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Case Report

Isolated Thyroid Sarcoidosis: A Rare Clinical Entity and Literature Review

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Abstract

Thyroid sarcoidosis is a rare condition in which sarcoidosis, an inflammatory disease characterized by the formation of small clusters of inflammatory cells (granulomas), affects the thyroid gland. These granulomas can lead to thyroid enlargement, sometimes, but very rarely accompanied by hormonal imbalances, which may result in either hyperthyroidism or hypothyroidism. Diagnosis typically involves imaging tests such as ultrasound, thyroid tissue biopsy, and blood tests to assess thyroid function. We present the case of a young woman who came to visit with a painless, palpable neck swelling lasting for the past four months, without other associated symptoms. She had no history of different medical conditions and was not on any medication. Her left lobe of the thyroid was enormously large and tended to be retrosternal, and the patient was undergoing thyroidectomy. Histopathological examination revealed granulomatous inflammation with multinucleated giant cells and no caseating necrosis, consistent with sarcoidosis. The patient was subsequently referred to a pulmonologist for further evaluation. Identifying thyroid sarcoidosis early can help prevent the development of complications such as thyroid dysfunction (hyperthyroidism or hypothyroidism), and early intervention is often linked to a better long-term prognosis, as it may help avoid permanent damage to the thyroid or other affected organs. Early detection helps optimize management, minimize risks, and improve the quality of life for patients with thyroid sarcoidosis.

Keywords: Granuloma; Thyroid Sarcoidosis; Isolated; Involvement

Introduction

Thyroid involvement in sarcoidosis is relatively uncommon but noteworthy. In post-mortem examinations of patients with a prior diagnosis of systemic sarcoidosis, the thyroid gland was involved in up to 4.5% of cases [1]. Sarcoidosis commonly impacts individuals in their 40s and 50s, with a slightly higher prevalence in women [1]. Thyroid sarcoidosis is an infrequent manifestation of sarcoidosis, a disease characterized by forming granulomas (clusters of inflammatory cells) in various organs. The first case of sarcoidosis and thyroid disease was reported in 1938 [2]. The thyroid gland can occasionally be affected, although it is not a common site for sarcoidosis involvement. When it does occur, thyroid sarcoidosis can present in different ways, including asymptomatic disease, goiter (enlarged thyroid), or even hypothyroidism. The pathogenesis of thyroid involvement in sarcoidosis is still not completely understood, but it is believed to involve a combination of immune dysregulation and granulomatous inflammation. Granulomas are characteristic of sarcoidosis and represent clusters of immune cells that form in response to an unknown trigger. The thyroid can become a site for granulomas, leading to tissue damage and potential thyroid dysfunction. The granulomas may directly disrupt normal thyroid function, causing either hypothyroidism or hyperthyroidism [3,4]. Clinically noticeable thyroid disease has been observed in less than 1% to 2.9% of sarcoidosis patients, with prior studies indicating that thyroid issues can arise at any stage

during the disease [5]. Early detection and management of thyroid abnormalities can help prevent potential complications associated with thyroid dysfunction.

Case Presentation

A 47-year-old female presents with a 4-month history of a painless, gradually enlarging neck mass. She has no significant respiratory symptoms (e.g., cough, shortness of breath), no joint pain, and no significant skin rashes. There is mild fatigue, but she attributes this to work stress. Her physical neck examination revealed an enlarged left lobe of the thyroid gland. No lymphadenopathy is noted. Cardiovascular, respiratory, and abdominal examinations are unremarkable. No skin lesions are observed. The ultrasound of the thyroid gland shows an enlarged thyroid, mainly the left lobe, with numerous heterogeneous nodules and retrosternal extension. Thyroid function tests, including TSH, fT4, and fT3, were within normal range, and Anti-TPO antibodies and Anti-thyroglobulin antibodies were negative. There was no evidence of hypothyroidism or hyperthyroidism. The patient was recommended to have thyroid fine needle aspiration, but she refused and said she agreed to have surgery because she did not feel good aesthetically with this thyroid enlargement. The computed tomography scan was performed as preoperative preparation for the thyroidectomy, and a shift of the trachea to the right was seen due to enlargement of the left thyroid lobe and bilateral mediastinal lymph nodes up to 18 mm (Figure 1a,b). No signs of active lung disease. The patient underwent the intervention, total thyroidectomy, and was discharged with thyroid substitution therapy. Definitive histopathological findings revealed granulomatous inflammation with multinucleated giant cells and no caseating necrosis, consistent with sarcoidosis (Figure 2). Once thyroid sarcoidosis was suspected, the patient was referred to a pulmonologist for further assessment.

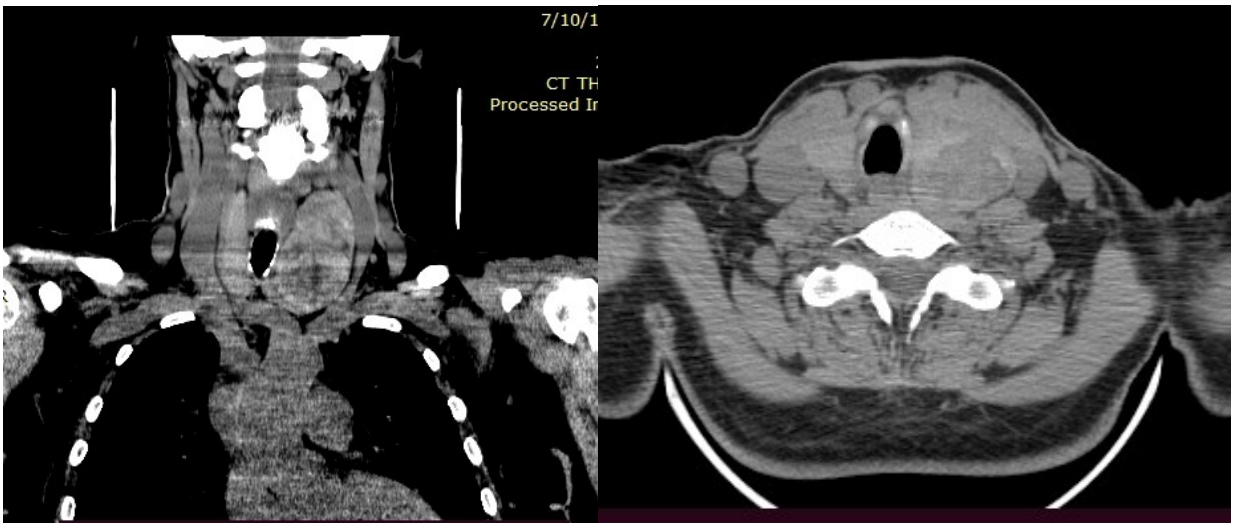

Figure 1 (a, b): Two different thyroid views in a CT scan. The enlarged left lobe and compression of the trachea.

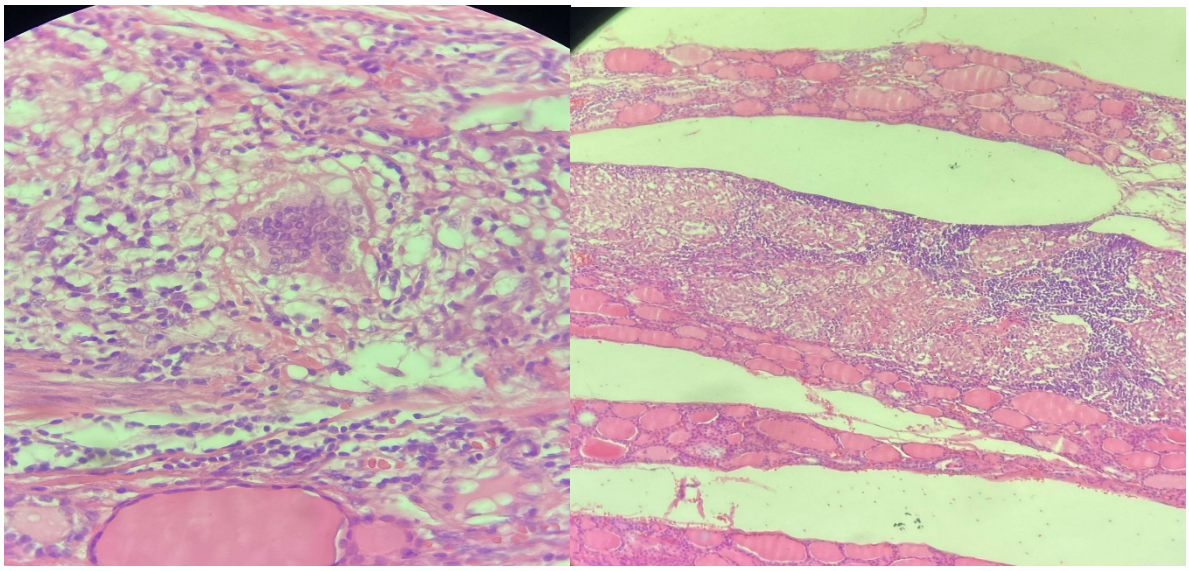

Figure 2 (a, b): Microscopic view of histopathological findings.

Discussion

Sarcoidosis is a rare inflammatory disease that primarily affects the lungs, but it can involve any organ in the body, including organs of the endocrine system [5]. It is characterized by the formation of granulomas—small clusters of immune cells—that can interfere with the normal function of the affected organs. While the cause of sarcoidosis is not fully understood, it is believed to result from an abnormal immune response, possibly triggered by an infection or environmental factors, in people with a genetic predisposition [6]. Sarcoidosis has been linked to autoimmune diseases, with some suggesting that sarcoidosis may itself be an autoimmune condition [6,7]. This connection with autoimmune disorders may help explain the observed relationship between sarcoidosis and autoimmune thyroid diseases, although these findings have been based on small studies or case reports [4]. Thyroid involvement occurs in a small percentage of people with sarcoidosis, and it‘s estimated that only 1-4% of patients with systemic sarcoidosis develop thyroid involvement [8]. This can happen at any stage during the progression of the disease. There is evidence of the association of sarcoidosis and autoimmune thyroid disorders [9,10]. So, Nakamura et al. [11] reported the prevalence of Hashimoto‘s thyroiditis in patients with sarcoidosis ranging from 3% to 11%. In a retrospective study by Shi et al. [12], Hashimoto‘s thyroiditis was the most common concomitant autoimmune disease in sarcoidosis patients, affecting 3.9% of cases. More broadly, Antonelli et al. [13] estimated the prevalence of autoimmune thyroid disorders in sarcoidosis patients to be 50.7% in females and 22.2% in males.

This type of thyroid involvement can result in thyroid enlargement (goiter) and sometimes in thyroid dysfunction. Although most patients with sarcoidosis do not experience a functional thyroid disorder, approximately 2-20% of cases may involve either hypothyroidism or hyperthyroidism [14,15]. The largest study published on the prevalence, characteristics, and potential impact of hypothyroidism in sarcoidosis patients found that 14% of these patients had hypothyroidism, with the majority being middle-aged white females [7]. This prevalence is comparable to findings from smaller sarcoidosis cohorts, such as a study from Italy, which reported a 17% prevalence of subclinical hypothyroidism and a 5% prevalence of overt hypothyroidism [13]. A cohort study from Greece found a 15% prevalence [16], while a nationwide case-control study from Taiwan examining comorbid conditions in sarcoidosis reported an autoimmune thyroid disease prevalence of approximately 12% [17]. Both sarcoidosis and thyroid disease have been linked to HLA genes. The connection between Hashimoto‘s thyroiditis and sarcoidosis may be attributed to heightened thyroid-specific T-cell activation, driven by an increased presence of Th1/Th17 cells in both conditions [3,11]. Infiltration of the thyroid gland by non-necrotizing granulomas can also lead to thyroid dysfunction and the onset of hypothyroidism [18]. Rarely, thyroid sarcoidosis could exhibit hyperthyroidism or sometimes coexist with Graves’ disease, the most common autoimmune disease in hyperthyroidism. HLA-B8, known to be one of the genes susceptible to Graves` disease, is reportedly associated with spontaneous resolution or shorter duration of disease in sarcoidosis [19,20]. Among thyroid autoimmunity, Hashimoto’s thyroiditis is a predominant disease. Other thyroid disorders associated with sarcoidosis include goiter, de Quervain‘s thyroiditis, and thyroid cancer.

Thyroid sarcoidosis may be asymptomatic; when symptoms do occur, they are often related to thyroid dysfunction or the presence of granulomas in the thyroid gland. Common clinical symptoms of thyroid sarcoidosis may include painless goiter which may be diffuse or with nodules, symptoms related to hypothyroidism or

hyperthyroidism (when occurred), discomfort or pain in the thyroid area due to inflammation or granuloma formation, and symptoms of systemic sarcoidosis as: fatigue, shortness of breath (due to lung involvement), skin rashes, joint pain, enlarged lymph nodes.

Enlargement of the thyroid gland due to sarcoidosis, without other signs of systemic involvement, is known as isolated thyroid sarcoidosis. Isolated thyroid infiltration in sarcoidosis is less common than the concurrent involvement of the lungs, which is more frequently observed [21]. In this condition, the thyroid becomes enlarged (goiter) due to granulomatous inflammation, but other typical symptoms of sarcoidosis, such as lung or skin involvement, may not be present. This type of thyroid involvement can be challenging to diagnose because the enlargement might be the only noticeable symptom, and it may be mistaken for other thyroid disorders like Hashimoto‘s thyroiditis or a benign goiter. Diagnosis often requires imaging, biopsy, and ruling out other causes of thyroid enlargement, along with monitoring for any potential development of systemic symptoms over time. Early detection allows for the correct diagnosis of sarcoidosis before it progresses to more severe stages, potentially affecting other organs like the lungs or heart. Sarcoidosis can be systemic and addressing it in the thyroid early on helps prevent widespread organ involvement.

Diagnosis typically involves imaging studies, such as ultrasound, to assess gland enlargement and Fine-Needle Aspiration (FNA) biopsy to confirm the presence of granulomas. Blood tests to evaluate thyroid function are also crucial to determine whether the thyroid is producing the correct amount of hormones. Treatment generally focuses on managing sarcoidosis, often with corticosteroids. However, isolated thyroid sarcoidosis may not require aggressive treatment if thyroid function remains normal.

Conclusion

Thyroid sarcoidosis is a rare manifestation of sarcoidosis, and it is important to emphasize that, in most cases, remains clinically insignificant. Given the increased risk of thyroid disease in sarcoidosis patients, healthcare providers should monitor thyroid function in these individuals. Early recognition and careful monitoring are key in managing these cases and can help prevent potential complications associated with thyroid dysfunction.

Conflicts of Interest: No conflict of interest.

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