

An Unusual Case of Neck Swelling

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Abstract Acute Suppurative Thyroiditis (AST), an infection of the thyroid caused by bacteria, fungi, or parasites, is a unique cause of thyroid disease. While the causative agents are usually gram-positive skin flora, cases due to atypical bacteria or fungi have been seen in susceptible patient populations. In adults, AST is usually attributed to trauma, fine needle aspiration of the thyroid, or an immunocompromised state usually due to organ transplant, HIV infection, or uncontrolled diabetes. If untreated, the morbidity and mortality of AST is high. We describe a case of AST in a patient whose only risk factor was uncontrolled type 2 diabetes mellitus where the presumed causative agent was extended-spectrum beta-lactamase producing *E. coli*, an exceedingly rare cause of AST. We discuss the commonly reported etiologies, risk factors, and hormonal dysfunction of this rare condition.

Keywords: acute suppurative thyroiditis, extended-spectrum beta-lactamase producing *E. coli*, type 2 diabetes mellitus

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1. Introduction

It is unusual to implicate the thyroid gland as a source of severe bacterial infection. The thyroidal optimal arterial supply, lymphatic drainage, separation of the gland from other structures in the neck by fascial planes, and ability to produce hydrogen peroxide make AST very rare (accounting for 0.1-0.7% of all thyroid disease). [1] This is in contrast to the more commonly encountered subacute thyroiditis and chronic thyroiditis, known to have viral and autoimmune etiologies, respectively. Among AST cases reported locally and internationally, most patients have anatomical defects such as pyriform sinus fistulas or thyroglossal duct cysts, underlying immunocompromised state, recent instrumentation, or trauma to the neck.[2] Here we present a unique case of this rare condition.

2. Case

A 78-year-old Salvadoran female presented with a 7-day history of fever, sore throat, and tender left-sided neck swelling. Oral amoxicillin initially helped her symptoms, but 2 days prior to admission, progressive neck swelling and confusion developed. The patient was brought to the Emergency Department (ED), where mild disorientation was observed. A temperature of 98.9° F, blood pressure of 138/65 mmHg, heart rate of 98 beats per minute, respiratory rate of 21 breaths per minute, and oxygen saturation of 98% on room air were documented. On examination, swelling in the anterior left neck

extending from the left sternocleidomastoid muscle across the midline and loss of appreciable landmarks were noted. Notable laboratory results are described in [Table 1](#).

Table 1. Notable Laboratory Values

Lab	Value
Sodium	153 mmol/L
Chloride	114 mmol/L
Bicarbonate	16 mmol/L
Blood Glucose	792 mmol/L
White Blood Cell Count	20 x 10 ⁹ /L
Venous blood pH	7.29
Beta-hydroxybutyrate	4.09 mmol/L
Free thyroxine level (free T4)	24.45 pmol/L
Thyroid stimulatig hormone	0.16 mU/L
Hemoglobin A1c	13.2%



Figure 1. Pockets of gas (red arrow) are seen at the expected location of the left thyroid gland extending across the midline with extension into the soft tissues of the neck, producing a mass effect on the trachea. Air fluid levels are seen posterior to the expected site of the trachea (dashed blue arrow)

Computed tomography (CT) of the neck with contrast showed several gas pockets with fat stranding in the thyroid bed area (Figure 1). The patient was initially given 2 liters of intravenous normal saline, followed by 0.45% normal saline and continuous insulin infusion. Her diabetic ketoacidosis and hypernatremia improved. Otolaryngology was consulted and emergent neck exploration ensued. Frank pus and necrotic debris were found in the area of the left thyroid lobe. Surgical specimens showed marked inflammation, abscess formation, and necrosis. Culture of the necrotic tissue grew extended spectrum beta-lactamase (ESBL) producing *E. coli*, sensitive to ertapenem. Several additional incision and drainage procedures were required in the first postoperative week, each with tissues cultures positive for ESBL *E. coli*. Blood cultures were negative. Urine cultures grew an unidentified gram negative rod. The patient was extubated on the 14th post-operative day and completed 21 days of intravenous ertapenem. Wound vacuum therapy and long acting insulin were given. On day 15 of hospitalization, the patient's TSH was 14 mU/L, and free T4 was 7.72 pmol/L. 50 micrograms (mcg) daily of levothyroxine was initiated, which was increased to 100 mcg after 3 weeks. She did not exhibit any clinical signs of hypothyroidism such as bradycardia or hypotension. On day 24, the patient was discharged to a rehabilitation facility.

3. Discussion

Acute Suppurative thyroiditis is very rare, and as stated above is usually seen in specific patient scenarios. In children, anatomical abnormalities such as pyriform sinus fistulas or thyroglossal duct cysts are usually the underlying cause. [2] AST in adults is usually due to immunocompromised states, fine needle aspiration of the thyroid, or direct trauma to the thyroidal area. Our patient's only risk factor was uncontrolled type 2 diabetes mellitus, which has been documented in the literature as a significant risk factor. [3]

The differential diagnosis of anterior neck swelling, fever, and neck pain is broad, and includes AST, subacute thyroiditis, thyroid cancer, deep vein thrombosis, and parapharyngeal abscess. After respiratory, cardiac, and neurologic function is stabilized, CT with iodinated contrast of the neck and chest allows for the most efficient differentiation between these diagnoses. Diagnostic and therapeutic ultrasound guided fine needle aspiration is used if there is no evidence of airway compromise and a mass or fluid collection is seen. [4]

Gram-positive skin flora are the most common agents implicated in AST. In descending order, the top 4 agents include *Staphylococcus aureus*, *Streptococcus pyogenes*, *Staphylococcus epidermidis*, and *Streptococcus pneumoniae*. [5] While not as common, gram negative and anaerobic bacteria are not infrequently noted as causative agents as well. Immunosuppressed patients have also been documented to have *Pneumocystis jirovecii*, *Nocardia* species, *Aspergillus*, and other rare fungi as the causative agent. [6,7,8,9] One case report attributed AST secondary to a urinary tract infection by *E. coli*. [10] In this case, the patient's Hemoglobin A1c was 13.1%. This patient's *E. coli* was susceptible to amikacin, and she was able to be discharged home on hospital day 5 after one surgical intervention. In our case, the urine did grow an unidentified gram-negative rod, but blood cultures were negative. We can only speculate that antibiotic resistance due to self-prescribed antibiotics may have contributed to bladder colonization by ESBL *E. coli* and AST.

An interesting caveat to our case was the change over time of the patient's thyroid function. She presented slightly hyperthyroid (TSH of 0.16 mU/L and free T4 of 24.45 pmol/L), which could be attributed to release of thyroid hormone secondary to destruction from infection (a similar mechanism to subacute thyroiditis). [9] This initial state of hyperthyroidism trended to a state of hypothyroidism, which did not recover after multiple drainages and resolution of the inflammation. This is likely due to the fact that approximately half of the thyroid gland was necrotic and resected (Figure 2). The patient was to follow up with her primary care physician for close titration of levothyroxine.

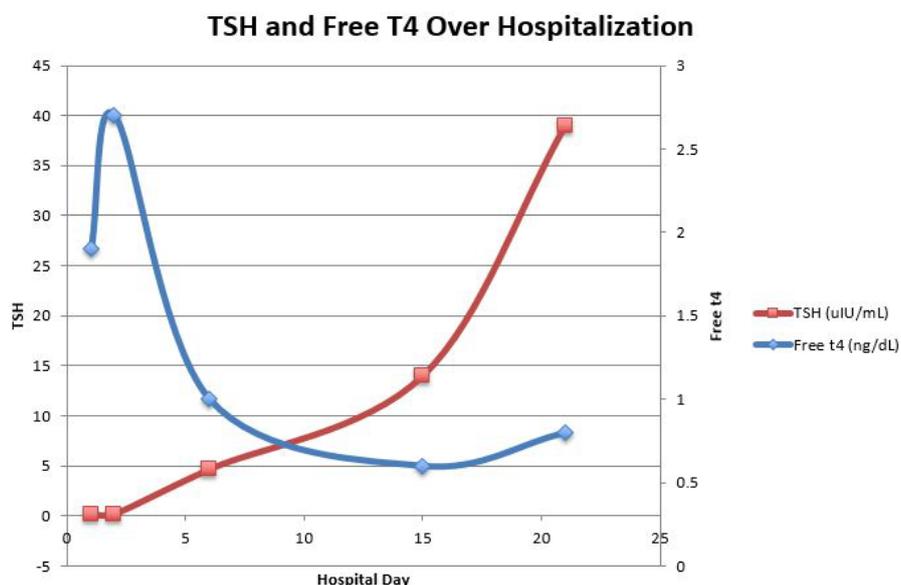


Figure 2. The patient presented with a TSH of 0.16 uIU/mL and free T4 of 1.9 ng/dL. During hospitalization, free T4 declined while her TSH increased, prompting supplemental levothyroxine

4. Conclusion

AST should be considered in a patient presenting with neck swelling and should prompt immediate treatment, especially in suspected immunocompromised states or uncontrolled diabetes. Systemic toxic symptoms are common but not always appreciable in patients with opportunistic infections. If diagnosed, a workup for an immunocompromised state or anatomical abnormality should be undertaken. Although rare, AST can have life-threatening consequences if not diagnosed and treated expeditiously

References

- [1] Ghaemi, Nosrat, Javad Sayedi, and Sepideh Bagheri. "Acute Suppurative Thyroiditis with Thyroid Abscess: A Case Report and Review Review of the Literature." *Iranian Journal of Otorhinolaryngology* 26.74 (2014): 51-55.
- [2] Seo, Jee Hyue et al. "Refractory Acute Suppurative Thyroiditis Secondary to Pyriform Sinus Fistula." *Annals of Pediatric Endocrinology & Metabolism* 19.2 (2014): 104-107. *PMC*. Web. 8 Dec. 2016.
- [3] Nishihara E, Miyauchi A, Matsuzuka F, Sasaki I, Ohye H, Kubota S, Fukata S, Amino N, Kuma K. Acute suppurative thyroiditis after fine-needle aspiration causing thyrotoxicosis. *Thyroid*. 2005 Oct; 15(10): 1183-7.
- [4] Paes, John E., et al. "Acute bacterial suppurative thyroiditis: a clinical review and expert opinion." *Thyroid* 20. 3 (2010): 247-255.
- [5] Unluturk U, Ceyhan K, Corapcioglu D. Acute suppurative thyroiditis following fine-needle aspiration biopsy in an immunocompetent patient. *J Clin Ultrasound*. 2014 May; 42(4): 215-8.
- [6] Ragni MV, Dekker A, DeRubertis FR, Watson CG, Skolnick ML, Goold SD, Finikiotis MW, Doshi S, Myers DJ. Pneumocystis carinii infection presenting as necrotizing thyroiditis and hypothyroidism. *Am J Clin Pathol*. 1991 Apr; 95(4): 489-93.
- [7] Ataca P, Atilla E, Saracoglu P, Yilmaz G, Civriz Bozdog S, Toprak SK, Yuksel MK, Ceyhan K, Topcuoglu P. Aspergillus thyroiditis after allogeneic hematopoietic stem cell transplantation. *Case Rep Hematol*. 2015; 2015: 537187.
- [8] McAninch EA, Xu C, Lagari VS, Kim BW. Coccidiomycosis thyroiditis in an immunocompromised host post-transplant: Case report and literature review. *J Clin Endocrinol Metab*. 2014 May; 99(5): 1537-42.
- [9] Teckie G, Bhana SA, Tsitsi JM, Shires R. Thyrotoxicosis followed by hypothyroidism due to suppurative thyroiditis caused by nocardia brasiliensis in a patient with advanced acquired immunodeficiency syndrome. *Eur Thyroid J*. 2014 Mar; 3(1):65-8.
- [10] Sen S, Ramakant P, Paul MJ, Jennifer A. Acute suppurative thyroiditis secondary to urinary tract infection by E. coli: A rare clinical scenario. *BMJ Case Rep*. 2016 Jan 13; 2016: 10.1136/bcr.2015-213231.