

Polyserositis Caused by Tuberculosis in a Young Female Patient with Hypothyroidism: A Diagnostic Challenge

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Polyserositis Caused by Tuberculosis in a Young Female Patient with Hypothyroidism: A Diagnostic Challenge

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Abstract

Introduction: The most frequent causes of polyserositis include neoplasia, autoimmune diseases, and infections. Polyserositis, an uncommon feature of disseminated tuberculosis (TB), may delay diagnosis of TB. Patients with hypothyroidism have a higher risk of developing tuberculosis compared to those without hypothyroidism.

Case presentation: Here, we report the case of a 32-year-old female patient who presented with a complaint of abdominal distension of 3 weeks associated with shortness of breath and excessive fatigue. Thyroid function tests were suggestive of primary hypothyroidism and sputum GeneXpert was positive for tuberculosis with exudative pleural effusion. The polyserositis resolved following the initiation of levothyroxine and anti-tuberculosis drugs.

Conclusion: Polyserositis is extremely rare in patients with primary hypothyroidism and it is uncommon presentation of tuberculosis. Evaluation for tuberculosis should be the rule for any patient presenting with polyserositis, especially in high tuberculosis burden countries.

Keywords: Polyserositis, Hypothyroidism, Tuberculosis

Key Clinical Messages

The most frequent causes of polyserositis include neoplasia, autoimmune diseases, and infections; whereas, polyserositis is extremely rare with primary hypothyroidism. Though tuberculosis is uncommon cause of polyserositis, evaluation for tuberculosis should be the rule for any patient presenting with polyserositis, especially in high tuberculosis burden countries.

Introduction

According to Losada et al. [1], polyserositis is an inflammation of several serous membranes, such as the pleura, pericardium, and peritoneum, which causes a buildup of exudates in these body cavities. The causes of polyserositis are numerous. According to a systemic review which included 114 patients, the most frequent causes of polyserositis were neoplasia (30; 26.3%), autoimmune disorders (19; 16.7%), and infections (16; 12.2%), [2]. Polyserositis, a rare presentation of disseminated tuberculosis, may delay diagnosis of tuberculosis [3].

Hypothyroidism and tuberculosis (TB) are correlated in both directions. Patients with hypothyroidism have a roughly 3-fold increased risk of developing tuberculosis (TB) compared to those without hypothyroidism, and those already suffering from TB have a 2-fold increased risk of developing hypothyroidism [4]. Chemotaxis, phagocytosis, the generation of reactive oxygen species, and the release of cytokines are just a few of the immune system processes that thyroid hormones regulate [5]. Hypothyroidism may have a negative impact on the immune system, and recent research has demonstrated that thyroid hormone signaling is crucial for an effective immunological response to TB infection [6].

We report a rare case of polyserositis due to tuberculosis, involving pleura, pericardium and peritoneum in a young female patient concomitantly diagnosed to have primary hypothyroidism.

Case Presentation

A 32-year-old female patient presented with abdominal distension of 3 weeks associated with shortness of breath, excessive fatigue, and loss of appetite. She had no previously known chronic medical illness. She had blood pressure of 100/70mmHg, pulse rate of 72 beats per minute, respiratory rate of 28 breaths per minute, oxygen saturation of 85% at atmospheric air, signs of bilateral pleural effusion and ascites. She had coarse and dry skin over her trunk and extremities [Figure 1].

Complete blood count showed normal white blood cell (WBC) count, moderate anemia (hemoglobin: 9.8 g/dL, MCV: 88 fl) and normal platelet count. Liver enzymes and serum creatinine were within the normal ranges. Thyroid function tests showed high thyroid stimulating hormone (TSH) level with low free T3 and T4 (TSH: 49 mU/L, Free T3: 0.1 pg/mL and Free T4: 0.3 ng/dL). Sputum GeneXpert MTB/RIF test was positive for rifampicin sensitive mycobacterium tuberculosis (TB). Anti-nuclear antibody (ANA) and rheumatoid factor were negative. Pleural fluid analysis revealed WBC count of 1200 cells/ μ L (neutrophil: 6.7%, Lymphocyte: 93.3%), LDH of 704 IU/L, protein of 5.6 g/dL and glucose of 47 mg/dL. Echocardiography showed pericardial effusion; abdominal ultrasound showed ascites; and chest x-ray showed bilateral pleural effusion [Figure 2].

The patient was diagnosed with polyserositis due to disseminated tuberculosis and primary hypothyroidism and started on anti-tuberculosis medications and oral levothyroxine (100 microgram daily). After a month of initiation of anti-TB and thyroid hormone replacement, patient showed marked improvement of her symptoms and repeated imaging confirmed resolution of the body cavity fluid collections.

Discussion

Infectious infections like tuberculosis have been known to cause polyserositis. Serosal tuberculosis is a common extrapulmonary manifestation, particularly in places with a high tuberculosis burden, whereas polyserositis is a less common form of the disease [7, 8]. In an old case series, 50% of the cases of polyserositis had mycobacterium tuberculosis [9]. Certain case reports have shown that endocrine disorders including hypothyroidism can also be the cause for polyserositis [10]. A diagnostic challenge is faced when both tuberculosis and hypothyroidism are present in a patient who has polyserositis and microbiologic tests, such as GeneXpert, remain the most important tools to confirm tuberculosis as a cause for the polyserositis, like in our case.

The most typical clinical features of hypothyroidism include cold intolerance, fatigue, weight gain, constipation, and dry skin [11, 12]. In patients with primary hypothyroidism, ascites, pericardial effusion, or pleural effusion can all occur alone; however, the occurrence of all three together is highly uncommon and not well recognized [13]. Hypothyroidism-related pericardial and pleural effusions have features that lie in between

exudate and transudate and exhibit little sign of inflammation [14]. Different pleural fluid characteristics including transudate, exudative and bloody pleural effusions have been reported from patients with multiple body cavity fluid collections due to hypothyroidism [15 – 18]. Our patient had clinical features and thyroid function tests suggestive of hypothyroidism; however, the polyserositis was most likely due to disseminated tuberculosis evidenced by positive GeneXpert MTB/RIF test from sputum and the exudative nature of the pleural fluid.

In a small study of 50 patients with sputum-positive pulmonary TB who were hospitalized in South Africa, the most prevalent endocrine dysfunction was a low free T3 state, which was present in almost 90% of patients as part of sick euthyroid syndrome. In some hospitalized individuals recovering from nonthyroidal illnesses, temporary spikes in blood TSH values (up to 20 mU/L) may occur [20]. It is typical for patients to have permanent hypothyroidism when their serum TSH levels are over 20 mU/L [21]. Sick euthyroid syndrome might have been considered as one differential diagnosis for the hypothyroidism in our patient; but, the very high TSH level (47 mU/L) was suggestive of permanent hypothyroidism.

Hypothyroidism has been rarely reported to be caused by thyroid tuberculosis (TB), an uncommon disease with an incidence of 0.1-0.4%, even in areas with high rates of pulmonary tuberculosis. Our patient did not have a thyroid mass or nodule, which contrasts with solitary thyroid nodule, which is the most common clinical presentation of thyroid TB [22]. There are also case reports of hypothyroidism following the initiation of second-line anti-TB agents, particularly p-amino salicylic acid and ethionamide, and first-line anti-TB agents such as rifampicin, which have more significant effects on thyroid physiology [23, 24]. Contrary to these findings, our patient did not take any anti-tuberculous medication before the diagnosis of hypothyroidism.

Conclusion

Polyserositis with combination of ascites, pericardial and pleural effusions is extremely rare in patients with primary hypothyroidism and it is uncommon presentation of tuberculosis. Consideration and work up for tuberculosis should be the rule, for any patient presenting with polyserositis of indefinite cause, especially in high tuberculosis burden countries like Ethiopia.

Authors' Contributions

Gashaw Solela: Conceptualization; data curation; resources; validation; writing – review & editing

Ferhan Kedir: Resources; writing – original draft

Merga Daba: Data curation; writing – original draft

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Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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Conflict of Interest Statement

The authors declared no potential conflicts of interest.

Ethics Approval

Ethical clearance including publication of this patient's case details was obtained from Institutional Review Board of Yekatit 12 Hospital Medical College.

Consent for publication

The patient gave an informed written consent for the publication of her case details including the history, physical findings, laboratory reports and images.

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