CASE REPORT

Salmonella Paratyphi A infection of a Thyroid Cyst

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Abstract
We report a case of infected thyroid cyst with *Salmonella Paratyphi A* in 64 years old patient who presented with short history of fever and neck pain. Ultrasound neck showed thyroid cyst for which fine needle aspiration was done. Culture of aspirated fluid grew *Salmonella Paratyphi A*. Patient was treated successfully with Ceftriaxone. Blood or other site cultures were not sent so source of origin could not be determined. Suppurative infections of thyroid gland are uncommon[1] due to high levels of iodine within the gland however, in rare cases thyroid gland may get infected in case of underlying thyroid disorders like neoplastic or autoimmune diseases.[2] In current case, no underlying thyroid related abnormality was found. Based on short duration of illness found in case history, this case appears as an example of acute thyroiditis caused by *Salmonella Paratyphi A*. In conclusion, infectious thyroiditis caused by *Salmonella Paratyphi* A is rare and may be encountered in patients with or without prior comorbid or immunosuppression.

Introduction
Salmonella Paratyphi A belongs to genus Salmonellae which contains various species associated with a variety of human and animal infections. In most instances, *Salmonella Paratyphi A* is associated with enteric fever or gastroenteritis in human population. However, there are case reports where it has been isolated in other body sites like splenic and liver abscesses.[3] Thyroid gland is usually very resistant to infections due to presence of high levels of iodine present within the gland.[1] Thyroid cysts may get infected and present as thyroiditis. Here we report a case of thyroid cyst which was infected with *Salmonella Paratyphi A.*

Case
A 64-year-old man, with a background history of hypertension and Meniere's disease presented to the emergency department (ED) of a tertiary are hospital with complains of neck pain and fever for few days. Neck examination didn't reveal any palpable swelling. At the time of presentation, his hemoglobin was 10.2g/dl, total leukocyte count of 10.1 with neutrophilic predominance of 76%. His Thyroid Stimulating hormone (TSH) level was identified as 0.252 ulU/ml. Consideringthe possibility of one of deep neck space infections, intravenous ceftriaxone was started in ED. Ultrasound neck showed a cystic nodule measuring about 3.6 x 5 cm in right lobe of thyroid gland, therefore ultrasound guided aspiration of 33 ml fluid was performed and sent for culture and sensitivity. Blood cultures and stool cultures were not sent. He remained in ED for a day and then got discharged in stable condition.

His thyroid fluid was received in microbiology department which showed few pus cells, numerous RBCs and few Gram negative rod (GNR) on Gram stain. After 24 hours of incubation, all three types of culture plates (Sheep blood agar, Chocolate agar and MacConkey's agar) showed growth of single type of GNR. On MacConkey's agar these GNR were grown as non-lactose fermenter. On initial testing this isolate was found motile and its oxidase test was found negative. As a routine laboratory protocol, identification conventional biochemical analysis was used for identification. On triple sugar iron slant, alkaline over acid reaction was observed. This GNR showed no Hydrogen Sulphide and Indole production. This isolate also did not show Citrate utilization or production of ammonia from hydrolysis of urea slant. Keeping in consideration above reactions, GNR isolate was tested against Salmonella antisera that turned out positive for Salmonella polyvalent (A-I &Vi Becton, Dickinson) and factor 2 antisera (Becton, Dickinson). Identification of isolate was further confirmed using API 20E system which identified the strain as *Salmonella Paratyphi A*. Its' drug susceptibility was performed by Kirby Bauer disk diffusion method on Muller Hinton agar that showed strain to be sensitive to Ampicillin(10ug), Chloramphenicol (30ug), Ceftriaxone(30ug), Cefixime (5ug), Trimethoprim-Sulfamethoxazole (25ug) while intermediate sensitivity to Ciprofloxacin (5ug). Susceptibilities to above antibiotics were confirmed using Vitek-2 system (BioMerieux, France).

Discussion
Usually, thyroiditis caused by an infectious etiology is associated with acute presentation and is known as acute infectious thyroiditis or suppurative thyroiditis. It is most commonly encountered in children with pyriform sinus fistula. Etiological agents include bacteria such as *Staphylococcus aureus*, , *Staphylococcus epidermidis*, and . Gram negative bacteria like *Enterobacteriacae, Hemophilus* species, *Ekinella* and *Kingella* species can also cause thyroid infection but not common. In adults, infection usually follows upper respiratory tract infections, or may be associated with underlying thyroid disorders like neoplastic thyroid nodule, subacute thyroiditis, Hashimoto's thyroiditis or penetration of thyroid gland with foreign body. Thyroid gland infection secondary to *Salmonella* species is

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rare. Non typhoidal strains are more common culprits as compared to typhoidal strains. In 2014, Kuzu *et al* reported isolation of non typhoidal *Salmonella* species in a fifty year old female with no prior comorbids.[4] Similarly, in 2002 Su DH et al reported acute suppurative thyroiditis caused by *Salmonella* typhimurium in a 79 year old female which may be secondary to bacteremia.[5] In 2003, Dai MS *et al* reported Salmonella group B thyroiditis in 82 year old male with chronic lymphocytic leukemia.[5] Another case report Maraj *et al* in 2013 reported a case of 48 year old HIV positive woman with *Salmonella* species suppurative thyroiditis.[7]

There have been many case reports where *Salmonella Paratyphi A* had been isolated from other sites like breast abscess, liver abscess and tubo-ovarian abscess.[3, 8,9,10] Majority of reported cases are due to complication of enteric fever caused by *Salmonella Paratyphi* (Paratyphoid fever). Literature review rarely shows acute thyroiditis/abscess caused by *Salmonella Paratyphi A*, without proven or probable case history of enteric fever. Literature review identified only two published cases of *Salmonella Paratyphi* thyroid and neck abscess, reported in 1989 and 2012 respectively. In both cases authors could not identified correlation of thyroid infection with enteric fever as both cases had fever of less than a week duration and blood cultures yielded nothing.[11, 12]

In our patient, blood cultures and stool cultures were not requested. However, based on short duration of fever and current illness, this case appears as an example of acute thyroiditis caused by *Salmonella Paratyphi A.*

Conclusion

Infectious thyroiditis caused by *Salmonella Paratyphi A* is rare and may be encountered in patients with or without prior comorbid or immunosuppression.

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