From Kidney to Heart: A Rare Cardiac Invasion by Renal Cell Carcinoma

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Abstract

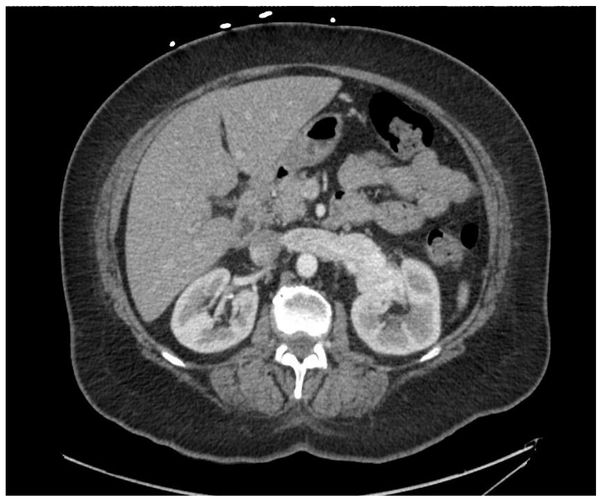
- In this report, we present a rare case of an asymptomatic right atrial tumor thrombus in a patient with RCC—an uncommon and often clinically silent presentation that underscores the importance of vigilant imaging and multidisciplinary management.

- Renal cell carcinoma (RCC) represents about 3% of all cancers, with over 80,000 new cases and nearly 15,000 deaths estimated in 2023. Tumor thrombus (TT) occurs in 4–10% of RCC cases, most commonly involving the renal vein (10–18%) and less frequently the inferior vena cava (IVC) (4–23%). Rarely, in about 1% of cases, the thrombus can extend into the right atrium. Clear cell carcinoma is the predominant histologic subtype in RCC cases associated with TT.

Clinical presentation

- A 63-year-old female with a past medical history of hypertension, type 2 diabetes mellitus, and a known left renal mass under surveillance was found to have an incidentally discovered right atrial mass on transthoracic echocardiogram. The patient was asymptomatic at the time of evaluation.

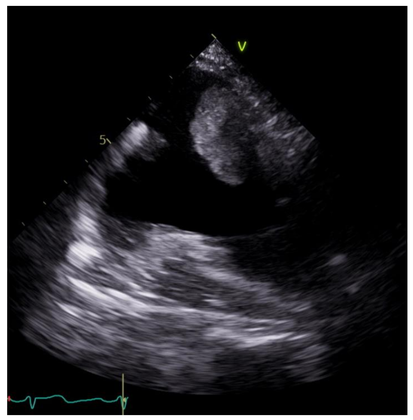
- A contrast-enhanced CT scan revealed a large left renal mass with tumor extension into the inferior vena cava (IVC). Subsequent abdominal MRI demonstrated a centrally located 5 cm left renal mass with tumor thrombus extending cephalad through the IVC into the right atrium, consistent with a Level IV thrombus. The patient underwent open left radical nephrectomy, retroperitoneal lymph node dissection (RPLND), IVC thrombectomy, and sternotomy with cardiopulmonary bypass. Final pathology was consistent with clear cell renal cell carcinoma.



Discussion

- This intravascular extension occurs via direct luminal propagation rather than true vascular wall invasion, yet it reflects the biologic aggressiveness of the malignancy. Complete surgical resection of both the renal tumor and associated TT has been associated with favorable outcomes, with 5-year survival rates reported between 47% and 62%. In contrast, incomplete resection or presence of metastatic disease significantly worsens prognosis [5,6]. While the thrombus level itself has not consistently demonstrated prognostic significance, extension into the right atrium (Level IV) has been associated with poorer outcomes.*

- Renal cell carcinoma (RCC) with tumor thrombus (TT) is known to be associated with an increased risk of venous thromboembolism (VTE). However, the role of anticoagulation in this population remains controversial in clinical practice. It is not yet clear whether anticoagulation confers a survival benefit in patients with RCC and TT, and there is limited comparative evidence regarding the optimal anticoagulant agent—whether direct oral anticoagulants (DOACs), low molecular weight heparin, or warfarin.



- RCC with tumor thrombus to the RA is a rare presentation with significant clinical challenges. Surgical intervention, including nephrectomy and thrombectomy, is crucial for long-term survival, but positive margins pose concerns for recurrence. Multidisciplinary teams, including oncology, cardiology, and surgery, are essential for managing such complex cases.

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