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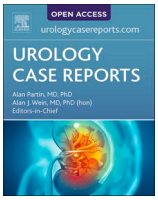

Oncology

IVC thrombectomy and atrial tumor removal with radical nephrectomy and adrenalectomy for metastatic melanoma with immune checkpoint inhibitor therapy: A case report and literature review☆

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ABSTRACT

Caval thrombus with intracardiac involvement is a rare condition that is associated with renal cell carcinoma. Few reports in literature describe this presentation with metastatic melanoma. Metastatic melanoma is known to involve the adrenal gland, although associated tumor thrombus extension into the renal vein and inferior vena cava is extremely rare. In this case report, we describe radical nephrectomy and adrenalectomy for metastatic melanoma.

1. Introduction

Metastatic melanoma involves the adrenal gland in up to 50 % of patients with systemic disease and is a known site of metastasis despite a poorly understood mechanism of dissemination.[1] While the adrenal gland is a known metastatic site, renal vein involvement with a tumor thrombus is rare with a minority extending to the right atrium, and generally associated with renal cell carcinoma (RCC).[2] Few reports have described this condition, with none describing surgical intervention or postoperative course.[1,3,4] Here, we present a patient with metastatic melanoma with Level IV tumor thrombus extension into the right atrium and discuss the benefits of metastasectomy in the era of immunotherapy for patients with this unusual presentation.

2. Case presentation

We present a case of a 64-year-old male patient with a history of gastroesophageal reflux disease and T1b melanoma that was excised and negative on sentinel node biopsy 10 years ago. The patient sought care at the emergency department after developing worsening abdominal and flank pain and unintentional weight loss over 4 months. A computed tomography (CT) of the abdomen and pelvis with contrast revealed a 16 cm enhancing mass in the kidney with internal necrosis, and a thrombus extending from the left renal vein into the inferior vena cava (Fig. 1). A CT of the chest with contrast revealed a filling defect in the right atrium. A magnetic resonance imaging (MRI) with contrast of the brain was unremarkable. Based on these diagnostic reports, the patient was found to have a tumor thrombus extending into the right atrium, with the kidney mass consistent with renal cell carcinoma. Given the presence of an extensive caval thrombus and atrial thrombus, decision was made to proceed with surgical resection, since any systemic therapy would likely not adequately treat the patient's intravascular thrombus. After discussing his treatment options, the patient elected to proceed with left radical nephrectomy, inferior vena cava (IVC) thrombectomy, and sternotomy with removal of the right atrial tumor thrombus.

The patient underwent robotic-assisted laparoscopic radical nephrectomy with IVC thrombectomy with planned open conversion with sternotomy for the atrial tumor thrombus. Following hilar dissection, ligation, and transection of the renal artery, the procedure was converted to open to mobilize and extract the tumor, vena cavavotomy for

Abbreviations: RCC, renal cell carcinoma; CT, Computed tomography; IVC, Inferior Vena Cava; ASCO, American Society of Clinical Oncology.

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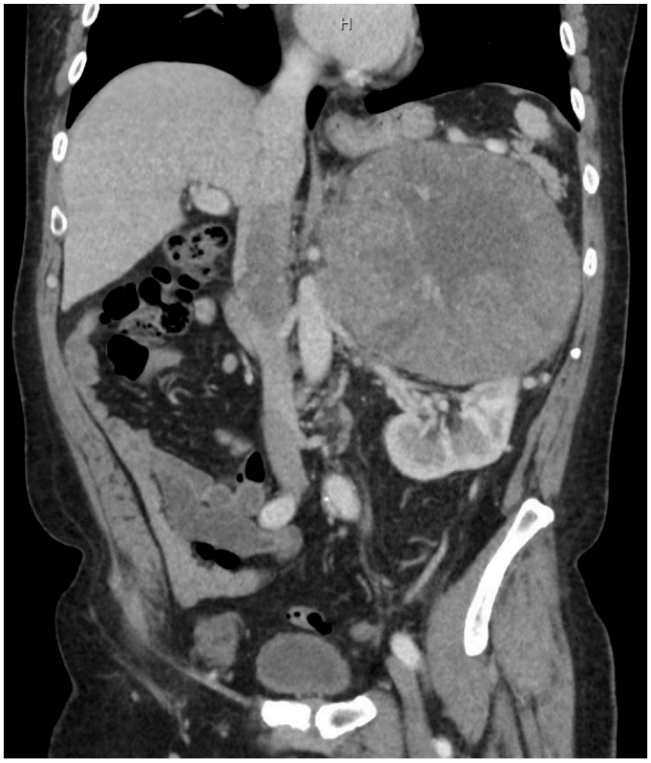

Fig. 1. CT of abdomen and pelvis with contrast with 16 cm enhancing left renal masses, with evidence of intracaval thrombus.

thrombus removal, and renal vein ligation. This was done with a modified subcostal incision in the left upper quadrant. The kidney and tumor were then removed, with an estimated blood loss of 900 mL. A total of 5 units of blood were transfused during the procedure, with an operative time of 540 minutes.

Pathology showed a well-circumscribed tumor 17 cm in the largest dimension on the superior pole of the left kidney without parenchymal involvement, with gross absence of adrenal gland and with markers of S-100, SOX-10, Melan A, and HMB-45, consistent with melanoma (Fig. 2). Renal vein invasion was noted, and none of the six lymph nodes were positive for tumor cells. The patient was discharged on postoperative day 11 after an unremarkable course.

During the patient's postoperative stay, the patient required 3 units of blood. The patient was discharged from the ICU to the floor on postoperative day 4. In addition, the patient had an AKI which resolved on postoperative day 6. The hospital stay was otherwise unremarkable and the patient was discharged home on postoperative day 11.

Based on his risk of recurrence, the patient started immunotherapy with nivolumab/ipilimumab. After 4 treatment cycles, restaging imaging revealed suspected brain metastases which were treated with radiation therapy. Five months after surgery, a restaging MRI of the brain with contrast revealed 4 additional lesions. Immunotherapy was changed to nivolumab/relatlimab with concurrent radiation therapy. After 5 cycles of nivolumab/relatlimab, the metastases resolved. At the last follow-up 12 months after surgery, the patient was without evidence of active disease.

3. Discussion

Our report aimed to describe an unusual presentation of a metastatic melanoma mimicking a renal cell carcinoma with extension of thrombus into the atrium. At initial diagnosis, the patient was worked up with the assumption the mass was likely a renal cell carcinoma. On post-operative pathology, the mass was confirmed to be adrenal of origin with metastatic melanoma. While rare, our case sheds light on a rare situation in which a metastatic melanoma can present similar to an aggressive kidney tumor with IVC and atrial involvement.

A prior report by Watson et al. described a 38-year-old female with Level II thrombus due to metastatic melanoma who underwent caval thrombectomy with radical nephrectomy but was subsequently placed on comfort measures several months after surgery.[3] Of note, this patient presented with brain metastases before surgery, which differs from our case. Klatte et al. described a case of a 34-year-old male where open surgical management was performed to treat his secondary melanoma to the kidney with caval thrombus. The patient developed recurrence postoperatively at multiple sites and was unresponsive to systemic therapy with interleukin-2 and chemotherapy, with the patient succumbing to disease 5 months after surgery.[4] Similarly, this patient presented with brain metastases before nephrectomy, which is unlike our case and may have led to the dismal outcome observed.[3,4] There appears to be an association between the development of brain metastases with caval thrombus, suggesting a possible mechanism of hematogenous seeding.[3,4]

A report of a 70-year-old female with a remote history of cutaneous melanoma developed metastases involving both adrenal glands and caval thrombus with intracardiac extension. The patient was started on immunotherapy with nivolumab and ipilimumab.[1] Similar to the aforementioned report, our patient was started initially on combination immunotherapy with nivolumab and ipilimumab.[1] Reports suggest adrenal melanoma is resistant to immunotherapy possibly due to the immunosuppressive environment of the adrenal gland acting as a sanctuary site for metastases, and both surgical resection followed by treatment with immunotherapy improve survival for metastatic adrenal melanoma.[5]

Of note, neoadjuvant therapy is recommended by ASCO guidelines for resectable Stage III and IV metastatic melanoma.[6] For patients with known etiology of metastatic melanoma, neoadjuvant therapy prior to surgery may be indicated.[7] However, given the extensive vascular thrombus and atrial thrombus in our patient, neoadjuvant therapy would likely have not provided much benefit given the extensiveness of his disease.

4. Conclusion

We demonstrated that metastatic melanoma can present as an aggressive kidney tumor, with caval involvement as well as atrial tumor thrombus. Metastasectomy may be a potential option for patients with tumor involvement of the IVC and cardiac extension of the thrombus, in the era of immune checkpoint inhibitors. In patients with this presentation, monitoring for the development of brain metastases while receiving immunotherapy is warranted due to potential hematogenous seeding and consistent with other reports.[3,4] Although these cases are rare, further studies are needed to better define patient selection criteria and observe long-term outcomes.

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Hackensack University Medical Center Department of Urology.

CRediT authorship contribution statement

Michael Raver: Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Bianca DeAgresta:** Writing – review & editing. **Alexandra Della Pia:** Writing – review & editing. **Cara Wong:** Writing – review & editing. **Grace Basralian:** Writing – review & editing. **Jennifer Nguyen:** Writing – review & editing. **Nitin Yerram:** Writing – review & editing, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

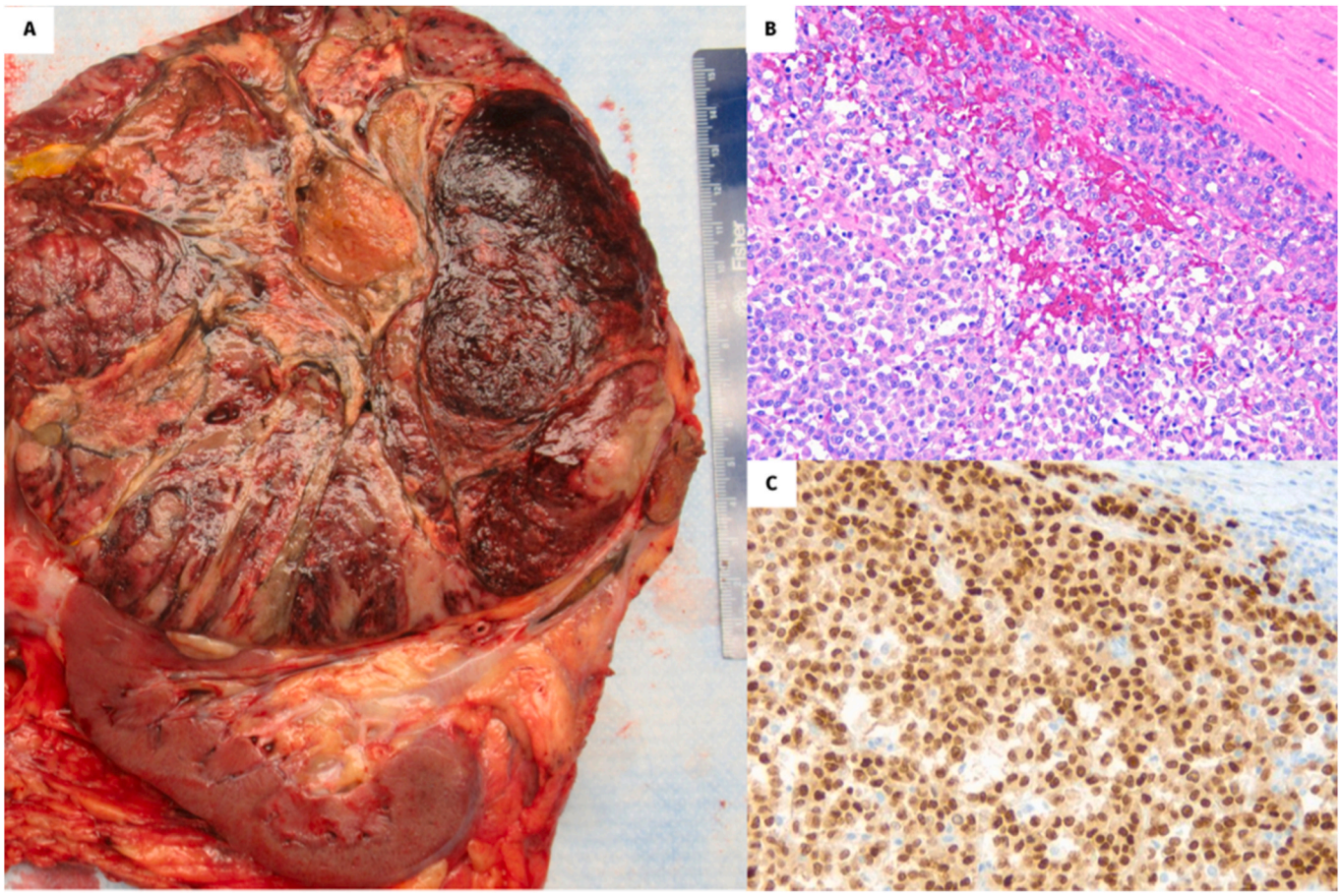

Fig. 2. A. Gross appearance of the large (17 cm), well-circumscribed tumor B. Microscopic appearance; Hematoxylin-eosin stain C. Immunohistochemical staining positive for SOX 10.

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