symptoms most commonly requiring endoscopy of patients with gastric metastasis include anemia, gastrointestinal bleeding, dyspepsia, and epigastric pain. Metastases are most common in the gastric body, and are more likely to be single rather than multiple. Grossly, such lesions can resemble submucosal tumors, with or without central depressions, or primary gastric cancers.8 The outcome of patients with metastatic gastric cancer is generally poor, because concomitant metastases to other organs are common.5

Fig. 1. Upper endoscopy showing an erosive lesion approximately 0.6 cm long in the anterior wall of the gastric mid-body.

Fig. 2. (A) Computed tomography showing a hypervascular mass (arrow) approximately 5 cm long and bilobular in shape in the right kidney. (B, C) Positron emission tomography showing an isometabolic mass (arrow, maxSUV 2.7) in the right kidney. maxSUV, maximum standardized uptake value.

Fig. 3. Pathology findings for the tumor of the right kidney. The tumor was 5.2×3.8×3.5 cm in size, located in the lower pole (arrow), and confined to the renal parenchyma. Thus, lymphovascular invasion and tumor emboli in the renal vein were absent in the tumor. The Fuhrman nuclear grade was 2/4. Inset: The tumor cells had clear cytoplasm and round nuclei, typical of renal cell carcinoma of the clear cell type (H&E stain, ×400).
Metastasis to the stomach from RCC is extremely rare, although we identified as many as 36 such patients (including the patient described here, but excluding those identified on autopsy) by systematic review of articles in English using a computerized search of the PubMed database (Table 1).

We found that gastric metastases from RCC were more common in males than in females (26 males vs 9 females). Median age at presentation was 67 years (range, 48 to 84 years). Among the most frequent clinical symptoms were upper gastrointestinal bleeding, anemia, and epigastric pain. Some patients were asymptomatic or had nonspecific symptoms. The most frequent location of metastatic lesions was the gastric body, followed by the fundus and the antrum. A single polypoid lesion was more common than were multiple or ulcerated lesions. The size of such metastatic tumors varied from 0.5 to 8.0 cm. The average period from RCC surgery to the presentation of gastric meta-

Fig. 4. Endoscopic resection of the metastatic lesion of the stomach. (A) Marking associated with soft coagulation. (B) Snaring after pre-cutting with a needle knife and partial submucosal dissection with an IT-knife after the injection of a saline-epinephrine solution into the submucosa. (C) Ulcer after endoscopic resection. (D) Grossly resected specimen.

Fig. 5. Microscopic features of the resected specimen showing the characteristics of a metastatic gastric tumor arising from renal cell carcinoma (RCC). (A) The poorly defined tumor, approximately 0.6 cm long, was located in the submucosa, extended to the lamina propria (arrow), and did not involve the deep resection margins (H&E stain, ×40). (B) The morphologic features of the tumor cells were consistent with the features of metastatic RCC of the clear cell type (H&E stain, ×400).
| Case                          | Age/Gender | Symptoms                        | Location    | Characteristics of metastatic lesions | Interval, yr | Treatment     | Outcome                  | Histologic type     | TNM stage | Additional metastasis |
|------------------------------|------------|---------------------------------|-------------|---------------------------------------|--------------|--------------|--------------------------|---------------------|-----------|-----------------------|
| Sullivan et al. (1980)        | 69/M       | Melena, anemia                  | Antrum      | Single, polypoid                      | 7            | Antrectomy    | -                        | Clear cell carcinoma | 3b/0/0    | None                  |
| Nakamura et al. (1984)        | 65/M       | Melena                          | -           | -                                     | 9            | PG            | Died 33 days after operation | Clear cell carcinoma | -         | Ileum                 |
| Cosme et al. (1984)           | 84/F       | Melena                          | -           | -                                     | 24           | -            | -                        | -                   | -         | -                     |
| Bisesti et al. (1984)         | 64/M       | Chest pain                      | -           | -                                     | 14           | STG           | -                        | -                   | -         | -                     |
| Ibáñez Olcoz et al. (1989)    | 60/F       | Melena                          | Body        | Two, polypoid, 5 cm                   | 1.8          | None          | Died 4 wk after discharge  | Clear cell carcinoma | 3b/X/X    | Lung, brain            |
| Ibáñez Olcoz et al. (1989)    | 67/M       | Melena                          | -           | -                                     | 0.1          | None          | -                        | Clear cell carcinoma | -         | -                     |
| Márquez et al. (1992)         | 70/M       | Melena, UGI bleeding, anemia    | Body        | Single, ulcerated, 1.5 cm             | 0.1          | None          | Died 4 wk after diagnosis | Clear cell carcinoma | 3a/X/X    | Lung                  |
| Durous et al. (1992)          | 66/M       | Anemia                          | Fundus      | Three lesions                         | 12           | Interferon    | Alive with disease        | Clear cell carcinoma | 1a/0/X    | Lung, parotid          |
| Otawa et al. (1992)           | 61/F       | Hema-temesis                    | -           | -                                     | 0            | TG            | Died 3 mo after operation | -                   | -         | None                  |
| Herrera Puerto et al. (1993)  | 63/M       | Hema-temesis, melanoma          | Antrum      | Single, ulcerated                     | 0.1          | None          | Died 4 wk after nephrectomy| Clear cell carcinoma | 3b/X/X    | None                  |
| Boruchowicz et al. (1995)     | 48/M       | Dysphagia                       | Fundus      | Polypoid                              | 1.3          | CTx           | Died at 4 mo              | Clear cell carcinoma | -         | -                     |
| Blake et al. (1995)           | 63/M       | UGI bleeding                    | -           | -                                     | 6            | -            | No complication at 5 mo   | Clear cell carcinoma | -         | Lung                  |
| Odori et al. (1998)           | 59/M       | -                               | Body        | Single, ulcerated, 1.5 cm             | 4.4          | TG with regional LND | No tumor recurrence at 17 mo | Clear cell carcinoma | 2/0/0     | None                  |
| Picchio et al. (2000)         | 64/F       | Melena, anemia                  | Body        | Single, polypoid, 1.5 cm              | 14           | STG           | No tumor recurrence at 6 mo | Clear cell carcinoma | 2/0/0     | None                  |
| Mascarenhas et al. (2001)     | 66/M       | Hema-temesis, melanoma          | Body        | Single, ulcerated, 5 cm               | 4            | PG            | No tumor recurrence at 3 yr | Clear cell carcinoma | -         | Lung, pleura           |
| Kok Wee et al. (2004)         | 60/M       | Melena                          | Body        | Two lesions                           | 20           | Endoscopic ablation | -                        | Clear cell carcinoma | -         | -                     |
| Kobayashi et al. (2004)       | 78/M       | Anemia                          | -           | 0.5 cm                                | 4            | Gastrectomy   | Died at 5 mo              | Clear cell carcinoma | -         | Liver                 |
| Suarez Fonseca et al. (2004)  | 61/F       | Melena, anemia, epigastric pain | Body        | Single, polypoid, 6 cm                | 4            | None          | Alive with disease at 6 mo | Clear cell carcinoma | 3b/0/0    | Lung                  |
| Lamb et al. (2005)            | 69/F       | UGI bleeding, melanoma          | Body        | 5 cm                                  | 3            | Palliative embolization | Died at 23 mo              | Clear cell carcinoma | -         | -                     |
| Riviello et al. (2006)        | 68/M       | UGI bleeding, melanoma          | Fundus      | Single, polypoid, 5 cm                | 11           | TG, CTx       | Died at 2 yr              | Clear cell carcinoma | -         | Lung, liver, pancreas   |
| Portanova et al. (2006)       | 67/F       | Melena, dyspnea                 | Body        | Single, ulcerated, 3 cm               | 5            | Gastrectomy   | -                        | Clear cell carcinoma | 3a/X/X    | Pancreas               |
sis was approximately 6.5 years (range, 0 to 24 years). Twenty-one patients showed disseminated tumor spread to other organs, most frequently to the lungs. Ten patients had solitary gastric metastases. Two patients presented with metastatic gastric cancer arising from RCC before detection of a renal mass; one patient was diagnosed with advanced RCC with metastatic gastric cancer as well as lung and bone metastases, and the second patient, described here, had a single gastric metastasis arising from a small RCC without evidence of additional metastases.

The optimal treatment for patients with gastric metastases arising from RCC remains unclear. Fourteen previously reported patients underwent surgical resection (total/partial gastrectomy or wedge resection); 3 (including the patient described here) received endoscopic resection/excision; 7 were treated with systemic therapy including interferon, tamoxifen, sunitinib malate, or chemotherapy; 6 received palliative embolization or endo-

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**Table 1. Continued**

| Case                      | Age/ Gender | Symptoms | Location          | Characteristics of metastatic lesions | Interval, yr | Treatment                      | Outcome                      | Histologic type | TNM stage | Additional metastasis |
|---------------------------|-------------|----------|-------------------|---------------------------------------|--------------|--------------------------------|-----------------------------|-----------------|-----------|-----------------------|
| Saidi et al. (2007)³⁵     | -           | Melena, anemia | Body             | Single, polypoid, 1 cm                 | 10           | WR                             | No tumor recurrence at 18 mo | Clear cell carcinoma | -         | None                  |
| Pezzoli et al. (2007)³⁵   | 78/M        | Anemia   | Body              | Three, polypoid, 2-3 cm                | 5            | Endoscopic mucosal resection   | Died 6 mo after surgery    | Clear cell carcinoma | -         | Multiple              |
| Pollheimer et al. (2008)³⁰| 69/M        | Epigastric pain, nausea, emesis | Body | Single, ulcerated, 7.5 cm | 4.2 | Tamoxifen | Died at 19 mo | Clear cell carcinoma | 2/X/X | Lung, bone, adrenal   |
| Pollheimer et al. (2008)³⁰| 77M         | None     | Antrum            | Single, ulcerated, 3 cm                | 6.3          | Interferon                     | Died at 4 mo               | Clear cell carcinoma | 3a/X/X | Lung, bone             |
| Pollheimer et al. (2008)³⁰| 83/F        | Melena, anemia | Antrum | Multiple, 4.5 cm | 1.7 | Endoscopic ablation           | Died at 5 mo               | Clear cell carcinoma | 3b/X/X | Lung, liver, pancreas |
| Pollheimer et al. (2008)³⁰| 65/F        | UGI bleeding, melena, anemia | -     | Two, 4 cm            | 13.1         | Endoscopic ablation           | Died at 3 mo               | Clear cell carcinoma | 3a/X/X | Lung, brain            |
| Pollheimer et al. (2008)³⁰| 69/M        | Anemia, epigastric pain | Body | Multiple, 5.4 cm | 9.3 | Endoscopic ablation, sunitinib | Alive with disease at 2 yr | Clear cell carcinoma | 3a/X/X | Lung, bone             |
| Ko et al. (2008)³¹        | 71/M        | Abdominal pain | Body             | Multiple, polypoid                     | 0            | None                           | Alive with disease         | -                | -         | Lung                  |
| Kibria et al. (2009)³¹    | 53/M        | Melena, dizziness | Fundus | Single, polypoid, 1.5 cm | 0 | None                           | Died 2 mo after diagnosis  | Clear cell carcinoma | -         | -         | Lung                  |
| Yamamoto et al. (2009)³¹ | 74/M        | Melena   | Body              | Single, polypoid, 8 cm                 | 5            | WR                             | Died 4 wk after wedge resection | -               | 3b/0/0 | Brain                 |
| Maeda et al. (2009)³¹     | 49/M        | Nonspecific | Body             | Single, polypoid, 2 cm                 | 2            | PG                             | Died 15 mo after operation | Clear cell carcinoma | 3a/0/1 | -                     |
| Sugasawa et al. (2010)³⁵  | 69/M        | Melena   | Fundus            | Single, elevated lesion with ulcer     | 19           | WR                             | No recurrence at 12 mo      | Clear cell carcinoma | 1/0/0 | None                  |
| Garcia-Campelo et al. (2010)³⁶ | 75/M    | Nonspecific | Fundus, body      | Several, multilobulated and polypoid, 0.6-1.5 cm | 3 | Sunitinib                     | Complete response 6 mo after treatment | -                | 3/0/0 | None                  |
| Eslick et al. (2010)³⁷    | 65/M        | Melena   | Lower stomach     | Single, polypoid lesion with oozing blood | 9            | Snare polypectomy             | Alive 7 yr after diagnosis  | Clear cell carcinoma | 3a/X/X | None                  |
| The present case          | 79/M        | Abdominal pain | Body             | Single, 0.6 cm                        | 0            | Endoscopic submucosal dissection | No tumor recurrence at 6 mo | Clear cell carcinoma | 1b/0/1 | None                  |

RCC, renal cell carcinoma; TNM, tumor, node, metastasis; UGI, upper gastrointestinal tract; PG, partial gastrectomy; STG, subtotal gastrectomy; TG, total gastrectomy; CTx, chemotherapy; LND, lymph node dissection; WR, wedge resection; -, not specified.
scopic ablation for control of bleeding; whereas 7 received no specific therapy.

The clinical course in patients with RCC and metastasis to the stomach appears to be unpredictable. Generally, the outcome of patients with RCC and gastric metastases is poor. Some patients die within a few weeks, whereas six (including ours) showed no tumor recurrence at a median of 17 months (range, 6 to 36 months) after metastatectomy. Of 10 patients with solitary gastric metastases, 6 underwent surgical metastatectomy, 2 underwent endoscopic resection (snare polypectomy and endoscopic submucosal dissection), 1 was treated with sunitinib malate, and 1 received no therapy. Five patients showed no evidence of tumor recurrence at a median of 12 months (range, 6 to 18 months) after metastatectomy, and one patient lived for 7 years after diagnosis. One patient showed a complete response 6 months after treatment with sunitinib malate.

Although the optimal treatment for patients with solitary gastric metastasis arising from RCC remains unclear, patients with potentially surgically resectable primary RCC and a solitary resectable metastatic cancer are candidates for nephrectomy and metastatectomy. Patients in generally good condition showed prolonged survival after nephrectomy and complete resection of the metastatic lesion. Similarly, complete metastatectomy may offer survival benefits in patients with solitary gastric metastases arising from RCC. The optimal treatment modality in a patient with a small, solitary gastric metastasis confined to the mucosa and submucosa may be endoscopic resection.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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