Primary Thyroid Tuberculosis: An Uncommon Presentation of a Thyroid Mass

Benjamin M. Laitman, MD, PhD1, Shabnam Samankan, MD2, Songhon Hwang, BS3, and Raymond L. Chai, MD1

Keywords
tuberculosis, thyroid mass, thyroiditis, cystic necrosis

A 70-year-old male with no significant past medical history presented with a large fluctuating right neck mass present for the previous 4 months. The mass initially improved with a 10-day course of Augmentin and Bactrim but began to grow again slowly over the following number of months. The patient reported 7/10 neck pain, difficulty breathing while supine, dysphagia, and voice changes.

Contrast enhanced computed tomography (CT) of the neck revealed a 7.6-cm rim-enhancing area of cystic necrosis within a lesion of the right thyroid bed. This demonstrated extracapsular extension involving the infrahyoid strap muscles but not the overlying skin (Figure 1A). An additional hypodense nodule was also noted in the left thyroid lobe. The laryngeal skeleton and trachea remained patent with possible cricoid invasion, although there was mass effect on the trachea. No central or lateral compartment lymph node disease was identified. Positron emission tomography-CT demonstrated a hypermetabolic right thyroid mass with a standardized uptake value (SUV) max of 13.0 (Figure 1B). Numerous bilateral hypermetabolic cervical lymph nodes were seen in level IIb and right level IIa. There were also multiple hypermetabolic left internal mammary chain, bilateral axilla, mediastinal, and bilateral hilar lymph nodes concerning for metastases. Chest X-ray did not demonstrate concerning features (Figure 1C), but CT of the chest noted a number of pulmonary nodules, some with tree bud morphology, but several solid pulmonary nodules as well, suggestive of pulmonary metastasis. Flexible laryngoscopy did not demonstrate any abnormalities, revealing a patent airway with bilaterally mobile and symmetric vocal cords.

In the weeks prior to presentation, the mass began draining from a fine needle aspiration site. The biopsy itself was non-diagnostic (Bethesda I) showing only a fibrotic thyroid mass. It was challenging to obtain cells for definitive cell block/flow cytometry. Given the ambiguity of diagnosis, the patient was taken to the operating room for open biopsy.

Intraoperatively, extreme fibrosis was noted just beneath the level of the platysma. The right sternohyoid and sternothyroid muscles were incised revealing further fibrosis as well as the thyroid mass. Sharp dissection was used to excise a generous amount of tissue for both permanent section and fresh for flow cytometry which revealed a necrotizing granuloma staining positive for acid fast bacilli (AFB) (Figure 2). Given the lack of pulmonary tuberculosis (TB) lesions on chest X-ray (Figure 1C), these results indicated primary TB in the thyroid gland. He was subsequently treated with standard RIPE therapy (rifampin, isoniazid, pyrazinamide, ethambutol) and is doing well.

Tuberculosis primarily affects the lungs but can be extrapulmonary in 15% to 20% of cases.1 The thyroid gland is relatively resistant to TB infection; however, the underlying mechanisms are unknown.2,3 The presence of high iodine levels, a thyroid capsule, the bactericidal action of the colloid, or the gland’s rich lymphatic and vascular supply have been suggested to play a role in the gland’s relative immunity.4

In the thyroid, TB can present as 1 of 2 forms: more commonly as miliary spread from pulmonary or cervical lymph node TB, or occasionally as the primary site of involvement.3

1 Department of Otolaryngology—Head and Neck Surgery, Icahn School of Medicine at Mount Sinai, New York, NY, USA
2 Department of Pathology, Icahn School of Medicine at Mount Sinai, Mount Sinai West Hospital, New York, NY, USA
3 Medical School, Icahn School of Medicine at Mount Sinai, New York, NY, USA

Received: July 16, 2020; accepted: July 22, 2020

Corresponding Author:
Benjamin M. Laitman, MD, PhD, Mount Sinai Hospital, One Gustave Levy Place, New York, NY 10028, USA.
Email: benjamin.laitman@mountsinai.org
**Figure 1.** A. CT of the neck with contrast demonstrating the thyroid lesion with areas of necrosis in the right thyroid lobe in addition to areas of hypodensity in the left thyroid lobe. B. PET-CT showing hypermetabolic activity in the right thyroid lobe. C. Chest X-ray demonstrating no abnormalities or signs of active pulmonary tuberculosis. PET-CT indicates positron emission tomography computed tomography.

**Figure 2.** A. Thyroid tuberculosis featuring confluent epithelioid granulomas with numerous giant cells (arrowheads) (hematoxylin–eosin, 200×). B. Necrosis can be seen in the middle of granulomatous nodules which were marked with an asterisk (hematoxylin–eosin, 200×). C. Photomicrograph showing acid fast bacillus (arrowhead) magnified in inset in upper right corner (ZN stain, 600×).
Primary TB of the thyroid gland is extremely rare and an unusual presentation both of thyroid masses and of TB infections more generally, occurring at an estimated rate of 0.1% to 0.4% of TB cases. Such rarity often causes a delay in diagnosis. The highest incidence of TB is in Asia and Africa, with over one-third of the world’s cases occurring in India and China alone. Indeed, our patient was born in China and immigrated in 1997, traveling back twice per year.

The presentation of primary thyroid TB is variable. There can be diffuse or nodular swelling, discrete or cystic masses, or an acute abscess. Patients with primary TB of the thyroid gland are typically euthyroid but can occasionally present with thyrotoxicosis or hypothyroidism. The presentation of thyroid TB is usually subacute, mimicking granulomatous thyroiditis, but if presenting acutely can also mimic acute suppurative thyroiditis. The presence of pain often suggests an infectious etiology as in this case; in its absence, this may suggest malignancy. Radiologic features of thyroid TB are nonspecific and can mimic malignancy; however, CT with contrast has shown caseous necrotic lesions in multiple studies. This is in line with the radiologic findings we found in our patient.

While rare, our case suggests that TB of the thyroid gland should be included on the differential, especially when radiologic examination shows areas of central necrosis, when patients have a history of TB, or are from countries where TB prevalence is high.

**Declaration of Conflicting Interests**

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

**Funding**

The author(s) received no financial support for the research, authorship, and/or publication of this article.

**ORCID iD**

Benjamin M. Laitman  https://orcid.org/0000-0002-9582-6088

**References**

1. Golden MP, Vikram HR. Extrapulmonary tuberculosis: an overview. *Am Fam Physician*. 2005;72(9):1761-1768.
2. Raman L, Murray J, Banka R. Primary tuberculosis of the thyroid gland: an unexpected cause of thyrotoxicosis. *BMJ Case Rep*. 2014;2014:bcr2013202792.
3. Barnes P, Weatherstone R. Tuberculosis of the thyroid: two case reports. *Br J Dis Chest*. 1979;73(2):187-191.
4. Kataria SP, Tanwar P, Singh S, Kumar S. Primary tuberculosis of the thyroid gland: a case report. *Asian Pac J Trop Biomed*. 2012; 2(10):839-840.
5. Rankin FW, Graham AS. Tuberculosis of the thyroid gland. *Ann Surg*. 1932;96(4):625-648.
6. World Health Organization. *Global Tuberculosis Report*. World Health Organization; 2019. Accessed January 7, 2020.
7. Majid U, Islam N. Thyroid tuberculosis: a case series and a review of the literature. *J Thyroid Res*. 2011;2011:359864.
8. Kapoor VK, Subramani K, Das SK, Mukhopadhyay AK, Chattopadhyay TK. Tuberculosis of the thyroid gland associated with thyrotoxicosis. *Postgrad Med J*. 1985;61(714):339-340.
9. Chaudhary A, Nayak B, Guleria S, Arora R, Gupta R, Sharma MC. Tuberculosis of the thyroid presenting as multinodular goiter with hypothyroidism: a rare presentation. *Indian J Pathol Microbiol*. 2010;53(3):579-581.
10. Kang BC, Lee SW, Shim SS, Choi HY, Baek SY, Cheon YJ. US and CT findings of tuberculosis of the thyroid: three case reports. *Clin Imaging*. 2000;24(5):283-286.
11. Suri VS, Sakhuja P, Malhotra V, Gondal R, Singh S, Sidhu N. Co-existent tuberculosis and papillary carcinoma thyroid. *Trop Doct*. 2002;32(2):118.