Ball-shaped right atrial mass in renal cell carcinoma: A case report

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Ball-shaped right atrial mass in renal cell carcinoma: A case report

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Abstract

BACKGROUND

Renal cell carcinoma (RCC) is an aggressive tumor, with an incidental discovery in majority of the patients. Classic presentation is rare, and it has a high frequency of local and distant metastasis at the time of detection.

CASE SUMMARY

We present a rare case of a 58-year-old man with a ball-shaped thrombus in the right atrium at the time of first incidental identification of RCC in the emergency department. Cardiac metastasis, especially thrombus in the right atrium, is rare. It could either be a bland thrombus or a tumor thrombus, and physicians should consider this potentially fatal complication of RCC early at the time of initial presentation.

CONCLUSION

The classic presentation of RCC is rare, and patients can present with atypical symptoms and local or distant metastasis at the time of initial detection. Detection of a ball-shaped lesion in the right atrium is rare, and the patient should undergo appropriate evaluation with an aim to differentiate bland thrombus from a tumor thrombus secondary to intracardiac metastasis, as it aids in therapeutic management and prognosis.

Core Tip: The classic presentation of renal cell carcinoma is rare, and patients can present with atypical symptoms and local or distant metastasis at the time of initial detection. Cardiac metastasis, especially thrombus in the right atrium, is rare and emergency physicians should consider it early at the time of presentation. Detection of a ball-shaped lesion in the right atrium is rare, and the patient should undergo appropriate evaluation with an aim to differentiate bland thrombus from a tumor thrombus secondary to intracardiac metastasis, as it aids in therapeutic management and prognosis.

INTRODUCTION

Renal cell carcinoma (RCC) is an aggressive tumor constituting about 3% of all adult malignancies, with a peak incidence in the sixth and seventh decades of life. The classic triad of flank pain, abdominal mass and hematuria is seen in 10% of the cases. Most cases have an incidental discovery[1,2] with local or distant metastases in 25% of the cases at the time of detection. 10% of these patients have tumor extension into the renal vein and inferior vena cava[3], while only 1% of the total cases have the tumor extending into the right atrium[4]. We present a rare case of a 58-year-old man with a right atrial ball thrombus secondary to metastasis at the time of first incidental identification of RCC in the emergency department (ED).

CASE PRESENTATION

Chief complaints

A 58-year-old male presented to the ED with complaints of breathlessness and reduced effort tolerance for 1 wk.

History of present illness

A 58-year-old male presented to the ED with complaints of breathlessness and reduced effort tolerance for 1 wk. He denied chest pain, orthopnoea or paroxysmal nocturnal dyspnoea. He also noted a ten-kilogram weight loss over the last 2 mo. He went to a family physician where he was found to have hematuria and proteinuria on urine examination, and hence referred to the ED. He denied hematuria, lower urinary tract symptoms or fever.

History of past illness

He had no past medical history and was not on any long-term medication.

Physical examination

On presentation, his vital signs were stable but he appeared pale and had bilateral pitting lower limb edema up to the knees. Abdominal examination revealed a left sided large, palpable abdominal mass, but there was no rectal bleeding or malena. Examination of respiratory, cardiac and neurological systems was normal.

Laboratory examinations

His electrocardiogram showed normal sinus rhythm with T-wave inversions and ST-segment flattening in all leads, along with deep T inversions in leads V2-V4. Bedside ultrasound showed a large heterogenous mass arising from the left kidney suspicious of RCC. Bedside echocardiogram showed a ball-like structure in the right atrium (Figure 1), oscillating between the right atrium and right ventricle intermittently during cardiac cycles, suspicious for a tumor thrombus. There was no pericardial effusion but the right ventricle appeared larger than the left ventricle, suggestive of signs of right heart strain. Blood investigations showed hemoglobin of 7.3 g/dL, elevated serum creatinine of 155 umol/L (1.75 mg/dL) and N-terminal pro-B type natriuretic peptide of 7325 pg/mL. Rest of his blood tests including liver panel, troponin-T, PT/APTT and a SARS-CoV-2 polymerase chain reaction was normal.

Imaging examinations

Chest X-ray revealed mild pulmonary venous congestion. Computerized tomography (CT) scan of the abdomen and pelvis (Figure 2) revealed a 13.9 × 15.8 × 16 cm irregular, heterogenous left renal mass, suspicious of RCC, with extension of tumor into left renal vein and inferior vena cava (IVC) and metastasis to the liver. CT pulmonary-angiogram showed extensive right pulmonary embolism (Figure 3) with evidence of right heart strain and pulmonary arterial hypertension, as well as pulmonary metastasis (Figure 4). A thrombus was noted in the enlarged right ventricle and right atrial appendage.

MULTIDISCIPLINARY EXPERT CONSULTATION

The patient was commenced on subcutaneous enoxaparin 80 mg and admitted to high dependency unit. Histopathology after imaging-guided biopsy of the left renal tumor revealed clear cell RCC. After discussion at the multi-disciplinary tumor board meeting, he was not scheduled for cytoreductive nephrectomy and thrombectomy in view of metastatic burden.

FINAL DIAGNOSIS

He was diagnosed to have left renal cell carcinoma with ball-shaped thrombus in the right atrium, with associated right pulmonary embolism as well as pulmonary metastasis.

TREATMENT

He was treated with enoxaparin 80 mg twice daily and tyrosine kinase inhibitor (TKI) drug Pazopanib 800 mg once daily.

OUTCOME AND FOLLOW-UP

He was discharged and scheduled for out-patient follow-up with hematologist and oncologist.

DISCUSSION

RCC can present as a solitary metastatic lesion or as a widespread systemic disease, but cardiac metastasis from RCC is extremely rare. The incidence of a thrombus in the right atrium is 0.75%, which is significantly lower than that that of a thrombus in the left atrium[5]. Thrombus in the right atrium is usually located at the atrial appendage or atrial wall. A ball thrombus in the right atrium is even rarer[5].

The ball-shaped lesion in our patient's right atrium could either be a bland thrombus or a tumor thrombus which spread along IVC. In patients with malignancy, bland thrombus is usually a venous thrombus. Pathogenesis of ball thrombus is still unclear and it can be difficult to make a diagnosis. The challenge is to correctly

differentiate bland thrombus from a tumor thrombus secondary to intracardiac metastasis, as it aids in appropriate therapeutic management as well as prognosis. On perfusion magnetic resonance imaging (MRI), heterogeneous enhancement of this ball-shaped lesion and presence of blood products within it suggests a tumor thrombus secondary to RCC metastases. On the contrary, a bland thrombus will show non-restricted diffusion and complete nulling of the mass on MRI perfusion imaging[6]. Bland thrombus may resolve after thrombolytic and anticoagulant therapy, unlike tumor thrombus. Our patient unfortunately died before further evaluation could be conducted.

Combining cytoreductive nephrectomy and/or metastasectomy with chemotherapy helps in palliation. The possible surgical option for metastatic RCC extending into the right atrium and causing pulmonary embolism, in this patient, is cardiopulmonary bypass with deep hypothermic circulatory arrest, which is safe and efficient method for removal of the tumor and thrombus[7]. Manual repositioning of the tumor thrombus out of the right atrium into the inferior vena cava on the beating heart is also a safe approach with low risk of tumor thrombembolization[8]. In recent times, the progression free survival has improved due to advances in chemotherapy, treatment with immunotherapy and TKI[9]. But the overall long term prognosis of patients with metastatic RCC is poor, with a median survival of 6-12 mo.

CONCLUSION

The classic presentation of RCC is rare, and patients can present with atypical symptoms and local or distant metastasis at the time of initial detection. Cardiac metastasis, especially thrombus in the right atrium, is rare and emergency physicians should consider it early at the time of presentation. Detection of a ball-shaped lesion in the right atrium is rare, and the patient should undergo appropriate evaluation with an aim to differentiate bland thrombus from a tumor thrombus secondary to intracardiac metastasis, as it aids in therapeutic management and prognosis.

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