A patient presented with high fever and bloody pericardial effusion (hemorrhagic pericarditis), with literature review

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Abstract

We report a case of hemorrhagic pericarditis caused by *Mycobacterium tuberculosis* infection of the pericardium which is an extremely rare diagnosis. The literature review showed that there were rare cases of tuberculosis causing hemorrhagic pericarditis, but the diagnosis was made either at postmortem or not firmly diagnosed. Our patient was definitely diagnosed as hemorrhagic pericarditis due to *M. tuberculosis*, he was treated and was discharged.

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Keywords

Pericarditis; Hemorrhagic Pericarditis; Mycobacterium Tuberculosis; Tuberculous Pericarditis.

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Introduction

Pericarditis is caused by several factors; idiopathic, infections, neoplasm, autoimmune, radiation, post STEMI (ST-segment elevation myocardial infarction) and noxious substances [1]. However, hemorrhagic pericarditis may be caused by some of the factors but at different rates; *M. tuberculosis* is conceptually placed as a "frequent" cause of hemorrhagic pericarditis, despite its occurrence, it is an uncommon cause even among cases of pericarditis in endemic areas [2]. A study from Rohilkhand region (India), a county known to have high tuberculosis prevalence, 322 patients with pericarditis were enrolled between June 2015 - May 2017, among them, 257 (80%) of the patients had tuberculous pericarditis and none of them presented with hemorrhagic pericarditis including few patients with HIV and tuberculosis co-infection [3]. In another retrospectives single USA medical center

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in the 1990s, hemorrhagic pericarditis causes were etiologically diverse, the leading causes detected in the 96 patients were: iatrogenic 31%, Malignancy 26%, Complications of acute myocardial infarction 11%, idiopathic 10%, uremic 7% and *M. tuberculosis* was rare among the other causes (1 patient) which was diagnosed as a postmortem [4]. In addition, mixed connective tissues disease and infliximab were added to the causes in some reports [5-6]

In the current case, we report a case of hemorrhagic pericarditis in a patient who was initially presented in Sudan with chest pain, prostration, and fever. Workup did not reveal the etiology of his illness, he presented to Al Khalidi hospital for evaluation, and hemorrhagic pericarditis due to *M. tuberculosis* was firmly diagnosed.

The case

A thirty-four years old Sudanese male patient with no underlying morbid condition. He presented to Al Khalidi Hospital/ Medical center emergency department with the complaints of fever of four weeks duration, it was associated with chest pain, productive cough, abdominal pain, diarrhea, and weight loss. On presentation, he looked sick, sleepy and sweating. He was febrile with temperature $\geq 38.2^{\circ}\text{C}$ in his initial admissions days, heart rate 138 beat/min and blood pressure 122/75. He appeared weak, could not walk, and sleepy. His heart sounds were distant with no audible murmur and no lungs crepitations, soft abdomen, and no peripheral signs on extremities.

Laboratory

HIV 1 and 2 antibodies were negative, hemoglobin 11.0 gm/dl, MCV 78, WBC 9600/mm³, platelets 337000/mm³, ALT 45 IU/L, AST 61 IU/L. Serum creatinine 0.56 mg /dl, BUN 17.3 mg/dl, bilirubin 0.97 mg/dl. Electrolytes: Na⁺ 126 mmol/L, K⁺ 3.84 mmol/L, Ca⁺⁺ 8.53 mg/dl, Cl⁻ 92 mmol/L, CRP 136 mg/dl and ESR 90 mm/1st hour. Cardiac troponin

blood level < 0.05 ng/ml and 0.02 ng/ml, CKMB 8.1 U/L, BNP 37.73 pg/ml. Procalcitonin 3.123 ng/ml. Two sets of aerobic and anaerobic blood cultures on admission did not grow bacteria (BacT/Alert, Biomerieux). Pericardial fluid aerobic incubation showed no growth. Plain chest X-ray showed cardiomegaly with water bottle sign. Brain MRI was normal. Electrocardiography showed sinus tachycardia with low voltage. 2D-echocardiography (Figure not available) showed moderate posterior pericardial effusion with pericardial thickening and ejection fraction was $> 60\%$. Chest CT-scan with I.V contrast demonstrated large and circumferential pericardial effusion measuring up to 4.5 cm in thickness, the effusion is relatively high in density (Hounsfield unit of 25) with some septations, the pericardium is thickened measuring 7 mm in thickness (**Figure 1**). No pulmonary nodules, small sized multiple mediastinal lymph nodes were noted. Ultrasound-guided pericardiocentesis revealed blood with a thick deep

Figure 1: The pericardium is thickened measuring 7mm in thickness, with large and circumferential pericardial effusion measuring up to 4.5 cm in thickness. The effusion is relatively high in density (Hounsfield unit of 25) and it has some septations.

dark color, 200 ml of bloody pericardial fluid was aspirated on 1/11/2018. In the next few days, he remained febrile, though his general condition improved and became more wakeful. The aspirate did not show acid-fast bacteria, malignant cells or bacteria on gram stain and culture. Pericardial fluid samples sent for cytology and analysis showed WBC +2, no bacteria seen on gram stain, and AFB stain was negative. Empirically, he was treated as a septic patient with hemorrhagic pericarditis with parenteral cefazoline 2 gram every eight hours.

Later, a pericardial window was done, and tissue pathology showed caseating granulomas (**Figure 2 A, B**) and positive AFB on Ziehl-Neelsen stain (**Figure 3**). Mycobacterial PCR (GenXpert, Cepheid) was posi-

Figure 3: Tissue stain with Ziehl-Neelsen demonstrates an acid-fast bacillus.

Figure 4: Acid fast bacilli grown in six weeks on Lowenstein-Jensen media and stained with Ziehl-Neelsen stain.

tive, described as "detected low". QuantiFERON-TB was negative. Pericardial fluid culture grew *M. tuberculosis* on Lowenstein-Jensen media in six weeks and was AFB stained (**Figure 4**). The patient was started on anti-tuberculosis treatment (isoniazid, rifampin, ethambutol and pyrazinamide) plus vitamin B6 with moxifloxacin in the first four weeks. He showed a progressive improvement, declining fever with normalizing sodium (Na 133mmol/L), declining procalcitonin (0.704 ng/ml) and he was discharged

Figure 2.

A: shows a granuloma with caseation necrosis; B) shows the caseation with Langerhans multinucleated giant cells.

from the hospital. As an outpatient, he was afebrile without serious complaints but mild pain at the site of his chest wound, though the surgical wound was clean and completely healed, also he complained from low back pain, and a new MRI spine was normal. His oral temperature was 36°C, and other physical signs were unremarkable.

Discussion

Despite the patient was sick for one month and progressively getting worse, his initial presentation seemed like a bacterial sepsis, purulent bacterial pericarditis was suspected, and he was started on cefazolin [7]. CT scan of the heart showed pericardial effusions with signs like what was reported from 2D-echocardiography in Sudan of having unique signs (thickened effusion, fibrin strands, and shaggy pericardium) that support an early tuberculous pericarditis diagnosis [8]. Pericardial biopsy and later *M. tuberculosis* growth documented the diagnosis. Despite he was started on isoniazid, rifampin, ethambutol, and pyrazinamide plus B6, he showed improvement but fever continued few more days, moxifloxacin was added and fever resolved. An extensive review on the causes of pericarditis conducted by Noubiap JJ, et al. revealed that *M. tuberculosis* a responsible agent in pericarditis, but not hemorrhagic pericarditis, and furthermore, no unique 2D-echocardiographic signs were detected [9]. A cross-sectional study from Sudan between January 2011 and June 2012 enrolled 985 patients, 22.7% (224) were extrapulmonary tuberculosis, only 1.9% [4] patients were pericardial, and none were hemorrhagic [10]. Our patient diagnosis was firmly based on bacterial culture (**Figure 4**), and on pericardial biopsy with the characteristic picture (**Figure 2 A, B**) and AFB on Ziehl-Neelsen stain of the pericardial biopsy (**Figure 3**). Notably, the QuantiFERON-TB test was negative, false negative QuantiFERON-TB were reported in active tuberculosis infections with rates between 7.1% to 13.9 % [11-12], and false nega-

ve results may be source-dependent [13]. PCR was weakly positive, however, PCR methodology for the target genes may affect the results [14].

Conclusion

Our case is a rare presentation of *Mycobacterium tuberculosis* infection of the pericardium causing hemorrhagic pericarditis, and it was confirmed by histological and microbiological tests.

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