



A diagnostic conundrum of a “ring of fire”: a case of tuberculous perimyocarditis

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A 36-year-old man presented to our hospital with a 2-week history of palpitations in the context of 3 months of a dry cough, weight loss, and night sweats.

The patient had no medical history, no recent foreign travel, and no contact with anyone who was unwell or who had been exposed to tuberculosis. He had no notable family history; he was born in Ghana and had moved to the UK 12 years earlier.

On examination, he was not distressed; his heart rate was 120 beats per min. An electrocardiogram (ECG) showed atrial flutter with rapid ventricular response; a chest x-ray showed cardiomegaly and CT angiography showed no signs of a pulmonary embolism but indicated a soft tissue mass surrounding the ascending aorta, mediastinal lymphadenopathy, and a pericardial effusion. A CT of the patient’s abdomen and pelvis showed no abnormalities or extra-thoracic lymphadenopathy. Laboratory investigations showed a raised high-sensitive cardiac troponin-I (hs-TNI) concentration (60·6 ng/L; normal range 2·0–19·9), brain natriuretic peptide concentration (380; normal range 0–100), and C-reactive protein concentration (55 mg/l; normal 0–0·5).

Viral serology ruled out recent viral infection; HIV serology, serum angiotensin-converting-enzyme, auto-immune screen, and TB ELISpot were negative. Transthoracic echocardiography and cardiovascular MRI (CMRI) confirmed a global pericardial effusion with thickened basal—mid-inferior and inferior-lateral—left ventricular walls and mild biventricular dysfunction. A heterogeneous mass, involving the visceral pericardium and invading the left ventricular myocardium, with evidence of oedema and inflammation on T2-weighted MRI, and patchy fibrosis on late gadolinium enhancement in the thickened segments (figure), were also seen.

¹⁸F-fluorodeoxyglucose PET/CT showed increased activity in the pericardium—the so-called ring-of-fire

sign—and the left ventricular wall; in the subcarinal, paratracheal, thoracic inlet, gastrohepatic, ileocolic, and right inguinal lymph nodes; and in lytic bone lesions in the seventh and ninth left ribs and fifth lumbar vertebra (figure). We did a bone marrow trephine and video-assisted thoracoscopy-guided pericardial window; and a pericardial and right lower lobe, and thoracic lymph node biopsy. Histopathology and immunohistochemistry ruled out lymphoma, malignant histiocytosis, and amyloidosis; Ziehl-Neelsen stains were negative for mycobacteria.

Our working diagnosis was initially sarcoidosis: histology showed a lung granuloma. However, the atypical cardiac features prompted us to seek further tissue samples prior to starting a glucocorticoid: a biopsy of the right inguinal lymph node showed necrotising granulomatous inflammation, and PCR showed *Mycobacterium tuberculosis*. Based on the serum hs-TNI, the extensive pericardial and myocardial inflammation on PET and CMRI, and confirmation with PCR, we revised the diagnosis to tuberculous perimyocarditis. Quadruple anti-tuberculous therapy was given for 12 months with tapering glucocorticoid cover. Echocardiography, CMRI, and CT, 3 months after initiating the anti-tuberculous treatment, confirmed the full resolution of the left ventricular wall mass with no re-accumulation of the pericardial effusion (appendix); there was regression of the mediastinal and hilar lymphadenopathy, and the lytic bone lesions. Over the 18-month follow-up, the patient remained in full remission, and was able to resume normal daily activities.

Differentiating tuberculosis and sarcoidosis can be challenging as there is considerable overlap in their clinical, radiological, and histopathological presentations. Regarding cardiac tuberculosis, multimodal investigations and multidisciplinary

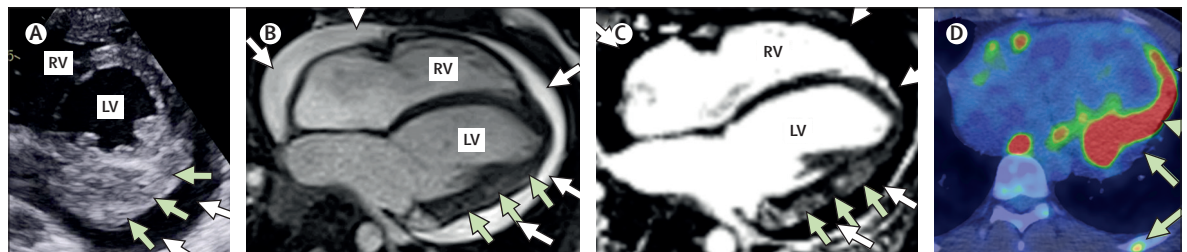


Figure: Tuberculous perimyocarditis

(A) Transthoracic echocardiography, parasternal short axis view of the mid-LV. (B) CMRI, horizontal long axis view, show thickened mid-inferior and inferior-lateral LV walls (green arrows) and the pericardial effusion (white arrows). (C) CMRI, horizontal long axis view with late gadolinium enhancement, shows patchy thickening of epicardial and LV inferior-lateral wall segments (white arrows), before treatment. (D) ¹⁸F-fluorodeoxyglucose PET/CT shows increased activity indicating inflammation in subcarinal, paratracheal, thoracic inlet and the right inguinal lymph nodes; the pericardium—the so-called ring-of-fire sign; lateral and apical LV myocardium; and lytic lesion in the left seventh rib (green arrows) before anti-tuberculosis therapy. CMRI=cardiovascular MRI. RV=right ventricle. LV=left ventricle.

management are essential for timely diagnosis and treatment (video).

Contributors

We were all involved in caring for the patient, revising, reviewing, and editing the manuscript.

Declaration of interests

Written consent for publication was obtained from the patient. We declare no competing interests.

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