Urology Case Reports 5 (2016) 27–30

Contents lists available at ScienceDirect

Urology Case Reports

journal homepage: www.elsevier.com/locate/eucr

Oncology

Collecting Duct Carcinoma With Cardiac Metastases: A Case Report & Literature Review

James N. Voss [a,*], Nkwam M. Nkwam [a], Thomas A. McCulloch [b], Gurminder S. Mann [a]

[a] Department of Urology, Nottingham City Hospital, UK
[b] Department of Histopathology, Nottingham City Hospital, UK

ARTICLE INFO

Article history:
Received 16 December 2015
Accepted 28 December 2015

Keywords:
Collecting duct carcinoma
Renal cell carcinoma
Cardiac metastases

ABSTRACT

Collecting duct carcinoma (CDC), is a rare and aggressive form of renal cell carcinoma (RCC) accounting for around 1% of all renal malignancy. It affects younger patients and is associated with rapid progression, distant spread and poor prognosis. Cardiac metastases from all types of RCC, without involvement of the inferior vena cava are very rare. We present the case of a 54 year old man with a history of CDC, who presents with collapse and ventricular tachycardia secondary to multifocal cardiac metastases. We are not aware of any other reports in the literature of CDC and cardiac metastases.

Introduction

Collecting duct carcinoma (CDC), also known as Bellini duct carcinoma, is a rare type of renal cell carcinoma (RCC) accounting for around 1% of all renal malignancy. It affects younger patients and is associated with rapid progression, distant spread and poor prognosis. Most cases are metastatic at presentation and surgery is usually not curative.[1] RCCs are known to extend directly into the right atrium via the inferior vena cava, but distinct cardiac metastases that have seeded in the cardiac tissue are rare, particularly to the left side of the heart. It has been proposed that cardiac metastases to the left side of the heart spread via intra-thoracic lymphatics, rather than by direct or hematogenous routes and that this mode of spread is associated with a poorer prognosis.[2,3] We present the case of a 54 year old man with a history of CDC, who presents with collapse and ventricular tachycardia secondary to multifocal cardiac metastases.

Case presentation

A 54 year old Caucasian engineer was referred by his general practitioner to the acute surgical unit with a 4 day history of left flank pain, rigors and a palpable mass in his left flank. He was febrile and tachycardic. Initial blood results revealed hemoglobin of 121 g/L, a leukocytosis of 27.2 $\times$ 10^9/L, reduction in eGFR of 46 ml/min/1.73 m^2 and a raised C-reactive protein of 464 mg/L. Bone profile and liver function tests were normal. His initial ECG showed sinus tachycardia. He had no significant past medical history but was an ex-smoker of around twenty pack-years. There was no significant family history of note. A contrast-enhanced CT scan of the chest, abdomen and pelvis demonstrated a 17 $\times$ 14 $\times$ 19 cm heterogenous mass arising from the lower pole of the left kidney, displacing it anteriorly. There were also multiple enlarged left para-aortic lymph nodes measuring up to 25 mm and small lung nodules in the left upper and right lower lobes. CT appearances were consistent with a primary renal malignancy, which had bled significantly into the renal capsule (Fig. 1).

He required a 2 unit blood transfusion after which his condition stabilized without the need for emergency intervention. A decision was made that he would undergo a delayed open left radical nephrectomy with prior angio-embolization to allow time to recover from the acute episode. This was performed 6 weeks later via a rooftop incision with selective angio-embolization of three renal arteries immediately prior to the procedure. He made an uncomplicated recovery and was discharged 5 days post-operatively. Histology revealed a pT3a collecting duct carcinoma with tumor present in lymphatics of the hilar fat including the surgical hilar resection margin. Initial overall staging was pT3aN1M0 (Fig. 2).

Ten weeks post-operatively he was admitted to the acute medical unit following an episode of collapse. His hemoglobin level had fallen to 79 g/L. Initial ECG demonstrated a ventricular tachycardia which was successfully converted to sinus rhythm with amiodarone. An urgent CT angiogram was arranged to identify any

* Corresponding author. Department of Urology, Nottingham Universities, NHS Trust, Nottingham NG51PB, UK. Tel.: +44 7595170514.
E-mail address: j.voss@hotmail.co.uk (J.N. Voss).

http://dx.doi.org/10.1016/j.eucr.2015.12.010

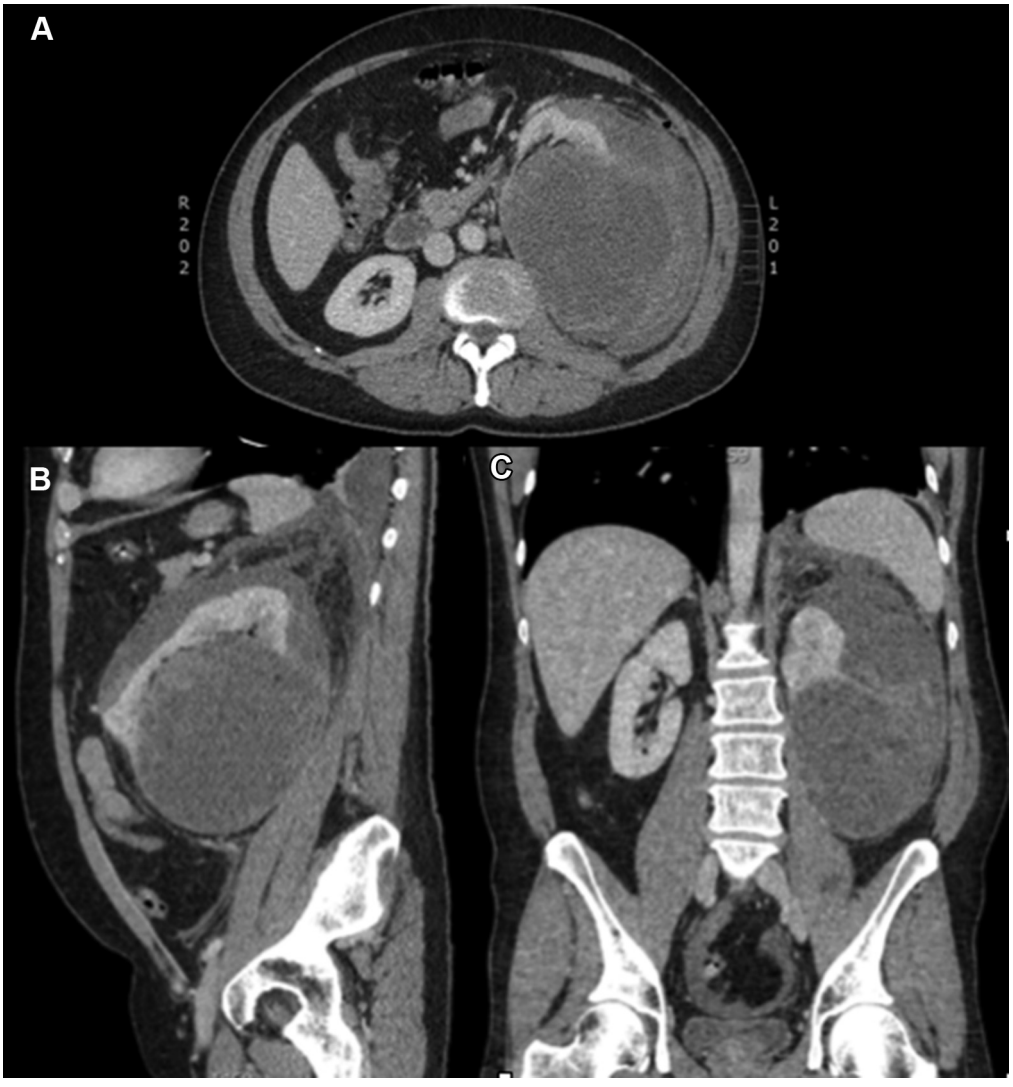

Figure 1. Contrast-enhanced CT scan of the abdomen and pelvis demonstrating an indeterminate mass arising from lower pole of left kidney with surrounding capsular and hilar hematoma; (A) axial view, (B) sagittal view, (C) coronal view.

source of bleeding. This revealed a moderate left pleural effusion, a pericardial effusion, an increase in size of the pulmonary nodule in the right lower lobe and a hypodense mass in the basal lateral wall of the left ventricle, consistent with a cardiac metastasis. He was transferred to the acute coronary care unit where an echocardiogram confirmed a global pericardial effusion with otherwise normal cardiac function.

A cardiac MRI showed multifocal myocardial masses arising from the walls of the left and right ventricles and a further mass within the right ventricular outflow tract (Fig. 3). He spontaneously developed swelling of his left shoulder and an X-Ray revealed a pathological fracture of his left acromium. He developed chest sepsis and a further contrast-enhanced CT scan showed bilateral pleural effusions with evidence of progressive pulmonary and pleural metastasis. He was commenced on treatment with oral pazopanib, a potent selective multi-targeted receptor tyrosine kinase inhibitor that blocks tumor growth and inhibits angiogenesis, but after only 7 days of treatment he deteriorated from progressive lung and cardiac metastases and died. Overall, time from diagnosis to treatment was just 16 weeks.

Discussion

Collecting duct carcinoma is a rare and aggressive form of RCC which develops from the collecting ducts in the renal medullary pyramid, unlike conventional RCC which is thought to arise from the proximal tubule. Population-based studies have shown that patients present at a higher stage and have worse disease-specific survival when compared to other types of renal malignancies.[1] Emerging evidence suggests they are clinically, histologically and genetically distinct from other types of RCC and should be treated as a separate disease entity.[4]

Cardiac metastases from all types of cancer are not as rare as one might expect, with up to 25% of patients with known malignancy being diagnosed at autopsy. The most common tumors with cardiac metastatic potential are carcinomas of the lung, breast and esophagus, malignant lymphoma, leukemia and malignant melanoma. The majority of cardiac metastases however are clinically silent, which is in contrast to this case.[3,5] Around 1% of RCCs are reported to have direct extension of tumor into the right atrium via the inferior vena cava but distinct cardiac metastases without

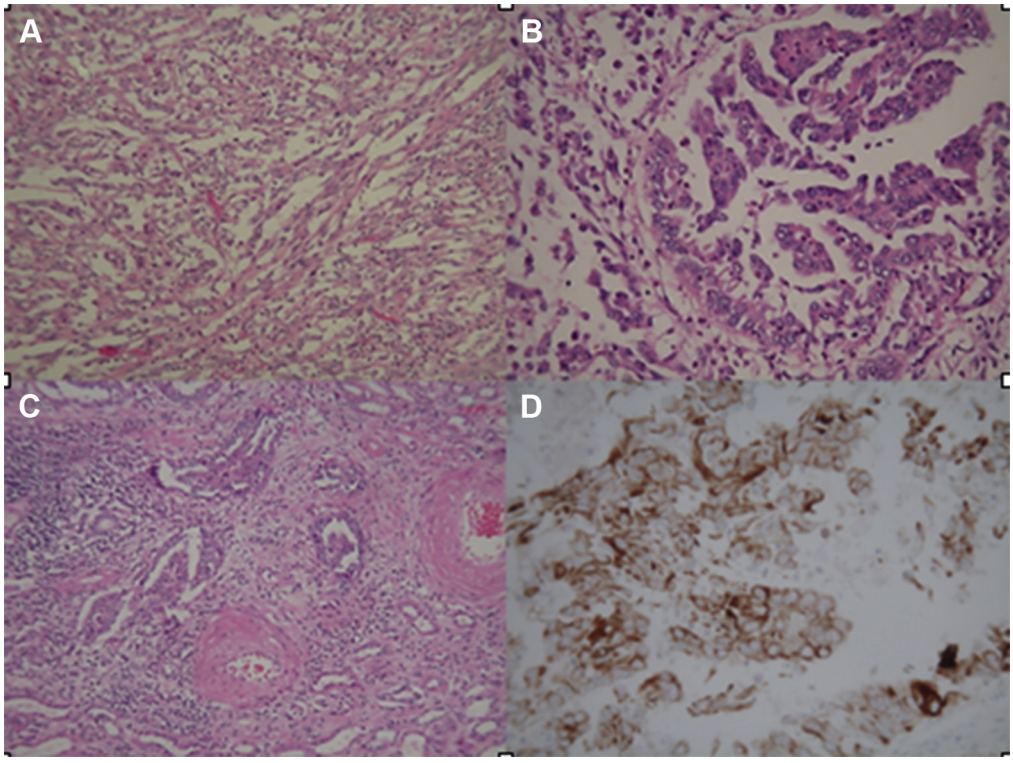

Figure 2. Histology showed a mainly sarcomatoid renal cell carcinoma (A) with focal areas of typical collecting duct carcinoma morphology (B). Areas in the medulla showed in situ carcinoma in collecting ducts (C). The diagnosis was confirmed with immunopositivity for high molecular weight cytokeratin (D). Note that morphology was sub-optimally preserved following embolization.

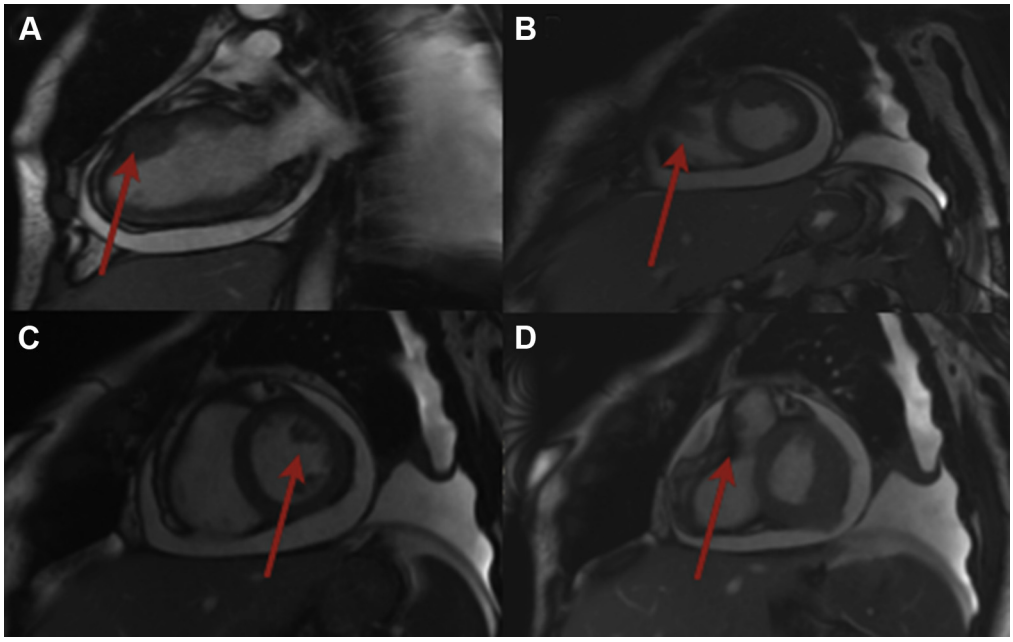

Figure 3. Cardiac MRI images showing intramural mass anterior mid-left ventricle (A), basal right intra-ventricular mass (B), left intra-ventricular mass (C) mass within right ventricular outflow tract (D).

inferior vena cava involvement are very rare, particularly to the left side of the heart. Spread via the intra-thoracic lymphatics has been proposed that causes a pattern of left cardiac metastases with epicardial and pericardial involvement and pleural metastases,[2,3] as seen in this case.

Conclusion

This case illustrates an unusual combination of cardiac metastases secondary to CDC. Cardiac involvement should be considered in all patients with CDC and cardiac symptoms and MRI is the investigation of choice. Rapid deterioration and disease progression can be expected in patients presenting with cardiac metastases secondary to CDC and the prognosis is extremely poor.

Conflicts of interest

There is no conflict of interest.

References

1. Dason S, Allard C, Sheridan-Jonah A, et al. Management of renal collecting duct carcinoma: a systematic review and McMaster experience. *Curr Oncol*. 2013;20(3):e223–e232.
2. Goldberg AD. Tumors metastatic to the heart. *Circulation*. 2013;128:1790–1794.
3. Reynen K, Köckeritz U, Strasser RH. Metastases to the heart. *Ann Oncol*. 2004;15(3):375–381.
4. Gupta R, Billis A, Shah RB, et al. Carcinoma of the collecting ducts of Bellini and renal medullary carcinoma: clinicopathologic analysis of 52 cases of rare aggressive subtypes of renal cell carcinoma with a focus on their interrelationship. *Am J Surg Pathol*. 2012;36(9):1265–1278.
5. Lam KY. Tumors of the heart. A 20-year experience with a review of 12,485 consecutive autopsies. *Pathol Lab Med*. 1993;117(10):1029–1031.