



## Case Report

# A 15-year-old girl with pericardial tuberculosis complicated by cardiac tamponade: A case report in Somalia

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## ARTICLE INFO

## Keywords:

Pericardial effusion  
TB  
Cardiac tamponade  
Emergency pericardiocentesis

## ABSTRACT

**Introduction and importance:** Pericarditis is a common illness that can appear in a variety of clinical settings and has numerous causes. In developing nations where tuberculosis is still a serious public health issue, more than 50% of cases of pericarditis are related to tuberculosis.

**Case presentation:** There was no history of TB, alcoholism, IV drug abuse, immunosuppressant, or corticosteroid use. On examination, she had a fever, tachycardia, pulsus paradoxus of 10 mmHg, hypotension, tachypnea, and a distended jugular vein. On auscultation, her heartbeats were muffled, and accompanied by a pericardial rub. Laboratory investigation showed low hematocrit and a high WBC count with lymphocyte predominance. ESR and CRP levels were elevated. Her chest X-ray revealed an enlargement of the cardiac silhouette. The ECG showed low voltage complexes. Echocardiography showed circumferential 30 mm × 25 mm pericardial effusion with fibrin strands in the visceral pericardium. An emergency pericardiocentesis was performed under the guidance of transthoracic echocardiography using sub-xiphoidal standards. Microbiologic analysis of the pericardial fluid confirmed tuberculosis. After successful pericardiocentesis, the patient's condition improved massively. After three days of pericardiocentesis drainage, TB treatment was started and she was discharged for outpatient flow up.

**Clinical discussion:** Tuberculous pericarditis is a serious tuberculosis (TB) complication that can be difficult to diagnose and often goes undetected, leading to late complications such as constrictive pericarditis and cardiac tamponade, which lead to increased mortality. This current case illustrates a young female patient presenting with isolated TB pericarditis complicated by cardiac tamponade. She had massive improvement following pericardiocentesis and anti-TB treatment.

**Conclusion:** In Africa, tuberculous pericarditis should be considered as a differential diagnosis in any patient presenting with moderate to massive pericardial effusion. A high index of suspicion is required for the diagnosis of extrapulmonary TB pericarditis, especially in patients without known risk factors.

## 1. Introduction

Pericarditis is a common illness that can appear in a variety of clinical settings and has numerous causes. In developing nations where tuberculosis is still a serious public health issue, more than 50% of cases of pericarditis are related to tuberculosis [1,2]. In 2010, there were 8.8 million new cases of tuberculosis (TB), 1.1 million TB-related deaths among people without HIV, and 0.35 million HIV-related TB deaths around the world [3,4].

Tuberculous pericarditis is a serious medical problem in developing countries, where it is a common cause of heart failure and the most common cause of constrictive pericarditis [3]. Numerous conditions, such as infection, idiopathic chronic pericarditis, and mediastinal radiation, can result in pericardial effusion. However, the most common cause is Mycobacterium TB. In places where TB is common [4].

We report this case of tuberculous pericarditis in which tuberculosis manifested as pericardial tamponade.

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<https://doi.org/10.1016/j.amsu.2022.104252>

Received 22 June 2022; Received in revised form 20 July 2022; Accepted 20 July 2022

Available online 31 July 2022

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## 2. Case Presentation

A 15-year-old girl was referred from a private hospital came to the emergency room with a history of 2 weeks of fever, worsening dyspnea, and mild non-productive cough. Associated with night sweating. There were no past medical history of TB, alcoholism, IV drug abuse or immunosuppressions such as pregnancy and corticosteroid use. Likewise, the patient did not have any other chronic conditions such as diabetes, cancer, or HIV infection. The patient also denied having recently contact to anyone who had TB or a persistent cough.

On examination, she was sick-looking, febrile, and had a body temperature of 38.8 °C as well as tachycardia (a heart rate of 120 beats per minute) and pulsus paradoxus of 10 mmHg. Her blood pressure was low (85/40 mmHg). She had tachypnea (her breathing rate was 23 breaths per minute) with an oxygen saturation of 97% on a pulse oximeter. Her jugular vein was distended (the vertical distance between the sternal angle and the highest point of the pulse was 10 cm H<sub>2</sub>O). On auscultation, the heartbeats were muffled and accompanied by a pericardial rub. The rest of the examination, including the musculoskeletal system, was normal. On Tygerberg's score, we found two variables (fever and night sweat) whereas the other remaining variables (weight loss, serum globin, and leukocytosis) were negative.

Laboratory investigation showed a hemoglobin level of 7.3 g/dl (hematocrit of 29%) and a white blood cell count of  $12 \times 10^3/\text{mm}^3$  with lymphocyte predominance. An ESR of 48 mm/h and a C-reactive protein level of 121 mg/L were noted. She was seronegative for HIV and pregnancy tests. Her hepatic, and renal function tests and cardiac enzymes were within normal limits. Her chest (PA) X-ray revealed an enlargement of the cardiac silhouette (cardiothoracic ratio (CTR) > 50% (water bottle heart) (see Fig. 1). The ECG revealed low voltage complexes with a heart rate of 100 beats per minute (see Fig. 2). The echocardiography revealed a circumferential pericardial effusion with fibrin strands on the visceral pericardium (measuring 30mm on the laterals and 25mm on the apical area), right ventricular and atrial collapse in diastole, impaired filling of the right chambers of the heart (pericardial effusion with tamponade), and a pericardial wall thickness of 3mm (Fig. 3) While the patient was on the bedside, an emergency pericardiocentesis was performed Using an aseptic method and a central line catheter of 7 French in size, on a sub-xiphoidal standard under the guidance of transthoracic echocardiography. A total of 1200 ml of straw-colored pericardial fluid was drained over the course of a few days. As the echo showed that the thickness of the pericardial wall and pericardial tuberculosis are common causes of constrictive pericarditis, we sent the patient for a chest CT, which did not show any signs of constrictive pericarditis (Fig. 4).

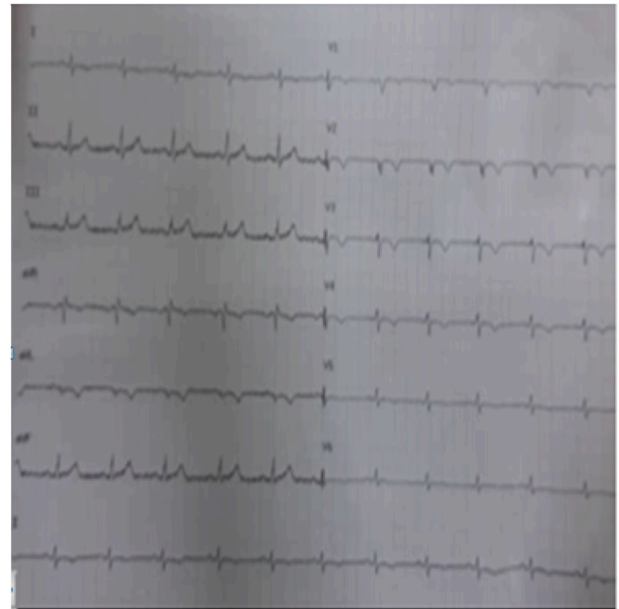


Fig. 2. ECG showing low voltage complex in precordial leads.



Fig. 3. Cardiac ultrasound indicating large pericardial effusion.

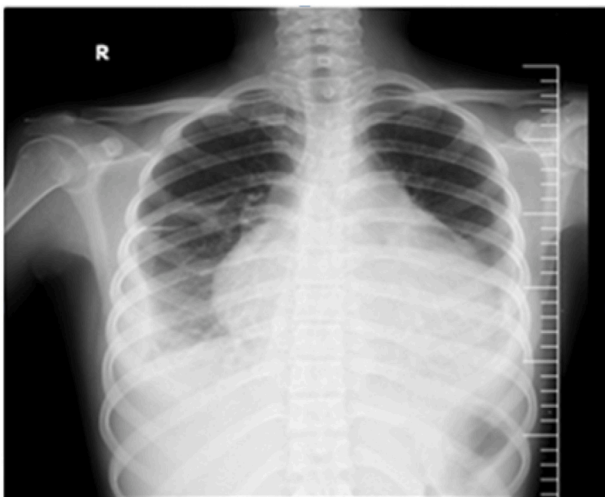


Fig. 1. Chest x ray demonstrating enlarged cardiac silhouette (bottle shaped heart) indicating pericardial effusion.



Fig. 4. Chest tomography (CT) revealed mild pericardial effusion and central line in the pericardial space. the CT was done after.

Microbiologic analysis of the pericardial fluid tested positive for tuberculosis. Acid-fast bacilli and pus cells were visible in the acid-fast stained smears. Sputum was negative for AFB. After successful pericardiocentesis, the patient's dyspnea subsided, her blood pressure was back to normal, and her heart sounds were heard to be normal. Isoniazid (INH) 300 mg, rifampicin (RIF) 600 mg, ethambutol (EMB) 1500 mg, and pyrazinamide (PZA) 2000 mg were started on the third day. Her condition improved massively after 5 days of hospitalization. She was discharged with *anti*-TB therapy. Following that, she was reviewed during follow-up (4 weeks post-discharge). Echocardiography showed no evidence of pericardial effusion and normal diastolic filling in the right heart chambers. This case has been reported in line with the SCARE 2020 criteria [21].

### 3. Discussion

Isolated pericardial tuberculosis (TB) is an uncommon form of extrapulmonary tuberculosis. It is caused by the dissemination of mediastinal lymph nodes, lung, spine, sternum, or during miliary infection. Tuberculous pericarditis has a diverse clinical appearance and should be included in the examination of all instances of pericarditis. Tuberculous pericardial effusion normally develops slowly, and the most common symptoms are dyspnea, fatigue, cough, chest discomfort, night sweats, orthopnea, weight loss, and lower limb edema. Although chest discomfort, cough, and dyspnea are prevalent, severe acute-onset pericardial pain as a hallmark of idiopathic pericarditis is uncommon [5, 8]. Our patient did not have a previous history of TB, likewise, there were no other chronic conditions or immunosuppression. Her symptoms started insidiously over a course of 2 weeks with fever, mild non-productive cough, and worsening dyspnea, which later progressed into severe dyspnea with cardiac tamponade.

Penetrating trauma to the heart or ventricular wall rupture during a myocardial infarction induces immediate cardiac tamponade, whereas infection, autoimmune illnesses, neoplasia, uremia, and other inflammatory diseases cause a slowly increasing course [6]. In this case, there was no history of trauma, no acute or chronic myocardial infarction, no history of autoimmune disorders, no uremia, or other inflammatory diseases. *Mycobacterium tuberculosis* was identified as the cause of pericarditis.

TB has a varied clinical presentation and should be investigated in situations of non-self-limiting pericarditis. Despite the fact that the overall frequency of tuberculosis has decreased, the number of cases of extrapulmonary tuberculosis has remained consistent [7]. Since only a small number of people get vaccinated against TB and tuberculosis is common in our area, this is a serious problem for public health in our continent that can have fatal complications.

In all cases where pericarditis is suspected, a basic diagnostic evaluation should include auscultation, ECG, transthoracic echocardiography, routine blood tests, including markers of inflammation (like C-reactive protein or erythrocyte sedimentation rate) and myocardial lesion (like creatine-kinase or troponins), and a chest x-ray. Additional tests should be related to the suspected origin [9].

The incidence of the various types of pericardial effusions at Tygerberg Hospital differs significantly from developed countries. TB accounted for less than 4% of cases overall in first-world nations, while TB was the most common cause, accounting for 69.5% of all pericardial effusions in a study conducted in South Africa (Epidemiology of pericardial effusions at a large academic hospital in South Africa) [10]. A significant pericardial effusion should be suspected when microvoltage is seen on ECG [11]. Similar findings were recorded in our case, demonstrating significant pericardial effusion.

In more than 90% of cases, chest radiography reveals a broadening of the cardiac silhouette with a globular shape described as a "bottle of water" structure. In general, these findings are seen in association with active lung TB and pleural effusion in 30% and 60% of patients, respectively [12]. In this case, the patient's chest X-ray revealed an

enlargement of the cardiac silhouette (cardiothoracic ratio (CTR) > 50% (water bottle heart) consistent with the classic picture of TB pericarditis. However, our case was negative for pulmonary tuberculosis.

On echocardiography, tuberculous pericarditis is frequently associated with pericardial effusion and thickening of the visceral pericardium, and fibrin bands that heal with pericardial fibrosis [13]. The echo of our patient showed circumferential fibrinous pericardial effusion and thick pericardial wall.

Subxiphoid, parasternal, and apical routes are the three basic methods used for pericardiocentesis. In order to target the deepest layer of effusion and avoid intervening structures, the pericardiocentesis window should be chosen based on imaging guidance. Patient positioning, including slight reverse Trendelenburg, may increase the window size. The subxiphoid (subcostal) approach is the safest and most commonly used, especially in emergency cases [14].

The diagnosis of tuberculous pericarditis can be confirmed if the pericardial biopsy reveals the following findings: positive Koch bacillus culture and granulomas with caseous necrosis; the presence of Langhans-type multinucleated giant cells; or the presence of tuberculous bacilli in the sample [15]. In our case, we didn't need a pericardial biopsy because a microbiological test showed that the pericardial effusion was caused by *mycobacterium tuberculosis*.

In the pericardial fluid analysis, a protein-rich lymphocytic exudate that is frequently severely hemorrhagic is common. However, the tuberculous pericarditis fluid is paucibacillary, and the smear's estimated diagnostic accuracy is just 5% [16]. The sensitivity of pericardial fluid culture varies between 53% and 75% [17]. The PCR test for *Mycobacterium tuberculosis* DNA or RNA in a pericardial fluid is easier, faster, and less expensive than pericardial tissue PCR, but it has a lower sensitivity (15% versus 80%, respectively) and can produce up to 20% false positives [18]. We analyzed the pericardial fluid of the patient, obtained through pericardiocentesis. The fluid was a clear yellow. Analysis revealed a positive for tuberculosis in the acid-fast stained smears. PCR of TB was not readily available in our setting.

Management of tuberculous pericarditis consists of two months of rifampicin, isoniazid, pyrazinamide, and ethambutol, followed by four months of isoniazid and rifampicin (a total of six months of treatment) [19]. In our case, isoniazid (INH) 300 mg, rifampicin (RIF) 600 mg, ethambutol (EMB) 1500 mg, and pyrazinamide (PZA) 2000 mg were prescribed. After 5 days of hospitalization, her condition improved massively, and she was discharged with *anti*-TB therapy. Following that, she was reviewed during follow-up (4 weeks post-discharge) with no evidence of pericardial effusion and no complaints were documented during follow-up.

According to the European Society of Cardiology's pericardial disease guidelines, it may be reasonable to use adjunctive corticosteroids in patients with TBP who do not have HIV infection at a tapering dose of 120 mg of prednisolone over the course of six weeks but not in HIV-positive people due to the higher risk of malignancy [20].

### 4. Conclusion

Pericardial tuberculosis is a form of tuberculosis that can cause severe consequences such as cardiac tamponade. Our case demonstrated that tuberculous pericarditis should be highly suspected in every patient presenting with pericardial effusion living in endemic areas of TB disease, even without any known contact with a person who has pulmonary TB.

### Ethical approval

N/A.

### Sources of funding

There is no funding source for this study.

### Author contribution

M.M.W and S.A involved in patient care, collected data, and wrote the manuscript. M.S.H performed a literature review and also. A.H.M and H.A. supervised and edited the manuscript. All authors reviewed and approved the final version for submission.

### Registration of research studies

N/A.

### Guarantor

Mohamud Mire Waberi, the corresponding author.

### Consent

Written informed consent was obtained from parents of the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

### Availability of data and materials

N/A.

### Provenance and peer review

Not commissioned, externally peer reviewed.

### Consent for publication

Written informed consent was obtained from the parents of the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

### Declaration of competing interest

The authors declare no conflict of interest.

### Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.amsu.2022.104252>.

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