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Case Report

Thyroid abscess in a postpartum woman with subclinical hyperthyroidism: A Case Report

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Abstract

Thyroid abscess is a rare condition, and acute suppurative thyroiditis (AST) accounts for <1% of all thyroid diseases. It is a potentially fatal infection. The risk factors include pre-existing thyroid disorders, immunosuppression, and neck procedures. Staphylococcus aureus is the most common causative organism.

The case report aims to demonstrate the rarity of a huge thyroid abscess caused by Serratia odorifera in a postpartum woman.

A 42-year-old female with no known comorbidity but a 2-year history of an un-investigated thyroid mass and 1 month postpartum presented with 3 weeks of a painful anterior neck mass. She had no clinical features of hyperthyroidism although the thyroid hormone levels were consistent with subclinical hyperthyroidism. The thyroid abscess was confirmed by ultrasound scan. It was managed with appropriate antibiotics, ultrasound-guided needle aspiration, and surgical drainage with a good outcome.

We present a rare case of thyroid abscess caused by Serratia odorifera in a postpartum woman with subclinical hyperthyroidism. For a huge thyroid abscess, we recommend incision and drainage, and a minimum of two weeks of appropriate antibiotics.

Background

Thyroid abscess is a rare condition, and acute suppurative thyroiditis (AST) accounts for <1% of thyroid diseases.[1] AST progresses to thyroid abscess and is a potentially fatal infection.[2,3] The majority of AST occurs in the left thyroid lobe.[3] The infection reaches the thyroid lobe via direct trauma, invasion from neighboring structures, and hematogenous spread.[3] The risk factors include infective endocarditis, pre-existing thyroid disorders, immunosuppression (Human Immunodeficiency Virus), and congenital abnormalities such as pyriform sinus fistula and persistent thyroglossal duct.[1,4] Thyroid abscess has been reported after fine needle aspiration, trauma to the anterior neck, upper respiratory tract infection, multinodular goiter, autoimmune thyroiditis, and thyroid cancer.[2,4,5] The organisms causing thyroid infections are bacteria (most commonly *Staphylococcus aureus), Streptococcus species*, *Mycobacterium tuberculosis*, parasites, viruses, and fungi.[1,5-8]

The patient presents with classic and non-classic features of thyroid abscess. Patients might present with fever, neck pain, swelling, pressure symptoms, and airway compromise.[1] Depending on the thyroid hormone level, the patient might present with clinical features of hyperthyroidism, hypothyroidism, or euthyroidism.[1] Mycobacterial thyroid abscesses have been linked with a hyperthyroid state while hypothyroid in fungal thyroid infection.[9]

The diagnosis of thyroid abscess is clinical and the investigative modalities include laboratory examination, neck radiographs, ultrasound and/or computer tomography (CT) scans, and fine needle aspiration biopsy.[10] The ultrasound scan is the imaging of choice for the diagnosis of thyroid disease.[1,3] The ultrasound scan shows fluid accumulation, the affected thyroid lobe, whether the lesion is unilocular or multilocular, and the presence of enlarged lymph nodes.[3]

Due to its rarity, management is guided by case reports and series.[1] However, the management of choice for thyroid abscesses remains antibiotics and surgical drainage.[5] The preferred antibiotics include amoxicillin-clavulanate,

azithromycin, and piperacillin-tazobactam with vancomycin.[1] Successful percutaneous needle aspiration and transoral drainage of the thyroid abscess have been documented.[1,7] In some cases, open thyroid surgery has been performed and includes lobectomy, hemithyroidectomy, near-total thyroidectomy, and total thyroidectomy.[3,10]

The case report aims to demonstrate the rarity of a huge thyroid abscess caused by *Serratia odorifera* in a postpartum woman with subclinical hyperthyroidism.

Case presentation

A 42 years old female with no known comorbidity but a history of 2 years of an uninvestigated thyroid mass and 1-month post normal vaginal delivery presented with 3 weeks of painful anterior neck mass, pain on swallowing, loss of appetite, and general body weakness. She had no fevers or chills, difficulty in breathing, cough, palpitations, anxiety, heat intolerance, or weight loss. She denied any neck surgical procedure before the presentation and neither took alcohol nor smoked.

On physical examination, she was noted to be afebrile (36.7), normotensive (128/72 mmHg), and oxygen saturation of 97%. On admission, the pulse was 122 beats per minute and reduced to normal ranges throughout her admission. She had no clinical signs of hyperthyroidism. She had a huge 12cm*14cm tender anterior neck swelling without palpable lymph nodes. The swelling was soft and fluctuant with shiny overlying skin. The oropharynx and the rest of the systemic examination were non-revealing.

Laboratory tests revealed moderate microcytic anemia 7.70g/dl, leukocytosis (WCC 11.13x10^9/L), neutrophilia 80.6% with thrombocytosis of 836x10^9/L. Chemistry revealed sodium of 135 mmol/L, potassium of 3.0 mmol/L, urea of 2.6 mmol/L, and creatinine of 68 µmol/L. The thyroid function test revealed low thyroid-stimulating hormone (TSH) 0.04mIU/L with normal free thyroxine (T4) 15.18 pmol/L and free tri-iodothyronine (T3) 4.32 pmol/L.

Ultrasound scan showed enlarged thyroid lobes with the right lobe having a central necrotic loculated lesion concerning an abscess and no cervical lymphadenopathy. The pus was negative for Mycobacterial PCR GeneXpert and so was the urine Mycobacterial Lipoarabinomannan (LAM) antigen test. Pus studies revealed a gram-negative bacilli *Serratia odorifera* sensitive to amikacin, ceftriaxone, cephalothin, gentamicin, and ofloxacin. The chest radiograph and computer tomography (CT) scan were not done as they were not accessible at the time.

The thyroid abscess was initially aspirated under ultrasound guidance (100ml drained) and on day 3 the site of the puncture burst and a formal incision and drainage were performed under local anesthesia. About 80 ml of thick yellowish non-foul-smelling pus was drained (figure 1). The pus progressively reduced in volume without reaccumulating. She was empirically placed on intravenous cloxacillin

Figure 1. Post open surgical drainage of the thyroid abscess

500mg four times a day for five days before being switched to intravenous ceftriaxone 1g twice daily based on the laboratory antibiogram. For pain, she received paracetamol 1g thrice daily orally. She was discharged on day 6 on oral ofloxacin 400mg twice daily for a week and Pregamal (Ferrous Fumarate and Folic Acid) one tablet per day for thirty days. The follow-up was uneventful.

Discussion

The final diagnosis was a thyroid abscess in a postpartum woman. Thyroid abscess is rare due to its fibrous encapsulation, iodine-rich environment, extensive lymphatic drainage, and abundant dual blood supply.[1,2] Infection of the neck risks airway compromise and therefore requires prompt diagnosis and treatment.[2] A thyroid abscess is a serious, life-threatening endocrine emergency.[2]

Thyroid abscess is frequently reported in children and females aged 20 to 40 years.[5,10] Thyroid abscesses are commonly observed on the left side although it involved more of the right thyroid lobe in our 42-year-old postpartum mother.[8,11-13] Meanwhile, some studies show that abscesses occur equally in each thyroid lobe.[2] A pre-existing thyroid disorder is a risk factor for thyroid abscess formation and our patient had a longstanding thyroid swelling which was not investigated before admission for thyroid abscess.[1,4,8] Clinically, our patient did not present with classic features of hyperthyroidism such as heat intolerance, palpitations, tremors, anxiety, weight loss, and increased appetite.[2] Although all her vitals were normal throughout the hospital stay, she was tachycardic on admission. The tachycardia could have been attributed to pain or infection which resolved after treatment.[14] In our case, the thyroid hormone levels were consistent with subclinical hyperthyroidism. Euthyroid, as well as hypothyroidism, has been reported in thyroid abscesses.[1,11] Other authors argue that rarely is hyperthyroidism associated with acute suppurative

thyroiditis[7] as the majority of patients (83.1%) with bacterial infections of the thyroid were euthyroid.[9] However, hyperthyroidism has been documented in thyroid abscesses in the background of a multinodular goiter.[15] Furthermore, transient thyrotoxicosis in thyroid abscesses has been attributed to the release of thyroid hormones by the damaged thyroid follicles.[12]

The classic features of thyroid abscess are fever, cervical pain, and a painful mass,[13] and the majority of patients present with painful neck swelling.[1,4,5] Patients could present with difficulties in breathing, dysphonia, and odynophagia.[2,9] In our case, she presented with both classic and non-classic features of thyroid abscess. Some authors lament that non-classic presentation led to a low index of clinical suspicion.[10] Furthermore, misinterpretation of the available imaging modalities results in delayed diagnosis of thyroid abscess and progressive respiratory insult.[10]

Thyroid abscess was confirmed through clinical findings and ultrasound scan.[13] The ultrasound scan speedily identified the abscess, affected thyroid lobe, and size, and guided the percutaneous aspiration.[10] The ultrasound was cost-effective, highly accessible, and confirmed the diagnosis without exposing the patient to ionizing radiation.[10] The CT scan was not readily accessible or reported at our facility. Arguably, the CT scan is the next modality of choice provided the ultrasound scan is inconclusive.[1] Although the CT scan of the neck was never performed in our case, it delineate the thyroid abscess, the extent of the infection, displaced structures, and extra-thyroidal extension.[7,15]

The traditional management of choice for an abscess is surgical drainage and antibiotics. Moreover, modalities such as ultrasound or CT-guided drainage or needle aspiration, transcervical incision and drainage, and transoral drainage are utilized.[1,5] Literature showed that needle aspiration drainage is recommended for thyroid abscesses less than three centimeters while catheter drainage for greater than three centimeters.[5] In unstable cases with airway compromise, it is recommended to urgently drain the abscess.[2] In our case, transcervical incision and drainage were performed after an unsuccessful ultrasound-guided needle aspiration. Our case serves as an example of a failure or inadequacy of ultrasound-guided needle aspiration in managing a huge thyroid abscess. Therefore, we recommend incision and drainage for a huge thyroid abscess.

Additionally, thyroidectomy is reserved for failed open drainage, and persistent or recurrent abscesses.[2,12] To remove the local source of infection, thyroid lobectomy has been performed in patients with no clinical improvement after non-operative treatment.[2,3,15] Other surgical options employed to relieve pressure symptoms caused by the thyroid abscess include total thyroidectomy, near-total thyroidectomy, and hemithyroidectomy.[3]

In our case, the pus analysis showed a gram-negative bacillus *S. odorifera.* As such, this case study adds *S. odorifera* to the list of possible causes of a huge thyroid abscess. Multiple causative pathogens have been documented, mostly *S. aureus* and *Streptococcus species,* but also *Escherichia coli, Klebsiella pneumoniae, Salmonella typhi, Hemophilus influenza*, *Eikenella corrodens, M. tuberculosis*, parasite, viruses, candida.[1,2,5-7] Thyroid abscesses caused by methicillin-resistant *Staphylococcus aureus* (MRSA), and gram-negative bacteria *Acinetobacter calcoaceticus* and *baumanii* have been reported.[1,5,7,9] However, in some cases of thyroid abscesses, the causative organisms are not established.[1,7]

Several routes have been used to administer antibiotics in thyroid abscesses, mainly orally and intravenously, but also injected in the abscess cavity after aspirating the pus.[5] In our case, intravenous cloxacillin was administered empirically and switched to intravenous ceftriaxone based on sensitivity pattern with a good outcome. Ceftriaxone has also been used in *K. pneumoniae* thyroid abscesses with a good outcome.[11] Other antibiotics documented in treating thyroid abscesses are amoxicillin-clavulanate, benzylpenicillin, clindamycin, azithromycin, piperacillin-tazobactam, vancomycin, ciprofloxacin, and ofloxacin.[2,5,7] An average of 14 days of antibiotic therapy was found to be sufficient in treating thyroid abscesses.[2,12] Furthermore, it is recommended to use antimicrobial therapy for a minimum of two weeks in treating thyroid abscess, and the choice of antibiotic is based on laboratory antibiogram.[3]

In case of delayed diagnosis, delayed treatment, and/or untreated condition, the disease causes significant morbidity and mortality.[3,10] The mortality rate ranges from 3.7 to 12.1%.[2,4,9] Besides being a life-threatening endocrine emergency, it can complicate into failed drainage, abscess rupture, persistent abscesses, fistulae to the trachea or esophagus, descending necrotizing mediastinitis, sepsis, airway compromise, and recurrent acute suppurative thyroiditis.[1,2,5,12]

Conclusion

Thyroid abscess is an extremely rare condition. We present a rare case of thyroid abscess in a postpartum woman with subclinical hyperthyroidism and add *Serratia odorifera* to the list of possible causes of thyroid abscess. The ultrasound scan remains the preferred imaging of choice in the diagnosis and needle-guided treatment of thyroid abscess. For a huge thyroid abscess, we recommend incision and drainage, and a minimum of two weeks of appropriate antibiotic therapy. The outcome is good with appropriate management.

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