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CASE REPORT

Case report - Thoracic oncologic

Right ventricular metastasis of transitional cell carcinoma of the renal pelvis: successful single stage surgical treatment

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Abstract

A 58-year-old female presented with symptoms mimicking infective endocarditis and was diagnosed with a right ventricular metastasis from a transitional cell carcinoma (TCC) of the left renal pelvis. The patient was treated with concurrent removal of the cardiac tumour and radical left nephrectomy followed by adjuvant gemcitabine-cisplatin chemotherapy. To our knowledge, this is the 14th report of cardiac metastases from TCC and the only case where one-stage surgical management of primary and cardiac metastases from TCC has been successfully completed.

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1. Introduction

Symptomatic cardiac metastases from primary transitional cell carcinoma (TCC) are uncommon, and cases where the presenting complaint is directly attributable to the cardiac metastasis with subsequent discovery of the primary tumour are rare. Such cases pose considerable clinical challenges and the optimum management is unclear. We report the first successful one-stage nephrectomy and debulking of cardiac metastasis from TCC in a 58-year-old female patient.

2. Case summary

A 58-year-old female secretary presented to her GP in May 2010 complaining of a five-month history of malaise, anorexia and 3 kg weight loss and a two-month history of worsening shortness of breath on exertion, palpitations, light-headedness and night sweats. She had a single brief episode of haematuria four months previously. She was referred to the Cardiology Department at King’s College Hospital, London for investigation of suspected infective endocarditis.

Her medical history included hypothyroidism controlled with 150 μg thyroxine daily and a 15 pack-year smoking history. On examination, the patient was apyrexial, had no peripheral stigmata of infective endocarditis, however, on auscultation, a loud, pansystolic murmur was audible, loudest at the lower left sternal edge.

A transthoracic echocardiogram (Fig. 1a) revealed a large right ventricular mass arising from the interventricular septum and abutting the pulmonary valve. The mass was causing significant obstruction to the right ventricular outflow tract. A ventricular myxoma was suspected, however, computed tomography (CT)-scan of the chest, abdomen and pelvis confirmed a right ventricular filling defect (Fig. 1b and c) and two sub-centimetre nodules in the lower lobe of the right lung and a large 80 × 76 mm heterogeneous infiltrative mass at the upper pole of the left kidney, subsequently confirmed by magnetic resonance imaging (MRI) (Fig. 1d and e). Cardiac catheterisation demonstrated no compromise of coronary artery blood flow.

Our cardiothoracic and urological surgeons agreed a multidisciplinary, concurrent, one-stage removal of the right ventricular mass and radical left nephrectomy. Surgical access to the right ventricle was gained via a median sternotomy, bicaval to ascending aortic bypass at 28°C and a transverse incision in the right atrium. Before accessing the mass via the tricuspid valve, the pulmonary artery was cross-clamped to prevent embolisation to the lungs. The tumour was strongly adherent to the intraventricular septum and tumour debulking from interventricular septum was performed leaving it intact (Fig. 1f and g). A radical left nephrectomy was performed following closure of the sternotomy.

Histopathology confirmed a 90 × 80 × 50 mm variegated, grade III TCC with sarcomatoid differentiation infiltrating the renal parenchyma and perinephric fat. Areas of coagulative necrosis and cystic change were noted (Fig. 2a–c). Metastatic deposits were found in the 3/7 of the local nodes, however, the renal vein, left adrenal gland and resection margins were clear of tumour. The right ventric-
Fig. 1. Echocardiographic, CT and MRI and intraoperative images of cardiac metastasis and primary tumour: echocardiogram of the cardiac metastasis abutting the pulmonary valve (a). Axial (b) and coronal (c) contrast enhanced CT images of the metastatic tumour causing a filling defect in the right ventricle. Axial (d) and coronal (e) contrast enhanced T1 MRI images of the primary renal tumour. Photographs show metastatic tumour occupying the right ventricle, adherent to the intraventricular septum before (f) and after (g) tumour debulking. CT, computed tomography; MRI, magnetic resonance imaging.

ular mass was found to be metastatic TCC with focal squamoid and sarcomatoid differentiation (Fig. 2d). The tumour was staged pT4 pN2 pM1.

The patient made a remarkably swift and uneventful postoperative recovery. She was discharged home 14 days postoperatively with a referral to the oncology team who commenced adjuvant gemcitabine and cisplatin chemotherapy. On nine-week postoperative outpatient follow-up, her performance status is zero and she reports no cardiorespiratory symptoms.

3. Discussion

TCC of the renal pelvis accounts for only 5% of urothelial tumours and has an incidence of 0.7–1.1 per 100,000 population with a 1.7:1 male to female bias [1]. Risk factors for TCC include smoking, analgesic nephropathy and occupational exposure to petrochemicals. Gross tumour pathology characteristically demonstrates a highly infiltrative mass destroying the renal parenchyma [1]. Patients tend to present with flank pain and haematuria and five-year
survival has been reported as 100%, 91.7%, 72.6% and 40.5% for Ta, T1, T2 and T3 tumours, respectively [1].

Cardiac metastases are found in 2.3–18.3% of disseminated cancer cases at autopsy, most commonly arising from malignant melanoma and primary mediastinal tumours [2]. Such metastases are clinically under-recognised and usually asymptomatic. Fourteen cases of symptomatic cardiac metastases from TCC have been reported in the literature, four arising from tumours of the renal pelvis. TCC cases where the presenting complaints (e.g. dyspnoea, dizziness) are directly attributable to cardiac metastases are exceptionally rare, with only three cases reported, two of which had primaries arising in the renal pelvis [3, 4]. Cardiac metastasis from TCC of the renal pelvis may be more likely to present in this manner; TCC of the upper urinary tract are, on average, more invasive and of higher grade at presentation compared to TCC of the bladder [5].

Optimum management of TCC with cardiac metastasis is unclear. Of the cases reported in the literature, the vast majority of patients have died within weeks of diagnosis. Resection of cardiac metastases was attempted in two cases but survival did not exceed four weeks [6, 7]. Gemcitabine-carboplatin based chemotherapy has been used for palliation of cardiac metastases in two cases with some success; one patient remained asymptomatic for over one year with a 40% reduction in cardiac tumour size and another demonstrated performance status improvement from three to zero for seven months before subsequent deterioration [8, 9].

One-stage surgical management of cardiac and renal pathology have been successfully employed to treat renal cell carcinomas with concomitant tumour infiltration of the inferior vena cava, pulmonary artery tumour embolisation, or multi-vessel coronary artery disease [10]. One-stage approaches are hypothesised to reduce ventilation duration and hospital stay over two-stage approaches [10], and although concern has been raised that post-bypass immunosuppression may contribute to subsequent metastatic tumour growth, no evidence currently supports this hypothesis. In conclusion, cardiac metastasis from TCC poses considerable clinical challenges. We report that one-stage nephrectomy and cardiac surgery can be successfully employed to extend lifespan and improve quality of life for such patients.

References


Fig. 2. Histological characteristics of tumour: (a) primary tumour within renal papilla (H&E, 4×). (b and c) High magnification (H&E, 20×) of areas of primary tumour. (d) Sarcomatoid metastasis to heart (H&E, 20×).


