Letter to the Editor

False positive of ^{68}Ga-DOTATATE uptake in multiple duodenum and pancreatic metastasis of renal clear cell carcinoma: a case description

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Introduction

Renal cell carcinoma (RCC) represents the most prevalent form of urogenital malignancy, exhibiting a mortality rate ranging from 30% to 40%. Among many different histologic variants of RCC, clear cell RCC (ccRCC) is the most common histological type (1). Despite its potential for early detection and effective management through surgical or ablative interventions, ccRCC presents significant challenges in terms of clinical management. Approximately 25% of ccRCC cases manifest metastasis, with the lungs, bones, liver, and brain being the predominant sites for metastatic dissemination (2). The gastrointestinal tract (GIT) is not a common site for metastatic ccRCC. Metastatic ccRCC carries a poor prognosis, with untreated patients having a 5-year survival rate ranging from 0% to 18% (3). Therefore, early detection of distant metastasis in ccRCC is crucial for determining appropriate treatment strategies and assessing patient prognosis.

Imaging examinations play a pivotal role in metastatic diagnosis by employing computed tomography (CT) or magnetic resonance (MR) imaging to assess tumor size and extent of localized disease. However, conventional examinations exhibit limited specificity and do not facilitate characterization of lesions. The expression of somatostatin receptor (SSTR) in ccRCC has been reported and ^{68}Ga-DOTA-octreotate (DOTATATE) exhibits a higher affinity for SSTR subtype 2 (SSTR2) receptors (4). Therefore, positron emission tomography/CT (PET/CT) using ^{68}Ga-DOTATATE has the potential to be employed for the surveillance of ccRCC, which has been rarely reported. Here, we present a case demonstrating the uptake of ^{68}Ga-DOTATATE in a patient with multiple duodenal and pancreatic metastases originating from ccRCC.

Case presentation

A 72-year-old female patient, who underwent right nephrectomy for ccRCC 18 years prior, presented to the Gastroenterology Department of Beijing Friendship Hospital with the complaint of frequent vomiting for 1 month. She reported no abdominal pain, diarrhea, fever, or other associated symptoms. Her family history was unremarkable. Physical examination showed that the abdomen was flat, with no pressure pain or rebound pain. Laboratory tests revealed no obvious abnormalities in tumor markers. The CT examination revealed multiple heterogeneous enhancements in the pancreas and duodenum. Subsequently, ^{68}Ga-DOTATATE PET/CT imaging was conducted for further evaluation, which demonstrated increased DOTATATE accumulation in both the body of the pancreas and the descending part of duodenum (*Figure 1*). To mitigate the potential for inflammatory or physiological absorption in the GIT, we conducted delayed imaging, yielding outcomes comparable to those obtained through conventional scanning (*Figure 2*).

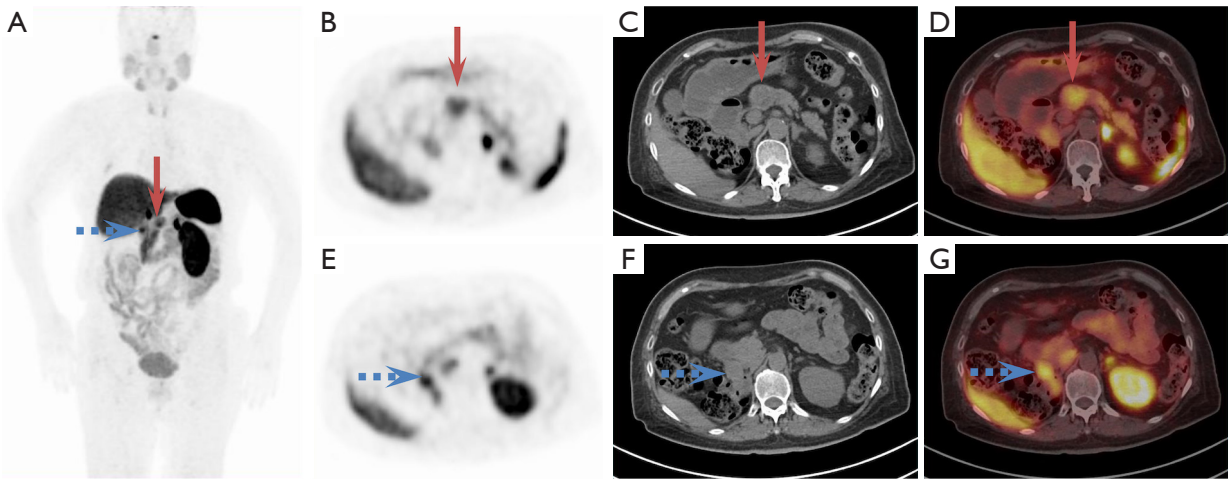

Figure 1 Increased DOTATATE accumulation in the body of pancreas (arrows in A-D), and an avid lesion in descending part of duodenum (dotted arrows in A,E,F,G). DOTATATE, DOTA-octreotate.

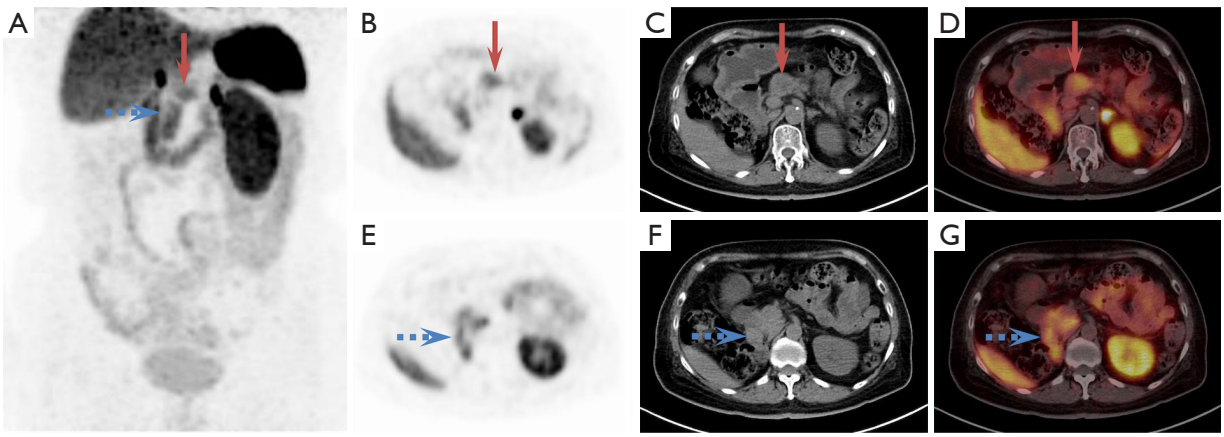

Figure 2 Abdominal delayed 68Ga-DOTATATE PET/CT was performed, which showed similar findings with routine scan, including pancreatic lesion (arrows in A-D), and duodenal lesion (dotted arrows in A,E,F,G). DOTATATE, DOTA-octreotate; PET/CT, positron emission tomography/computed tomography.

Notably, no abnormal uptake was observed at any other site. Based on the patient's clinical history and imaging results, neuroendocrine tumor (NET) was considered a potential diagnostic possibility. Finally, ultrasonic endoscopic-guided puncture was performed. Microscopic examination of the pancreatic nodule revealed grayish-brown puncture tissue, while a few pancreatic follicles and cytoplasmic translucent cells were arranged in nests. Immunohistochemistry showed that tumor cells were positive for CD10, Vimentin, CAIX, E-cadherin, Pax-8, P504s, CK, and Ki-67 (10%), and in contrast, negative for CD117, EMA, CK7, and Syn. The final pathological diagnosis indicated metastasis of ccRCC (*Figure 3*). The patient's discomfort symptoms were managed through clinical fasting, rehydration, and acid suppression in a symptomatic approach. During the follow-up consultation with the family, they declined genetic testing and surgical intervention. Ongoing follow-up is being conducted.

All procedures performed in this study were in accordance with the ethical standards of the institutional committee and with the Helsinki Declaration (as revised in 2013). Written informed consent was provided by the patient for publication of this article and accompanying images. A copy of the written consent is available for review

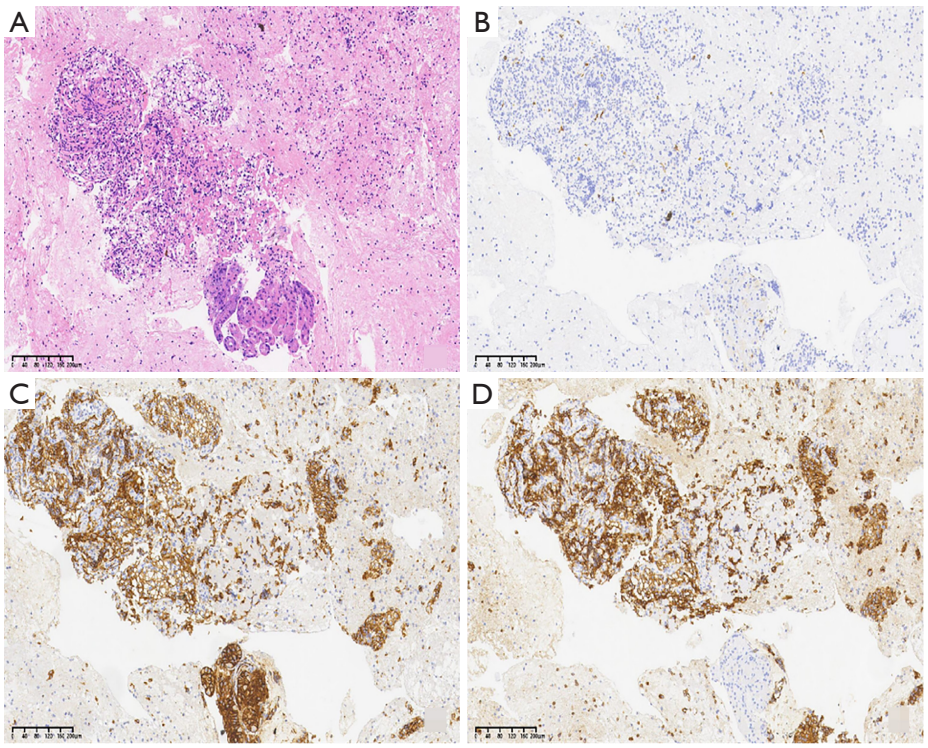

Figure 3 Pathology and immunohistochemistry. (A) HE staining indicated that the tumor presents a few pancreatic follicles and cytoplasmic translucent cells were arranged in nests (×10); (B-D) immunohistochemistry indicated CD10(+), CD117(–), CAIX(+), EMA(–), Vimentin (small foci), E-cadherin(+), CK7(–), Pax-8(+), P504s(+), Syn(–), and CK(+) (×10). HE, hematoxylin and eosin.

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Discussion

This case report of ^{68}Ga-DOTATATE uptake in multiple duodenum and pancreatic metastases of ccRCC provides the clinical, radiological, and pathological data available, and is thus of considerable significance for image collection in future cases.

PET/CT imaging with ^{68}Ga-labeled SSTR agonists is a cornerstone of NET patient management, and recommended for the diagnosis, staging, and monitoring of NET. To date, several agonist agents (including ^{68}Ga-DOTATATE and ^{68}Ga-DOTATOC) have been approved for NET imaging. A meta-analysis encompassing 465 NET patients reported an estimated sensitivity of 90.9% and specificity of 90.6% for ^{68}Ga-DOTATATE PET (5). False-positive uptake of ^{68}Ga-DOTATATE may lead to diagnostic challenges, including uterine subserosal fibroid (6), spinal meningiomas (7), splenic hemangioma (8), intraosseous hemangioma (9), lymphadenopathy induced by coronavirus disease 2019 (COVID-19) vaccination (10), cholesterol granuloma (11), insufficiency fracture (11), squamous cell carcinoma (12), bladder diverticulum (13), and chronic prostatitis (14).

ccRCC is one of the most prevalent malignancies affecting the genitourinary system. It also exhibits expression of SSTR, rendering ^{68}Ga-labelled SSTR agonists a viable modality for comprehensive assessment and monitoring of disease progression (15). Some studies have suggested that ^{68}Ga-DOTATOC PET/CT may have a complementary role relative to ^{18}F-FDG PET/CT in the detection of recurrent tumors in the postoperative state of ccRCC (16,17). Limited cases showing ^{68}Ga-DOTATATE uptake in the metastases of ccRCC have been reported, including contralateral adrenal metastasis (4), soft tissue metastasis (18), pancreatic metastasis (19,20), colon metastasis (21), and thyroid metastasis (19,22). Among these, metastases to the pancreas are infrequently observed, accounting for less than 2% of pancreatic malignancies. Duodenal metastasis is also a rare occurrence, with only one reported case demonstrating metastasis to the duodenal

region after a 14-year interval following primary ccRCC resection (23). In about 20–30% cases, primary ccRCC had synchronous metastasis to the distant organ. During the follow-up period, metachronous metastases will develop in 20% of patients diagnosed with ccRCC (24). Furthermore, we found in published literature, cases of metastatic RCC in pancreas have been mostly reported in men (75%) with average age of 65.5 years (25). Our case demonstrated a metastatic ccRCC to the pancreas and duodenal region that occurred in a female patient over 70 years of age.

A notable aspect of this article is that the patient underwent a ^{68}Ga-DOTATATE PET/CT scan to confirm the character of pancreatic and duodenal nodules, and the PET/CT revealed that they were hypermetabolic. The present patient had undergone right nephrectomy 10 years prior and the final pathology confirmed ccRCC metastasis. This case highlights that high uptake on ^{68}Ga-DOTATATE PET/CT imaging should raise suspicion for distant metastases in cases with a history of ccRCC.

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Footnote

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Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at https://qims.amegroups.com/article/view/10.21037/qims-24-1828/coif). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All procedures performed in this study were in accordance with the ethical standards of the institutional committee and with the Helsinki Declaration (as revised in 2013). Written informed consent was provided by the patient for publication of this article and accompanying images. A copy of the written consent is available for review by the editorial office of this journal.

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