

# Echo-guided percutaneous coil embolization of a symptomatic massive metastasis of a renal cell carcinoma in the right ventricular outflow tract

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## KEYWORDS

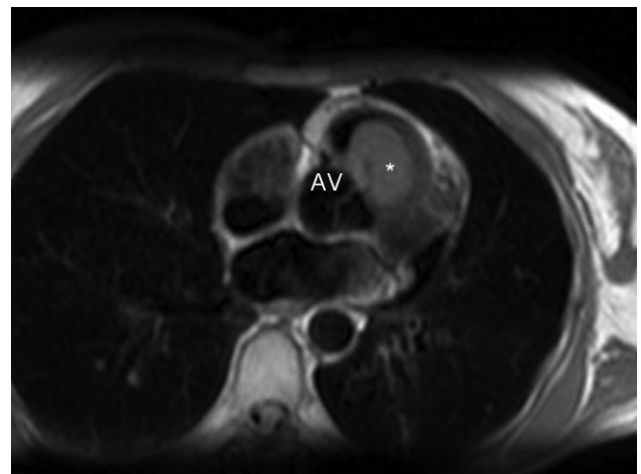
Renal cell carcinoma;  
Magnetic resonance imaging  
(MRI);  
Echo-guided percutaneous  
coil embolization;  
Cardiac metastasis;  
Tumour

We present the case of a 41-year-old woman who was admitted to our centre with progressive symptoms of congestive heart failure (NYHA class III) 5 years after a radical nephrectomy for renal cell carcinoma. Magnetic resonance imaging demonstrated a 5 × 3 cm homogeneous intracardial mass causing right ventricular outflow tract obstruction, not accessible to surgical resection. Serial echo-guided, percutaneous coil embolization of the cardiac metastasis was performed with Contour SE Microparticles® (150–250 or 300–500 µm) after identification of the target region of the metastasis by contrast injection (Levovist®) through the balloon catheter into the coronary artery under transoesophageal echocardiographic control prior to induction of the necrosis, corresponding to the technique which has been described for septal ablation in hypertrophic obstructive cardiomyopathy. Follow-up after serial embolization showed a good haemodynamic and a marked clinical response (dyspnoea NYHA I–II) which lasted during the 19 month of survival after the index procedure.

Right ventricular (RV) metastases from renal cell carcinoma (RCC) without inferior vena cava or right atrium involvement are exceedingly rare.<sup>1,2</sup>

We present the case of a 41-year-old woman who was admitted to our centre with progressive symptoms of congestive heart failure (NYHA class III) 5 years after a radical nephrectomy for RCC. Computed tomography revealed diffuse hepatic and paraaortic metastases, and a solitary cardiac metastasis in the RV outflow tract. This situation was considered metastatic stage IV RCC, with a usually poor response to immunotherapy and 5-year-survival rate <10%.

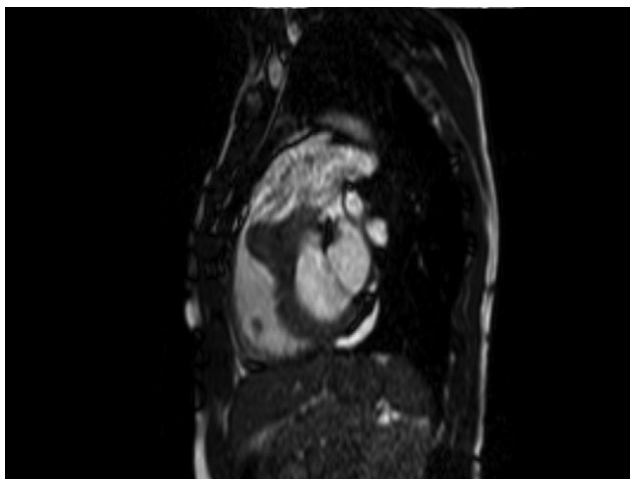
Magnetic resonance imaging (MRI) demonstrated a 5 × 3 cm homogeneous mass causing RV outflow tract obstruction, but sparing the pulmonic valve, and infiltration of the aorta and the aortic valve by the metastasis, not accessible to surgical resection (*Figures 1* and *2*, see Supplementary data online *Movie 1*). Cardiac catheterization confirmed



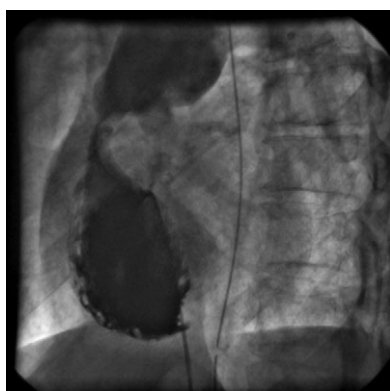
**Figure 1** Magnetic resonance imaging (MRI) (1.5 Tesla, darkblood technique, transversal axis) demonstrating the metastasis (asterisk) in the right ventricular outflow tract, and infiltration of the aorta and the aortic valve (AV).

RV outflow tract obstruction (*Figure 3*), and demonstrated vascularization of the metastasis by atypical tumour

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**Figure 2** Magnetic resonance imaging (MRI; systolic short-axis view, balanced TFE) demonstrating the RV outflow tract obstruction caused by the cardiac metastasis (41 × 43 × 58 mm).

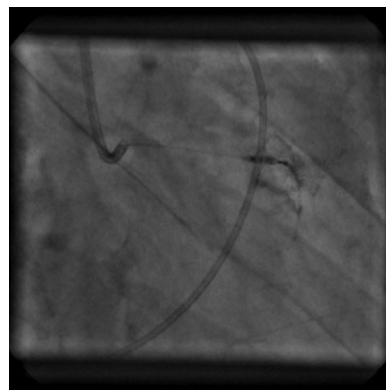


**Figure 3** Right ventricular ventriculography: cardiac metastasis impinging the right ventricular outflow tract (LAO 64°, CAUDAL 0°).

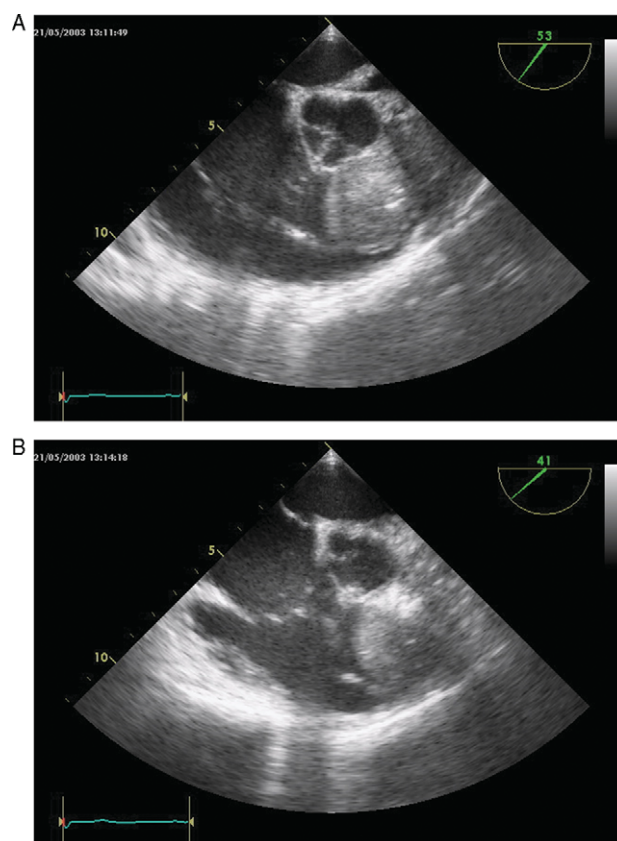


**Figure 4** Coronary angiography demonstrated vascularization of the metastasis by the left anterior descending and the left circumflex artery (RAO 38°, CAUDAL 14°)

vessels originating from the left anterior descending and the left circumflex artery (Figure 4, see Supplementary data online *Movie 2*). Serial palliative coil embolization of the metastasis (Contour SE Microparticles®, Boston Scientific; 1–2 ml with 150–250 or 300–500 μm) was performed with an over-the-wire technique. A transit balloon (diameter



**Figure 5** After the balloon was inflated to a pressure of 6–8 bar, the correct balloon position and supply area were determined by contrast injection through the balloon catheter into the coronary artery prior to induction of the necrosis (RAO 38°, CAUDAL 14°)



**Figure 6** Transoesophageal echocardiography showing the metastasis in the right ventricular outflow tract before the procedure (A) and after contrast injection (B; Levovist®)

and length of 2.5 mm/0.4 cm or 2.0 mm/1.0 cm) was placed into the proximal part of the target vessel, inflating the balloon to a pressure of 6–8 bar. The correct balloon position and supply area were determined by contrast injection (Levovist®) through the balloon catheter into the coronary artery under transoesophageal echocardiographic control prior to induction of the necrosis (Figures 5 and 6A and B, see Supplementary data online *Movies 3, 4a and 4b*), corresponding to the technique which has been described for septal ablation (PTSMA) in hypertrophic obstructive cardiomyopathy (HOCM).<sup>3,4</sup> Follow-up after serial embolization

showed a good haemodynamic and a marked clinical response (dyspnoea NYHA I–II) which lasted during the 19 month of survival after the index procedure.

We conclude that solitary cardiac metastasis causing important haemodynamic impairment may be treated palliatively in selected patients by selective, echo-guided coil embolization. Life-threatening complications of this procedure like myocardial infarction due to embolization of a coronary artery should be discussed with the patient before the procedure.

### Supplementary data

Supplementary data are available at *European Journal of Echocardiography* online.

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