

# Metachronous metastasis to contralateral retroperitoneal adipose tissue after radical nephrectomy: a case report and review of the literature

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## Abstract

Renal cell carcinoma (RCC) metastasis to the adrenal gland, perirenal adipose tissue, and ureter on the contralateral side is rare. We report a case of solitary metachronous clear cell renal cell carcinoma (ccRCC) metastasis to the contralateral retroperitoneal adipose tissue, which was identified after radical nephrectomy. A patient had undergone retroperitoneal laparoscopic radical nephrectomy for RCC in the right kidney in December 2012. Postoperative pathological analysis showed Fuhrman grade I ccRCC, T<sub>1b</sub>N<sub>0</sub>M<sub>0</sub>. Three years after surgery, a solitary tumor of 1.0 × 1.0 cm was identified by an abdominal computed tomographic scan inside the retroperitoneal fat pad in front of the left posterior abdominal wall, without adhesion to the abdominal wall. The tumor was then completely resected by retroperitoneal laparoscopic resection. Pathological analysis showed that it was a metastasized lesion from a previous tumor. Nine months after surgery, there was no sign of recurrence confirmed by radiographic follow-up. Findings from this case indicate the unpredictability of dissemination of RCC. Our findings support a follow-up regimen that includes regular postoperative computed tomographic scans to identify early metastasis. To the best of our knowledge, this is the first reported case of contralateral retroperitoneal adipose metastasis after laparoscopic tumorectomy.

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## Keywords

Metachronous renal cell carcinoma, contralateral metastasis, retroperitoneal adipose tissue, retroperitoneal laparoscopic tumorectomy, radical nephrectomy, kidney

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## Introduction

A total of 20% to 40% of patients with renal cell carcinoma (RCC) experience metastasis or local recurrence after radical nephrectomy.<sup>1</sup> The most common sites of distant RCC metastasis are the lungs (50%–60%), bone (30%–40%), liver (30%–40%), and brain (5%);<sup>2</sup> however, metastasis may occur at a lower incidence in other organs.<sup>2</sup> Although RCC metastases to the ipsilateral adrenal gland, perirenal adipose tissue, and ureter are relatively common, metastases to the contralateral adrenal gland, perirenal adipose tissue, and ureter are rare.<sup>3–5</sup> To the best of our knowledge, only one case of RCC metastasis to contralateral perirenal adipose tissue has been previously reported,<sup>6</sup> and metastasis to contralateral retroperitoneal adipose tissue has not been reported. We describe the first case of clear cell renal cell carcinoma (ccRCC) that metastasized to perirenal retroperitoneal adipose tissue after radical nephrectomy, which was performed via retroperitoneal laparoscopic tumor resection.

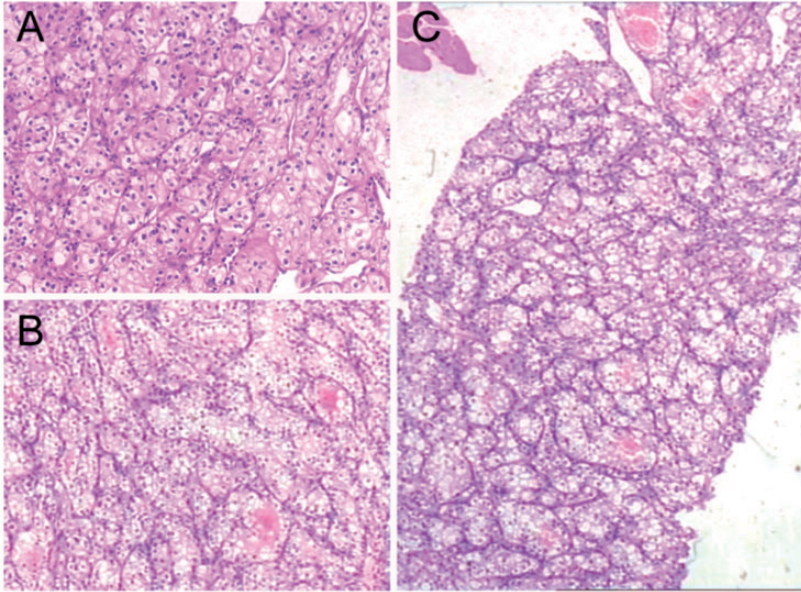
## Case report

The patient was a 46-year-old man who was admitted to our hospital in February 2016 after detection of a tumor at the left retroperitoneum by computed tomography (CT). He had undergone retroperitoneal laparoscopic nephrectomy in December 2012 to remove a tumor in the lower pole of the right kidney. This tumor measured  $6.5 \times 4.0$  cm. Postoperative pathological analysis showed

that the tumor was T<sub>1b</sub>N<sub>0</sub>M<sub>0</sub> stage ccRCC that infiltrated the renal capsule (Figure 1a). No tumor was found at the distal surgical margin of the ureter or blood vessels and lymph nodes at the renal hilum. The patient did not receive any targeted therapy or immunotherapy before admission. A contrast-enhanced CT scan that was performed in January 2013 showed no mass in the contralateral kidney. The patient underwent follow-up chest and abdominal CT every 6 months after surgery for 3 years. The results were consistently normal without detectable lesions throughout his visit in December 2015.

In 2016, a solitary tumor of  $1.0 \times 1.0$  cm was detected in front of the left posterior abdominal wall (Figure 2) with no clear margin from the abdominal wall. The patient underwent ultrasound-guided tumor biopsy. The pathological diagnosis was metastatic ccRCC with Vim+ (#MX034; Fuzhou Maixin Biotech, Fuzhou, China), CD10+ (#MX002, Fuzhou Maixin Biotech, Fuzhou, China), P504S+ (Clone: UMAB215, #ZM-0228; ZSGB-BIO, Beijing, China), CA-9+ (#sc-25599; Santa Cruz, CA, USA), PAX-8+ (Clone: MRQ-50, #ZM-0468; ZSGB-BIO, Beijing, China), CK7+ (Clone: EP16; #ZA-0573, ZSGB-BIO, Beijing, China), and Ki-67 (5%+, Clone: UMAB107, #ZM-0166; ZSGB-BIO, Beijing China) (Figure 3).

The patient underwent retroperitoneal laparoscopic tumorectomy. Intraoperative findings included a  $1.0 \times 1.0$ -cm solitary tumor that was located inside a retroperitoneal fat pad. This fat pad was located in front of the



**Figure 1.** Hematoxylin and eosin stain of (a) resected primary clear cell renal cell carcinoma in the right kidney, which affected the renal capsule, (b) a biopsy sample of metastatic clear cell renal cell carcinoma, and (c) resected metastatic clear cell renal cell carcinoma. Magnification was 40 $\times$

posterior abdominal wall, but without adhesion to the abdominal wall. The tumor was completely removed by retroperitoneal laparoscopic tumorectomy (Figure 4). A trocar was inserted at the subcostal margin of the posterior axillary line (A), anterior axillary line (B), and iliac crest (C) (Figure 4). The puncture points A, B, and C were placed with 12-mm, 5-mm, and 10-mm trocars, respectively. Postoperative pathological analysis showed metastatic ccRCC (Figure 1c). Nine months after surgery, there was no sign of recurrence as shown by radiographic follow-up.

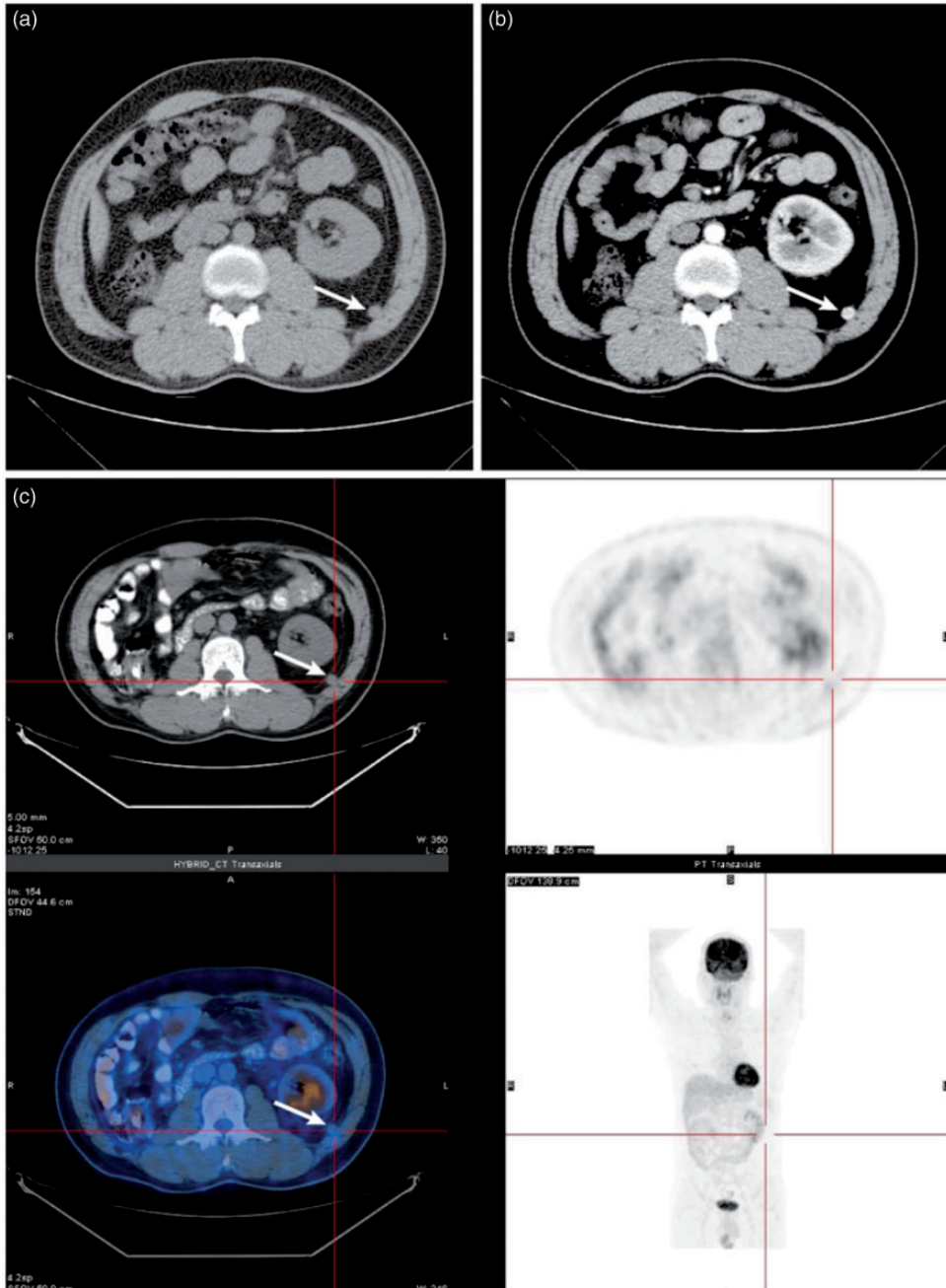
The study protocol was approved by the Yantai Yuhuangding Hospital Ethics Committee. Consent was obtained from the patient.

## Discussion

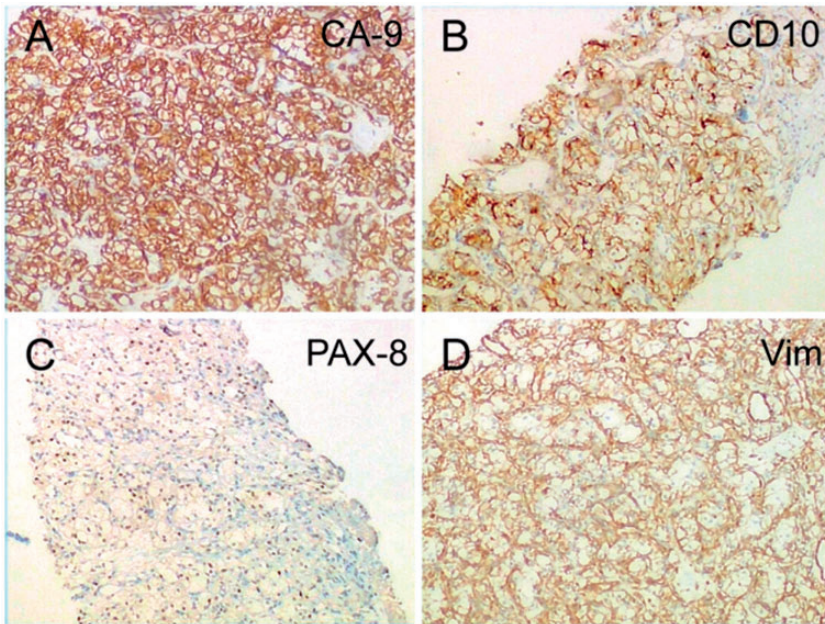
Metastases of RCC to the contralateral adrenal gland, perirenal adipose tissue,

and ureter are rare,<sup>2</sup> with only 14, one, and nine cases, respectively, described in the literature. We report the first case of ccRCC metastasis to contralateral retroperitoneal adipose tissue.

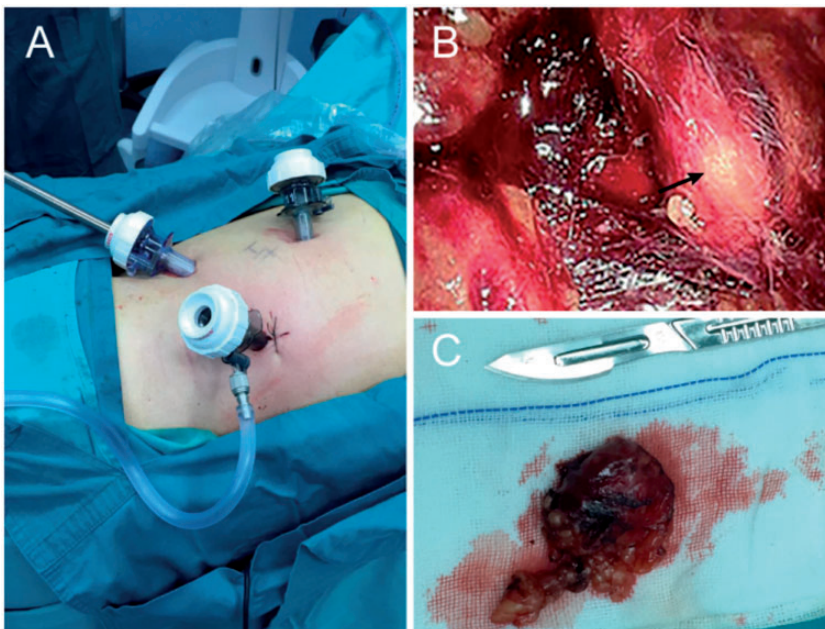
The specific mechanism and routes of metastasized RCC to the contralateral adrenal gland, perirenal adipose tissue, and ureter largely remain unclear. Moslemi et al.<sup>7</sup> suggested that RCC cells may metastasize to the contralateral adrenal gland via the antegrade hematogenous route. A previous study showed that the adrenal gland may have an increased affinity for spread of RCC compared with other organs in the case of solitary contralateral adrenal metastasis.<sup>8</sup> Previous studies have indicated that possible routes for ureteral metastasis could be endoluminal, blood borne, or lymphatic spread.<sup>9–11</sup> A neoplasm on the left side could spread to the ureter and pelvis much faster than on the right side because of richer collateral circulation



**Figure 2.** (a) Abdominal computed tomographic scan of the patient. (b) Enhanced abdominal computed tomographic scan of the patient. (c) Positron emission tomography-computed tomographic scan of the patient. Arrows indicate renal cell carcinoma



**Figure 3.** Immunohistochemical staining of a biopsy of metastatic clear cell renal cell carcinoma with (a) anti-CA9, (b) anti-CD10, (c) anti-PAX8, and (d) anti-Vim. Magnification was 100×



**Figure 4.** (a) Trocar positions in laparoscopic surgery. (b) Image during laparoscopic surgery. The arrow shows renal carcinoma. (c) The resected tumor

around the left renal veins.<sup>12-15</sup> We consider that possible routes for metastasis may include lymphatic, or more likely, blood dissemination. The association between tumor metastasis and the features of the primary tumor (side, location, volume, pathological type, stage, and grade) still requires further investigation.

Van der Poel et al.<sup>16</sup> analyzed 152 resections of RCC metastases at the lungs, bone, lymph nodes, cerebrum, and locations in the spinal canal, thyroid, bowel, and testis from 101 patients. These authors suggested that the patient's survival is significantly prolonged after resection of metastases if the time between the primary tumor and appearance of metastasis is longer than 2 years. Based on the location of solitary metastasis, radical resection of the solitary metastasis is recommended, with a reported 5-year survival of 20% to 30%.<sup>17</sup> Boni et al.<sup>18</sup> described that use of validated prognostic factors are required to choose the best cost-effectiveness strategy because of the wide range of low- and high-grade adverse effects associated with the use of adjuvant therapies. In our case, we chose retroperitoneal laparoscopic tumorectomy based on preoperative CT scans. A postoperative histological examination showed a metastasized tumor from the initial lesion. When choosing the surgical method, we believe that making this decision on the basis of preoperative imaging examination results and the location and number of metastases is important.

In a literature review, Middleton et al.<sup>19</sup> concluded that 3-year and 5-year survival after excision of solitary metastasis was 45% and 34%, respectively. These authors found a significantly shorter survival in patients with synchronous solitary metastases than in those with metachronous solitary metastases. Kierney et al.<sup>15</sup> reported that predicted survival after complete resection of metastases was 77%, 59%, and 31% at 1, 3, and 5 years, respectively, with a

median survival of 3.4 years. In another study, 3- and 5-year survival after excision of metachronous solitary metastasis was 58% and 35%, respectively, whereas for synchronous solitary metastasis, the 3-year survival was only 20%.<sup>20</sup> Some other studies showed lower survival rates in patients who developed metachronous metastasis within 1 year after radical nephrectomy compared with those who developed metastasis more than 1 year after surgery (median overall survival, 33 versus 55 months).<sup>21-23</sup>

Fukuda<sup>24</sup> compared the histological grade of primary and metastatic renal tumors (including in lymph nodes or other organs) in 100 patients and considered it to be the same in 60% of the patients. Another study also showed that there was no substantial difference in cell type and structural composition between primary and metastatic renal carcinomas.<sup>25</sup> Contralateral metastasis frequently occurs in ccRCC,<sup>4,25</sup> which is consistent with our case. Whether there is a tendency for contralateral metastasis in ccRCC still needs to be determined in larger future studies.

## Conclusion

In conclusion, we report the first case of contralateral retroperitoneal adipose metastasis after laparoscopic tumorectomy for ccRCC. This case illustrates the unpredictability of dissemination of RCC. Therefore, patients with RCC need to receive regular CT scans to identify early metastasis.

## Declaration of conflicting interest

The authors declare that there is no conflict of interest.

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