

## Case Report

# Thyroid tuberculosis: two cases report and review of the literature

You-Ding Jiang<sup>1</sup>, Jian-Qi Gao<sup>1</sup>, Sui Chen<sup>1</sup>, Xiao-Yan Deng<sup>2</sup>

<sup>1</sup>Department I of Thoracic Surgery, <sup>2</sup>Department of Ultrasonography, Guangzhou Chest Hospital, Tuberculous Institute of State Key Laboratory of Respiratory Disease, No. 62, Hengzhigang Road, Yuexiu District, Guangzhou 510095, Guangdong, People's Republic of China

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**Abstract:** Thyroid tuberculosis (TTB) is a rare form of extrapulmonary tuberculosis. We report two cases of young women with this disease. One woman presented with a solid, painless swelling in the left side of the neck, the other woman had a similar swelling in the right side of the neck and some palpable cervical lymph nodes in both sides of the neck. They did not complain dysphagia, dyspnea or any tuberculosis specific symptoms. Neither signs nor symptoms of hypothyroidism or hyperthyroidism were present. Patients had no other tuberculosis focus or history. Chest X-ray was normal. Sputum for acid fast bacilli (AFB) was negative, but tuberculin skin tests (TST) were positive and strongly positive respectively. Ultrasonography revealed a 45 mm × 44 mm × 33 mm hypoechoic mass and might mimic thyroid adenoma on the first woman. On the second woman, Ultrasonography, computed tomography (CT) and positron emission tomography-computed tomography (PET-CT) examinations showed a 18 mm × 15 mm × 15 mm hypoechoic mass and malignant cervical lymphadenectasis. She was made thyroid malignancy in overstage the primary diagnosis. Hemithyroidectomy on the first woman and total thyroidectomy on the second woman were performed. Both histopathologic examinations of the thyroid biopsy material revealed caseating granulomas with epithelioid histiocytes and giant cells. Cultures and stains for AFB in the specimens were either negative. The final diagnosis were TTB, TTB and tuberculosis lymphadenitis respectively. Antituberculous therapies were started after surgery and there was no recurrence in the thyroid lesion during the subsequent regular follow-up in outpatient clinic.

**Keywords:** Thyroid, thyroid gland, tuberculosis

### Introduction

Tuberculosis is still highly prevalent in some areas of the world. Tuberculosis affects almost all organs of the human body, the lung is the main target in primary infection. Extrapulmonary tuberculosis was reported to constitute 15.33% of all the tuberculosis cases in the world and 0.76% in China [1]. However, TTB is still extremely uncommon, compared to another prevalent extrapulmonary tuberculosis, such as tuberculosis pleural effusion, tuberculous cervical lymphadenitis, etc, TTB may be asymptomatic or present with an occasionally elusive spectrum of manifestations. Its clinical manifestations and radiological features are similar findings to those of thyroid malignancy or other thyroid masses. Consequently, TTB is often overlooked, mis-diagnosed and mis-treat-

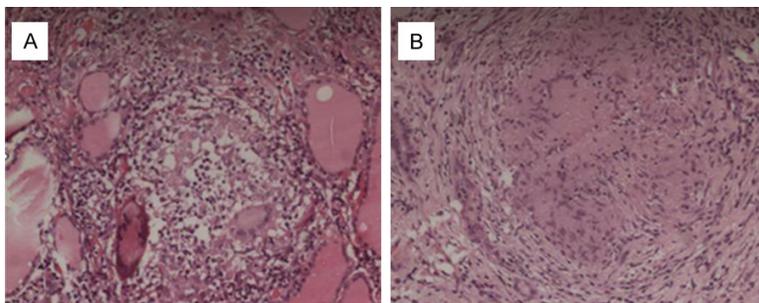
ed. There have been isolated case reports and few case series of TTB in the literature so far. Here, we report two cases of TTB with the consent obtained from the patients and have a review of the literature to discuss the clinical characteristics and treatment for an attempt to improve the understanding of TTB.

### Cases report

#### Case 1

A 49-year-old female farmer presented to our hospital on January 27, 2007 with a solid, painless swelling that had gradually increased in size over two months in the left and anterior neck and radiologic findings of a focal thyroid lesion. There was no constitutional symptoms such as dysphagia, dyspnea, irritability, fever,

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**Figure 1.** Histological images revealed epithelioid cell, Langerhans giant cell, necrotic caseation along with surrounding thyroid follicles (H&E, 100x).

night sweats, weight loss, fatigue, or anorexia. She denied past or family tuberculosis history except BCG vaccination history against tuberculosis. On examination, a solid, non-tender, painless, 40 mm × 30 mm in size, poorly defined margins swelling was noted in the left and anterior neck. The swelling moved with deglutition and its overlying skin was normal, suggesting that it originated from the thyroid. No enlargement of the regional lymph nodes was found. Trachea was slightly pushed to the right side. White blood cell (WBC) count in the peripheral blood was  $6.9 \times 10^9/L$  (normal range,  $3.5-9.5 \times 10^9/L$ ), neutrophil level was 45% and erythrocyte sedimentation rate (ESR) was 9 mm/h (normal range, 0-26 mm/h). Thyroid profile revealed normal level of the thyroid hormones [T3 1.37 nmol/L (normal range, 1.3-3.1 nmol/L), T4 92.25 nmol/L (normal range, 66-181 nmol/L), free T3 4.23 pmol/L (normal range, 3.7-6.8 pmol/L), free T4 13.83 pmol/L (normal range, 12-22 pmol/L), thyroid stimulating hormone (TSH) 2.08 mU/L (normal range, 0.27-4.2 mU/L)]. Human immunodeficiency virus testing was negative. Tumor markers including CA19-9, CEA and Calcitonin were within normal range. Coagulation profile, liver and renal functions were within normal limits. Chest X-ray revealed no pulmonary abnormalities. TST (1:10,000) was positive (14.5 mm). Ziehl Neelsen stainings for AFB using sputum in the continuous three mornings were negative. Ultrasonography of the neck revealed a nodular lesion involving most of the left lobe of thyroid, the left lobe of thyroid was enlarged, measuring 44 mm × 45 mm × 33 mm in size. The lesion was hypoechoic and heterogeneous in echogenicity. The hypoechoic areas did not extend into the isthmus. Poor blood flow signal was found

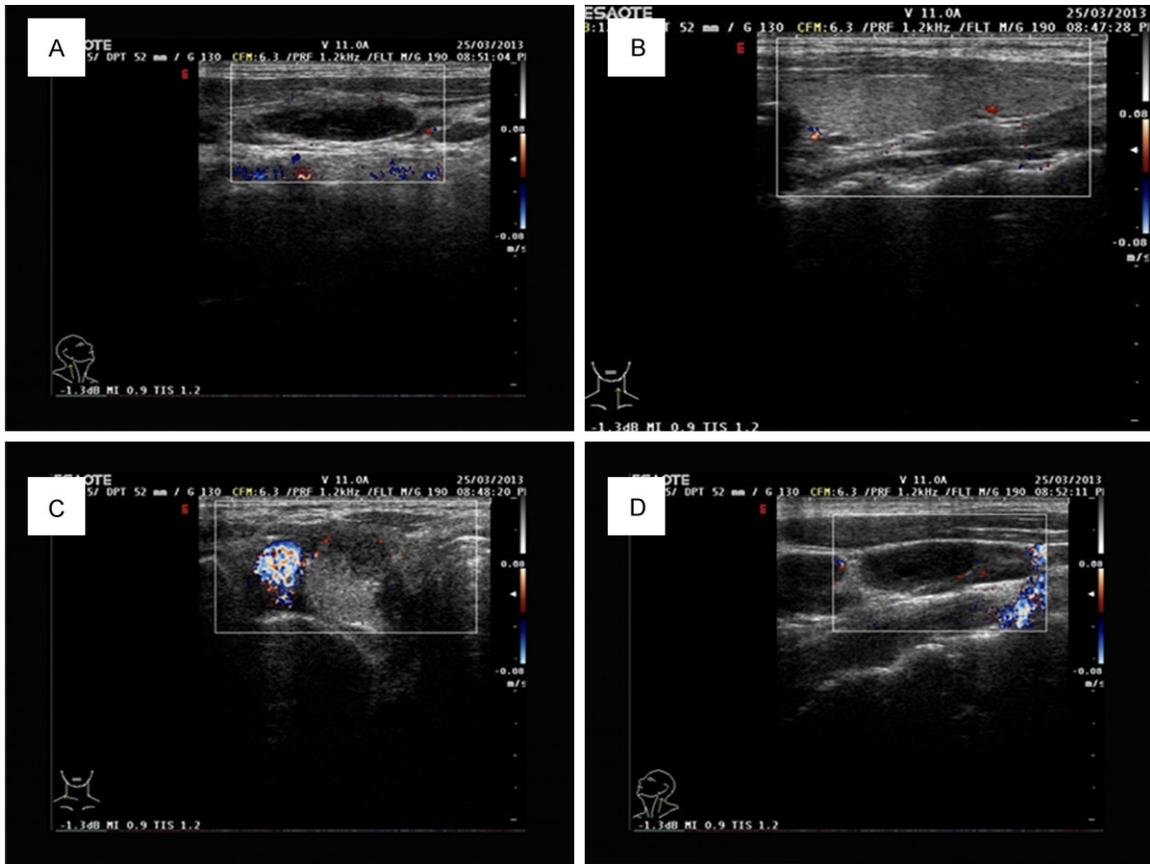
in the lesion. Hemithyroidectomy was performed with the diagnosis of goiter with adenomatous preoperatively. Cut section showed the lesion filled with colloid along with a focus of caseous necrosis. Microscopically histopathologic examination revealed the characteristic features of caseating necrosis, epithelioid cell granulomas and Langhans' giant cells (**Figure 1**).

Gram stain and tissue culture, stain and culture for AFB in the thyroid material did not reveal bacteria or mycobacterium. The final diagnosis was TTB. The patient was started on standard antituberculous therapy postoperatively ie, Rifampicin (R), Isoniazid (H), Ethambutol (E) and Pyrazinamide (Z) for initial phase of 3 months followed by continuation phase with H, R, E for next 6 months. The patient was followed up for 9 months without recurrence and her general wellbeing was remarkable.

### Case 2

A 34-year-old female farmer was transferred to our hospital on July 8, 2013 because of the pharynx nasalis tuberculosis diagnosed histopathologically by the specimens obtained from nasopharyngoscope in the other hospital. She was presented with a solid, painless swelling that had slowly increased in size over two months in the right side of neck. There was no tuberculosis specific symptoms. She denied past or family history of tuberculosis except BCG vaccination history against tuberculosis. No signs or symptoms of hypo- or hyperthyroidism were present. A solid, non-tender, painless, 15 mm × 15 mm in size, infiltrative margins swelling was examined in the anterior neck more toward to the right side. It had a smooth surface with firm consistency, but moved with swallowing. The enlargement of the regional lymph nodes on both sides of the neck was palpable. Coagulation profile, liver and renal data, tumor markers revealed normal. ESR was 15 mm/h. Thyroid hormones revealed normal (TT3 1.85 nmol/L, TT4 121.40 nmol/L, FT3 4.0 pmol/L, FT4 14.94 pmol/L, TSH 1.65 mU/L). Human immunodeficiency virus testing was negative. Chest X-ray revealed no pulmonary abnormalities. TST was strongly positive (20

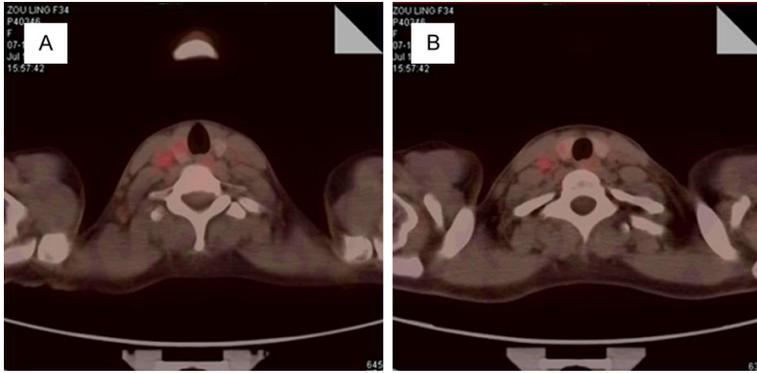
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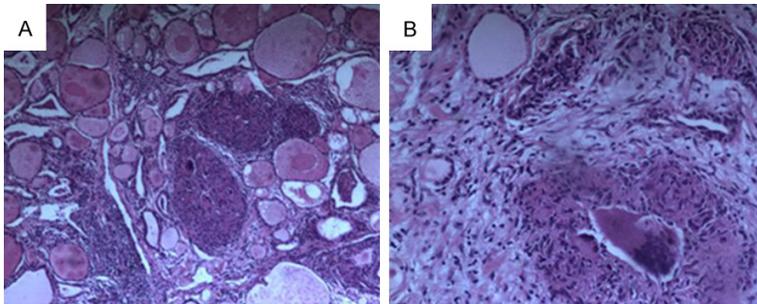
**Figure 2.** Thyroid ultrasound revealed an enlarged cervical lymph node on the right lobe of the thyroid (A) and a heterogeneous hypoechoic lesion with 18 mm of maximal dimension (C). On the left lobe of the thyroid, a similar lesion with 3 mm of maximal dimension was identified in the enlarged cervical lymph node (B) and the other left lobe was seen to be normal (D).

mm and a water bulb in skin). Sputum for AFB was negative. Ultrasonography revealed a nodular lesion involving most of the right lobe of thyroid. The right lobe of thyroid was enlarged, measuring 18 mm × 15 mm × 15 mm in size. The lesion was hypoechoic and heterogeneous and did not extend into the isthmus. Poor blood flow signal was found in the lesion (**Figure 2**). A similar swelling which was 3 mm × 3 mm × 2 mm in size, heterogeneous hypoechoic lesion, was identified in the left lobe of thyroid by US. CT of the neck in the other hospital revealed a low density mass in the right lobe of thyroid which micked malignancy along with some enlarged cervical lymph nodes. PET-CT examination on July 15, 2007 suggested the right lobe lesion of thyroid might be malignancy with metastatic cervical lymphadenectasis due to the maximal standard uptake value (SUV) of the lesion was 2.9, its avenue SUV was 2.3, and its value of CT was 65 HU (**Figure 3**). A total thy-

roidectomy was performed with the thyroid malignancy in overstage primary diagnosis pre-operatively. Cut section did not show caseous necrosis, but histopathological examination revealed that the lesions on both lobes of thyroid and the extracted lymph nodes consisted of granuloma with caseous necrosis, Langhan's giant cells and epithelioid cells (**Figure 4**). Gram stain and tissue cultures, staining and culture for AFB in the specimen showed negative. The final diagnosis was TTB and tuberculosis lymphadenitis. There was no postoperative complications. The patient was treated postoperatively by the same anti-tuberculous option prior to a permanent substitution with L-thyroxin (LT) (100 ug per day). Thyroid hormones were normal (T3 1.95 nmol/L, T4 135.10 nmol/L, FT3 5.22 pmol/L, FT4 20.36 pmol/L, TSH 0.459 mU/L) at the hospital discharge. Patient was asymptomatic and euthyroid during the 8 months follow-up.



**Figure 3.** PET-CT revealed areas of increased 18F-fluorodeoxyglucose (18F-FDG) uptake in the right lobe lesion of thyroid with cervical lymphadenectasis.



**Figure 4.** Histological images showed epithelioid cell, Langerhans giant cell, necrotic caseating granuloma along with surrounding thyroid follicles (H&E, 100x).

### Discussion

Thyroid was regarded in the 19<sup>th</sup> century as never been infected tuberculosis [3]. However, TTB was firstly reported by Lebert [2] in 1862 in a disseminated miliary tuberculosis woman whose autopsy showed TTB. Then in 1878, Chiari [3] described 7 TTB cases in 100 autopsies of patients died from disseminated tuberculosis. Bruns [3] in 1893 described the first TTB case diagnosed in a woman with a rapidly enlarging goitre and cervical lymphadenopathy, but no evidence of pulmonary tuberculosis. The successful drainage of tuberculosis thyroid abscess was firstly reported in 1894 [3]. Rankin and Graham [4] identified 21 TTB cases from 20,758 thyroidectomy specimens, an incidence of 0.1%. El Malki HO, et al [5], diagnosed 8 TTB cases in 2,426 partial thyroidectomy specimens, an incidence of 0.3%. In Turkey, the incidence of TTB was 0.6-1.15% [6]. Physicians diagnosed TTB in 0.1-1% of cases due to the difficulties of differential diagnosis according to

the symptoms and insufficient knowledge of TTB, but in 2-7% of cases during autopsy [7]. The reasons for so low incidence may be [4, 8-10]: (1) some antagonistic actions and immunity between mycobacterium tuberculosis and thyroid hormone or iodine; (2) the affluent blood flow and oxygenation in thyroid were not suitable for mycobacterium tuberculosis growth. Hence, unhealthy thyroid may lose or reduce such protection against tuberculosis and develop TTB.

Some investigators [7, 11, 12] considered that the spread ways for TTB might include military spread, direct spread from an adjacent focus, such as cervical lymph nodes tuberculosis, laryngeal tuberculosis, trachea tuberculosis, mediastinal lymph node tuberculosis, and lymphatic spread. The more common way might be miliary spread as one part of generalized dissemination [4]. Occasionally, military spread may occur in preexisting thyroid enlargement [13]. The lymphatic spread route is controversial so far based on the literature [9, 13]. Our later patient presented with tuberculosis pharynx nasalis which was not contiguous, hence the spread was likely to be direct spread or lymphatic spread. However, that whether the TTB was infected by the tuberculosis lymphadenitis or the tuberculosis lymphadenitis was by TTB, was not clear yet. The first patient did not have extrathyroid focus or disseminated tuberculosis. Hence it was likely to be primary TTB in which there was not known tuberculosis focus outside of the thyroid.

The clinical presentation of TTB is asymptomatic and variable. TTB may be primary or associated with disseminated tuberculosis and there is no consensus on which is the most frequent [8, 9]. BulbulogluE et al [8] reviewed 76 TTB cases reported from 1905 to 2004 and found that 49 cases were presented most commonly

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with solitary nodules or multinodular goiter, 10 cases were abscess, 2 cases were cyst, most cases were primary TTB, and only 10 cases co-existent pulmonary tuberculosis. Anirban Ghosh et al [9] reviewed about 200 TTB cases reported before 2006 and found that almost all cases had primary foci elsewhere in the body, and isolated TTB was extremely rare. We performed a PubMed and library search using the key words "thyroid tuberculosis" "tuberculosis and thyroid" and retrieved detailed articles from the English-language literatures after 2006 (**Table 1**).

The 21 cases in **Table 1** revealed a slight middle-aged female preponderance. There were 12 cases presented with solitary nodule, 5 cases with cystic mass or recurrent cyst, 3 cases with multinodular goiter, 2 cases alonged with swollen regional lymph nodes, 1 case with cold abscess, and no case with chronic skin sinus. Thyroid swelling or neck swelling was often the main initial symptom in 21 cases, alonge occasionally with some specific tuberculosis symptoms such as intermittent cough, low grade fever, night sweating, weight loss, fatigue, anorexia, emaciation, hemoptysis, and some hyper- or hypothyroidism symptoms such as exophthalmos, hoarseness of voice, palpitation, dysphagia, dyspnea and irritability. There were 4 cases with extrathyroid tubercular focus such as pulmonary tuberculosis, cervical spine tuberculosis and tuberculosis lymphadenitis. Like some reports [14-16], tuberculous thyroiditis can often be mistaken for carcinoma. Among the 21 lesions, 11 lesions located in the right lobe, 7 lesions in the left lobe and 3 lesions in both the lobes. All of the lesions moved with deglutition. PPD was positive or strongly positive. Thyroid function was preserved in most of the 21 cases and reports of thyroid function abnormalities were extremely infrequent [17, 18]. There were 4 cases with hyper- or hypothyroidism symptoms in **Table 1**. These observations might be associated with the short disease history of TTB and the small number of literature.

The features of US in the 21 cases, like the report [19], may show a solitary nodule, multiple nodules, diffuse goiter, and regional lymphadenopathy occasionally, but rarely cold abscess. The lesion is usually heterogeneous hypoechoic except that the abscess is anecho-

ic. The features of CT, MRI and PET-CT were less described in the 21 cases reports. Other investigators [20] reported that CT might show: (1) an enlarged thyroid and any other infection focus in the neck; (2) the parenchymal lesions appear hypodense against the enhancing normal thyroid; (3) abscesses, either within the gland or in the subcutaneous plane, show peripheral rim enhancement; (4) along with or without regional lymphadenopathy. MRI was sporadically reported [21]: (1) the normal thyroid gland was homogeneously hyperintense relative to the neck muscles on both T1- and T2-weighted images; (2) the tuberculous lesion showed an intermediate signal on both T1- and T2-weighted images, the signal intensity was higher than normal glandular parenchyma due to the presence of densely cellular inflammatory granulation tissue, with tuberculous granulomas with or without minimal necrosis; (3) the abscess appeared hypointense on T1- and hyperintense on T2-weighted images, and peripheral rim enhancement on contrast-enhanced MRI; (4) regional lymph nodes were better seen on T1-weighted images. There was a paucity of reports highlighting the role of PET-CT to assess TTB presently. The lesions were seen as areas of increased <sup>18</sup>F-fluorodeoxyglucose uptake in active regions of granulomatous inflammation with cold abscess representing necrosed tissue [22]. In our latter patient, PET-CT showed the increased <sup>18</sup>F-fluorodeoxyglucose uptake and increased CT value in the lesion.

TTB is difficult to diagnose because the initial symptom, laboratory examination and the appearance of imaging may not provide a substantial clue or specific information for an accurate and timely diagnosis. The diagnosis of TTB is frequently delayed and may represent an incidental finding at pathological examination. Neither Sometimes PPD was positive or strongly positive. Some cases co-exist tuberculosis or tuberculosis history. These important clues may raise the suspicion of TTB. Most investigators [2, 6, 12, 23] accept the definitive histological and bacteriological evidences as the diagnostic essential criterion. Histopathological features include caseating necrosis, epithelioid cell granulomas and Langhan's giant cells [2, 6, 12, 23]. However, many diseases may cause epithelioid granulomatous in thyroid, like granulomatous thyroiditis, palpation thyroiditis, fun-

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**Table 1.** Summary of cases of TTB from English-language literatures in recent 10 years

Case No/Sex/ Age (years)	Presentations	Co-exist- ing illness	TST (mm)	Thyroid function	Neck USG	Examination and diagnosis	Treatment and follow-up	Ref No.
1/M/65	recurrent thyroid cyst, intermit- tent cough	active PTB	-	normal	LLT, cystic lesion	AFBS (+), TTB diagnosis by FNAC	FNAC+local incision, abscess drainage, medications	Chuang TJ, et al. (1), 2015
2/F/20	Thyromegaly	no	-	normal	LLT, 2.2 x 2 x 2-cm, heterogenous hypoechoogenicity lesion	caseating necrosis, epithelioid cell granulomas and Langhan's giant cells/TTB diagnosis	partial thyroidectomy+ medications/asymptomatic 9-year	De-Tao Yin, et al. (2012), 2012
3/F/34	neck mass, low fever, night sweating	no	-	normal	RLT, 2 x 2 x 2-cm, cystic lesion	AFBC (+)/TTB diagnosis	partial thyroidectomy+ medications/asymptomatic 7-year	De-Tao Yin, et al. (2012), 2012
4/F/68	aggravate in neck mass, low fever, weight loss	no	-	normal	RLT, 3.5 x 3 x 3-cm, hypoechoogenicity, and swollen lymph nodes	caseating necrosis, epithelioid cell granulomas and Langhan's giant cells/RLT-TTB, LLT-goiter	subtotal thyroidectomy+ medications/asymptomatic 6-year	De-Tao Yin, et al. (2012), 2012
5/F/28	neck mass, exophthalmos, emaciated, fatigue	old PTB	-	normal	RLT, 1.5 x 1.5 x 1-cm, hypoechoogenicity	caseating necrosis, epithelioid cell granulomas and Langhan's giant cells/RLT-TTB+goiter	subtotal thyroidectomy, no medications/asymptomatic 5-year	De-Tao Yin, et al. (2012), 2012
6/M/45	rapid neck swelling, cough, hemoptysis, dysphagia, evening fever, night sweats, weight loss	active PTB and AFBC (+) for sputum	22.00	hypothyroidism	RLT, 4.7 cm, heterogenous hypoechoogenicity	AFBC (+) AFBS (-), necrosis, epithelioid cell granulomas and multinucleated giant cells without neoplastic cells/TTB	FNAC, 3HREZ/?HR/well 6-months	Luiz HV, et al. (2), 2013
7/F/56	thyroid nodule, multinodular goiter	no	strong positive	hypothyroidism	BLT, 0.5 x 1.1-cm, hypoechoogenicity in both lobes	caseating necrosis, epithelioid cell granulomas and Langhan's giant cells, BLT-TTB+tuberculosis lymphadenitis+papillary thyroid cancer	total thyroidectomy+ selective neck dissection+6HRE+LL	Liwei Meng, et al. (7), 2014
8/F/45	neck swelling, low fever, weight loss	no	18x18	normal	RLT, 6 x 5-cm	AFBC (+), caseating necrosis, epithelioid cell granulomas and Langhan's giant cells/TTB	FNAC, 2HREZ/4HR/well follow-up	Sunita Sanehi, et al. (59), 2007
9/F/47	neck swelling	no	negative	normal	RLT, many hypoechoegen- ic nodules in both lobes, the maximal ones (3 x 1-cm) in the right lobe	caseating necrosis, epithelioid cell granulomas and Langhan's giant cells/TTB+LNTB	partial thyroidectomy+ 2HREZ/6HR	Ines Zendah, et al. (4), 2008
10/F/35	neck swelling, hoarseness of voice	no	-	normal	RLT, 4.5 x 3-cm, heterog- enous hypoechoogenicity	AFBS(+), caseating necrosis, epithelioid cell granulomas and Langhan's giant cells/TTB	partial thyroidectomy, no medications	Sant Parkash Kataria, et al. (10), 2012
11/M/45	neck swelling	no	strong positive	normal	LLT, 3.4 x 2.7 x 2.4-cm, inhomogeneously hypoechoogenicity lesion	AFBS (-), multifocal granulomatous caseous necrosis/TTB	FNAC+3(HR+ ciprofloxacin)/well-3 months	Gao-Yi Yang, et al. 2015
12/M/49	neck swelling, sweating, evening fever, palpitation, weight loss	no	-	normal	RLT, 5.5-cm, heterog- enous hypoechoogenicity and cystic	caseating necrosis, epithelioid cell granulomas and Langhan's giant cells/TTB	FNAC+thyroidectomy+no medications	Kon Stantinos Terzidis, et al. (1), 2007
13/F/21	neck swelling, fever, weight loss	TB contact history	positive	normal	-	AFBC (+) AFBS (-), caseation necrosis/TTB	FNAC+3HREZ/6HRE/well 6-months	Uzma Majid, et al. 2011
14/F/51	neck swelling	no	-	normal	hypochoic nodule (left), small solid and cystic nodules	possibility granulomatous (RLT), inflammation (LLT)	total thyroidectomy+ 3HREZ/6HRE+LL	Uzma Majid, et al. 2011

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15/M/32	solitary nodule in right neck	no	-	normal	RLT, 4 x 4-cm, multinodular goiter	caseation necrosis/TTB	FNAC+3HREZ/6HRE	Uzma Majid, et al. 2011
16/M/21	neck swelling, malaise, weakness	cervical spine TB	-	normal	LLT, hypoechoogenicity nodule	AFBS (+), caseating necrosis, epithelioid cell granulomas and Langhan's giant cells/TTB	FNAC+medications	Madhusudhan KS, et al. (7), 2009
17/F/26	neck lump	no	34.00	normal	RLT, 3.5 x 1.8-cm, cystic mass	AFBC (+)	FNAC+HREZ	Prince Cheriyan Modayil, et al. 2009
18/F/11	neck swelling	no	-	normal	LLT, 1.8 x 1.6-cm, multi-lymphadenopathy	AFBS (+), caseating necrosis, epithelioid cell granulomas and Langhan's giant cells/TTB	FNAC+medications	Anita Bodh, et al. (1), 2014
19/F/34	neck swelling, multi-thyroid enlargement	hypothyroid 10 years	-	hypothyroid	BLT, 2 x 1.5-cm, heterogeneously hypoechoogenicity in both lobes	AFBS (+), caseating necrosis, epithelioid cell granulomas and Langhan's giant cells, adenomatous goiter/TTB	FNAC+subtotal thyroidectomy, no medications	Chaudhary A, et al. 2010
20/F/49	neck swelling	no	-	normal	LLT, 4.5 x 4.4 x 3.3-cm, heterogenous hypoechoogenicity lesion	AFBS (-) AFBC (-) caseating necrosis, epithelioid cell granulomas and Langhan's giant cells/TTB	partial thyroidectomy+3HREZ/6HRE/asymptomatic 9-months	our cases
21/F/34	neck swelling	no	-	normal	RLT, 1.8 x 1.5 x 1.5-cm, hypoechoogenicity/LLT, 0.3 x 0.3 x 0.2-cm, hypoechoogenicity/regional lymph node on both sides	AFBS (-) AFBC (-) caseating necrosis, epithelioid cell granulomas and Langhan's giant cells, adenomatous goiter/TTB+LNTB	total thyroidectomy+3HREZ/6HRE+LL/asymptomatic 6-months	our cases

Abbreviations: - = no detail about TST; F = female; M = male; LT = levothyroxine; AFBS/AFBC = staining/culture for AFB; AFBS (-)/AFBC (-) = staining/culture for AFB was negative; AFBS (+)/AFBC (+) = staining/culture for AFB was positive; PTB = pulmonary tuberculosis; LLT/RLT = left/right lobe of thyroid.

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gal infection, tuberculosis, sarcoidosis, goitrous autoimmune thyroiditis, granulomatous vasculitis, thyroglossal duct cyst, lipomas or thyroid neoplasia and foreign body reaction [23, 24]. Caseating necrosis and the demonstration of AFB in the specimens are the distinguishing feature to TTB. The smear of AFB in the specimen is not always positive, but the diagnosis is still not be precluded because the simultaneous culture of AFB reveal positive more frequently than staining. We should wait patiently the culture result for 4-6 weeks. Among the 21 cases, there are 10 cases with positive demonstration of AFB in the specimens, 5 cases with staining positive and 5 cases with culture positive. The small number of case can not explain the whole incidence of staining positive and culture positive. Importantly, TTB may coexist with thyroid carcinoma [14-16]. Some authors highly recommended FNAC and US-guided FNAC biopsy for the timely and accurate diagnosis. The tissue obtained by FNAC was examined pathologically and stained, cultured for AFB. We summarized some diagnosis points and clues as following: (1) young adults, especially women; (2) people with tuberculosis history or close contact with tuberculosis history, or the existence of other parts of tuberculosis lesions, or there were some tuberculosis symptoms; (3) painless neck mass; (4) short-term diagnostic antituberculosis treatment affirm significant improvement; (5) the lesions with caseous necrosis and (or) the demonstration of AFB were found after surgery or FNAC.

Treatment for TTB is mainly based on antituberculosis medications and additional surgical removal or drainage. Drug regimen and duration vary among authors and different tuberculosis diseases. We chose H, R, E and Z for initial phase of 3 months followed by continuing phase with H, R and E for next 6 months (3HREZ/6HRE). Some patients in the literatures [2, 10, 15, 17, 18, 24] performed H, R, E and Z for initial phase of 2 to 3 months followed by H, R and with or without E for next 4 to 6 months [2~3HREZ/4~6HR(E)]. Among the 21 cases, 2 cases did not accept any medications after surgery, but responded well to the sole surgery. Some authors did not recommend a total thyroidectomy due to consequent hypothyroidism. A total thyroidectomy was performed in our latter patient and no findings of hypothyroidism by the permanent therapy of LL in the follow-up. The methods of percutaneous antitu-

berculosis drugs injection is available [8]. Some practices in **Table 1** had affirmed FNAC more micro-invasive and simpler than surgery, because FNAC can avoid some unnecessary thyroidectomy in some events.

However, there were still some defects for FNAC in our opinions, such as subcutaneous haematoma, accidental tracheal injury, local infection, subcutaneous tracheal abscess formation and the small number of tissue which was not always convenient for histological and bacteriological examinations. What's more, with the development of mini-invasive and fast-recovery surgery, and to avoid progression to a thyroid abscess formation for failed drug therapy, and with the advantages of the whole removal of some simultaneous lesions such as goiter, hypothyroidism, hyperthyroidism and carcinoma, surgery is still necessary. Surgical removal or thyroidectomy should occur in the large lesion, infected cysts, TTB case coexisting with thyroid carcinoma, mimicking malignancy lesions [24], and the cases whose diagnoses are not confirmed by FNAC. Surgical drainage should be performed in abscess and subcutaneous abscess formed after FNAC. Sole chemotherapy or FNAC may be performed in the small nodule and non-abscess case. Thyroid function should be monitored during TTB treatment [8]. In the 21 cases and all other previous reports, no death and recurrence were found and TTB responded well to the medications and some surgeries. Its overall treatment effect was satisfactory.

### Summary

Thyroid tuberculosis is rare and difficult to discern clinically and on examinations. A greater awareness of the differential diagnosis of thyroid masses is necessary. Its final diagnosis is made on the definitive histological or bacteriological evidence by surgery or FNAC. The overall response to antituberculous therapy with or without surgery or FNAC is good.

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### Disclosure of conflict of interest

None.

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**Address correspondence to:** You-Ding Jiang, Department I of Thoracic Surgery, Guangzhou Chest Hospital, Tuberculous Institute of State Key Laboratory of Respiratory Disease, No. 62, Hengzhigang Road, Yueshi District, Guangzhou 510095, Guangdong, People's Republic of China. E-mail: jyd-mgkyc@sina.com

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