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Metastatic renal cell carcinoma in the bladder following complex partial nephrectomy: A case report

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ABSTRACT

Metastasis of renal cell carcinoma (RCC) to the bladder is rare. We present a case of a 74-year-old patient with a metachronous, solitary metastasis of RCC to the bladder twenty months after partial nephrectomy and JJ-stent placement for a complex renal tumor. The mechanism of RCC metastasis to the bladder remains controversial, and we believe this case adds support to the drop metastasis theory.

1. Introduction

RCC commonly metastasizes to the lungs, lymph nodes and brain.[1] Metastasis of RCC to the bladder is rare,[2] with less than 100 cases reported in the literature.[2–4] There are various hypotheses on the mechanism of metastasis of RCC to the bladder. Hematogenous dissemination of cancer cells is the most widely endorsed. The controversial drop metastasis theory posits that bladder metastasis occurs when cancer cells enter the collecting system and travel down the ureter into the bladder through the ipsilateral ureteral orifice (UO).[4]

2. Case presentation

A 64-year-old man presented with bronchitis, and a 4.5cm left renal mass was detected incidentally during work up. Medical history included morbid obesity (BMI 39.33 kg/m^2), asthma, hypertension, dyslipidemia, and a recent admission for acute pancreatitis. His preoperative serum creatinine (sCr) was 1.17ng/ml, with a corresponding GFR of >60ml/min/1.73 m^2 and no evidence of proteinuria. Contrast CT showed a 4.5 × 4.3 × 3.6cm mass at the posteromedial upper pole, possibly invading the renal collecting system. He elected for robotic partial nephrectomy (RPN) for the management of this mass. Given the proximity of the mass to the collecting system and the high likelihood of significant entry into it, cystoscopy with JJ-stent (6Frx28cm) placement was performed first. The patient had a mean arterial pressure in the 60s and 70s, which was resolved by administration of IV fluids. Prior to clamping the renal vasculature, 25mg of mannitol was given, and excellent urine production was noted. The RPN proceeded smoothly, with resection deep into the renal cortex exposing the collecting system and stent within. A segmental artery directly supplying the tumor was identified and clipped. A resection with grossly negative tumor margins was achieved. Reconstruction was performed in two layers, with 3-0-vicryl to close the entrance into the collecting system, and then 0-vicryl to reapproximate the parenchymal defect. Warm ischemia time was 29 minutes, no blood products were administered, and a closed-suction drain was placed. The patient's hospital stay was uncomplicated, with removal of the drain post-op day 10 and the JJ-stent post-op day 30. Final pathology revealed a 3cm, pT1aN0M0, grade two, clear cell RCC (ccRCC) mass with negative margins (Fig. 1A).

The patient was surveilled for tumor recurrence with CT and chest x-ray. Post-operative renal function at 6 months revealed a sCr of 1.5, GFR of 47ml/min/1.73 m,[2] and stage 3a CKD. Twenty months later, the patient presented with gross hematuria and underwent cystoscopy identifying a 1.7cm bladder stone and a lesion near the left UO. Subsequent cystolitholapaxy, transurethral resection of the prostate (TURP), and bladder biopsy revealed the lesion near the left UO to be metastatic ccRCC. CT showed a 1.3cm nodule anterior to the stomach in the greater omentum and no systemic disease. After discussing options for management, the patient elected to return for a second stage TURP, TUR of the bladder tumor (TURBT), and laparoscopic excision of the omental mass. Final pathology of the bladder mass revealed metastatic ccRCC (Fig. 1B), while the omental mass was fat necrosis. He continued

Abbreviations: RCC, renal cell carcinoma; RPN, robotic partial nephrectomy; ccRCC, clear cell renal cell carcinoma.

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surveillance with urology and medical oncology without evidence of disease and without systemic therapy for an additional twenty-two months.

Twenty-two months following TURBT, follow-up CT revealed a 4.3 × 3.5cm area of irregular enhancement at the posterior midpole of the left kidney, concerning for a local recurrence of RCC. The patient initially declined treatment until symptoms developed. Nine months later, he developed gross hematuria and elected to proceed with open left radical nephrectomy (RN) with retroperitoneal lymph node dissection. Final pathology revealed a 6cm, grade 2, ccRCC mass, extending into the pelvicalyceal system (Fig. 1C); one lymph node was positive for metastasis (stage pT3aN1M1). The patient started on systemic therapy with cabozantinib.

Two years later, a 1.7cm mass was discovered near the proximal, descending colon, subsequent biopsy showed no concern for malignancy. The mass was monitored with CT scans over two years. A repeat biopsy was positive for ccRCC, and the patient was referred to surgical oncology. The patient elected for surgical resection. The 2cm mass was found lodged in retroperitoneal fat, without adherence to the spleen or colon, and was excised completely. Final pathology confirmed metastatic ccRCC with negative margins (Fig. 1D). At most recent follow-up (eleven years after initial diagnosis), he continues systemic therapy with cabozantinib. Recent CT shows a stable, residual, three-centimeter tumor at the bed of the prior RN.

3. Discussion

We present a long-term survivor of ccRCC metastatic to multiple sites metachronously. Metastatic RCC is typically grouped into low-, intermediate- and high-risk using Heng criteria.[5] Even low-risk metastatic RCC (for which this patient does not qualify) has a median survival of 43 months.[5] Others have reported positive results with complete metastasectomy,[1] as this patient had several times during his cancer journey. The rarity of metastatic RCC to the bladder makes risk stratification unclear. This patient's case is remarkable, as he is alive and with stable disease eleven years after initial diagnosis.

Five cases of RCC drop metastasis have been reported in the literature, sites of metastasis included ureter, peritoneum, and bladder. Overall survival ranged from ten months to nine years following initial treatment. The case presented here appears to confirm the drop metastasis theory of RCC.[4] Although the initial tumor had no pathologic evidence of collecting system involvement, its deep tumor location may have led to shedding of cancer cells prior to or during tumor resection. In addition, the placement of the JJ-stent at the time of PN may have facilitated transmission of cancer cells down the ureter and into the bladder during the four weeks it was in place. Alternatively, ureteral dilation from the stent may have made access to the bladder easier after removal.

4. Conclusion

Metastasis of RCC to the bladder is rare and has been documented less than 100 times in the literature. Following the placement of a JJ-stent during a challenging PN, a bladder tumor identified nearly two years later proved to be metastatic RCC. Shedding of RCC cells down the ureter directly into the bladder seems the most likely explanation of the findings in this case, supporting the drop metastasis theory.

Author contributions

DNB-Investigation, writing, original draft. SN-writing, reviewing, editing. TS-providing histologic images. BRL-conceptualization, writing, editing, reviewing, supervision.

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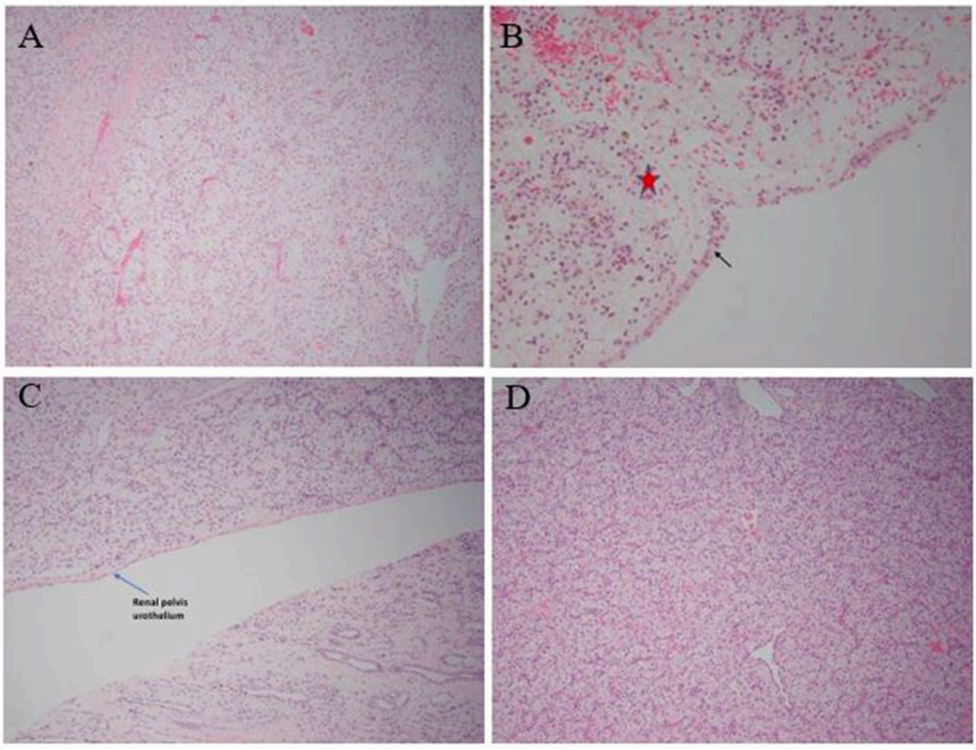

Fig. 1. Hematoxylin and Eosin stain of the initial left-sided renal mass showing the clear cell renal cell carcinoma (ccRCC) histologic subtype (A). Sample of the bladder lesion showing ccRCC, indicated with the red star, with normal urothelium below, as indicated by the black arrow (B). Local recurrence of ccRCC in the left kidney with extension into the pelvicalyceal system (C). Final recurrence of ccRCC in the pericolonic space (D). (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

Declaration of competing interest

All authors declare that they have no conflicts of interest to disclose.

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