Nocturnal dyspnoea in a patient with previous nephrectomy

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Background

- 69-year old bus driver
- presented acutely with nocturnal dyspnoea
- History of hypertension, dyslipidaemia and type II diabetes mellitus
- cigarette smoker
- previous renal cell carcinoma and nephrectomy

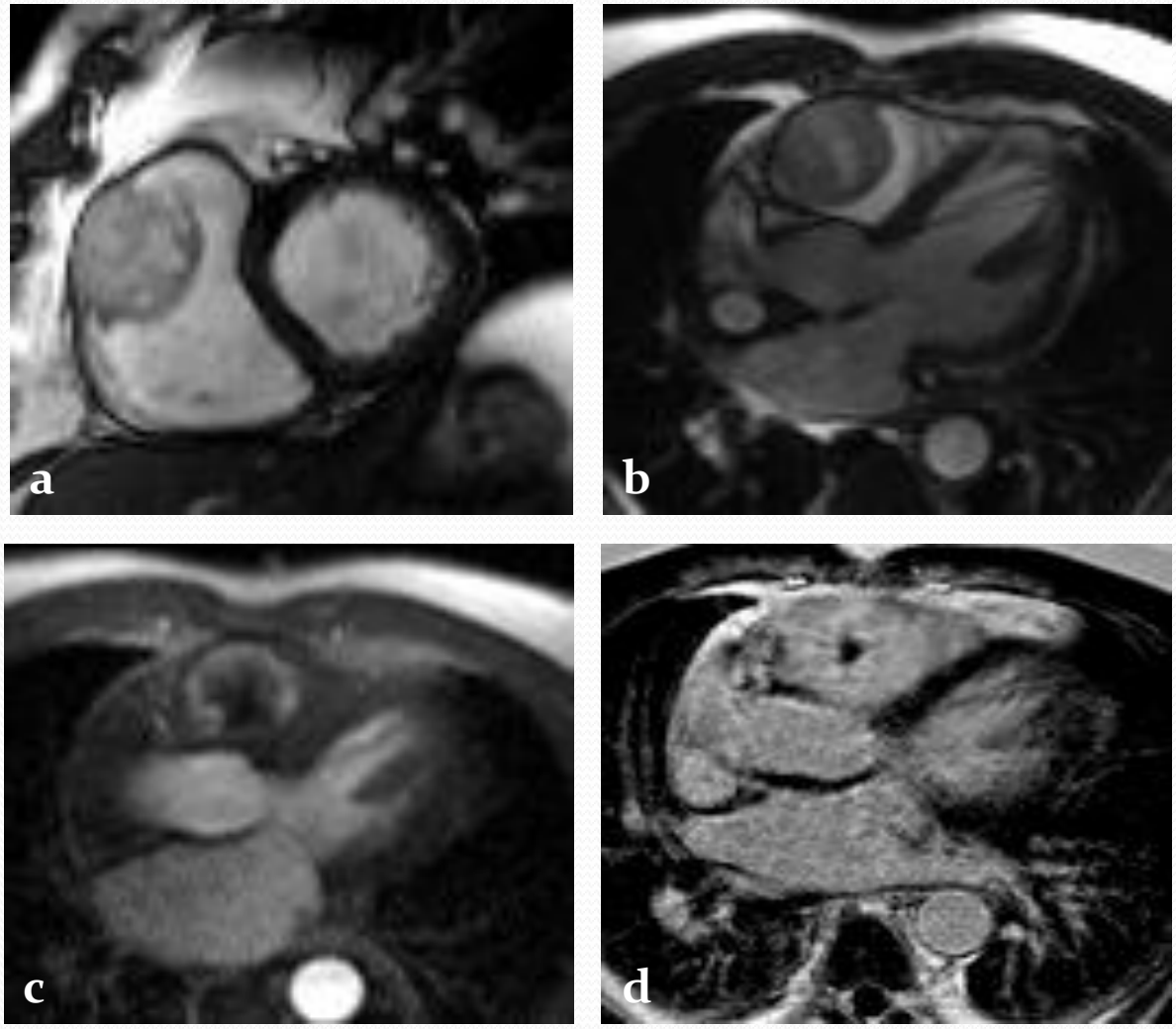
Early investigations

- Admission **ECG** demonstrated sinus rhythm with anterior T-wave inversion (leads V1–V4)
- **CXR** revealed cardiomegaly with a suspicion of a left hilar opacity associated with loss of basal lung volume
- **Chest CT scanning** showed mild left basal atelectasis, a normal left hilum and two pulmonary nodules in the right lung field
- **TTE** revealed a dilated and functionally impaired right ventricle (RV) within which was a large circular mass contiguous with the RV free wall

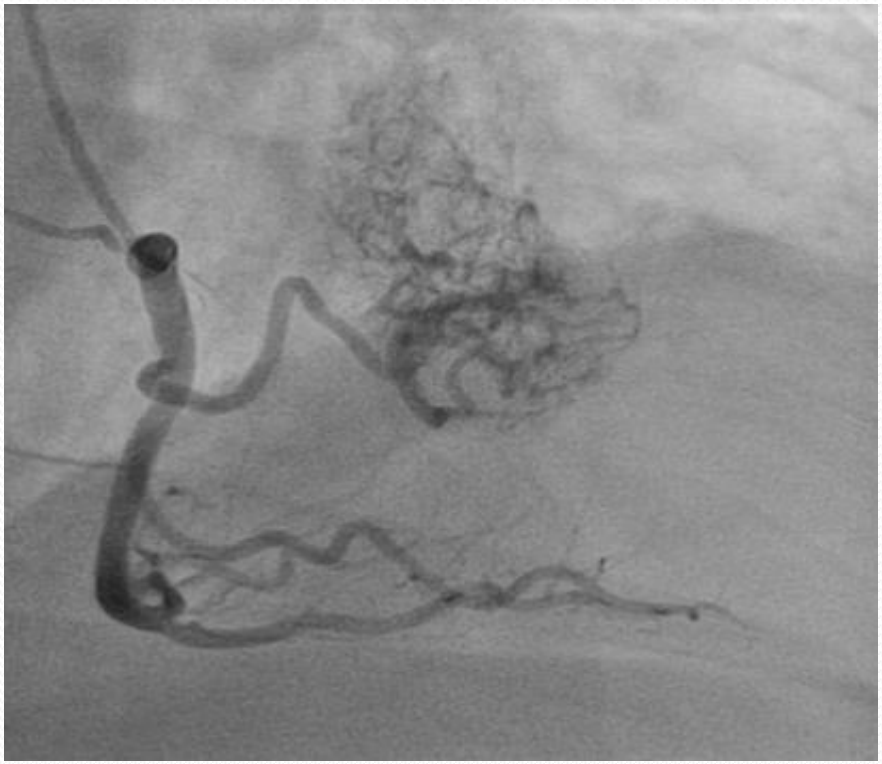
CMR imaging

- **well-circumscribed mass** (52x48mm) within a dilated RV (RVEDV 133ml/m²; RVESV 56ml/m²) that was attached to the free wall distal to the RV outflow tract (a-b)
- **absence of signal on T1-weighted sequences** with **intermediate signal on T2-weighted imaging**
- **enhanced on first-pass perfusion** (c) indicating a vascular structure and **enhanced entirely on delayed contrast sequences** (d), except for a small central hypodense region

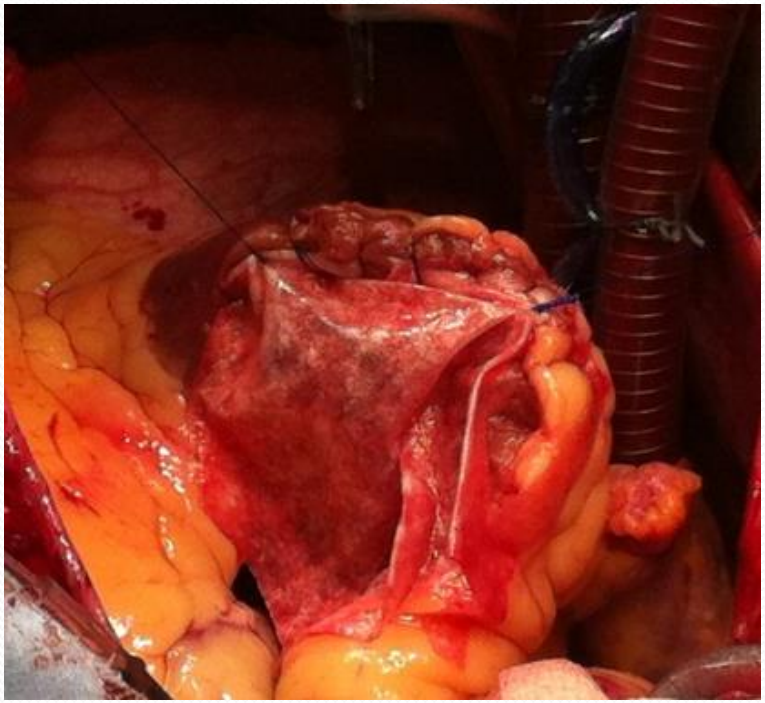
CMR

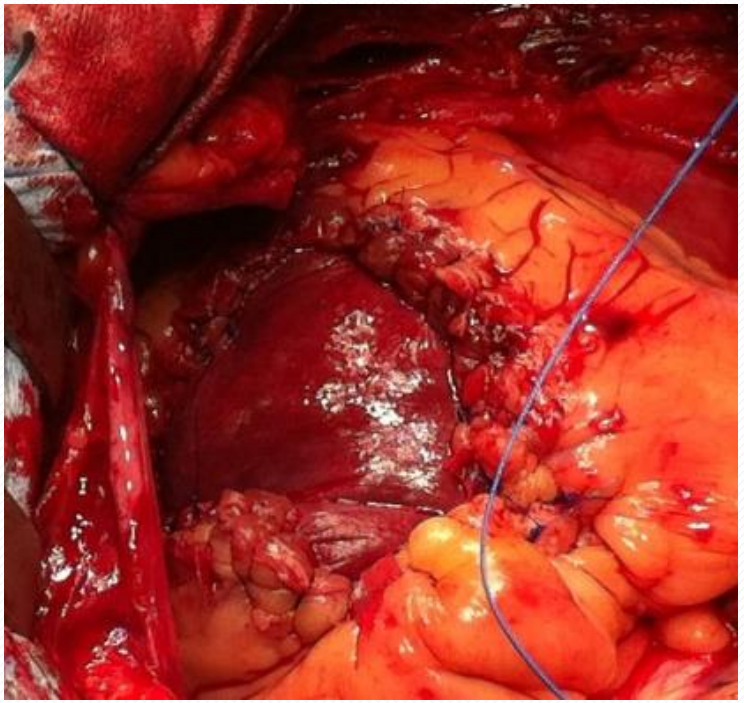


Tumour blush



Surgical resection and Cormatrix® patch repair



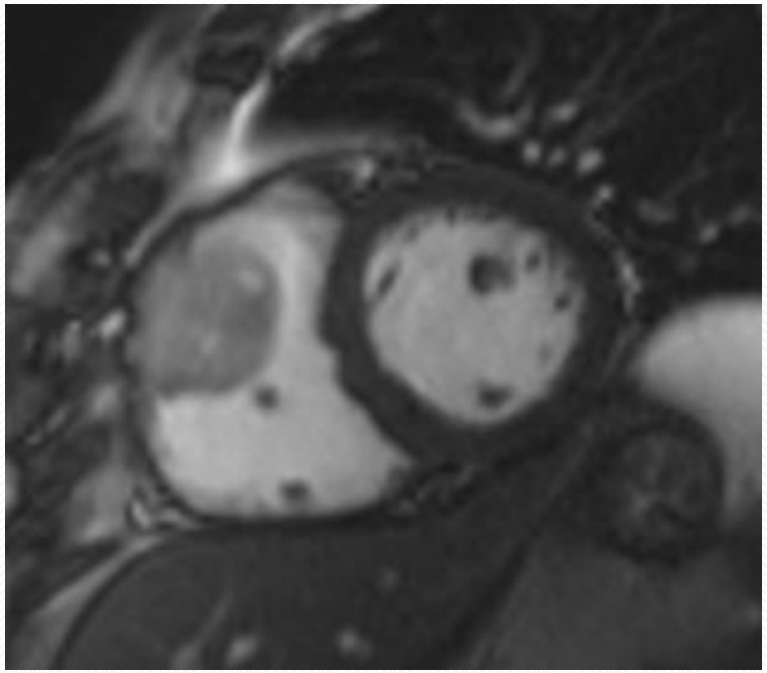


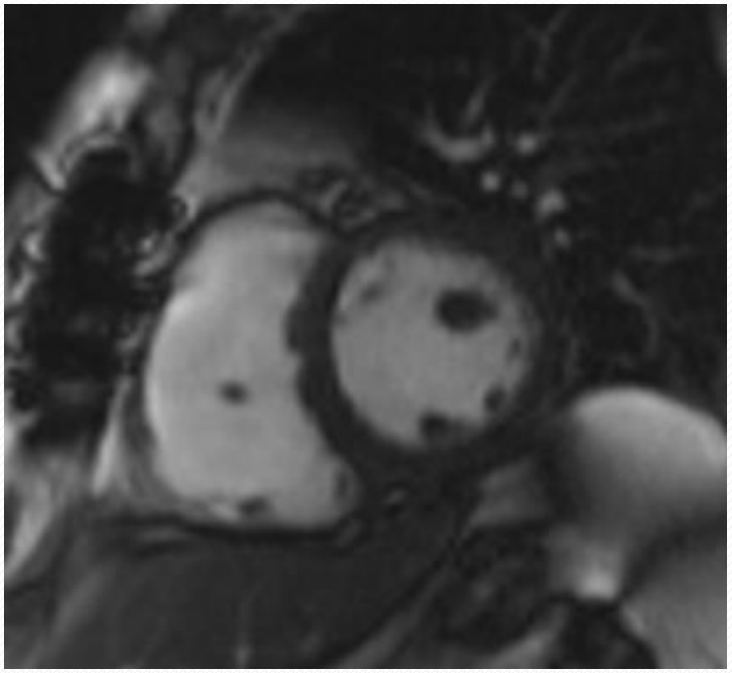
Follow-up

- CMR imaging performed six-weeks post-operatively (Figure 4)

- improving RV volumes and a regional wall motion abnormality at the site of CorMatrix® patch repair

Pre- and post- op





Summary

- Isolated cardiac metastases from renal cell carcinoma are rare[1]
- Haematogenous spread most commonly involves the right atrium and inferior vena cava[2], however solitary late metastases to the RV have been previously reported[3]
- In this case, we describe the first human use of the CorMatrix® extracellular matrix (ECM) patch following right ventricular resection for a solitary cardiac metastasis
- Further improvements in right ventricular regional contractile abnormalities are anticipated in our patient at long-term follow-up

References

- 1. Ishida N, Takemura H, Shimabukuro K, Matsuno Y. Complete resection of asymptomatic solitary right atrial metastasis from renal cell carcinoma without inferior vena cava involvement. *J Thorac Cardiovasc Surg* 2011;142(3):e142-4

- 2. Zustovich F, Gottardo F, De Zorzi L, Cecchetto A, Dal Bianco M, Mauro E, Cartei G. Cardiac metastasis from renal cell carcinoma without inferior vena involvement: a review of the literature based on a case report. Two different patterns of spread? *Int J Clin Oncol* 2008;13:271-4

- 3. Masaki M, Kuroda T, Hosen N, Hirota H, Terai K, Oshima Y, Nakaoka Y, Sugiyama S, Kawakami M, Lizuka N, Tomita Y, Ogawa H, Kawase I, Yamauchi-Takihara K. Solitary right ventricle metastasis by renal cell carcinoma. *J Am Soc Echocardiogr* 2004;17:397–398

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A 69-year old bus driver presented acutely to hospital following an episode of nocturnal dyspnoea. Co-morbidities included hypertension, dyslipidaemia and type II diabetes mellitus, a prior history of cigarette smoking and renal cell carcinoma.

Admission ECG demonstrated sinus rhythm with anterior T-wave inversion (leads V1–V4) and chest x-ray revealed cardiomegaly with a suspicion of a left hilar opacity associated with loss of basal lung volume. Subsequent CT scanning showed mild left basal atelectasis, a normal left hilum and two pulmonary nodules in the right lung field. Transthoracic echocardiography revealed a dilated and functionally impaired right ventricle (RV). Noted within the RV cavity was a large circular mass that was contiguous with the RV free wall.

Cardiac magnetic resonance (CMR) imaging demonstrated a well-circumscribed mass (52x48mm) within a dilated RV (RVEDV 133ml/m2; RVESV 56ml/m2) that was attached to the free wall distal to the RV outflow tract (Figures 1a-b). There was absence of signal on T1-weighted sequences with intermediate signal on T2-weighted imaging. The RV mass enhanced on first-pass perfusion (Figure 1c) indicating a vascular structure and enhanced entirely on delayed contrast sequences (Figure 1d), except for a small central hypodense region.

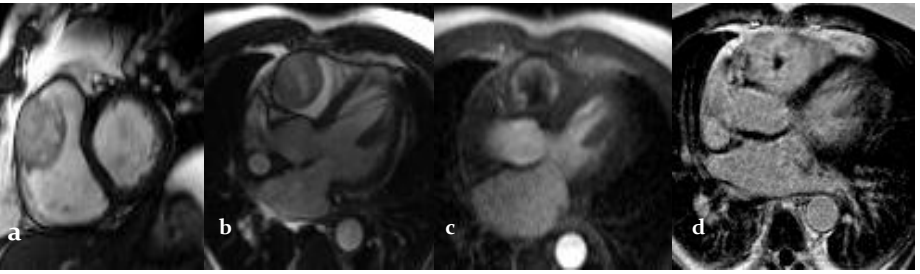

Figure 1. a. and b. a well-circumscribed mass within a dilated RV that was attached to the free wall distal to the RV outflow tract ; c. the RV mass enhanced on first-pass perfusion and d. enhanced entirely on delayed contrast sequencing except for a small central hypodense region

The multidisciplinary team agreed on surgical resection as management. Pre-operative coronary angiography showed non-obstructive coronary artery disease with a dramatic vascular blush within the RV mass originating from the proximal RCA (Figure 2).

The tumour was resected *en bloc* with macroscopically clear margins. CorMatrix® pledgets were used to reattach the papillary muscle and pulmonary valve annulus to the native RV, with a CorMatrix® patch (70x100mm) used to repair the right ventricle. Histology confirmed metastatic renal cell carcinoma (Figures 3a-b).

Figure 2. Vascular blush of the mass demonstrated during coronary angiography, with supply coming from the right coronary artery (RCA)

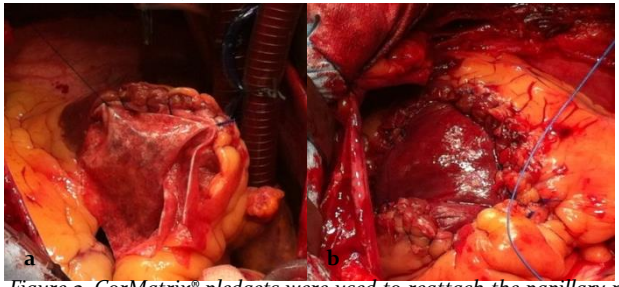

Figure 3. CorMatrix® pledgets were used to reattach the papillary muscle and pulmonary valve annulus to the native RV, with a CorMatrix® patch used to repair the right ventricle

Follow-up CMR imaging performed six-weeks post-operatively (Figure 4), revealed improving RV volumes and a regional wall motion abnormality at the site of CorMatrix® patch repair.

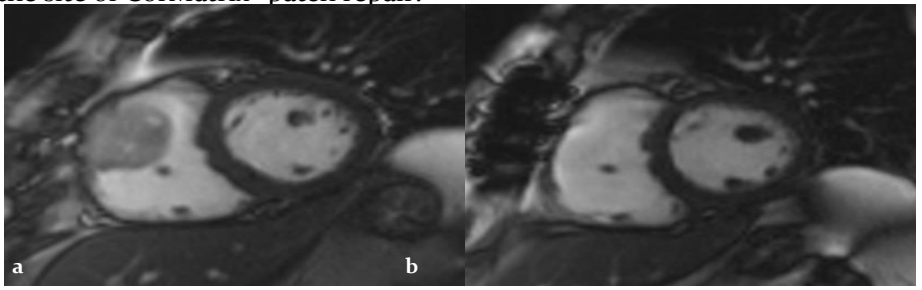

Figure 4. a. pre-operative mass in RV, b. post-operative image with resection mass and repair of RV wall with CorMatrix® patch