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Cholesterol Crystals in the Pleural Fluid of an Afghan Female with Rheumatoid Arthritis and Prior Tuberculosis: A Rare Case of Pseudochylothorax

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ABSTRACT

Pseudochylothorax is a rare pathological condition characterized by lipid-rich pleural fluid containing cholesterol crystals, mostly related to chronic inflammatory diseases such as tuberculosis and rheumatoid arthritis. We present a case of a 60-year-old Afghan Pashtun female who presented on June 15, 2025, with chest pain and shortness of breath. She had a long-standing history of rheumatoid arthritis and prior pulmonary tuberculosis. Chest radiography revealed a left-sided pleural effusion. Microscopic examination of the pleural fluid showed a predominantly proteinaceous background with abundant cholesterol crystals, suggestive of pseudochylothorax. To the best of our knowledge, this is the first published case report of pseudochylothorax from Afghanistan. Even though the presence of cholesterol crystals in pleural effusion is extremely rare, clinicians should consider pseudochylothorax in the differential diagnosis of unexplained or persistent pleural effusions, particularly in regions with a high prevalence of tuberculosis.

Keywords: Cholesterol crystals; Pleural effusion; Pseudochylothorax; Afghan; Rheumatoid arthritis; tuberculosis

Introduction

Pseudochylothorax or cholesterol pleural effusion is a rare pathological condition characterized by milky lipid-rich fluid in the pleural space that contains cholesterol crystals [1]. Pseudochylothorax is mostly related to chronic inflammatory diseases, such as tuberculosis and rheumatoid arthritis [2]. The most frequently reported cause is tuberculosis [3]. Other less frequently reported underlying causes are rheumatoid lung disease, syphilis, diabetes mellitus, alcoholism, Meig's syndrome, paragonimiasis, cancer, trauma, and hemothorax [3, 4].

The main differential diagnosis of pseudochylothorax is with chylothorax. In chylothorax, there is accumulation of lymphatic fluid (chyle) in the pleural space, presence of chylomicrons, high

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fluid triglycerides, and normal/low fluid cholesterols [5]. To the best of our knowledge, no published case report of pseudochylothorax from Afghanistan is available in the literature. Herein, we report the first case of pseudochylothorax from Kabul, Afghanistan.

Case presentation

Patient information and history

On June 15, 2025, a 60-year-old Afghan Pashtun female presented to the Outpatient Clinic with chief complaints of chest pain and shortness of breath. She had a long-standing history of rheumatoid arthritis diagnosed seven years ago. Physical examination revealed ulnar deviation and swan-neck deformities in both hands. She had been treated with methotrexate for three years and non-steroidal anti-inflammatory drugs (diclofenac and celecoxib) for the last seven years. Three years prior, she underwent thoracentesis for a pleural effusion; however, the diagnostic results were unavailable. She was also previously diagnosed with pulmonary tuberculosis based on acid-fast bacilli (AFB) positive sputum smears and completed a 6-month course of anti-tuberculosis therapy. Written informed consent for publication was obtained from the patient.

Physical examination and chest radiography

On presentation, her vital signs were as follows: blood pressure 110/70 mmHg, pulse rate 96 beats per minute, respiratory rate 24 breaths per minute, and body temperature 37.4 °C. Physical examination revealed retraction of the left chest wall, dullness on percussion over the left hemithorax, absent breath sounds over the left lung field, and decreased vocal fremitus on the same side. Cardiac rhythm was regular with no pathological murmurs. Chest radiography revealed a massive left-sided pleural effusion.

Routine laboratory examination

Her complete blood count (CBC) examination revealed total leukocyte count (TLC) 7000/mm^3 (granulocytes 66.6% and lymphocytes 25.3%), hemoglobin (HB) 12.5 g/dL, hematocrit (HCT) 39.2%, mean corpuscular hemoglobin (MCH) 22.1 pg, total red blood cell (RBC) count 5,650,000/mm^3, mean corpuscular volume (MCV) 69.4 fL, and platelet count of 353,000/mm^3. Her erythrocyte sedimentation rate (ESR) was 70 mm/hour, while rheumatoid factor (RF) was positive (1/128).

Pleural fluid analysis

We received 16 mL of pleural fluid from left side of the chest for routine analysis and cytopathology at the clinical pathology department. The following results of pleural fluid were obtained at clinical pathology: color was pale yellow, turbidity was opaque, coagulum was not visible, pH 7.5, specific gravity 1.010, glucose 24 mg/dL, total protein 6.0 g/dL, albumin 3.4 g/dL, lactate dehydrogenase (LDH) 1732 U/L, cholesterol 144 mg/dL, triglyceride 30 mg/dL, TLC 50 cells/μL, (lymphocytes 60 % and neutrophils 40 %), and RBC count 300 cells/μL. No acid-fast bacilli (AFB) and no bacteria were seen in the Ziehl-Neelsen stain and the Gram stain, respectively. Chylomicron analysis was not conducted for the patient. Laboratory examinations for serum protein, serum albumin, and serum LDH levels were not available. The bacterial culture, tuberculosis testing or culture, adenosine deaminase (ADA) testing, and chest CT-scan imaging were not conducted for the patient. Microscopic examination of the pleural fluid revealed abundant cholesterol crystals (Figure 1).

For cytology examination, two haematoxylin and eosin (H&E) and two pap slides were stained and prepared. Microscopic examination of the smears revealed a predominantly proteinaceous background with abundant cholesterol crystals, suggestive of pseudochylothorax. Meanwhile, occasional benign mesothelial cells were also noted. No evidence of malignancy was seen in the smears examined.

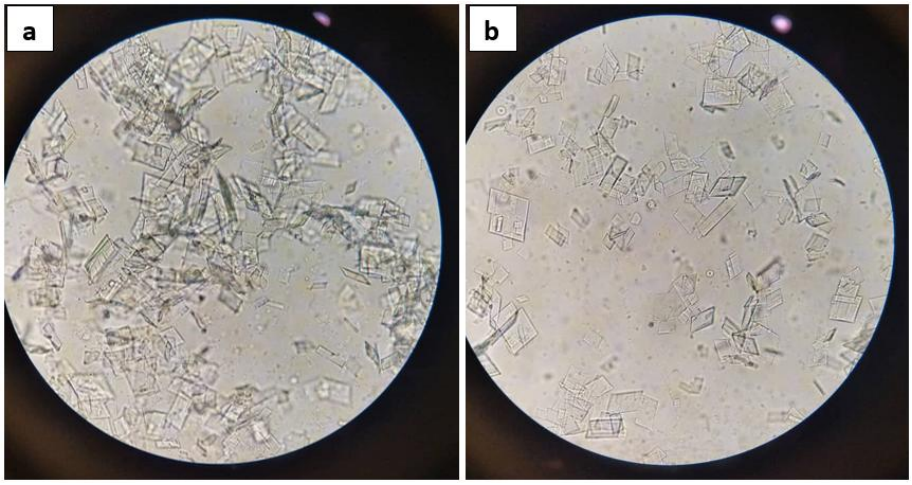


Figure 1 (a and b): Cholesterol crystals, observed under the microscope in the pleural fluid of the patient

Discussion

Pseudochylothorax is a rare pathological condition where cholesterol crystals are seen in the microscopy of the pleural fluid. Under the microscope, cholesterol crystals appear as needle-shaped or irregularly shaped transparent square crystals [1]. A systematic review of 62 studies and 104 patients reported that 71.9% were males, 88.5% had an etiology of tuberculosis or rheumatoid arthritis, 88% had unilateral pleural effusion, 94% had milky appearance of the exudate, and 61.1% had a predominance of lymphocytes [6].

Our case was excluded for being chylothorax. In chylothorax, there is accumulation of lymphatic fluid (chyle) in the pleural space, presence of chylomicrons, high fluid triglycerides, and normal/low fluid cholesterols. Our case was a patient of pseudochylothorax due to these reasons: (a) pleural fluid triglyceride was 30 mg/dL, cholesterol crystals were visible on microscopy, patient had confirmed rheumatoid arthritis and a history of previous pulmonary tuberculosis.

From India, a case report of pseudochylothorax in a 62-year-old male was reported. His main complaints were cough, blood in sputum, and shortness of breath. He had a history of tuberculosis. His chest radiography showed a huge left-sided pleural effusion. Microscopic examination of the pleural fluid revealed numerous rhomboid-shaped cholesterol crystals and a few lymphocytes [3].

From China, a case report of pseudochylothorax was reported of a 68-year-old male. His main complaints were shortness of breath after activity and cough for one month. He did not have any history of tuberculosis. His joint examinations were unremarkable, serum tumor markers were normal, tuberculosis IgG was negative, and sputum and pleural fluid acid-fast stain were negative. In the pleural fluid microscopy, cholesterol crystals were observed [1].

Five cases of pseudochylothorax were reported from the United Arab Emirates. The details of the five patients were as follows: (i) The first patient was a 20-year-old male. He had a history of recurrent spontaneous pneumothorax. He had a right-sided pleural effusion for four months. (ii) The second patient was a 28-year-old male with a history of recurrent spontaneous pneumothorax. He had a right-sided pleural effusion for six months. (iii) The third patient was a 48-year-old female. She was diagnosed with rheumatoid arthritis seven years ago. She had a right-sided

pleural effusion for four months. (iv) The fourth patient was a 29-year-old male. One year ago, he was diagnosed with pulmonary tuberculosis. He had a persistent left-sided pleural effusion for four months. (v) The fifth patient was a 23-year-old male. Four months ago, he developed COVID-19 pneumonia and had a persistent left-sided pleural effusion [7].

The main limitations of this case report were the unavailability of some laboratory examinations, chest CT-scan, MRI, treatment details, follow-up, and the clinical outcome of the patient.

Conclusion

Pseudochylothorax should be differentially diagnosed from chylothorax and empyema, since each of these pathological conditions needs a different management strategy. For the treatment of pseudochylothorax, control of its underlying etiology is of utmost importance. Although the presence of cholesterol crystals in pleural effusion is extremely rare, clinicians should consider pseudochylothorax in the differential diagnosis of unexplained pleural effusions. It is especially of great importance in countries where tuberculosis is endemic, such as Afghanistan.

Conflicts of interest

The authors declare no conflicts of interest, financial or otherwise, that could have influenced the work reported in this study.

Funding

There was no financial support for this case report.

Ethical consideration

Ethical approval was taken from the Ethics Committee of Afghan International Islamic University (code number AIIU-EC-2025.05). Written informed consent for publication was obtained from the patient. The patient was assured that her name and identity would not be disclosed to anyone and would be kept confidential.

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