A case of idiopathic thyroid abscess caused by Escherichia coli

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ABSTRACT
Suppurative thyroiditis with an abscess is a rare form of thyroiditis that can present as a diagnostic challenge. Its rarity is attributed to unique features of the thyroid gland that make it resistant to infection. Delay in diagnosis often can lead to morbid complications from the progression of the infection. Although more likely to be caused by gram-positive bacteria, gram-negative organisms are also known to cause this infection which often requires surgical treatment. The authors present a case of thyroid abscess from Escherichia coli from an unknown source.

1. Background
Thyroiditis is an inflammation of the thyroid gland and may have a variety of etiologies [1]. The thyroid gland is usually resistant to infection due to its rich lymphatic drainage, dual blood supply, encapsulation, and iodine concentration. Thus, suppurative thyroiditis is a relatively uncommon cause of thyroiditis. Suppurative thyroiditis, including thyroid abscess, constitutes 0.7 to 1% of all thyroid diseases. It is usually caused by hematogenous spread or direct inoculation of a pathogen. Treatment includes systemic antibiotics targeting the causative organism although the gold standard remains surgical drainage [2,3]. Here, the authors present a case of thyroid abscess caused by E. Coli from an unknown source.

2. Case description
A forty-one years old female with no apparent past medical history presented to the emergency department with pain and swelling in the neck for one week. Review of systems was positive for fever, chills, dysphagia, and nausea. The patient denied symptoms of an upper respiratory tract infection, and additionally denied prior fever, cough, cold or heat intolerance, palpitations, anxiety, hyperreflexia, weight loss, or tremors. The patient was treated with oral antibiotics (doxycycline) prior to presenting to the hospital for presumed pharyngitis.

On presentation, vital signs were normal without fever or tachycardia. Physical examination revealed diffuse enlargement of the thyroid gland along with tenderness to palpation. Laboratory studies were significant for leukocytosis with an elevated ESR of 97 mm/hour (reference range 4–25 mm/hour), CRP 363.4 mg/L (reference range <5 mg/L), and elevated thyroglobulin 7244.00 ng/ml (reference range 1.60–59.90 ng/ml). Her thyroid stimulating hormone, thyroglobulin antibodies, free triiodothyronine, free thyroxine, and total T4 were notably normal. Autoantibody workup revealed normal TSH receptor antibody and thyroid peroxidase antibody levels. Initial CT scan of the neck with intravenous contrast on admission showed an enlarged left thyroid lobe with a heterogeneous lesion measuring 2.5 cm, which caused a mild mass effect on the trachea. Ultrasound of neck was done to further evaluate the thyroid mass and revealed nodules in the left lower thyroid and isthmus. No radiographic evidence of abscess or fluid collection was noted.

Subacute thyroiditis and thyroid abscess were among the likely causes. Since imaging studies had not identified a concerning locus for infection, oral glucocorticoids were started for treatment of subacute thyroiditis. Antibiotics were also initiated, however, given the clinical concern for infectious etiology. The patient later spiked a fever to 101.1 Fahrenheit on day 4. Repeat CT scan of the neck with IV contrast showed increased retropharyngeal soft tissue edema, enlarged left lobe of thyroid and several nonenhancing foci within the gland concerning for abscesses. Antibiotics were broadened to target a wider pathogen spectrum, and a fine needle aspiration was performed which resulted in drainage of 1 cc of purulent fluid. The patient continued to have neck pain and eventually underwent incision and drainage of the lesion. Cultures demonstrated Escherichia coli sensitive to ceftriaxone. Urine culture and blood culture remained negative. The patient was discharged home on oral antibiotics. Underlying etiology for the infection remained unidentified with no obvious immunocompromised state or other source of infection like a urinary tract infection. On Otorhinolaryngology evaluation, there was no pyriform sinus fistula seen on direct laryngoscopy.
or upon review of neck imaging. HIV antigen/antibody screen was reported negative. There has been no evidence of recurrence since then on a follow up of 1 year.

3. Discussion

Suppurative thyroiditis is a relatively uncommon form of thyroiditis [1]. The primary risk factors for development of a thyroid abscess are immunocompromised status and anatomical abnormalities such as a pyriform sinus fistula [4,5]. Other less common predisposing factors include multinodular goiter, autoimmune thyroiditis, and thyroid cancer [2,5]. Infection most commonly occurs through hematogenous spread from a distant site, though other sources include direct extension from other neck infections or direct inoculation in the setting of trauma. The most common causative organisms for suppurative thyroiditis are Staphylococcus and Streptococcus species. However, causative organisms are more varied in immunocompromised hosts and can include Pneumocystis jiroveci (carinii), Mycobacterium tuberculosis, Aspergillus, Klebsiella pneumoniae, Candida, Brucella melitensis, and others [1,6]. Thyroid abscess associated with E. Coli is rare. Upon literature review, we found a few reported cases of E.Coli related acute suppurative thyroiditis, in whom patients were immunocompromised. Hematogenous spread from a urinary tract infection appears to be the most common source [7–10]. In our patient, the original source of infection remains unidentified.

The clinical presentation often includes fever, odynophagia and anterior neck pain. Symptoms can be incorrectly attributed to acute pharyngitis leading to a delay in diagnosis. Patients are at risk for rapid extension of the infectious site and can develop signs of airway compromise [1,4,5,11].

Patients with suppurative thyroiditis and abscess typically remain euthyroid. In a review of 191 cases of suppurative thyroiditis from 1980 to 1997, Yu et al reported most of the bacterial infections (83.1%) were euthyroid, while fungal or mycobacterial infections were hypothyroid (62.5%) and hyperthyroid (50%), respectively [12]. Other laboratory investigations may reveal leukocytosis and elevated ESR and CRP [1]. Diagnosis is based on clinical suspicion, and imaging may assist in confirming the diagnosis. Ultrasound is the preferred modality for diagnosis and can also be used to assist percutaneous drainage. CT scan of the neck is sensitive for diagnosing and characterizing an abscess and can be used if additional information regarding airway compromise is needed. Radionuclide scanning with Technetium-99m typically shows no uptake in the area of abscess and thus may not be able to differentiate a cold nodule from an abscess [13,14].

Once the diagnosis is established, treatment should be started immediately with antibiotics to avoid progression. Parenteral antibiotics alone are usually not sufficient to treat the abscess and surgical drainage is required in most cases, be it open surgical drainage or a more minimally invasive incision and drainage [2,15]. Needle aspiration under ultrasound guidance is reported to be successful in certain cases as well. Another alternative approach is placement of a percutaneous drainage catheters via either CT or sonographic guidance; this may be considered in simple abscesses with no loculations [14]. Surgical drainage may also afford the opportunity for management of predisposing anatomic factors at the same time to avoid recurrence. The pyriform sinus may be resected or obliterated during the surgery [16].

Potential complications may include thyroid storm, airway obstruction, internal jugular vein thrombosis, and sepsis. Mortality with suppurative thyroiditis is reported to range from 3.7 to 12.1% [3] and tends to be higher in immunocompromised patients. Early recognition and treatment is essential to decrease the morbidity and mortality associated with suppurative thyroiditis and thyroid abscess.

4. Conclusion

Thyroid abscesses are uncommon and should be considered in patients presenting with unresolving symptoms of anterior neck pain and swelling. Prompt treatment is necessary to avoid complications and extension which may lead to airway compromise. Surgical management is the mainstay of managing the patients with thyroid abscesses.

Disclosure statement

No potential conflict of interest was reported by the authors.

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