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CASE REPORT

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A Wolf in Tuberculosis' Clothing: Pericardial Mesothelioma Masquerading as Tuberculous Pericarditis

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ABSTRACT

Introduction: Primary pericardial mesothelioma is one of the rarest cardiac tumors and carries a poor prognosis. The presence of multiple potential causes of pericarditis can delay diagnosis and initiation of appropriate treatment. Advanced cardiac imaging plays a key role in improving diagnostic accuracy. However, even when a definitive diagnosis is established, therapeutic strategies remain insufficiently standardized and outcomes are often suboptimal. **Case presentation:** We describe a case of sarcomatoid-type primary pericardial mesothelioma initially misdiagnosed as tuberculous pericarditis. Diagnostic evaluation included multimodality imaging, such as echocardiography, computed tomography, and cardiac magnetic resonance imaging. The patient was subsequently treated with carboplatin and pemetrexed chemotherapy. Despite therapy, the disease progressed, and the patient did not survive. **Conclusions:** Primary pericardial mesothelioma is a rare and aggressive malignancy typically diagnosed at an advanced stage, contributing to its unfavorable prognosis. Although advanced imaging modalities aid in detection and characterization, standardized diagnostic and therapeutic protocols are urgently needed to enable earlier recognition and more effective management.

Keywords: mesothelioma, pericardial effusion, tuberculosis

INTRODUCTION

Around 65–70% of malignant mesotheliomas originate from the pleura, whereas pericardial involvement accounts for only 1–2% of all cases.[1] Primary pericardial mesothelioma is therefore an extremely rare malignancy, with an incidence of less than 0.7% of malignant mesothelioma cases,[2] and only a limited number of reports exist in the literature. Owing to its rarity, no standardized management approach has been established. Diagnosis is particularly difficult, with up to 75% of cases identified only at the postmortem examination.[3] Diagnostic difficulties often arise

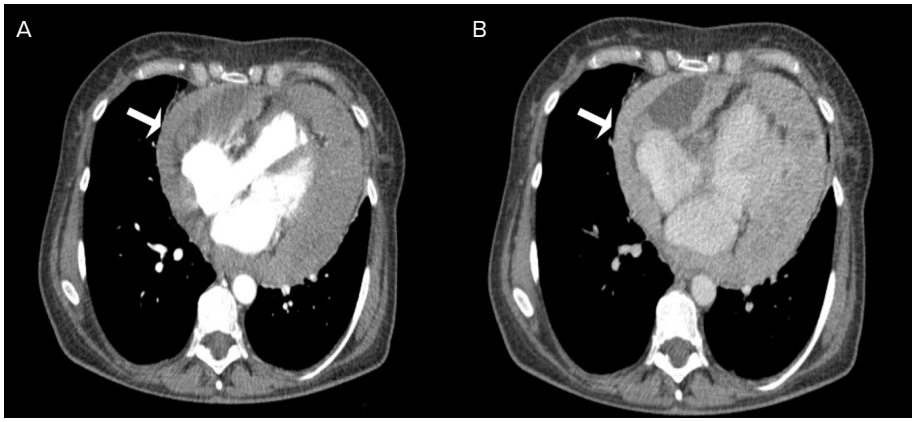

FIGURE 1. Contrast CT scan, first presentation: arterial phase (**A**) and venous phase (**B**). White arrows indicate circumferential pericardial thickening with both fluid and semi-solid components.

from the need to differentiate pericardial mesothelioma from other causes of pericarditis. It may be misdiagnosed as coronary heart disease, cardiomyopathy, tuberculous pericarditis, or pericardial metastases.[4] In tuberculosis-endemic countries, distinction from tuberculous pericarditis is particularly challenging, as both conditions can present with similar features such as pericardial effusion and thickening.[5] Here, we present the case of a patient with pericardial mesothelioma initially diagnosed as tuberculous pericarditis, illustrating the diagnostic challenges posed by their clinical overlap and the need for increased awareness.

CASE PRESENTATION

A 51-year-old woman, previously diagnosed with tuberculosis-associated pericardial effusion four months earlier and treated with standard tuberculostatic therapy, presented to the emergency department with progressively worsening dyspnea and fatigue on minimal exertion. She also reported a dry cough, palpitations, and retrosternal chest pressure. On examination, the patient was afebrile, with a heart rate of 125 beats/min, blood pressure of 100/65 mmHg, and jugular venous distension. Mild bilateral ankle edema was noted, while cardiopulmonary auscultation was unremarkable. The electrocardiogram showed sinus tachycardia, Q waves in leads DII, DIII, and aVF, as well as T wave inversions in DI, DII, DIII, aVF, and precordial leads V3–V5. Transthoracic echocardiography revealed non-dilated cardiac chambers with preserved left ventricular ejection fraction, mild mitral and tricuspid regurgitation, and respiratory variation in mitral and tricuspid inflow. A circumferential pericardial effusion of 7–8 mm with moderate impact on

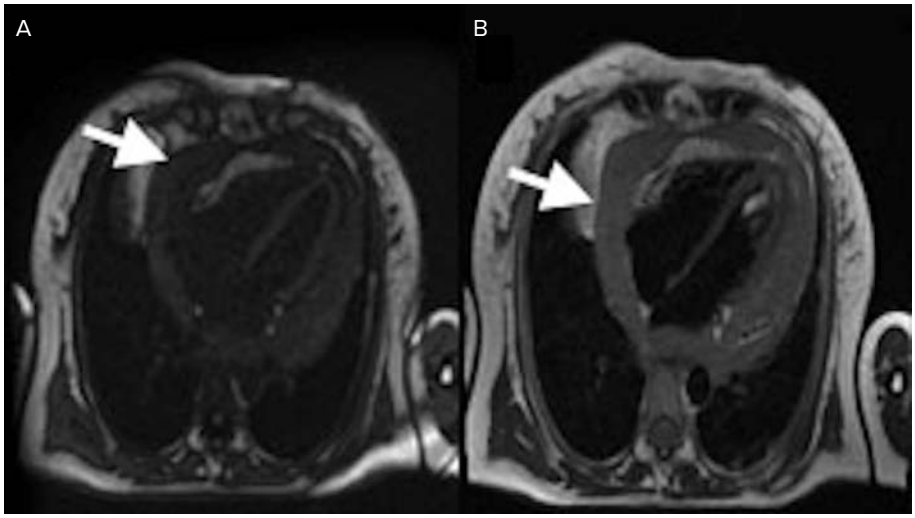

FIGURE 2. Native cardiac MRI, T1 acquisition (**A**) and T2 acquisition (**B**). White arrows indicate tissue-like pericardial thickening with an associated thin liquid component.

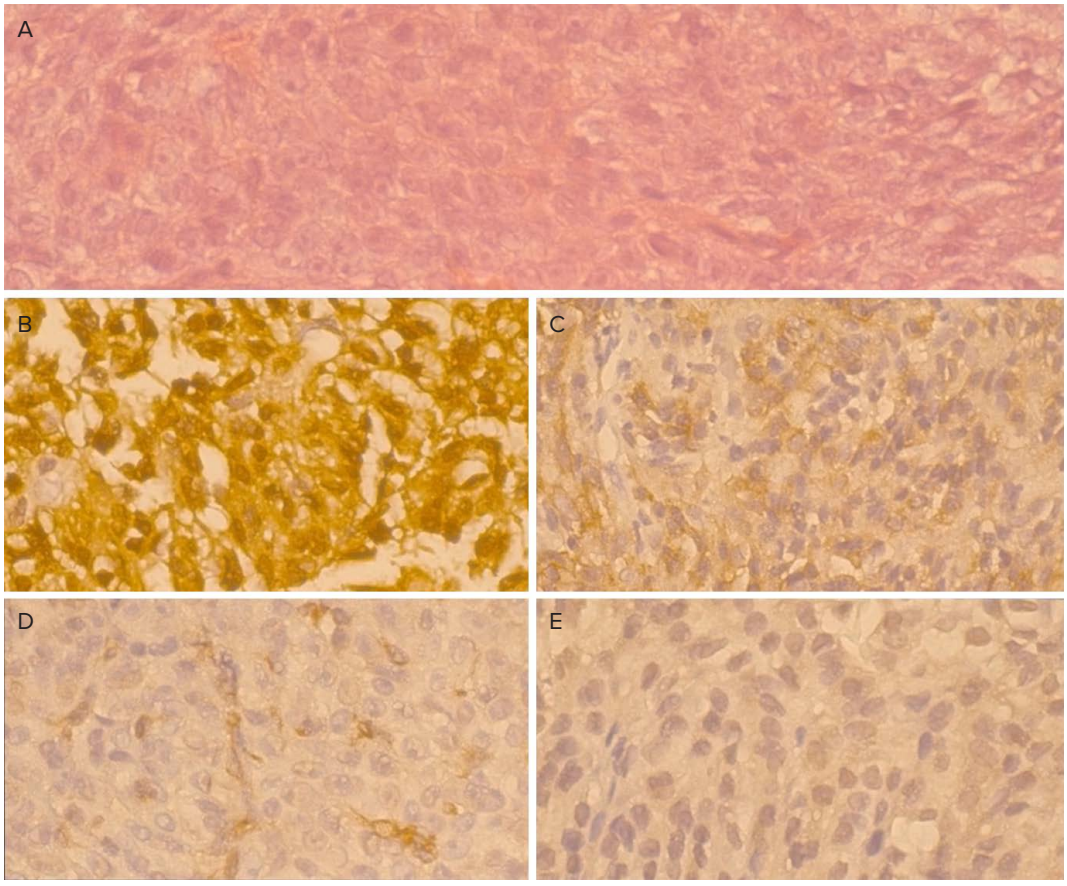

FIGURE 3. Microscopic features of pericardial tissue. **A.** Hematoxylin and eosin stain indicating fragments of fibroadipose tissue infiltrated by a disorganized fusocellular proliferation consisting of small cells with eosinophilic cytoplasm and atypical nuclei, with focal mitoses. **B.** Positive calretinin staining. **C.** Positive cytokeratin staining. **D.** Negative vimentin staining. **E.** Negative S100 protein staining.

right atrial hemodynamics was present, along with diffuse, irregular, and inhomogeneous pericardial thickening. Laboratory tests showed leukocytosis with neutrophilia and elevated C-reactive protein. Thoracic contrast-enhanced computed tomography (CT) (Figure 1) revealed marked, irregular pericardial thickening up to 4 cm, containing both fluid and semi-solid components. The thickened pericardium exerted compressive effects on the pulmonary artery, superior vena cava, and portal vein.

Additionally, multiple enlarged mediastinal and perice-liac lymph nodes (up to 14 mm) and a small left-sided pleural effusion were detected. Native cardiac magnetic resonance imaging (Figure 2) confirmed predominantly tissue-like pericardial thickening with a thin liquid component (approximately 4 mm), raising differential diagnoses such as lymphoma, primary mesothelioma, or granulomatous disease. To establish a definitive diagnosis, a pericardial biopsy was performed. Histopathological analysis revealed fibroadipose tissue infiltrated by disorganized fascicles of spindle cells with eosinophilic cytoplasm, nuclear atypia, and focal mitotic activity. Immunohistochemistry showed positivity for cytokeratin and calretinin, and negativity for vimentin and S100 protein. The Ki-67 proliferation index was elevated. These features were consistent with sarcomatoid-type malignant pericardial mesothelioma (Figure 3). After multidisciplinary oncologic consultation, systemic chemotherapy with carboplatin and pemetrexed was initiated. The patient was discharged on supportive medical therapy with ivabradine, aspirin, colchicine, furosemide, and spironolactone.

Three months later, the patient was readmitted with severe clinical deterioration and dyspnea at rest. She appeared markedly cachectic, with dry skin, cephalic cyanosis, prominent jugular venous distension, and dullness to percussion over the left hemithorax, consistent with a large pleural effusion. On examination, she was tachycardic (heart rate 130 beats/min) and hypotensive (blood pressure 85/60 mmHg). Hepatomegaly suggestive of venous congestion was also noted. Laboratory evaluation showed pancytopenia, mild hypokalemia, elevated NT-proBNP

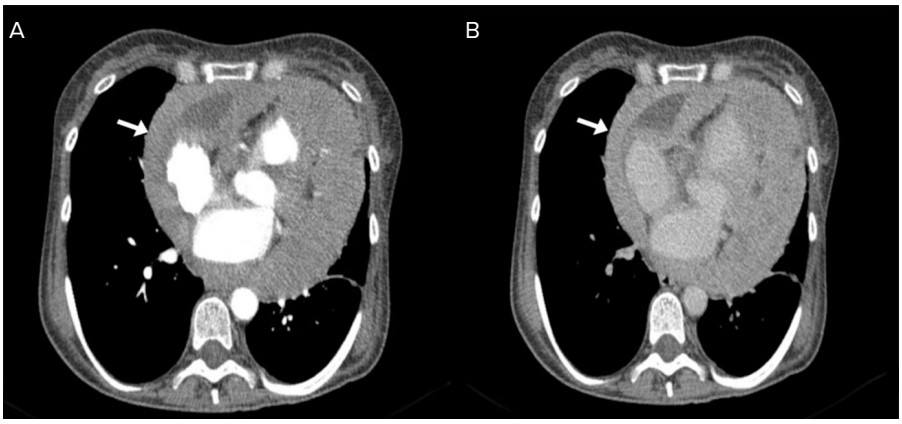

FIGURE 4. Contrast CT scan three months after diagnosis. **A.** Arterial phase. **B.** Venous phase. White arrows indicate a slight increase in the circumferential pericardial thickening.

(2,600 pg/ml), reduced renal function (creatinine clearance 44 ml/min/1.73 m^2), and increased high-sensitivity troponin (50 ng/L). Repeat contrast-enhanced CT (Figure 4) showed slightly increased pericardial thickening, decreased lymphadenopathy, and a larger left pleural effusion. Importantly, the scan also showed segmental thrombosis of the distal left subclavian vein, partial thrombosis of the distal left internal jugular vein, and involvement of the left brachiocephalic trunk. Despite treatment with vasoactive agents and correction of fluid and electrolyte imbalances, her condition continued to worsen. On the third day of admission, she developed cardiorespiratory arrest, and resuscitation was unsuccessful.

DISCUSSION

The diagnosis of pericardial mesothelioma is particularly challenging, especially in the setting of concurrent tuberculosis, as pericardial tuberculosis remains a leading cause of pericardial disease in endemic regions.[6] Multimodality imaging is essential for establishing the diagnosis. When available, positron emission tomography–computed tomography scan and late gadolinium enhancement magnetic resonance imaging can improve diagnostic accuracy by helping differentiate tuberculosis-related inflammatory changes from tumor infiltration.[7,8] However, in the absence of diagnostic puncture, there is a significant risk of misdiagnosing this aggressive malignancy, as the limited number of reported cases makes it difficult to define reliable imaging patterns. In the present case, the initial diagnosis of tuberculosis was based on a positive QuantiFERON test, leading to initiation of antituberculous therapy. The lack of clinical improvement, however, prompted reconsideration of the diagnosis, ultimately revealing that the presumed tuberculosis had masked the underlying malignant process.

The sarcomatoid subtype identified in our patient represents the rarest histological variant of pericardial mesothelioma, whereas the epithelioid and biphasic subtypes are more commonly encountered.[9] Although it is the rarest histological subtype, it is also the most aggressive.[10] Immunohistochemistry is central to diagnosis, as it helps confirm the mesothelial origin of the neoplastic proliferation; in our case, positivity for calretinin and cytokeratin supported the diagnosis.[11] Another critical component of the diagnostic workup is the Ki-67 proliferation index, which aids in distinguishing benign reactive mesothelial proliferations from malignant mesothelioma[12] and serves as a prognostic indicator by providing insight into the tumor's proliferative activity.[13] In this patient, the elevated Ki-67 index was consistent with the unfavorable clinical course and poor outcome. These findings underscore the highly aggressive nature of sarcomatoid pericardial mesothelioma, a malignancy associated with poor prognosis and a median survival of approximately 6 months.[3] Regarding emerging therapeutic approaches, immunotherapy – particularly with agents such as nivolumab and ipilimumab – has been approved for pleural mesothelioma. However, clinical benefits remain modest,[14] and more effective and better-tolerated strategies are urgently needed, especially for the rarest and most aggressive subtypes.

All these aspects highlight the urgent need for improved diagnostic tools and novel therapeutic strategies, with an emphasis on extending survival while minimizing severe or life-threatening adverse effects.

CONCLUSIONS

Primary pericardial mesothelioma remains a particularly challenging diagnosis, especially when pericardial effusion has multiple possible causes. Advanced imaging modalities

play a pivotal role in establishing a more accurate diagnosis. However, there is a critical need to establish standardized diagnostic and therapeutic protocols for this aggressive neoplasm to optimize patient outcomes and enhance both survival and quality of life.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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