

Thyroid Abscess Rare Complication of Thyroid FNA: Case Report and Literature Review

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Abstract: Fine needle aspiration (FNA) is a well-recognized modality for investigation of thyroid pathology. It is simple, reliable, inexpensive and generally safe procedure in the diagnosis of thyroid cysts and nodules. We report a case of right thyroid abscess following FNA of a simple thyroid cyst.

Keywords: Thyroid cyst, FNA, Thyroid abscess.

INTRODUCTION

FNA became one of the most helpful, reliable and accurate tools in diagnosis of thyroid pathology rarely with serious complications. We report a case of right thyroid abscess in a healthy 35 years old man after ultrasound guided fine needle aspiration of a thyroid cyst. We also review the literature for occurrence of this rare complication.

CASE REPORT

35 years old healthy man was investigated for painless swelling, gradually increasing in size in the right side of the neck. He had no symptoms of thyroid hyper or hypo function, no obstructive symptoms and no history of chronic medical illness or surgical operations.

He had thyroid ultrasound which showed a large cystic lesion arising from right thyroid lobe measuring about 4.4 x 3.5 cm almost replacing the whole right lobe with small echogenic nodule

measuring about 9 x 7.5 mm noted towards the upper pole which may represent the remaining thyroid tissue.

The left thyroid lobe and the isthmus appeared normal in size and shape with no cystic or solid lesion identified (Figure 1, 2 & 3).



Fig-1: The thyroid ultrasound showing a large cystic lesion arising from right thyroid lobe measuring about 4.4 x 3.5 cm almost replacing all the thyroid tissue



Fig-2: The Thyroid ultrasound showing small echogenic nodule towards the upper pole measuring about 9 x 7.5 mm which may represent the remaining right lobe thyroid tissue



Fig-3: The thyroid ultrasound showing the left thyroid lobe and the isthmus which appeared normal in size and shape with no cystic or solid lesion identified

The blood investigations including full blood count, urea and electrolytes and coagulation screen were within the normal limits. TSH was 1.24mIU/L (normal value 0.35-4.49mIU/L) and free T4 was 14pmol/l (normal value 9-19pmol/l).

The patient had ultrasound guided aspiration under aseptic technique, Three FNA passages were attempted through the cyst wall, with aspiration of about 30 ml of dark brownish fluid. The cytology of the aspirated fluid was reported as colloid nodule with cystic changes.

He presented three weeks later with sudden increase in the size of the cyst which became painful

and tender associated with progressive difficulty in swallowing and fever with rigors. On examination he looked sick, febrile with temperature of 38.5 C. his WBCC was $17,000 \times 10^6/L$, CRP 342mg/L (normal value 0-5mg/l), free T3 20.49pmol/L and TSH 0.25mIU/L.

He had an urgent CT scan which showed a large cyst with thick enhancing wall measuring about 5 x 5.5cm compressing and displacing the trachea to the left side and almost occupying the whole right thyroid lobe. The left thyroid lobe and isthmus appeared normal figure (4,5 and 6).

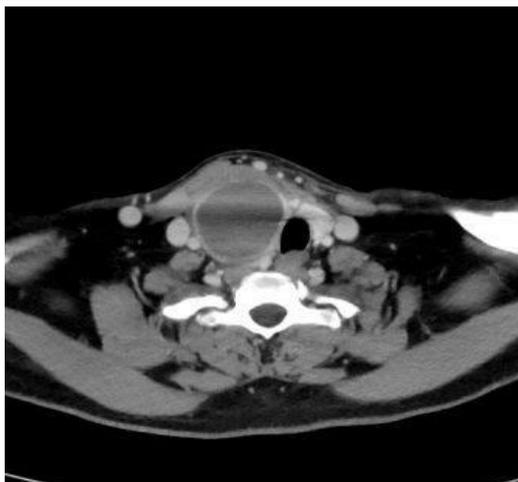


Fig-4: The CT scan of the neck (axial view) showing a large cyst with thick enhanced wall almost replacing the whole right thyroid lobe and displacing the trachea to the left



Fig-5: The CT scan of the neck (coronary view) showing the relation of the abscess to the trachea and the internal jugular vein



Fig-6: The CT scan of the neck (sagittal view) showing the same findings of figure 4

The patient was admitted for antibiotic therapy. Another trial of ultrasound guided drainage failed due to the thick content of the cyst. Decision was made to proceed with surgical drainage as the patient

remained febrile and continued to have tachycardia in spite of antibiotic therapy.

The patient was taken for surgery on the second day of admission. The neck was explored with

Kocher suprasternal incision. There was extensive subcutaneous edema. The deep investing cervical fascia, strap muscles and thyroid capsule were matted together with complete obliteration of dissection planes. The abscess was drained and the cyst wall and remaining of the right lobe were carefully dissected from the surrounding structures and excised after securing the superior and inferior thyroid arteries. The wound was closed in layers after positioning of a suction drain. Abscess fluid culture isolated Staphylococci.

Postoperatively the patient continued on IV antibiotic and discharged home on the 4th postoperative day without any complications.

DISCUSSION

Historically therapeutic punctures of the thyroid gland, using instruments resembling modern aspiration needles was described for the first time by Albucasis or Abu al-Qasim Khalaf ibn alAbbas Al-Zahrawi as it was his Arab name (936-1013 A.D) in his famous treatise, *Kitab al-Tasrif* (The Method of Medicine), the most influential book of Arab Medieval Medicine [1-3]. His description resembles a modern FNA of the thyroid gland [4].

FNA for the thyroid gland underwent a long journey since the description of Albucasis to the solid establishment of its role in diagnosis of thyroid pathology at present time. In the late 1920s, Hayes Martin and Edward Ellis performed aspiration biopsies using an 18-gauge needle for the cytological evaluation of thyroid lesions in the Memorial Hospital of New York [5]. In 1952, thyroid aspiration cytology using a fine needle (diameter of 0.4–0.8 mm) was introduced by Nils Söderström in Sweden [6].

Despite the fact that thyroid FNA was used in routine practice as an accurate test for distinguishing between benign and malignant thyroid nodules in Sweden since the 1950s, it was not until the 1980s that FNAC became widely used [7-9]. The reasons included lack of confidence in the sensitivity and specificity of the procedure, fear of tumor implantation in the needle track, apprehension of lawsuits and the reluctance of surgeons to relinquish the use of the formal histological biopsy technique [10].

At present time fine needle aspiration (FNA) biopsy is widely used in the diagnosis of thyroid diseases. The American thyroid association claimed that the wide use of FNA cytology for thyroid nodules has significantly decreased the rate of unnecessary surgery for benign thyroid nodules over the last three decades [11,12]. Serious complications are rare and this procedure is generally safe [13].

Thyroid fine-needle biopsy is a simple, reliable, inexpensive and generally safe diagnostic procedure in the management of thyroid nodules. Post-

FNA local pain and minor hematomas are the most common complications, while serious complications seem to be rare [14].

Thyroid abscess and acute suppurative thyroiditis are rare complications of thyroid FNA. Both can cause life threatening complications including tracheal compression due to enlarging mass, vocal cord paralysis [15] and abscesses spreading into the retropharyngeal space and mediastinum [16]. A transient phase of hyperthyroidism due to outpouring of thyroid hormone in conjunction with massive destruction of the tissues associated with the abscess was also reported [17].

Thyroid abscesses are rare disease entity as the thyroid gland is relatively resistant to developing infection due to its rich blood supply, well-developed capsule and high iodine content [18-21]. They account for less than 0.7% of surgical pathology in the thyroid gland [18].

The most common causative organisms responsible for thyroid abscesses are Staphylococci and Streptococci species [22] although few cases were reported to be caused by *Klebsiella* Spp [23] *Salmonella* Spp, [24,25] *Acinetobacter* [26] and *Eikenella corrodens* [27,28].

Thyroid abscesses were reported to be more common in patients suffering from immune deficiency and those who have pre-existent thyroid pathologies or anatomic gland anomalies [20,29-31].

Most reported cases of primary thyroid abscesses were arising from acute suppurative thyroiditis which is considered as an unusual type of head and neck infection. Acute Suppurative Thyroiditis is more common in children and young adults between 20 to 40 years of age with 92 % of the affected patients are children [32]. The frequency with which Acute Suppurative Thyroiditis proceeds to abscess formation is rare particularly with the advent of widespread usage of antibiotics. In a review of literature by Schweitzer and Olson [19] in their publication in 1981, they noted that only 39 cases of thyroid abscess had been reported in the medical literature since 1950, of which 16 were in children. In another review of literature Ogale SB et al. [33], noted that until 1997, only 60 cases had been reported in pediatric patients, 18 of which had recurred.

Recently Céspedes C, et al. [34] reported a series of five cases of thyroid abscesses from four hospitals in Bogotá (Colombia) between 2000 and 2010.

Thyroid abscesses complicating FNA of the thyroid gland are extremely rare. Yilder et al. [13] reported a case of Acute suppurative thyroiditis after FNA in a 57-year-old woman with diabetes mellitus

who was successfully treated with ultrasound guided percutaneous drainage. Similarly, Nishihara et al reported another case of acute suppurative thyroiditis after FNA in a 39 years old woman on steroid treatment for atopic dermatitis [35].

Although thyroid abscesses complicating FNA are rarely occurred in healthy subject. Sun JH et al. [36] reported, for the first time a case of an anaerobic thyroid abscess after FNA in a healthy subject. Halenka Milan et al. [37] reported another case of thyroid abscess after fine-needle aspiration biopsy caused by *Escherichia coli*, which is not a typical skin pathogen. They emphasized the necessity of adhering to strict aseptic technique even in minimally invasive procedures.

Prompt diagnosis and treatment of thyroid abscesses is of vital importance as if left untreated can result in serious complications including destruction of the thyroid or parathyroid glands, internal jugular vein thrombophlebitis, local or hematological spread to other organs, sepsis, and even abscess rupture or fistula formation with the esophagus or the trachea [19,22].

Thyroid abscess should be suspected in all patients who developed sudden pain and increase in the size of the gland after FNA especially when associated with fever, odynophagia, anterior neck swelling, erythema, dysphagia, hoarseness, and restricted head motion, although symptoms may be delayed for days or weeks. Laboratory investigations may or not show leukocytosis and thyroid hormone may be normal or elevated as a result of transient phase of hyperthyroidism due to outpouring of thyroid hormone in conjunction with massive tissue destruction. Kawanaka et al. [38] in 1994, Meier and Nagle [39] in 1996, and other authors reported thyroid hormone levels that may mimic hyperthyroid states, with increases in both free and total T4 and TSH suppression [40].

Ultrasound is considered as a first line imaging study to confirm the diagnosis of thyroid abscesses although the echotexture of an abscess on ultrasounds can vary based on the amount of internal debris/hemorrhage [41]. However, some researchers have argued CT and/or MRI to be better techniques for diagnosing inflammatory masses of the thyroid [42] as they provide more information regarding the extent and spread of the infection [43].

Treatment of thyroid abscesses includes drainage or partial or total thyroidectomy together with appropriate antimicrobial therapy [43,44]. Antibiotic therapy can be initiated with broad spectrum antibiotics until obtaining bacterial culture then antibiotic can be selected against the isolated bacteria.

Drainage can be achieved by different means including ultrasound guided needle aspiration alone,

ultrasound guided catheter insertion with or without abscess cavity irrigation with antibiotic, and open surgical drainage. In 1985, Herzon [45] reported the effectiveness of 18-gauge needle aspiration for the treatment of neck abscess. Of 25 patients he studied, 80% were successfully cured, but 20% subsequently required open surgical drainage. Iylin et al. [43] reported two cases in which drainage abscess of the thyroid was performed twice (on the first and fifth day of admission) using a 21-gauge needle, followed by injection of antibiotics into the abscess cavity. Chang et al. [46] reported treating 14 cases of head and neck abscesses effectively with needle aspiration alone in six cases and needle aspiration and catheter insertion in eight cases without needs for surgical drainage.

Formal open surgical drainage can be either incision or partial or total thyroidectomy. Thyroidectomy may be technically difficult in these circumstances due to the marked peri-glandular inflammatory change but careful and deliberate dissection should allow the operation to proceed in a satisfactory manner [21].

The key factor in prevention of this serious complication is adherence to strict aseptic technique during FNA procedures.

Summary

FNA became one of the most helpful, reliable and accurate tools in diagnosis of thyroid pathology rarely with serious complications. Thyroid abscesses were rare complication of thyroid FNA, reported to be more common in patients suffering from immune deficiencies and those with pre-existent thyroid pathologies or anatomic gland anomalies. Only few cases of thyroid abscesses complicating FNA were reported in healthy individuals. Prompt recognition and proper treatment are of vital importance as if left untreated can result in serious life threatening complications. Observing strict aseptic technique during the procedure is the key factor in prevention of this serious complication.

Conflict of Interest: None declared

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