



Oncology

Retroperitoneal drop metastases following robotic partial nephrectomy for renal cell carcinoma

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A B S T R A C T

Rare retroperitoneal recurrence of clear cell renal cell carcinoma highlights the risk of tumor violation during surgery. A 61-year-old female with recurrent RCC in the retroperitoneum is presented six years after partial nephrectomy. Initial surveillance CT revealed a renal cyst and subsequent imaging confirmed clear cell RCC. Multiple small lesions indicated retroperitoneal recurrence. Surgical excision confirmed metastatic clear cell RCC. The proximity of the recurrence to the lower pole of the primary tumor suggests tumor violation as the cause. Respecting tumor boundaries during surgery is crucial to prevent metastasis and improve patient survival.

1. Introduction

Renal cell carcinoma (RCC) is the most common malignant neoplasm of the kidney. Surgical resection, in the form of partial or radical nephrectomy, is the effective treatment modality for patients with localized RCC.¹ Locoregional recurrence after initial surgical treatment can occur in the ipsilateral adrenal gland, regional lymph nodes, psoas muscle, perirenal fat, or Gerota's fat.² Recurrence of RCC in the retroperitoneum and perirenal fat, outside of the surgical site, is a rare outcome after partial nephrectomy. In this study, we present a case of recurrent pT1b clear cell RCC in the retroperitoneum after partial nephrectomy.

2. Case presentation

Our patient is a 61-year-old female with history of hypertension, type 2 diabetes, hyperlipidemia, and obesity who was referred for potentially recurrent RCC. She had received a right partial nephrectomy in 10/2016 by an outside urologist for a 4.3cm renal mass that was limited to the kidney and without evidence of vascular invasion. Final pathology at that time noted pT1b NX clear cell RCC (grade 2) with negative margins.

Surveillance CT in 9/2021 showed 1cm exophytic low-density area extending from the right kidney, favored to be a renal cyst. There was also a 6mm slightly enhancing nodule with a lucent center, believed to represent a lymph node. Repeat CT 5/2022 noted an unchanged small renal cyst, but also identified an enlarging enhancing rounded nodule inferior to the right kidney that was 1.1cm. On follow up, CT-guided

biopsy confirmed clear cell RCC. CT chest and bone scan were without evidence of metastatic disease. Ablation was considered, but further review of the CT imaging identified multiple small lesions that potentially represented recurrence in the surrounding retroperitoneum (Fig. 1). In consultation with our tumor board, surgical excision was recommended over any percutaneous ablative techniques, or any forms of systemic therapy.

The patient underwent robotic-assisted retroperitoneal mass excision 9/2022, and final pathology showed metastatic clear cell RCC with 3 separate tumor nodules in adipose tissue with negative margins, measuring 1.3 x 0.9 x 0.7cm, 0.9 x 0.7 x 0.5cm, and 0.6 x 0.5 x 0.4cm (Fig. 2). The patient is currently on surveillance with negative three month follow up imaging.

3. Discussion

Tumor cell seeding after partial or radical nephrectomy is a phenomenon consisting of neoplastic cell contamination outside the tumor and implantation in the perinephric tissues.³ Most cases of seeding found in the literature involve needle-tract metastasis after biopsy, considered a very rare complication with the risk overall at about 0.01%.⁴ Since no renal biopsy was done in our case, the source of recurrence was most likely from intraoperative manipulation.

Manipulation of the tumor during surgery may lead to spillage and seeding of the cancer cells into the surgical field. Several reports have shown how this can contribute to trocar and port site metastasis.^{5,6} However, tumor seeding may also occur without any evident etiology or

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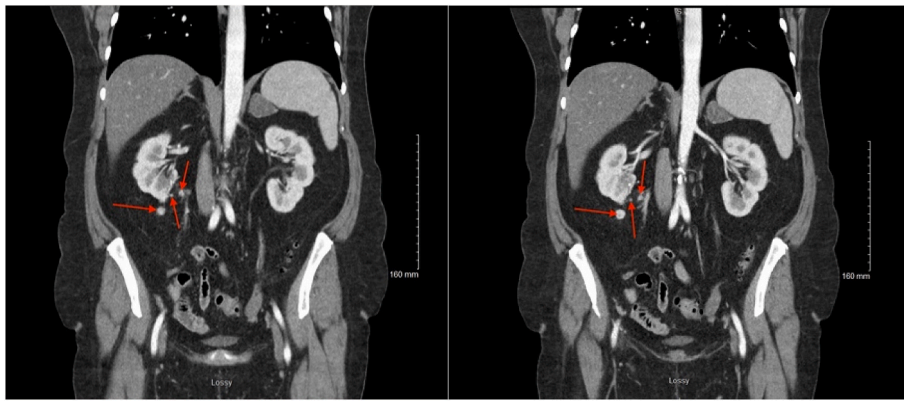


Fig. 1. CT imaging showing multiple small recurrences of RCC in the retroperitoneum.

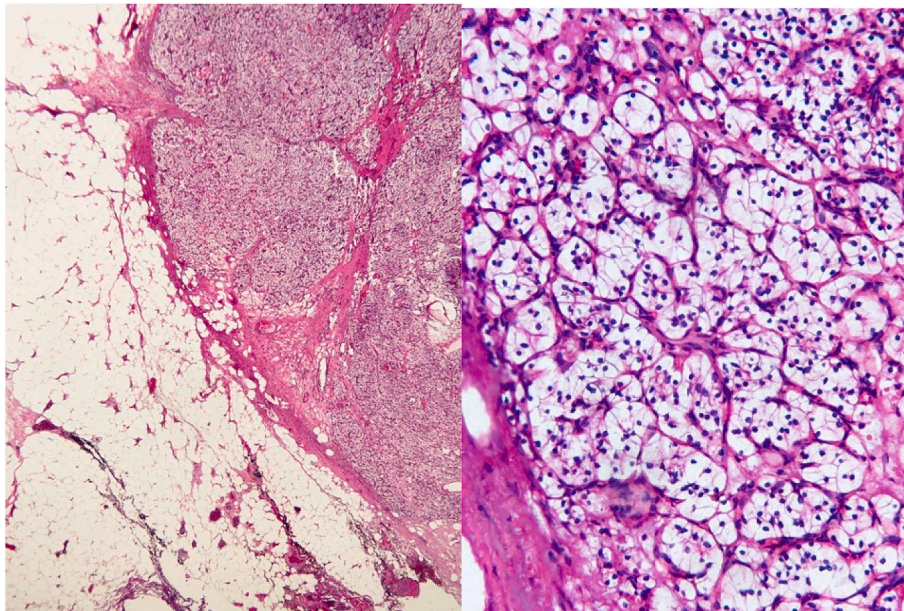


Fig. 2. H&E low and high magnification. Nodular and lobulated tumor is present in the adipose tissue. The tumor cells are composed of rather uniform clear cells arranged in alveolar/acinar patterns. The nuclei are small with inconspicuous nucleoli under 40X magnification (Grade1).

risk factors. Ploumidis et al. reported on a case with tumor seeding of the omentum two years after robotic-assisted radical nephrectomy of papillary RCC; the omental tumor was found to have features of papillary RCC, though no risk factors were identified to explain the seeding, such as morcellation or tumor violation.⁷

Multiple etiologies have been proposed to explain this phenomenon of tumor seeding, among the most important factor being the surgeon involved in the procedure. It has been well-documented that respecting tumor boundaries during oncological procedures can prevent recurrence of the tumor.⁸ Tumor manipulation has been shown to increase the rate of metastasis in both open and laparoscopic surgery. In an animal model, the abdominal wounds of rats were studied after both laparoscopic and open resection of implanted tumors. The results demonstrated that tumor metastasis to the wound was only found when the tumor was lacerated.⁹ This suggests that unnecessary manipulation of a tumor should be kept to a minimum to avoid such metastases from occurring.⁸ In addition, direct dissemination by contaminated surgical instruments has been well documented as a cause of tumor spread. This can be due to greater manipulation of the instruments near the tumor or at the tumor itself.⁸ Proper use of an entrapment bag during surgery also holds as an absolute necessity to prevent tumor cell contamination and recurrence during robotic and laparoscopic procedures.¹⁰

The importance of preventing tumor seeding lies with the data demonstrating how early recurrence of renal cell carcinoma is an independent prognostic factor in cancer-specific mortality. A multicenter study by Brookman-May et al. showed that a shorter period between surgery and recurrence is an indicator of decreased cancer-specific survival.¹¹ Rodriguez-Covarrubias et al. found that recurrent disease of localized RCC indicates poor prognosis, particularly with early recurrence within 12 months after surgery.¹² Adamy et al. defined late recurrence as > 5 years after nephrectomy and found that patients who did not show any recurrence for at least 5 years demonstrated better prognosis with a longer median survival.¹³

Our case of T1b clear cell RCC recurrence six years after partial nephrectomy adds to the small body of literature describing tumor seeding in the retroperitoneum following partial nephrectomy. We surmise the etiology to be direct tumor violation during the partial nephrectomy, as the location of recurrence in the retroperitoneum correlated to the lower pole location of the primary tumor.

4. Conclusion

We describe a rare finding of retroperitoneal recurrence of localized clear cell renal cell carcinoma after partial nephrectomy. This case

highlights the importance of adhering to oncologic principles during surgery, as tumor violation poses a major risk of metastasis and can negatively impact survival.

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