Metastatic Renal Cell Carcinoma Manifesting as Cardiac Tamponade

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Introduction

Renal cell carcinoma (RCC) accounts for 3% of adult cancers and causes about 13,000 deaths annually in the U.S. The most common subtype, clear cell renal cell carcinoma (CCRCC), can metastasize to organs like the lungs, bones, and liver. Rarely, it can spread to the heart, usually via the inferior vena cava (IVC). This case describes an unusual instance of RCC metastasizing to the left ventricle's exterior, occurring eleven years post-nephrectomy, without IVC involvement.

Case Report

An 81-year-old male with a history of multiple comorbidities and renal cell carcinoma (RCC). He had undergone a right nephrectomy in 2013 for a 5.5 x 4.1 x 4.0 cm RCC, which was confined to the renal parenchyma with negative margins. In 2024, he presented with chest pain and shortness of breath, leading to a diagnosis of hemopericardium and cardiac tamponade. He underwent an emergent pericardial window and was referred for further evaluation, where a highly vascular cardiac tumor was identified. During surgery, a frozen-section examination suggested RCC. The excised tumor, measuring 4.6 x 4.3 x 1.2 cm, had yellow hemorrhagic parenchyma. Pathological review, including immunhistochemical staining (PAX8++ and CD10+), confirmed the diagnosis of clear cell renal cell carcinoma.

Discussion

Cardiac metastases are typically associated with lung, breast, and melanoma rather than renal cell carcinoma (RCC). Although rare, RCC cardiac metastases are often found incidentally and can be asymptomatic or present with symptoms like dyspnea or palpitations. Clear cell carcinoma, the most common subtype of RCC, accounts for 80-90% of cases and has the highest distant metastasis rate at 15%. Its 10-year cancer-specific survival rate is 71%, lower than the 91% for papillary and 88% for chromophobe subtypes. This case presents a rare late recurrence of clear cell RCC metastasis to the left ventricle pericardium, 11 years post-nephrectomy, causing severe cardiac tamponade.

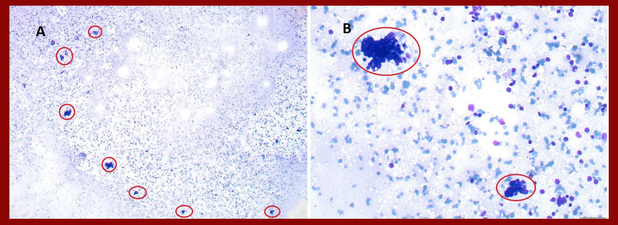

Figure 1: Touch preparation of Frozen section specimen showing multiple small clusters of tumor cells in the red circle (Figure A, 2X). Tumor cells are hyperchromatic with irregular nuclear contours and abnormal chromatin (Figure B, 20X)

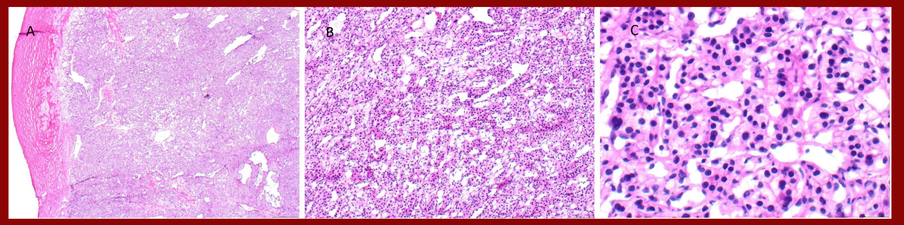

Figure 2: Low and medium power view of Frozen section H&E showing encapsulated, circumscribed mass with networks of arborizing small, thin-walled vessels (Figures A and B, 4 X and 20X). High power shows tumors with abundant vacuolated cytoplasm with variable nuclear atypia (Figure C, 40X).

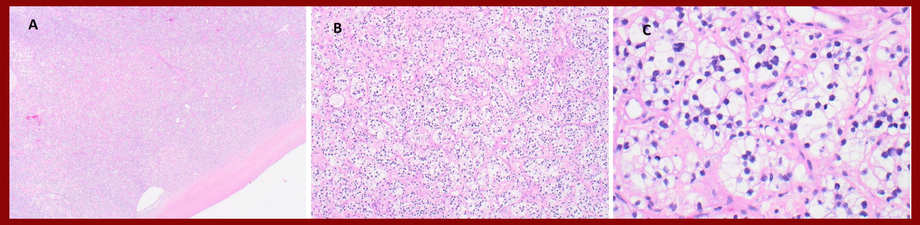

Figure 3: Low and high-power view of H&E permanent sections showing apparent features consistent with Clear Cell Renal Cell Carcinoma (Figures A, B, and C, 4X, 20X, and 40X).

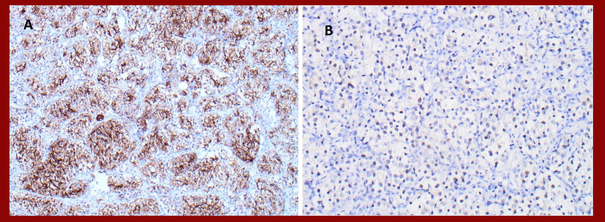

Figure 1: Diffuse cytoplasmic CD10 and Nuclear PAX8 immunohistochemistry staining of tumor cells consistent with Renal Cell Carcinoma (Figures A and B, 20X)

Conclusions

This case highlights the rare but significant possibility of late metastatic recurrence of clear cell renal cell carcinoma, even many years after initial nephrectomy and tumor excision. The patient's cardiac metastasis, which developed outside the myocardium in the left ventricle pericardium, underscores the complex and variable nature of RCC metastasis. This case serves as a reminder to consider RCC in the differential diagnosis when patients present with unexplained chest pain, dyspnea, or other related symptoms in those with a history of RCC. Awareness of such rare presentations is crucial for timely diagnosis and intervention.

References

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2. Bazine A, Fetohi M, Tanz R, Mahfoud T, Ichou M, Errihani H. Cardiac metastases of renal cell carcinoma revealed by syncope: Diagnosis and treatment. Case Rep Oncol. 2014;7(2):560–564. https://doi.org/10.1159/000366292