Occult infiltrating bi-ventricular papillary renal cell carcinoma metastasis found during coronary artery bypass graft surgery

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Abstract

Metastatic papillary renal cell carcinoma (RCC) to the heart has never been reported. We report the case of a 73-year-old patient with papillary RCC metastatic to the left and right ventricles, found during a triple vessel coronary artery bypass graft surgery.

Introduction

Metastatic tumour involvement of the heart from clear cell renal cell carcinoma (RCC) has been previously reported.[1-4] However, cardiac metastasis from papillary RCC has not yet been described. Papillary (or chromophilic) RCC, which accounts for 7% to 14% of adult renal neoplasms, is associated with a better prognosis than clear cell RCC.[5] We describe a patient diagnosed with papillary RCC found to have occult infiltrating bi-ventricular metastases discovered during triple vessel coronary artery bypass graft surgery (CABG).

Case report

A 73-year-old man with a history of chronic obstructive pulmonary disease and hypertension was evaluated for right-sided abdominal pain, weight loss and anemia. Physical exam revealed a palpable right sided abdominal mass. Abdominal computed tomography (CT) revealed a 9 × 7 cm cystic mass arising from the right kidney suspicious for cystic RCC. Additional staging workup was negative for metastatic disease. In anticipation of operative exploration, preoperative electrocardiogram was performed and showed ST segment depression in the anterior and septal leads. This was followed up by a nuclear stress test which was positive for a reversible perfusion defect. Left heart catheterization showed severe stenosis in the distal left main coronary artery, along with three-vessel coronary artery disease. Echocardiography demonstrated normal ventricular systolic function.

The patient was taken to the operating room for triple vessel CABG with a left internal mammary to left anterior descending coronary artery, a saphenous vein to the posterior descending artery branch of the right coronary artery, and a saphenous vein to the obtuse marginal branch of the circumflex coronary artery. During the operation, there were two 2 × 2 cm epicardial masses infiltrating into the myocardium: one on the right ventricle near the proximal segment of the coronary sinus and the other on the left ventricular wall near the apex. These were biopsied and sent for pathologic examination (Fig. 1a). The patient had an uneventful postoperative course and was discharged. After being discussed at a multidisciplinary tumour board, the patient underwent an open right radical nephrectomy without any complications and the final pathology (Fig. 1b) revealed papillary RCC type II (T2a, N0, M1). The patient underwent systemic chemotherapy with sunitinib and is doing well at the 8-month follow-up.

Discussion

Cardiac metastases from clear cell RCC are rare. A large autopsy study of 11 432 patients showed 264 cases of cardiac metastases, of which only 3 (1.1%) were renal in origin.[5] Metastatic tumours may reach the heart hematogenously, via lymphatic spread, or direct invasion. Although rare, clear cell RCC extension to the heart has most typically been described through direct involvement of the inferior vena cava (IVC) and right atrium (RA).[1,2] However, right ventricular metastases without IVC or RA involvement has also been described.[3,4] This case report is the first to describe cardiac metastases from papillary RCC.

Papillary RCC is the second most common histology after clear cell and has two subtypes, classified according to histologic features. Type I is on average diagnosed with a lower grade, and at a lower stage than Type II and also has

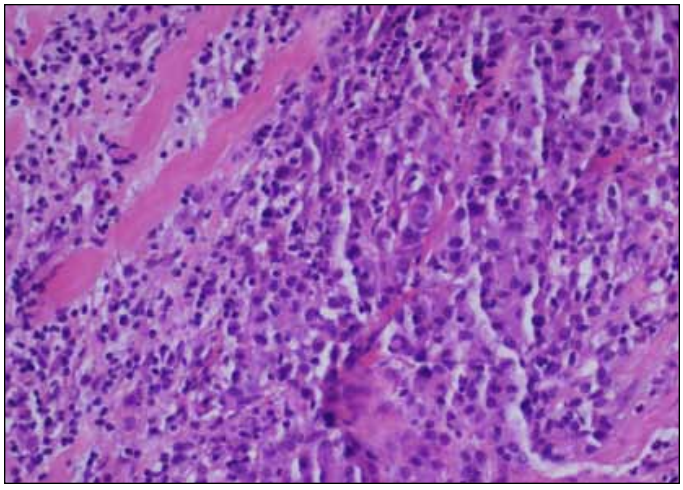

Fig. 1a. Hematoxylin and eosin stain of cardiac biopsy showing metastatic papillary renal cell carcinoma infiltrating the myocardium, magnification 400×.

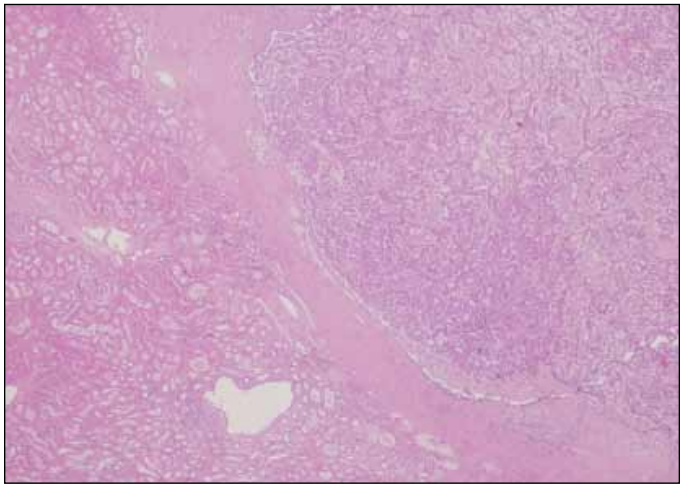

Fig. 1b. Hematoxylin and eosin stain of the section of the radical nephrectomy specimen. Lower left is normal kidney and upper right is papillary renal cell carcinoma, magnification 40×.

been shown to have a better prognosis.[5] However, patients with advanced stage unresectable papillary RCC have similar prognoses to those with clear cell RCC with a reported median survival of 8 to 13 months.[6,7] The largest series reporting on 270 patients with papillary RCC demonstrated that about 4% of patients presented with metastatic disease, with lung (47% to 78%) and retroperitoneal lymph nodes (34% to 61%) as the two most common sites of metastasis.[6,7] Treatment has included surgery or chemotherapy alone, or a combination of the two depending on both patient and tumor related factors, such as the site of metastasis and patient performance status. A number of systemic therapies have all been used with varying success.[8-11] Cytotoxic therapy with paclitaxel and carboplatin and immunotherapy with interleukin-2 and interpheron alpha have all failed to produce an objective response in two small series of patients treated for metastatic papillary RCC.[8,9] Another small series of patients treated with tyrosine kinase inhibitors reported responses in 2 of 12 patients treated with sunitinib and 0 of 28 with sorafenib.[10] When compared to interferon alpha, the mammalian target of rapamycin (mTOR) inhibitor temsirolimus has shown a general benefit in prolonging overall survival in patients with non-clear cell features in their tumours.[11]

There is evidence that patients with metastatic papillary RCC who are able to undergo complete removal of metastases (R0-resection) experience a survival advantage over those treated non-surgically.[7] However, survival is generally better the longer the interval between initial nephrectomy and the subsequent development of metastases. Isolated metastases to the heart can be resected, however, patients with initial solitary metastases eventually develop systemic disease. As reported here, this patient was not offered surgical resection of his cardiac metastases due to the infiltrative nature of the tumour spread, the presence of bilateral ventricular disease, and the synchronous presentation of his metastases. Nephrectomy, however, in the setting of metastatic RCC can provide symptomatic relief. Furthermore, there is emerging evidence that cytoreductive surgery, the removal of as much of the tumour as possible, may enhance the response to systemic therapy in RCC patients.[12]

Conclusion

We have reported the first case of metastatic papillary RCC to the heart found incidentally during coronary artery bypass surgery. These metastases were not apparent on computerized chest tomography or echocardiography, therefore, the incidence of patients with papillary RCC with isolated cardiac metastases is unknown. For patients with isolated unresectable cardiac metastases from papillary RCC, one reasonable treatment approach is cytoreductive surgery followed by systemic therapy with either sunitinib or temsirolimus. However, further research with more numbers and more long-term follow-up is needed to make any conclusions.

Competing interests: None declared.

This paper has been peer-reviewed.

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