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**Case Report**

# “Homomorphic” Tumor Metastases as an Endodiagnostic Clue: A Case Series of Renal-Cell Carcinoma Metastatic to the Stomach

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**Keywords**

Gastric tumor · Renal-cell carcinoma · Metastatic lesion · Endoscopy

**Abstract**

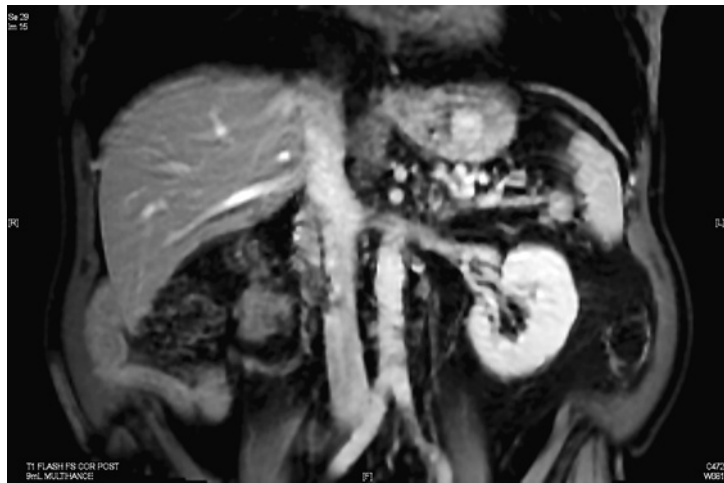
Distinguishing between a primary malignancy and a metastasis can be challenging in some cases. Herein, we describe 2 cases of gastric lesions that were endoscopically sampled and ultimately found to be metastatic from a renal-cell carcinoma. In both cases, the gastric metastases were endoscopically homomorphic to the primary organ (the kidney); i.e., grossly resembling and thus providing an endoscopic clue as to the primary tumor source. We report on the evaluation of obscure metastatic gastric involvement of malignancy and present the concept of homomorphism as a potential diagnostic clue in determining the source of unknown and often unsuspected primary malignancy.

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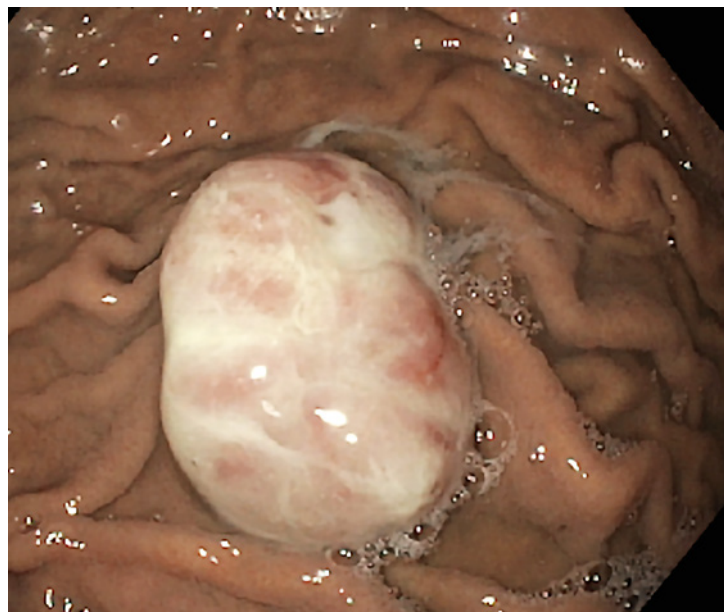
**Introduction**

Determining the underlying source of a malignancy is of paramount importance to appropriately guide medical and surgical therapy. Malignancy involving the gastrointestinal (GI) tract is no exception to this, but in some instances it can be particularly challenging to

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**Fig. 1.** Magnetic resonance imaging of the abdomen with contrast revealed an indeterminate, ovoid lesion in the proximal stomach.

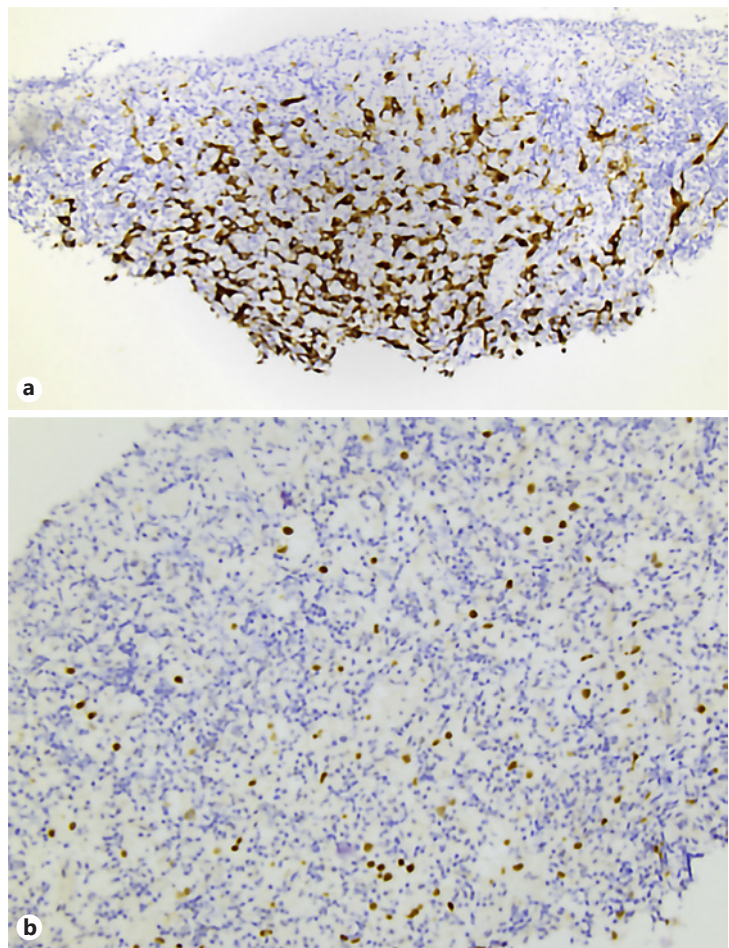


**Fig. 2.** Upper endoscopy revealed a 2-cm, kidney-like lesion in the proximal stomach.

Color version available online

determine whether a lesion is metastatic or primary. If it is a primary lesion, determining from what organ system and cell type a tumor originates can also be difficult – despite advances in endoscopy, imaging, and immunohistopathology. This is further compounded by the fact that metastases to the luminal GI tract are quite uncommon and thus are often clinically unsuspected, emphasizing the need for maintaining a broad differential diagnosis and having knowledge of often subtle, diagnostic clues pointing toward this possibility.

We report on 2 cases of malignancy with metastases to the GI tract wherein the metastatic lesion was curiously “homomorphic” in the sense that the lesion’s appearance resembled what was ultimately identified as the primary tumor source. This relatively novel term within the biomedical literature and the concept of tumor homomorphism that is proposed herein can be leveraged as a potential diagnostic clue in determining an otherwise unsuspected or unknown primary site of malignancy.



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**Fig. 3.** Histopathology illustrated by AE1–3 cyokeratin staining displayed tumor cells (a), while staining with PAX-8 (nuclear) confirmed the renal origin (b), collectively indicating metastatic renal carcinoma.

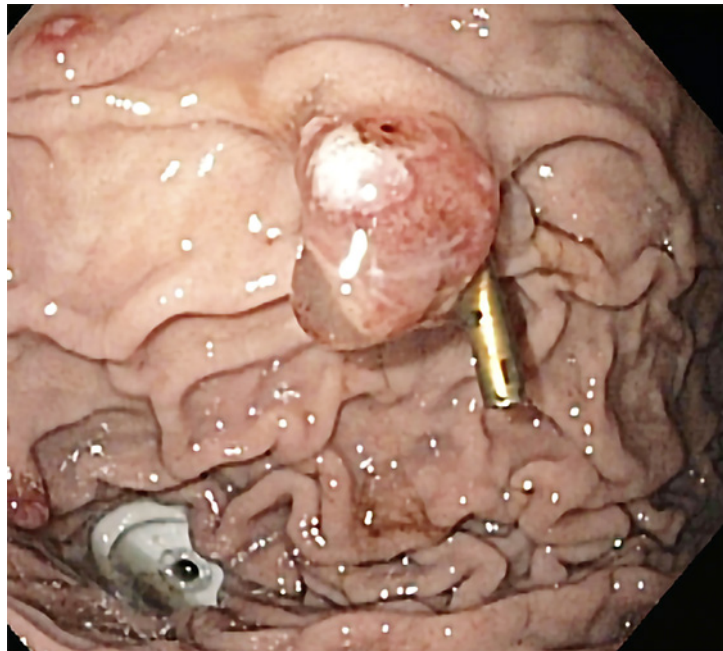
## Case Presentations

### Case 1

An 85-year-old male with a history of right renal-cell carcinoma (RCC) status post right nephrectomy 2 years before presented to his primary care clinic noting dyspepsia and malaise. Magnetic resonance imaging of the abdomen was performed both for surveillance as well as diagnostic purposes and revealed an indeterminate, ovoid, soft-tissue lesion in the proximal stomach (Fig. 1). The patient was thus referred for upper endoscopy with endoscopic ultrasound for further evaluation. This revealed a 2 cm, semi-pedunculated, kidney-like lesion (Fig. 2) which on endoscopic ultrasound was hypoechoic-isoechoic, with a thin hypoechoic rim. Cold forceps biopsy and fine-needle biopsy were performed, with histopathology and immunohistochemistry revealing metastatic renal carcinoma (Fig. 3a, b). The patient was ultimately referred back to oncology for palliative chemotherapy.

### Case 2

A 70-year-old male presented to the gastroenterology clinic for evaluation of progressive malaise, new-onset anemia, and weight loss. Abdominal imaging revealed a 3-cm left renal mass concerning for malignancy. As part of the patient's workup, upper endoscopy was performed and revealed a 1-cm, kidney-like lesion (Fig. 4). Cold forceps biopsies were obtained, and in conjunction with imaging findings of a renal mass, confirmed metastatic RCC (Fig. 5a, b). The patient was referred to oncology and urology for palliative management of newly diagnosed metastatic RCC.



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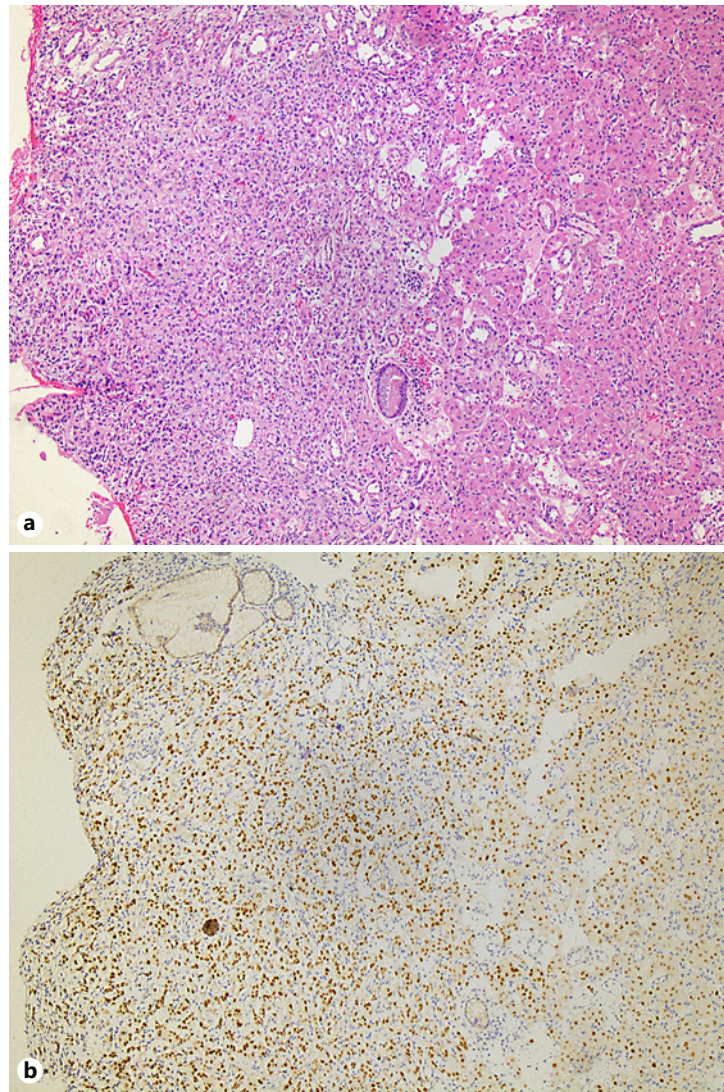
**Fig. 4.** Upper endoscopy revealed a 1-cm, kidney-like lesion in the fundus of the stomach.

## Discussion

Gastric malignancies are largely primary in nature, with metastatic involvement of the stomach being a relatively rare occurrence (approx. 0.2–1.7% of the cases) [1, 2]. The most common primary malignancies with metastasis to the stomach are the breast and lungs, comprising roughly 80% of the cases. However, more recherché sources of gastric metastasis, such as the esophagus, head and neck, uterus, ovary, bladder, and brain, have been reported [1, 3]. Based on the published literature and clinical experience, gastric metastases from RCC are even more rare [4].

The late diagnosis of advanced disease in patients with malignant involvement of the stomach may be attributed to its generally vague associated symptoms. In addition, the classic clinical symptomatology of dyspepsia, early satiety, and anemia, is shared by patients with primary and metastatic gastric neoplasms, making it difficult to distinguish between these two disease processes. Gastric metastasis from the breast or lung are often more promptly diagnosed owing to increased awareness of these primary sites' ability to spread to the stomach [5]. Meanwhile, diagnosis of gastric metastasis from RCC is usually a late event, presumably, on the basis of its rarity [6]. In our first case, the patient had a known history of RCC, and his malaise, though nonspecific, was immediately concerning for possible disease recurrence. Additionally, the gastric lesion itself was atypical in appearance for primary gastric cancer, which is generally topographically irregular, ulcerated, and friable. Most notable was that the lesion was remarkably homomorphic to what was histopathologically confirmed to be the primary tumor site, the kidney. Combined, these factors helped identify the primary source, which would have otherwise been very challenging.

Endoscopic findings of a depressed area covered by intact mucosa or an elevated submucosal tumor that is ulcerated at the apex – the “bull’s eye sign” or “volcano-like ulcer,” respectively – occur in about 50% of the metastatic gastric tumors [7]. Although this can hint toward metastatic disease, numerous other pathological processes present in a similar manner [1, 8].



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**Fig. 5.** Histopathology illustrated by AE1–3 cyokeratin staining displayed tumor cells (a), while staining with PAX-8 (nuclear) confirmed the renal origin (b), collectively indicating metastatic renal carcinoma.

Additionally, the absence of dysplasia of the gastric epithelium may help differentiate metastasis, but this also cannot exclude a primary gastric cancer [7, 8]. Thus, while challenging, especially when gastric mucosal infiltration is present, differentiating between primary and metastatic disease is of paramount importance [7]. As illustrated in both our cases, the concept of homomorphism coincided with the ultimate diagnosis.

In conclusion, although rare, RCC can metastasize to the stomach and do so with nonspecific symptoms. Metastasis to the stomach is often a late diagnosis and associated with poorer patient outcomes. Tumor homomorphism can be a unique diagnostic clue to the primary source of malignancy, particularly in cases where imaging and/or histopathology do not provide sufficient diagnostic data and/or to help confirm the possibility of a rare site/source of metastasis.

### Statement of Ethics

Written informed consent was obtained to publish this case as well as to include any images for publication. Ethical considerations were taken into account according to the principles that comply with the guidelines for human studies. In addition, the research was conducted ethically in accordance with the World Medical Association Declaration of Helsinki. No funding, sponsors, institutional affiliations, potential conflicts of interest, incentives for subjects and information exist within.

### Disclosure Statement

The authors have no conflicts of interest to declare.

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### Author Contributions

S.W. and T.I.M. assisted with manuscript preparation and editing. S.W., T.I.M., and J.H.T. drafted and critically revised the manuscript. A.Z. critically revised the manuscript. J.H.T. and R.T. provided histopathology data, endoscopy images, and edited the manuscript. S.W. and J.H.T. are the article guarantors.

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