



Acute Suppurative Thyroiditis in HIV – Non Typhoidal Salmonella -Case Report and Review of the Literature

DR.Meghana joshi, DR. Kishan delampady, Dr.Ganesh
khandige

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ABSTRACT

Background: Thyroid gland infections are rare. Their incidence is estimated to be less than 1% in immunocompromised hosts. Most common pathogens isolated are Gram positive aerobic cocci. Infections with Gram negative facultative aerobes such as Salmonella are rare.

Case presentation: A 39-year-old retropositive female presented with rapid enlargement of swelling in front of the neck fever and weight loss x 2 weeks . She was found to have a thyroid abscess. A needle aspiration for symptomatic and diagnostic purposes was performed. Cultures grew Non typhoidal Salmonella group. She was treated with a 4-week course of oral antibiotics

Conclusion: A thyroid abscess is a rare occurrence; however, a high index of suspicion is required to make the diagnosis. The management is directed at minimizing morbidity. The mainstay treatment is medical, but surgery is sometimes necessary to achieve adequate source control, particularly when complications arise.

I. INTRODUCTION

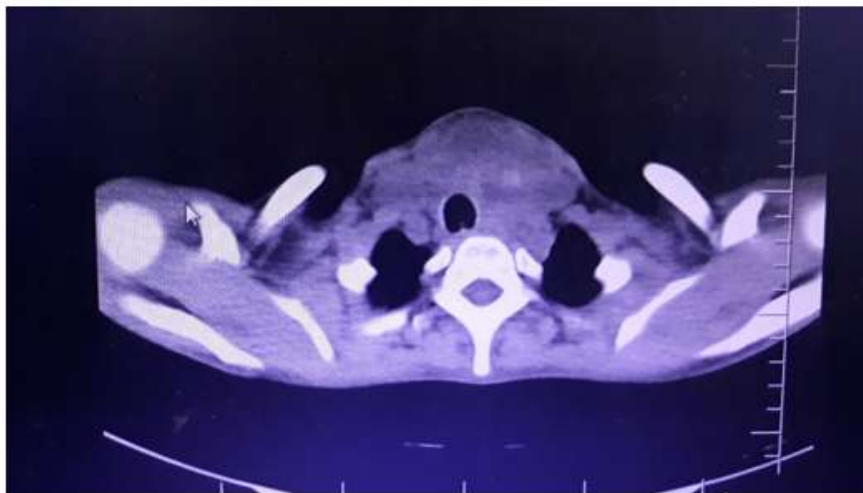
Thyroid infections are a rare because of the unique anatomical location and physiological characteristics the gland possesses [1, 2]. Acute Suppurative Thyroiditis (AST) is commonly seen in abnormal thyroid glands. A predisposing factor for this condition is an immunocompromised state [3]. It is caused by bacterial pathogens, of which Gram-positive aerobes such as Staphylococcus aureus and Streptococcus pyogenes are the most common isolates [4–6]. Infections with Gramnegative facultative aerobes such as Salmonella spp are rare, which could be life-threatening in immunocompromised patients.

Complications from the infection could range from recurrent laryngeal nerve injury, airway obstruction, sepsis, and death [7–9]. Therefore, prompt diagnosis and proper management can

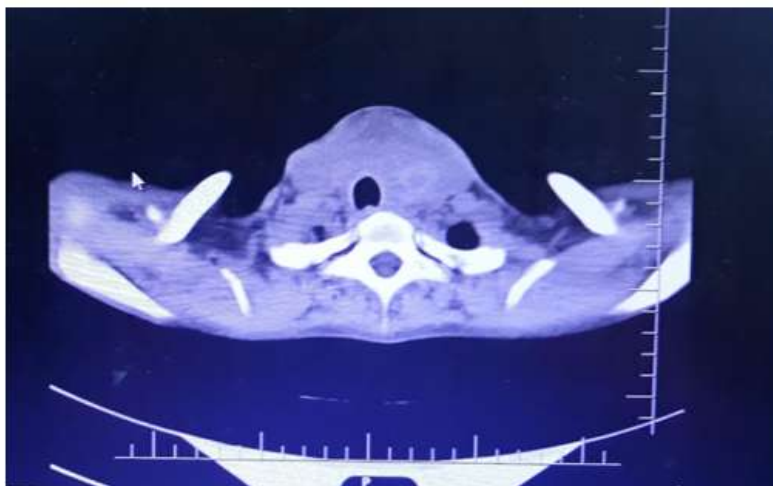
prevent such complications [10]. In this manuscript, we report on a case of a thyroid abscess due to Salmonella spp. in an HIV patient.

II. CASE PRESENTATION

A 39-year-old female presented to the outpatient department with a chief complaint of diffuse neck swelling with dull aching pain, non-radiating, aggravated by neck rotation, had no relieving factors, associated with a fever, chills since 2 weeks. She denied having any change in voice or difficulty in breathing or swallowing. Her past medical history did not reveal any thyroid disorders, recent infections, diabetes, hypertension. Her social history revealed no recent travel, no bird or farm exposure, and no sick family contacts. She denied using any illicit drugs. She had no pets and was a lifelong non-smoker. No h/o previous blood transfusions, multiple sexual partners. On examination, she appeared poorly nourished, no lymphadenopathy. No hoarse voice or stridor. Examination of her ears, nose, throat and oral cavity was normal. Inspection of her neck showed a symmetric diffuse swelling that moved with deglutition with overlying erythema. There was diffuse tenderness and fullness of the neck. There were no limitations in range of motion of the neck. A complete blood count revealed leukocytosis at $13.8 \times 10^9/L$ with a predominance of neutrophils. CLIA, TRIDOT, SPOT TEST showed positive retroviral status. Blood culture and urinalysis were unremarkable. Thyroid function tests were normal and Microcytic hypochromic anemia with anisopoikilocytosis and Hemoglobin level of 8.6, CD4 count -26 cells/mcl. Usg guided FNAC of thyroid gland features of Acute thyroiditis-? abscess in right lobe of thyroid, benign follicular nodule in left lobe of thyroid. Xray of neck lateral view showed a large homogeneous opacity in front of neck.



A contrast-enhanced computed tomography (CT) scan of the neck demonstrated a large midline collection in the subcutaneous plane that measured 25x 14cms - abscess formation(Fig. 1).



USG guided therapeutic aspiration done-25cc of pus aspirated and sent for microbiological investigations, following the aspiration patient was started on IV piperacillin tazobactam .



Gram staining of pus showed gram negative bacilli, culture showed *Salmonella* sp. Growth sensitive to cotrimoxazole piperacillin tazobactam, ceftriaxone, meropenem, cefepime, cefuroxime. Infectious Diseases specialists were consulted and started the patient on cefuroxime 250mg bd x 1 month, cotrimoxazole bd x 1 month and ART initiated.

Her white cell count became normal and she continued to improve. The patient completed a total of 4 weeks on the oral cefuroxime, cotrimoxazole and ART and had a complete recovery, remaining symptom free.

III. DISCUSSION AND CONCLUSION

The thyroid gland is rarely infected due to its protective fibrous capsule, rich vascularity, lymphatic drainage, and high concentration of iodine and hydrogen peroxide inhibiting bacterial growth [1, 5, 11, 12].

The incidence of AST and abscess formation is 0.1–0.7% of all reported thyroid lesions [6]. Abnormal thyroid anatomy, such as nodular goiter, cysts, and pyriform sinus fistulas can predispose to AST [5, 13, 14]. The latter originates from a third or fourth branchial cleft cyst anomaly, and can have tracts that connect the pyriform sinus and thyroid gland. Interestingly, for undetermined reasons, the right lobe is more commonly involved than the left lobe in suppurative thyroiditis [15, 16].

The causative organisms of AST are mainly bacterial with few reports caused by fungi and parasites [10]. The most common bacteria are Gram-positive aerobes such as *Staphylococcus aureus* and *Streptococcus pyogenes*, which account for 40% of cases [6]. Infections with Gram-negative aerobes account for 25%, while anaerobes account for 12% of AST cases [10]. Our review found 28 previously reported cases of *Salmonella* spp. AST. Previous reports are summarized in Table 1 [1, 2, 5, 7–10, 13–34].

Salmonella is a motile Gram-negative anaerobic bacillus with two main species; *S. enterica* and *S. bongori* [35]. However, there are many subspecies of both. *Salmonella* thyroiditis can be caused by typhoidal salmonella and non-typhoidal salmonella (NTS), with the latter being more common [16]. Common (NTS) serotypes are Enteritidis, Typhimurium, Newport, Javiana, and Heidelberg [36]. NTS causes gastroenteritis in immunocompetent patients and is often non-invasive.

However, a major predisposing factor to develop AST is immunocompromised status. Despite this, the incidence of thyroid infections in this population is less than 1% [3–5, 14]. Uncontrolled DM, prolonged use of steroids, Human Immunodeficiency Virus (HIV), cancer, and post-transplantation immune suppression are most commonly implicated in patients with AST secondary to *Salmonella* spp. and more specifically NTS.



In immunocompromised patients, NTS could cause more invasive extra-intestinal infections [35, 37–39]. Our patient was newly diagnosed of retropositive status with CD4 count 26 cells /mcl. infection by Salmonella occurs by dissemination of the bacteria through the bloodstream or lymphatics [15, 40]. Haematogenous spread occurs from the gastrointestinal (GI) tract, and extra-intestinal infection ensues after distant seeding of the bacteria. Salmonella can also spread through the lymphatic route from the GI tract or tonsils [40]. In the majority of reported cases, a previous episode of gastrointestinal illness, upper respiratory tract infection, or pharyngitis, was implicated prior to the infection in the thyroid gland [1, 7, 10, 1517, 22, 23, 33]. Fever, chills, neck pain, lethargy, sore throat, and compressive symptoms like dysphagia and voice changes are different presentations of AST [4, 10, 15]. Thyrotoxicosis is a potential complication [9, 18, 25]. It occurs due to the release of thyroid hormones into the circulation when thyroid follicles are disrupted from the infection [14, 33, 42]. This could be detected with thyroid function tests i.e. TSH, triiodothyronine (T3), and thyroxine (T4). Our patient only had her TFT measured for thyrotoxicosis, which was normal. Potential differential diagnoses to consider for patients presenting with AST symptoms are de Quervain's thyroiditis, medullary or anaplastic thyroid carcinoma, and subacute thyroiditis as well as other deep space neck infections [4, 16, 33, 42]. Other complications include airway obstruction, destruction of the thyroid or parathyroid glands, internal jugular vein thrombosis, recurrent laryngeal nerve injury, sepsis, and death [5, 7–9, 28]. Thus, prompt diagnosis is crucial. Blood work, imaging, and cultures are helpful in reaching the diagnosis [4, 10, 20, 24]. Blood workup includes complete blood count, inflammatory markers like CRP and erythrocyte sedimentation rate (ESR), and thyroid function tests such as TSH, T3 and T4 [4, 10, 33, 42].

Our patient had leukocytosis, anemia and low CD 4 count. However, from a metabolic standpoint, TSH was within normal limits ruling out thyrotoxicosis.

Imaging is very useful in reaching the diagnosis. Multiple imaging modalities can be utilised. US of the neck is a cheap, widely

available, and quick tool that could be utilized for both diagnosis and therapy. Other modalities include CT scan with contrast to evaluate for deep space neck infections, and a barium swallow study to help identify the presence of a pyriform fistula [4, 10, 33, 42]. Both US and CT can help to identify extra-thyroidal extension of the infection [4, 10, 33, 42].

Treatment for AST could be medical or surgical depending on the presentation. For conservative treatment, a trial of aspiration and antibiotic administration is a reasonable initial step [1, 10, 14, 31, 42]. Similar to the case reported by Vengathajalam et al., serial aspiration and antibiotic treatment resulted in complete recovery [10]. The choice of antibiotics is dictated by the local sensitivity and resistance patterns; however, ampicillin, third generation cephalosporins, and fluoroquinolones are often appropriate first line agents. The recommended duration of therapy is a minimum of 10–14 days. However, treatment of at least 4–5 weeks is reasonable if surgery was not performed to eradicate the infection [8]. Surgical therapies can include incision and drainage, hemithyroidectomy or total thyroidectomy [14, 42]. A formal incision and drainage or more involved surgery might not be necessary in the absence of complications. Furthermore, surgery in these situations might carry a higher risk of bleeding and injury to the recurrent laryngeal nerve given the presence of inflammation and scarring in the thyroid bed. On the other hand, surgery might be necessary if there is a high suspicion of malignancy, or persistence of infection [5, 15, 16, 18, 21, 23, 27, 30, 32, 33].

To conclude, AST is a rare occurrence. One must have a high index of suspicion when a patient presents with signs and symptoms of AST. Salmonella has a predilection for structurally abnormal tissues, such as cystic or mixed thyroid nodules. Both immunocompetent and immunocompromised patients can develop AST. Immunocompromised patients have a more virulent clinical course and poorer outcomes, including death. The purpose of management is to minimize morbidity; thus, quick diagnosis and early treatment is crucial. The mainstay treatment is medical, but surgery may be necessary to achieve adequate source control particularly in the presence of complications

Table 1

Case Number	Publication	Number of Cases	Age & Gender	Predisposing Comorbidities	Thyroid abnormalities	Salmonella Species	Intervention	
							Medical	Surgical
1	Svenungsson & Lindberg [17]	1	72 M	Steroid use	N/A	<i>Salmonella enteritidis</i>	TMP-SMX (duration not specified)	None
2	Walter and MacMonagle [18]	1	49F	None	MNG	<i>Salmonella choleraesuis</i>	Amoxicillin (duration not specified)	Thyroid lobectomy
3	Fule and Saoji [19]	1	N/A	N/A	N/A	<i>Salmonella paratyphi A</i>	N/A	N/A
4	Nmadi [20]	2	N/A	N/A	N/A	<i>Salmonella typhi</i>	N/A	N/A
5	Gudipati and Westblom [21]	1	79 M	N/A	N/A	<i>Salmonella typhimurium</i>	Ceftriaxone x 2 weeks	I&D
6	Igler, et al. [22]	1	70F	DM	MNG	<i>Salmonella enteritidis</i>	TMP-SMX x 4 weeks	I&D
7	Chiovato, et al. [23]	1	40F	None	MNG	<i>Salmonella Brandenburg</i>	Ceftriaxone x 10 days	Aspiration, I&D, and thyroid lobectomy
8	Lalitha and John [24]	2	N/A	N/A	None	<i>Salmonella paratyphi A</i> , <i>Salmonella choleraesuis</i>	None	None
9	Lecuit, et al. [25]	1	48 M	HIV infection	None	<i>Salmonella enteritidis</i>	Amoxicillin x 12 days	I&D
10	Suskovic and Z Vucicevic [26]	1	47F	DM	None	<i>Salmonella enteritidis</i>	Antibiotics (not specified)	I&D
11	Laha, et al. [27]	1	66 M	None	Thyroid nodule	<i>Salmonella group D</i>	Ciprofloxacin (duration not specified)	Subtotal thyroidectomy
12	Jasmi, et al. [14]	1	62F	None	MNG	<i>Salmonella typhi</i>	Amoxicillin-clavulanic acid x 3 days	Aspiration
13	Duraker, et al. [7]	1	52 M	DM	None	<i>Salmonella typhi</i>	Netilmicin + Clindamycin (duration not specified)	I&D
14	Su and Huang [16]	1	79F	DM	MNG	<i>Salmonella typhimurium</i>	Ofloxacin x 10 days Ampicillin (duration not specified)	Thyroid lobectomy
15	Dai, et al. [28]	1	82 M	CLL	MNG	<i>Salmonella group B</i>	Ceftriaxone x 17 days Ciprofloxacin (duration not specified)	I&D
16	Sriburee [29]	1	55F	None	MNG	<i>Salmonella group C</i>	Ceftriaxone (duration not specified) TMP-SMX x 2 weeks	Aspiration and I&D
17	Chen, et al. [30]	1	60F	Invasive thymoma	MNG	<i>Salmonella group D1</i>	Cefazolin and metronidazole (duration not specified) Ceftriaxone x 2 weeks	Thyroid lobectomy
18	Chou and Hsieh [31]	1	31F	None	MNG	<i>Salmonella choleraesuis</i>	Oral antibiotics (duration not specified) Ampicillin/sulbactam	I&D
19	Kudrop, et al. [32]	1	53F	None	MNG	<i>Salmonella group C</i>	Clindamycin and ceftriaxone (duration not specified) Antibiotics (duration not specified)	I&D and thyroid lobectomy
20	Wu, et al. [1]	1	74 M	Renal transplant on immunosuppressive therapy	None	<i>Salmonella enteritidis</i>	Cefepime x 4 days Ceftriaxone x 28 days Lifelong antibiotics	Thyroid lobectomy

Table 1 List of published cases of AST due to *Salmonella* spp. (Continued)

Case Number	Publication	Number of Cases	Age & Gender	Predisposing Comorbidities	Thyroid abnormalities	<i>Salmonella</i> Species	Intervention	Surgical
21	Ambrozak, et al. [15]	1	82 M	DM, and steroid use	None	<i>Salmonella enteritidis</i>	Medical Ceftriaxone x 2 weeks Ampicillin x 3 weeks	Thyroid lobectomy
22	Kiss, et al. [2]	1	48 F	HIV infection	N/A	<i>Salmonella</i> spp.	Ceftriaxone x 2 weeks	I&D
23	Kazi, et al. [33]	1	52 M	HIV infection	None	<i>Salmonella</i> spp.	Lifelong TMP-SMX	Thyroid lobectomy
24	Kuzu, et al. [9]	1	50 F	DM	N/A	<i>Salmonella enteritidis</i>	Metronidazole and ceftriaxone x 5 days Ciprofloxacin x 4 weeks	I&D
25	Murali & Bhandary [5]	1	26 F	None	MNG	<i>Salmonella Typhi</i>	Antibiotics x 1 week (duration not specified)	Thyroid lobectomy
26	Hernik, et al. [8]	1	61 F	DM	None	<i>Salmonella enterica</i>	Clindamycin, ceftriaxime x 1 week TMP-SMX x 1 week	I&D
27	Vengathajalam, et al. [10]	1	58 F	DM	MNG	<i>Salmonella</i> spp.	Antibiotics (not specified)	Aspiration
28	Quintana, et al. [34]	1	N/A	None	N/A	<i>Salmonella enteritidis</i>	Antibiotics (not specified)	None

F Female, M Male

N/A Not available or not mentioned in the article, MNG Multinodular goiter, DM Diabetes mellitus, HIV Human Immunodeficiency Virus, CLL Chronic lymphocytic leukemia, I&D Incision and drainage, TMP-SMX Trimethoprim/sulfamethoxazole



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