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Brucella-Associated Subacute Thyroiditis with Positive Blood Culture: A Case Report and Literature Review

Brucella İlişkili Subakut Tiroidit ve Pozitif Kan Kültürü: Bir Olgu Sunumu ve Literatür İncelemesi

Sema Yılmaz Kırık. _Brucella_ Subacute Thyroiditis

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Abstract
Brucellosis is a zoonotic infection with diverse clinical manifestations; however, thyroid involvement is exceedingly rare. Non-suppurative *Brucella* thyroiditis may clinically mimic subacute (De Quervain) thyroiditis, potentially leading to diagnostic delay. We report the case of a 50-year-old female livestock worker who presented with fatigue, sore throat, and right-sided cervical swelling. Laboratory evaluation revealed suppressed thyroid-stimulating hormone levels. Neck ultrasonography demonstrated thyroid nodules without evidence of lymphadenopathy. *Brucella* serology was positive, and *Brucella* spp. was isolated from blood culture, confirming microbiologically proven bacteremia. The patient was treated with streptomycin and doxycycline, followed by rifampicin and doxycycline, for a total treatment duration of 45 days, resulting in complete clinical recovery. In addition, a literature review identified six previously reported cases of non-suppurative *Brucella* thyroiditis. Most patients presented with painful thyroid swelling and transient thyrotoxicosis. Blood culture positivity was uncommon, whereas serological testing remained the primary diagnostic tool. All reported cases responded favorably to doxycycline-based combination therapy. In endemic regions, brucellosis should be considered in patients presenting with thyroid inflammation and biochemical thyrotoxicosis, particularly among individuals with occupational exposure to livestock. Early recognition and appropriate antimicrobial therapy can prevent misdiagnosis, unnecessary corticosteroid use, and invasive procedures.
Keywords: Brucellosis, subacute thyroiditis, thyroid involvement, bacteremia, zoonotic infection

Özet
Bruselloz, geniş klinik spektruma sahip zoonotik bir enfeksiyondur; ancak tiroid tutulumu son derece nadirdir. Non-süpüratif *Brucella* tiroiditi klinik olarak subakut (De Quervain) tiroiditi taklit edebilir ve tanıda gecikmeye yol açabilir.
Bu yazıda, halsizlik, boğaz ağrısı ve sağ servikal şişlik şikâyeti ile başvuran 50 yaşında, hayvancılıkla uğraşan kadın hasta sunulmuştur. Laboratuvar incelemesinde tiroid stimülan hormon (TSH) düzeyi baskılı saptanmıştır. Boyun ultrasonografisinde lenfadenopati olmaksızın tiroid nodülleri izlenmiştir. *Brucella* aglütinasyon testi pozitif bulunmuş ve kan kültüründe *Brucella* spp. üremesi saptanarak bakteriyemi mikrobiyolojik olarak doğrulanmıştır. Hasta streptomisin ve doksisiklin kombinasyonu ile tedavi edilmiş, ardından rifampisin ve doksisiklin ile toplam 45 günlük tedavi tamamlanmış ve klinik olarak tam iyileşme sağlanmıştır.
Ayrıca literatür taramasında non-süpüratif *Brucella* tiroiditi tanısı alan altı olguya ulaşılmıştır. Bildirilen olguların çoğunda ağrılı tiroid şişliği ve geçici tirotoksikoz saptanmış, kan kültürü pozitifliği nadir görülmüş ve tanı çoğunlukla serolojik yöntemlerle konulmuştur. Tüm olgular doksisiklin temelli kombinasyon tedavisine iyi yanıt vermiştir.
Endemik bölgelerde ve hayvancılık ile uğraşan hastalarda tiroid inflamasyonu ve biyokimyasal tirotoksikoz varlığında bruselloz ayırıcı tanıda düşünülmelidir. Erken tanı ve uygun antimikrobiyal tedavi gereksiz kortikosteroid kullanımı ve invaziv girişimleri önleyebilir.
Anahtar Kelimeler: Bruselloz, subakut tiroidit, tiroid tutulumu, bakteriyemi, zoonotik enfeksiyon

Introduction

Brucellosis is a globally prevalent zoonotic infection, particularly endemic in Mediterranean and Middle Eastern countries[1]. The diagnosis is established in patients with compatible clinical findings using standard tube agglutination (STA) testing and/or isolation of *Brucella* spp. from blood or other body fluids[2]. Although brucellosis can involve multiple organ systems, involvement of the thyroid gland is extremely rare[3]. To date, fewer than a dozen cases of non-suppurative *Brucella* thyroiditis have been reported in the literature. Clinically, this condition may mimic subacute, autoimmune, or suppurative thyroiditis, thereby leading to diagnostic confusion[4].

Because of its rarity and non-specific clinical presentation, *Brucella* thyroiditis may be overlooked, particularly in patients presenting with thyrotoxicosis and cervical pain. In endemic regions, failure to consider brucellosis in the differential diagnosis of subacute thyroiditis may result in delayed diagnosis and treatment.

Herein, we report the case of a livestock worker who initially presented with cervical swelling and suppressed thyroid-stimulating hormone (TSH) levels and was subsequently diagnosed with *Brucella*-associated subacute thyroiditis. In addition, we reviewed previously reported cases to better characterize the clinical features, diagnostic approaches, and treatment outcomes associated with this rare entity.

Case Report

A 50-year-old female farmer presented with fatigue, sore throat, and right-sided neck swelling that had persisted for one week. She reported working with livestock and noted a history of abortions among her animals. She denied recent tick bites, hunting exposure, or travel history. In addition, she reported joint pain and a sensation of chest pressure, but no fever, night sweats, or weight loss.

On physical examination, a 4-cm firm, mobile, and painless swelling resembling a lymph node was palpated in the left cervical region (Figure 1). The thyroid gland was not enlarged in the midline and was non-tender on palpation. Hepatomegaly was not detected, whereas splenomegaly was present. Cardiac auscultation revealed no murmurs.

Laboratory investigations revealed the following thyroid function results: TSH, 0.073 mIU/L (reference range: 0.55–4.78); free T3, 4.2 ng/L (2.3–4.2); and free T4, 2.13 ng/L (0.89–1.76). Anti-thyroid peroxidase and anti-thyroglobulin antibodies were negative. Other laboratory parameters were within normal limits, except for an elevated erythrocyte sedimentation rate (32 mm/h), alanine aminotransferase level (50 U/L; reference range: 0–45), and C-reactive protein level (26 mg/L; reference range: 0–5). The complete blood count demonstrated a predominance of monocytes.

Neck ultrasonography revealed thyroid nodules but no evidence of pathological lymphadenopathy, and the patient was subsequently referred to the endocrinology department. Additional differential diagnostic tests, including anti- human immunodeficiency virus antibodies, hepatitis markers, Venereal Disease Research Laboratory test, and tularemia microagglutination test, were negative (samples were sent to the public health laboratory for analysis).

The Brucella Rose Bengal test was positive, and the STA-Coombs test showed a titer of 1:1280. Subsequent blood cultures grew *Brucella* spp., thereby confirming the diagnosis of *Brucella* thyroiditis.

The patient initially received streptomycin and doxycycline for 10 days, followed by rifampicin and doxycycline, completing a total treatment duration of 45 days. During follow-up, her systemic symptoms and neck swelling resolved completely. Thyroid scintigraphy demonstrated heterogeneous and hyperplastic uptake with both hypoactive and hyperactive nodules. Fine-needle aspiration biopsy revealed benign thyroid cytology. The patient recovered fully and continues to attend regular follow-up visits.

Literature Search Strategy

A systematic literature search was conducted to identify all previously reported cases of brucellosis-associated thyroiditis. The PubMed, Scopus, and Web of Science databases were searched from their inception to January 2026. The search strategy included combinations of the following keywords: *"brucellosis," "Brucella," "subacute thyroiditis," "thyroiditis,"* and *"thyroid involvement."*

Case reports or case series describing subacute or acute non-suppurative thyroiditis associated with *Brucella* infection were included in the review. Only articles published in English or Turkish with full-text availability were considered eligible. Cases of suppurative thyroiditis or thyroid abscess were excluded, as were reports in which thyroid involvement was incidental in the context of predominant multiorgan disease.

In addition, the reference lists of the retrieved articles were manually screened to identify additional relevant publications. Six individual cases met the inclusion criteria and were therefore included in the present review.

Discussion

Brucellosis is a systemic granulomatous infection that can involve nearly every organ; however, thyroid involvement remains exceptionally rare, even in endemic regions. In a large Turkish cohort of 1,218 patients with brucellosis, only one case of thyroid involvement was reported, highlighting the rarity of this manifestation[5]. The clinical and laboratory characteristics of previously reported non-suppurative cases are summarized in Tables 1 and 2.

The thyroid gland is relatively resistant to bacterial infection due to its encapsulated structure, high iodine content, rich vascular supply, and extensive lymphatic drainage. Nevertheless, infection can occur via hematogenous spread or direct invasion. Clinically, *Brucella* thyroiditis may closely mimic classical subacute (De Quervain) thyroiditis, suppurative thyroiditis, or autoimmune thyroid disease, which can lead to diagnostic delays[4,6-9].

As shown in Table 1, most reported patients were middle-aged women presenting with fever, anterior neck pain, and painful thyroid enlargement. Transient thyrotoxicosis was observed in the majority of cases, characterized by suppressed TSH and elevated thyroid hormone levels, whereas thyroid autoantibodies were generally negative. Imaging findings, including ultrasonography and scintigraphy, were consistent with subacute thyroiditis[6-12].

Importantly, Table 2 demonstrates that blood culture positivity was uncommon in previously reported cases, with serological testing remaining the primary diagnostic method. In contrast, our patient had microbiologically confirmed *Brucella* bacteremia, strengthening the etiological association and underscoring the value of obtaining blood cultures in febrile patients from endemic regions[10].

Subacute thyroiditis is most commonly associated with viral infections[9]; however, not all cases are viral, particularly in brucellosis-endemic areas. Our patient initially presented with cervical swelling and suppressed TSH levels, consistent with classical subacute thyroiditis.

Occupational exposure and positive blood cultures confirmed the infectious etiology. This case emphasizes that thyroiditis should be considered during the evaluation of fever of unknown origin, especially in individuals with livestock exposure.
As shown in Table 2, all reported patients responded favorably to doxycycline-based combination therapy, most commonly doxycycline plus rifampicin, with or without an aminoglycoside. No mortality, recurrence, or permanent thyroid dysfunction has been documented[6-12]. These findings suggest that early recognition and prompt initiation of appropriate antimicrobial therapy result in excellent outcomes and can prevent unnecessary corticosteroid use or surgical intervention.

Conclusion

Brucella thyroiditis is a rare but clinically significant manifestation of brucellosis. In endemic regions, brucellosis should be considered in patients presenting with painful thyroid swelling and biochemical thyrotoxicosis, particularly among those with occupational exposure. Early microbiological confirmation and prompt initiation of appropriate antimicrobial therapy can ensure complete recovery and prevent misdiagnosis or unnecessary corticosteroid use.

Ethics

Informed Consent: Written informed consent was obtained from the patient for publication of this case report.

Footnotes

Conflict of Interest: The author declare no conflict of interest.
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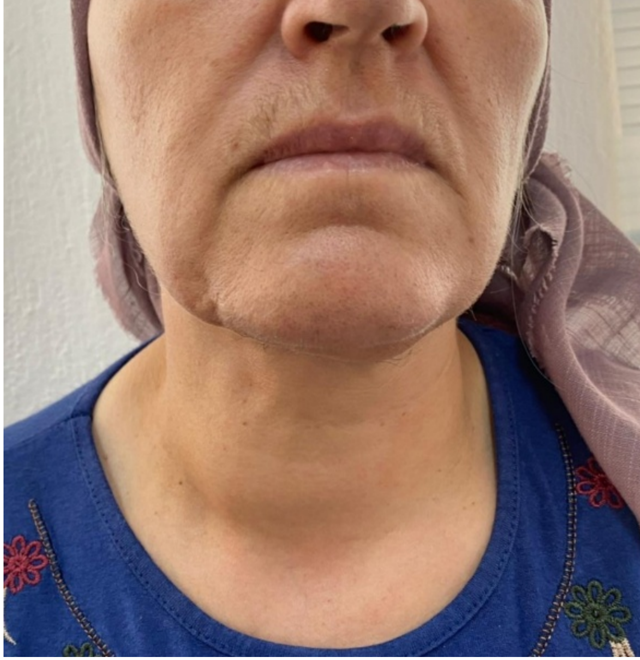

Figure 1. Cervical swelling observed in the patient at presentation.

Table 1. Clinical characteristics of previously reported *Brucella* thyroiditis cases.

Author	Year	Country	Age/sex	Type of thyroiditis	Main clinical features	Diagnostic methods
Sırmatel and Akarsu[6]	2004	Türkiye	34/M	Subacute	Fever, throat pain, arthralgia, and thyrotoxicosis	Serology, TFT
Küçükbayrak et al.[4]	2007	Türkiye	19/F	Subacute	Neck pain, fever, weight loss, night sweats, palpitations	IgM, scintigraphy
Alinaghian and Avijgan[10]	2016	Iran	62/F	Acute non-suppurative	Odynophagia and high fever	Serology, USG, and scintigraphy
Fatani et al.[11]	2018	Egypt	53/F	Subacute	Fever and sore throat	Serology, TFT
Cvetkova et al.[8]	2019	North Macedonia	55/M	Acute non-suppurative	Fever, thyroid pain, and arthralgia	USG, serology
Lahoud et al.[12]	2024	Lebanon	48/F	Subacute	Neck pain, thyrotoxicosis, and night sweats	Serology, scintigraphy
Present case	2025	Türkiye	50/F	Subacute	Neck pain and fever	Serology, scintigraphy, and USG

TFT, thyroid function tests; USG, ultrasonography; IgM, immunoglobulin M; M, male; F, female.

Table 2. Laboratory findings and treatment outcomes of reported *Brucella* thyroiditis cases.

Author	Blood culture	Thyroid function	Serology	Treatment	Outcome
Sırmatel and Akarsu[6]	Negative	Hyperthyroidism (high fT4, fT3)	Positive	Doxycycline ± Rifampicin (8 weeks)	Recovery
Küçükbayrak et al.[4]	Negative	Hyperthyroidism	IgM positive	Doxycycline + Streptomycin (6 Weeks)	Recovery
Alinaghian and Avijgan[10]	**Positive**	Low TSH, high fT4	Wright 1:1280	Doxycycline + rifampicin (3 months) + Strep + Steroid (14 Days)	Recovery
Fatani et al.[11]	Negative	Hyperthyroidism	Positive	Doxycycline + Rifampicin + Ciprofloxacin (6 Weeks)	Recovery
Cvetkova et al.[8]	Not reported	Mild thyrotoxicosis (only high fT4)	Positive	Gentamicin for 10 days, doxycycline, and ciprofloxacin for 45 days	Recovery

Lahoud et al.[12]	Not reported	Suppressed TSH, high T3/T4	Positive	Doxycycline + 900-mg Rifampicin (6 weeks)	Recovery
Present case	**Positive**	Suppressed TSH	Positive	Doxycycline + Rifampicin (6 weeks) + Streptomycin (10 days)	Recovery

TSH, thyroid-stimulating hormone; IgM, immunoglobulin.