Oncology

Robotic level II inferior vena cava thrombectomy for metastatic melanoma

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A B S T R A C T

We report on a case of a 38-year-old female who presented with metastatic malignant melanoma of her right kidney with Level II tumor thrombus. This is the first ever presented case of a renal melanoma IVC tumor thrombus. Furthermore, in an effort to expand the surgical scope of minimally invasive and robotic surgery, we report management of this lesion as the first case of non-renal cell carcinoma IVC tumor thrombus treated with a robotic thrombectomy.

Introduction

Renal metastasis of malignant melanoma is relatively rare, reportedly composing only 1.4% of metastatic renal disease. Additionally, the occurrence of renal melanoma that present with venous tumor thrombus is even more infrequent, with only such case previously described in the literature. This tumor thrombus extended into the renal vein (Level 0) and was managed with an open approach, in the same manner as all other metastasis to the kidney presenting with venous tumor thrombus. To our knowledge, never before has a metastatic renal melanoma presented with IVC tumor thrombus. Herein, we present the first ever case of a metastasis of malignant melanoma to the kidney with Level II IVC tumor thrombus, which is treated robotically.

Case presentation

The patient is a 38-year-old Caucasian female with a past medical history of a melanoma on her right anterior breast found six years earlier. Her initial melanoma was treated with excision and found to be 0.6 mm deep. The lesion was not ulcerated and demonstrated no high-risk features. She underwent biannual whole-body skin examinations with a dermatologist as part of her surveillance and there was no evidence of continued disease.

She initially presented at our institution with a Glasgow coma scale of 7 and intubated after sustaining a fall from standing as a result of new onset altered mental status. Per trauma protocol, a noncontrast CT scan of the brain and contrasted CT scan of the thorax, abdomen and pelvis were obtained. CT scans demonstrated intracranial hemorrhage, an 11.5 cm right renal lesion with tumor thrombus extending into the IVC and pulmonary lesions concerning for metastatic disease. CBC, BMP and LFTs were all normal. Urinalysis was negative for blood and cytology was negative for malignancy. An emergent craniotomy was performed, during which time a large, pulsatile intracranial hemorrhagic lesion consistent with metastatic melanoma was resected en bloc. This diagnosis was confirmed on pathology. Following the procedure, the patient regained nearly complete mental function. Physical exam at this time demonstrated mild right flank pain.

An MRI of the abdomen and pelvis was obtained one week later to better identify the extent of tumor thrombus in the renal vein and IVC. (Fig. 1). The thrombus extended 2.76 cm above the right renal vein, but did not extend above the hepatic veins (Level II, Neve’s system). TEE confirmed this level. A multidisciplinary team including Urology, Radiation Oncology and Hematology-Oncology recommended radical nephrectomy to rule out the possibility of renal cell carcinoma (RCC) as a primary tumor. The patient underwent a preoperative arterial particle embolization of her right renal artery by Interventional Radiology. The following day, a robot assisted laparoscopic radical nephrectomy with vena cava thrombectomy was performed (Fig. 2). Operative time was 83 minutes, including robot docking. Estimated blood loss was 150 mL. The patient was discharged on post-operative day one and she experienced no perioperative or postoperative complications. Several months after surgery, the patient was placed on comfort measures for reasons unrelated to the surgery.

Final histopathological analysis confirmed the diagnosis of metastatic malignant melanoma, positive for the BRAF mutation (Fig. 3). The tumor measured 10.3 cm in diameter and occupied 46.2% of the renal parenchyma. The tumor extended into the renal sinus, but did not violate the renal capsule, and all three lymph nodes were negative.

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Discussion

RCC accounts for approximately 90% of all renal tumors with secondary tumors occur primarily from the lung, colon and breast comprising 44%, 11% and 5% of metastasis respectively.\(^3\) Comparatively, melanoma metastasis to the kidney is rare. One case series showed that melanoma renal metastasis occurred in only 1.35% (20/1,481) of metastatic malignant cancers to the genitourinary tract.\(^1\) Furthermore, while RCC with venous tumor thrombus occurs frequently enough to be accounted for by TNM staging criteria (10–25% of cases), only one prior report has demonstrated that a venous tumor thrombus can occur with malignant melanoma (Level 0).\(^2\)

Just as in the prior described case of metastatic renal melanoma with tumor thrombus, our patient presented with brain melanoma metastasis sequelae and flank pain over the affected kidney. Moreover, while most metastatic melanoma is less than 1 cm in size, both the previously described tumor and the tumor described herein were greater in diameter (15cm and 10.5cm, respectively) occupying a large proportion of renal parenchyma (90% and 46.2%, respectively). In each case, the large lesion size may have contributed to the formation of venous thrombus. However, the tumor thrombus in the prior report was a Neve's system Level 0 (extension into renal vein only), compared to the Level II (> 2cm above renal vein, but below hepatic veins) tumor thrombus reported here. Therefore, this is the first IVC tumor thrombus seen in metastatic melanoma to the kidney. Importantly, the prior reported thrombus was removed with an open approach compared to the robotic approach that we chose.

This report represents the first case of non-RCC IVC tumor thrombus treated with a robotic thrombectomy. As robotic surgery continues to evolve, several groups continue to progress the limits of robotic-assist surgery to include Level III thrombectomy.\(^3,5\) Reports such as these extend the reach of robotic surgery for RCC nephrectomy with IVC thrombectomy. Our report expands the scope of robotic surgery to include nephrectomy and IVC thrombectomy for metastatic disease to the kidney, such as melanoma.
Conclusion

Though rare, non-RCC tumor thrombus does occur and requires treatment. This paper describes the first case of melanoma renal metastasis presenting with IVC thrombus. This is also the first reported robotic IVC thrombectomy in a non-RCC renal mass. As robotic surgery continues to evolve, the applications of this technology will continue to expand. Therefore, this case represents a new application for robotic caval thrombectomy in the setting of metastatic melanoma with IVC thrombus.

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