Metastatic Renal Cell Carcinoma Manifesting as a Gastric Polyp on CT: A Case Report and Literature Review

CT상 고혈관성 위용종으로 보이는 전이성 신세포암: 증례 보고 및 문헌 고찰

Hyun Jin Kim, MD1, Beom Jin Park, MD1*, Deuk Jae Sung, MD1, Min Ju Kim, MD1, Na Yeon Han, MD1, Ki Choon Sim, MD1, Yoo Jin Lee, MD1

Departments of 1Radiology and 2Pathology, Korea University Anam Hospital, Seoul, Korea

Gastric metastasis from renal cell carcinoma (RCC) is extremely rare, occurring in 0.2% of all RCC cases. Owing to its low prevalence, metachronous gastric metastasis from RCC may be underdiagnosed, and the imaging findings have not been well-established. Herein we present a case of metastatic RCC manifesting as a gastric polyp in a 70-year-old female along with a literature review on the imaging findings of gastric metastases from RCC. In patients presenting with gastric hyper-enhancing polypoid masses, metastasis from RCC should be considered as a differential diagnosis.

Index terms Carcinoma, Renal Cell; Polyposis, Gastric; Stomach Neoplasms

INTRODUCTION

Metastatic gastric tumors are extremely rare, where the lifetime prevalence among patients with underlying malignancies is reported to be 0.7%–1.7% (1, 2). Breast and lung cancer, and malignant melanoma are the most common primary malignancies (2, 3). Although metastasis may develop in a substantial number of patients with renal cell carcinoma (RCC), gastric metastasis is very uncommon, occurring only in 0.2% to 0.7% of all RCC cases (2, 4-6). Due to its rarity, the radiological features of RCC that manifest in the stomach have not been well-established on CT. Furthermore, gastric metastasis from RCC tend to be hypervascular and may cause gastrointestinal bleeding, thereby requiring close observation and prompt treatment. Thus, we report a case of metastatic...
Hypervascular Polypoid Gastric Metastasis from RCC

CASE REPORT

A 70-year-old female was referred to the genitourinary department for the evaluation of an incidentally discovered a 5.0 cm, well-defined, lobulated, hypervascular mass in the left kidney lower pole (Fig. 1A). Thoracoabdominal CT scan and renal scintigraphy showed no other visceral or lymph node metastases. After left nephrectomy, the patient was diagnosed with clear cell RCC (cT1bN0M0). Four years later, another small metastatic RCC was detected in the contralateral kidney on CT scan (Fig. 1B), for which she received cryoablation. In addition, bone metastasis developed in right sacral ala after two years.

A one year follow-up CT scan disclosed a 1.8 cm sized, well-defined, lobulated, polypoid mass on the posterior wall of high gastric body, manifesting strong arterial enhancement with washout in delayed phase (Fig. 1C). Esophagogastroduodenoscopy revealed a protruding polypoid mass with blood clots arising from greater curvature of high gastric body (Fig. 1D). Suspected to be advanced gastric cancer (Bormann type 1) or metastatic gastric tumor, endoscopic biopsy was performed. On microscopic examination, polygonal to cuboidal shaped tumor cells with distinct cell border and clear cytoplasm were identified (Fig. 1E, right). These cells were reactive with RCC marker and CD10 immunostains, consistent with metastatic RCC, clear cell type (Fig. 1E, left).

At 2 weeks’ follow-up examination, the patient complained of melena and the laboratory test results indicated a low hemoglobin level (8.4 g/dL). After conservative treatment with proton pump inhibitor drugs, the patient’s condition improved. However, subsequent CT revealed focal arterial enhancement at previous biopsy site, suggesting residual viable component (Fig. 1F, right). After 3 months, recurrent hyper-enhancing intraluminal polypoid tumor was noted at high gastric body (Fig. 1F, left).

This study was approved by the Institutional Review Board of our institution and the requirement for informed consent was waived (IRB No. 2021AN0136).

DISCUSSION

The common sites of metastasis from RCC are lung, bone, liver, adrenal glands and brain with frequency estimated to be around 45%, 30%, 20%, 9%, and 8%, respectively (4). On contrary, incidence of gastric metastasis attributable to disseminated RCC is exceedingly rare (1, 2, 5-10). Pollheimer et al. (8), from a single-center computerized RCC database, have reported that only 5 out of 2082 RCC patients developed gastric metastasis. Though rare, most patients with late gastric metastasis commonly manifest concomitant metastasis to other solid organs, especially lungs. Thus, gastric metastasis may be an indicator of advanced and progressed disease, consistent with our case.

Due to its rarity, only a few case reports or series exist that delineate the pathognomonic image features of metastatic RCC involving stomach. The majority of literatures emphasized endoscopic or macroscopic appearances and clinicopathologic findings, and so far only 7 of...
78 previous reports included its contrast-enhanced CT images. Furthermore, some of the images were outdated with poor image quality and only two articles specifically focused on describing the radiologic features rather than analyzing clinical and histopathologic outcomes (1, 2). Thus, there is still no widely accepted characteristic image finding for the diagnosis of gastric metastasis from RCC.

The reported cases of gastric metastases from RCC in the English literature until 2020, including our case (literature search lists in Supplementary Table 1 in the online-only Data Supplement), are summarized in Table 1. The patients had mean age of 64.9 years, of whom
72% were male. The tumors had average size of 3.1 cm (range: 0.4–10.0 cm) and were mostly located in the middle (43%) and upper (37%) body of the stomach. Mass may be situated in submucosa or mucosa and appear as polypoid mass (50.6%), ulcer (17.7%), relatively large mass (10.1%), elevated lesion (10.1%), minor erosion (3.8%); thus, polypoid morphology being the most frequent. Metastases from RCC are usually hypervascular as with primary tumor, therefore revealing heterogeneous hyperenhancement (1, 2, 8). Differential diagnosis of such hypervascular gastric tumors include not only metastasis, but also primary gastric mucosal and subepithelial tumors. Though rare, some gastric cancers may resemble subepithelial tumors and appear hypervascular. Furthermore, subepithelial tumors such as neuroendocrine tumors, gastrointestinal stromal tumor, glomus tumor, hemangioma, angiosarcoma, Kaposi sarcoma, nerve sheath tumors, heterotopic tissues, and vascular structures are considered as differential diagnosis of hypervascular polypoid mass involving the stomach (3).

Our case report not only includes the endoscopic feature, but also dynamic CT findings of primary RCC lesion and subsequent evolution of its secondary metastasis to the stomach. In addition, arterial phase, the most optimal CT protocol for detecting and characterizing hypervascular lesions, was included. CT images of the present case reveal a couple of features
consistent with the macroscopic appearances delineated in previous reviews, where the initial metastatic lesion appears as a well-circumscribed, polypoid mass at gastric body, demonstrating strong enhancement and delayed washout. After its endoscopic biopsy, the residual viable component manifests avid focal enhancement compared with the adjacent gastric mucosa and submucosa on the arterial phase. The following recurrent tumor also shows imaging features analogous to the initial morphology.

As claimed by Satomi (10), the growth rate of RCC may be classified as slow or rapid. In our case, metastases developed in contralateral kidney and stomach after 4 and 7 years of the first surgery, respectively. Favorable prognostic factor was that the metastatic lesions were slow-growing type, where the time interval from radical excision of the primary tumor to the detection of gastric metastasis was 6.5 years, more than the standard 6.3 years suggested by Satomi (10). Nonetheless, our case also presented with several poor prognostic factors denoted by Namikawa et al. (6), including protruding gastric lesion and multiple metastases.

Treatment modalities for RCC with gastric metastases include surgery, endoscopic resection, intervention, drug and palliative therapies. However, no definite therapeutic strategy has been established for the affected patients. For patients with favorable performance status and a resectable, slow-growing metastatic lesion, surgery is recommended; those with rapid-growing type metastasis cannot expect a promising outcome (2, 7). In our case, the patient had multiple metastases and thus, endoscopic biopsy, rather than surgery, was undertaken. Ultimately, residual viable portion progressed to local tumor recurrence. Thus, treatment should be chosen considering the patient’s overall performance status and prognostic factors. Newly emerging treatment modalities including administration of anti-angiogenic agents might also contribute to better survival.

Table 1. Review of Renal Cell Carcinoma Metastasis in a Literature Search

| Gross Appearance | Combined Features | Cases (Total = 79) | Available Image |
|------------------|-------------------|-------------------|----------------|
| Polypoid         | NC                | 40 (50.6)         | 6              |
|                  | Ulceration        | 31                | 5              |
|                  | Erosion           | 6                 |                |
| Ulcer            | 14 (17.7)         | 2                 |                |
| Mass             | 8 (10.1)          | 1                 |                |
| NC               | 5                 | 1                 |                |
| Subepithelial    | 3                 |                   |                |
| Elevated         | 8 (10.1)          |                   |                |
| NC               | 4                 |                   |                |
| Erosion          | 3 (3.8)           |                   |                |
| Others           | 6 (7.6)           |                   |                |
| Linitis plastica| 1                 |                   |                |
| Not available    | 5                 |                   |                |

NC = no combined feature
In conclusion, considering low detection rate of gastric poly on CT scan and low prevalence rate of metastatic RCC involving stomach, radiologic findings of the latter have not been well-established, which may ultimately lead to under-diagnosis. Therefore, evaluation of our case and review of other literatures suggest that if a patient with history of RCC manifests a hyper-enhancing intraluminal polyoid tumor with or without central depression on CT scan, gastric metastasis from RCC should be considered as a differential. Careful interpretation of radiological images from appropriate CT protocol including the arterial phase will not only allow accurate diagnosis but also prompt and appropriate treatment.

Supplementary Materials
The online-only Data Supplement is available with this article at https://doi.org/10.3348/jksr.2021.0051.

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Conflicts of Interest
The authors have no potential conflicts of interest to disclose.

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CT상 고혈관성 위용종으로 보이는 전이성 신세포암: 증례 보고 및 문헌 고찰

김현진1·박범진1*, 성득제1·김민주1·한나연1·심기춘1·이유진2

신세포암(renal cell carcinoma; 이하 RCC)으로 인한 위전이는 매우 드물며, 모든 신세포암 사례의 0.2%에서 발생한다. 낮은 유병률로 인해 영상 소견은 아직 정확히 정립되지 않은 상태로 RCC로 인한 위전이는 영상 진단이 어려울 수 있다. 이에 저자들은 70세 여성에서 발생한 RCC의 위전이 사례와 영상 소견을 보고하고, 현재까지 보고된 문헌을 검토하여 영상 소견을 정리하였다. 위에 고조영 증강 용종이나 종괴가 새로 보이는 경우, 신세포암에 의한 전이암의 감별이 필요하다.

고려대학교 안암병원 1영상의학과, 2병리학과