CASE REPORT: *Mycobacterium tuberculosis* pericardial cyst presenting as right heart failure in an immunocompromised patient

To the editor: Pericardial cysts are a rare cause of mediastinal masses (7%) and are mostly asymptomatic. Consequently, they are often an incidental finding, with a reported incidence of 1 in 100 000.[1] Symptoms may only become apparent once adjacent structures are compressed and may include chest pain, non-remitting cough, haemoptysis and shortness of breath. Although pericardial cysts are frequently congenital or neoplastic in origin,[2] it is important to keep an infective cause in mind. South Africa (SA) has a high burden of *Mycobacterium tuberculosis* (MTB) infections, with an estimated incidence of 463/100 000 population in 2022, and more than half of tuberculosis (TB)-related deaths occurring in individuals living with HIV.[3] Symptoms of pericardial cysts can closely mimic those of pulmonary TB and may easily be missed until they become potentially life-threatening.

In the following case, we describe an immunocompromised patient who presented with right heart failure as a compressive symptom of a drug-susceptible MTB pericardial cyst. The cyst was delineated on computed tomography (CT) of the chest and required open surgical excision and drainage.

A 47-year-old man presented to his base regional hospital with a 2-week history of exertional dyspnoea, two-pillow orthopnoea and fatigue, associated with night sweats, cough and haemoptysis. He had been gainfully employed prior to his illness and had no known TB contacts. On surgical history, the patient had had an uncomplicated excision of a lipoma on the back.

He was admitted and found to have a right-sided pleural effusion, progressive pedal oedema and ascites. He was diagnosed with HIV and initiated on antiretroviral therapy (ART). Because he had an estimated glomerular filtration rate of 41 mL/min/1.73 m^2, his regimen consisted of abacavir sulphate 300 mg daily, lamivudine 300 mg daily and dolutegravir 50 mg daily. The absolute CD4 count was 410 cells/μL.

Nucleic acid amplification testing (NAAT) for *Mycobacterium tuberculosis* complex (MTBC) on sputum, pleural fluid and ascitic fluid was negative. The patient was initiated on an empirical drug-susceptible anti-TB regimen (rifampicin 150 mg, isoniazid 75 mg, pyrazinamide 400 mg and ethambutol hydrochloride 275 mg) in view of his clinical presentation and was discharged after ~6 weeks. Seven months into ART his HIV viral load was 23 copies/mL, and 11 months after presentation he completed TB treatment while reporting good adherence and improvement of his symptoms.

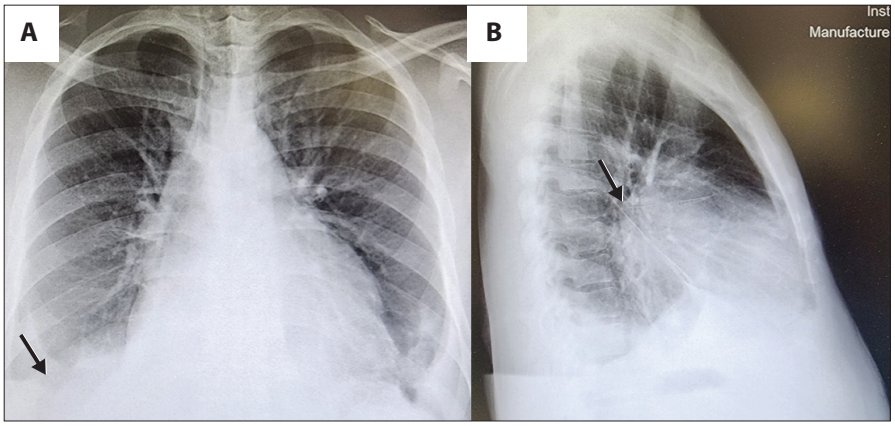

Fig. 1. Anteroposterior (A) and lateral (B) chest radiographs preoperatively. On the left, note the blunted, right costophrenic angle and marked prominence of the perihilar vasculature. On the right, fluid in the right horizontal and oblique fissures is indicated by the black arrows.

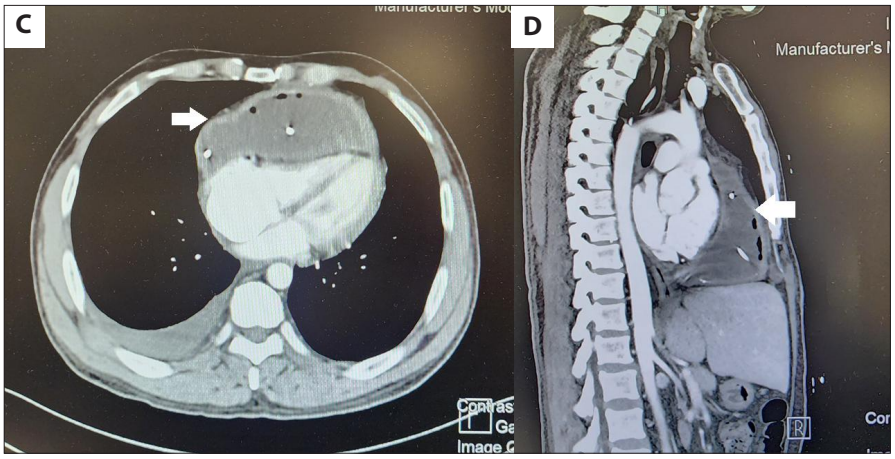

Fig. 1. Axial (C) and sagittal (D) computed tomography scans of the chest and upper abdomen preoperatively. White arrows indicate the pericardial cyst and associated mass effect.

Two years after the patient's first admission, the initial signs and symptoms recurred (namely dyspnoea and progressive pedal oedema with ascites), prompting referral to a tertiary centre for a cardiology review. This was only available a month later. A cyst (size not noted) was subsequently visualised on echocardiography, necessitating readmission to the base hospital for CT of the chest. The patient experienced worsening of his symptoms and was ultimately transferred to the quaternary academic hospital for further assessment.

At admission, he had a temperature of 36.3°C, pulse rate of 71 bpm, respiratory rate of 20 breaths per minute, blood pressure of 121/80 mmHg and pulse oximetry of 98% on room air. Clinical examination revealed

a chronically ill-looking patient with no respiratory distress at rest, bilateral pitting oedema, hepatomegaly, distended neck veins and ascites. The results of blood tests (full blood count, renal function, liver function tests, tumour markers, viral screen, erythrocyte sedimentation rate and procalcitonin) were unremarkable.

Chest radiography revealed a right-sided pleural effusion with an increased cardiothoracic ratio (Fig. 1A and 1B). On echocardiography, the heart was structurally normal with no thrombus and an ejection fraction of 55 - 60%. Additionally, the inferior vena cava was dilated at 2.3 cm. Contrast-enhanced CT chest findings were a thick-walled, complex anterior mediastinal lesion (13.3 cm × 9.7 cm × 11.8 cm) arising from the pericardium with a mass effect on the right ventricle, and associated features of right heart failure with normal lung fields (Fig. 1C and 1D).

Median sternotomy was performed, and a large mediastinal cyst extending to the phrenic nerves bilaterally, to the diaphragm inferiorly and to the innominate vein superiorly was found. The cyst had dense adhesions to the pericardium and diaphragm and drained thick, sebaceous-like material. The pericardium was noted to be thick and inflamed, causing a constrictive pericarditis. Specimens were taken intraoperatively for routine microscopy and culture plus TB NAAT and culture.

Specimens were prepared as per standard operating procedure and were analysed with Xpert MTB/RIF Ultra (Cepheid) and Xpert MTB/XDR (Cepheid). Cyst, pericardial and mediastinal tissue as well as cyst fluid all tested positive for MTBC. All were susceptible to rifampicin, isoniazid, fluoroquinolones, aminoglycosides and ethionamide. Histological examination of mediastinal tissue showed necrotising granulomatous inflammation suggestive of TB. The patient was re-initiated on first-line TB treatment and recovered well in the postoperative period, with rapid resolution of his right heart symptoms following surgery. Approximately 3 weeks later he was discharged back to the base hospital on the above treatment and is being followed up on an outpatient basis. Follow-up was also done to ensure that his dolutegravir was boosted, in line with current national SA HIV guidelines.

This patient's presentation is exceedingly rare in the context of both pericardial cysts and extrapulmonary TB, with only 8 cases of pericardial cysts secondary to MTBC being described in the literature. When they do occur, the most well-described site is the anterior mediastinum, typically in the costophrenic angles.[2,4-7] A recently published case was a Ghanaian patient who presented with right-sided cardiac failure (as in our patient) secondary to a giant anterior mediastinal cyst, where MTBC was isolated following echocardiography-guided drainage.[8] Similarly to our patient, he was immunocompromised (HIV) and had a history of having been treated for pericardial TB 6 months previously.

Considering that our patient had constitutional symptoms suggestive of pulmonary TB at first presentation, it may be reasonable to posit that he could previously have had a pericardial effusion that was not large enough to cause haemodynamic instability. It may have originated through retrograde lymphatic spread or via haematogenous dissemination, as is more likely in immunocompromised populations.[9] His first course of TB treatment may have partially treated the effusion, healing through fibrosis and forming a nidus for the cyst to grow at a later stage of immune reconstitution.

Transthoracic echocardiography, contrasted CT and cardiac magnetic resonance imaging are the diagnostic modalities of choice when a pericardial cyst is suspected, and are critical for accurate delineation.[2] Treatment is dictated by the severity of symptoms and the size and location of the cyst. Modalities include conservative care, percutaneous drainage and surgery. Surgical intervention is recommended when there are compressive symptoms that threaten vital structures, or there are large cysts, and where malignancy cannot be reliably excluded.[10] In a low- to middle-income country (LMIC) such as SA, delays in accessing this advanced imaging in the public healthcare sector are common. Few hospitals have the capacity to perform the imaging, and patients are reliant on clinicians having a high index of suspicion to facilitate expedited work-up and referral.

Pericardial cysts are a rare entity, often having an indolent course until they are large enough to present with potentially life-threatening symptoms. Our case underscores the need to consider this uncommon condition, particularly in the immunocompromised population in SA. This case also highlights how access to basic imaging modalities such as echocardiography in an LMIC needs to improve, as earlier diagnosis for symptomatic patients may result in improved outcomes and potentially allow less invasive modalities of treatment.

Written, informed consent to publish this case was obtained from the patient.

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