

Original Research Article

Correlation of fine needle aspiration cytology and histopathological examination in thyroid swellings: a prospective study

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ABSTRACT

Background: Thyroid swellings are not an uncommon condition. Physical examination, laboratory investigation, thyroid imaging, and cytology can be used to evaluate thyroid swellings. After a physical examination, ultrasonography and thyroid function tests, fine needle aspiration (FNA) cytology should be implemented. Although FNA cytology is a common method to evaluate the nodule, false negative and false positive results are not rare. Hence histopathology examination is confirmatory. Information gathered from history, physical examination, ultrasound and intraoperative appearance of thyroid swelling dictate further management. The purpose of the study is to correlate preoperative FNAC and postoperative histopathology in thyroid swellings.

Methods: This study of 52 in-patients with thyroid lesions was treated at UIORL-RGGGH MMC Chennai. FNAC and USG were used as preoperative tools for determining the procedure to be performed and was followed by HPE postoperatively for further management.

Results: Diagnostic categorization of 52 thyroid swellings were based on FNAC and histopathology. According to FNAC, 88.46% swellings were benign lesions and 11.54% were a malignancy. According to HPE, 82.69% were benign lesions and 17.31% were a malignancy. In our study, the collection of thyroid cases emphasizes the false negativity of FNAC. Cases suspicious of malignancy were decided based on intraoperative changes and were given a note of caution to the pathologists for a meticulous evaluation of slides.

Conclusions: FNAC is a simple, safe and cost-effective modality of investigation for thyroid disease but in cases of false negativity histopathology is confirmatory. The false positive results were found to be nil however there is a low percentage of false negative results which has to be confirmed by HPE.

Keywords: Thyroid swellings, FNAC, Histopathology

INTRODUCTION

Thyroid diseases are the most common endocrine disorders worldwide. According to various studies on thyroid disease, it has been estimated that about 42 million people in India suffer from thyroid disorders.¹ These studies of thyroid disorders are based on investigations like ultrasound, computed tomography, thyroid function tests and fine needle aspiration (FNA) cytology. The triple test has been in vogue for thyroid diagnosis since time immemorial.² Despite all these tests,

no single test is entirely accurate and the clinician must be judicious in their use of various testing modalities. FNAC has been adopted as the single best screening test worldwide as it differentiates between benign and malignant lesions effectively. It has radically changed the way we manage thyroid disease and it has to be overemphasized. FNAC of thyroid swellings is easy to perform, safe, inexpensive and accurate with a sensitivity of 65-98%, a specificity of 72-100%, a false positive rate of 1-8% and false negative rate of 1-11%.^{3,4} Therefore as a screening test, FNAC is highly sensitive. It depends

upon the skillful cytological interpretation and analysis. At the same time, there are a few disadvantages with FNAC like inadequate sampling, suspicious diagnosis and interobserver variations. A standard reporting system like Bethesda could be one of the ways to tackle this issue in addition to taking guided FNAC's. In spite of this, it can also produce false negative reports which will be highlighted in our study. A guided FNAC from the targeted suspicious region can solve the problem. Histopathology still remains the gold standard for diagnosis and dictates further management. The typical nuclear features characterizing malignancy could be easily differentiated from benign follicular epithelium with variable colloid. The frozen section can be an alternative in a dilemma to reduce radical surgeries, though not very specific for the thyroid gland. They could aid in guiding the plan of lymph node dissections in the presence of occult lesions.

Aim

The purpose of the study is to correlate preoperative FNAC and postoperative histopathology in thyroid swellings.

METHODS

This prospective study was carried out in an upgraded institute of Otorhinolaryngology at Rajiv Gandhi Government General Hospital, Chennai, Tamil Nadu from September 2016 to September 2018. A total of 52 inpatients (both males and females) of age >20 years with neck swellings were studied. Thyroid function tests were done in all patients and all were euthyroid.

The patients were selected as and when they presented to us during our study period. The diverse neck swellings presented to the ENT department underwent the clinical examinations after a thorough history taking. A detailed clinical workup including general physical examination and elaborate history of complaints like duration, the rate of growth, pain, family history were undertaken. They were exposed to a set of preoperative assessment tests which included FNAC USG CT SCAN thyroid function test (T3/T4/TSH/ft3/ft4) and a few hematological investigations (hemoglobin, total count, platelet count, blood sugar) and proceeded with a correlation of preoperative FNAC and postoperative HPE. Among a multitude of test for evaluation of goiter we take into consideration the mandatory tests i.e. FNAC and HPE.

Inclusion criteria: Both males and females, aged 20 to70 years, patients with thyroid swellings in the biochemically euthyroid state, patients with thyroid swellings having FNAC who underwent thyroidectomy.

Exclusion criteria: Previous history of head and neck irradiation, history of the rapid growth of tumor associated with pain, obstructive and compressive symptoms like dyspnea, dysphagia, dysphonia, those with

multiple endocrine neoplasia, autoimmune thyroiditis and toxic goiter.

Cytology and USG were used as preoperative assessment parameters to ascertain the type of surgery and the postoperative histopathology was compared with preliminary FNAC and statistical data has been compiled for the study.

RESULTS

In our study, the thyroid lesions were more common in females than males-85% in females and 15% in males. In this analysis, 30.77% cases fall in 21 to 30 years age group, 23.07% cases in 31 to 40 years, 28.85% cases in 41 to 50 years, 9.62% cases in 51 to 60 years, 7.69% cases in 61 to 70 years age group. It can be inferred that females with thyroid swellings were higher in all age groups when compared to males.

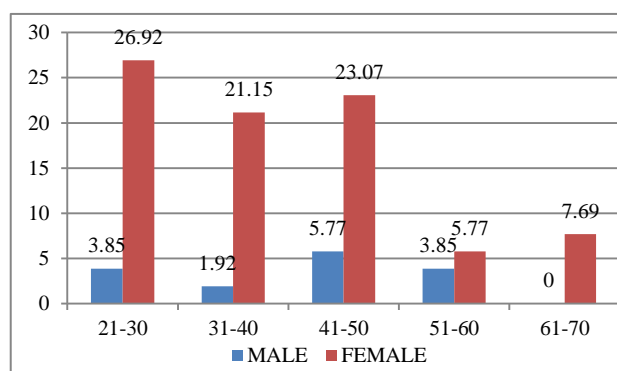


Figure 1: Age and sex distribution.

Any thyroid swelling of at least 0.5 cm to 1.0 cm can usually be detected by palpation, although estimation of size varies from physician to physician and it can be difficult to palpate in a patient with a short neck.

Table 1: Cytology reports.

Benign FNAC	N	Malignant FNAC	N
Colloid/nodular	44	Papillary	5
Adenomatous goiter	1	Follicular undetermined	1
Colloid with adenomatous hyperplasia	1	-	-
Total	46		6

In our study, the size of the smallest thyroid swelling was 0.9×0.8 cms and the size of the largest swelling was 8×6 cms. Out of total 52 palpable thyroid swellings, all were mobile on palpation without any tenderness and all moved up with deglutition. It was observed that the maximum number of thyroid lesions were firm in consistency, followed by thyroid lesions of mixed consistency

Out of 52 cases, benign FNAC's reported were 88.46% and malignant FNAC's were 11.54% of cases. In benign lesions 84.61% were colloids, 1.9% were adenomatous, 1.9% -colloid with adenomatous hyperplasia whereas in malignant FNAC's, 9.61% were reported as papillary carcinoma of thyroid and 1.9% were follicular lesions of undetermined significance (Table 1).

Table 2: Histopathology reports.

Benign HPE	N	Malignant HPE	N
Colloid goiter	37	Follicular carcinoma	1
Adenomatous	1	Papillary carcinoma	7
Colloid with papillary hyperplasia	1	Follicular variant of papillary carcinoma	1
Colloid with adenomatous hyperplasia	2	-	-
Follicular adenoma	2	-	-
Total	43	Total	9

Out of 52 palpable thyroid swellings, based on histopathology 82.69% were benign and 17.31% were malignant. The most common type of presentation according to HPE was colloid goiter observed in 71.15% patients while 1.92% patients had an adenomatous goiter, 1.92% patients had colloid with papillary hyperplasia, and 3.84% patients had colloid with adenomatous hyperplasia and 3.84% showed follicular adenoma (Table 2).

Table 3: Mismatch between FNAC and HPE.

The mismatch between FNAC and HPE	N
Major	3
Minor	5
Total	8

13.46% of patients had papillary carcinoma of thyroid, 1.92% patients had follicular carcinoma and 1.92% of patients had a follicular variant of papillary carcinoma. Hence the most common malignant presentation we

noticed according to our study was papillary carcinoma of the thyroid.

Table 4: Break up of cases based on mismatches.

Major mismatch	Minor mismatch	
Colloid to papillary carcinoma	1	Colloid to follicular adenoma 2
Adenomatous to papillary carcinoma	1	Colloid to adenomatous 1
Colloid to follicular variant of papillary carcinoma	1	Colloid to colloid with adenomatous hyperplasia 1
-	-	Colloid to colloid with papillary hyperplasia 1
Total	3	Total 5

The major mismatch is 5.76% of patients fall in the group of papillary carcinoma of the thyroid in which FNAC fails to diagnose it and the minor mismatch 9.61% patients who fall in the group of the benign variant.

DISCUSSION

In our study, the thyroid lesions were more common in females than males-85% in females and 15% in males like a similar study conducted by Kamale et al found to have 86.5% of female patients.⁵ Results obtained in a study by Rizvi et al and Sengupta et al showed cases diagnosed as colloid goiter in FNAC and turned out into various diagnoses on HPE.^{6,7} Likewise, in our study, the minor mismatch of 3.84% patients misdiagnosed as colloid in FNAC whereas it was diagnosed as follicular adenoma in histopathology, In a major mismatch, 1.92% was misdiagnosed as colloid in FNAC, but it was found to be papillary carcinoma on histopathology. Likewise, two more cases were misdiagnosed as colloid in FNAC but turned out malignant in histopathology. Due to this error, one of the above cases was re-operated for completion thyroidectomy due to the diagnosis of malignancy detected on HPE. The other two cases were planned for hemithyroidectomy for the solitary nodule, but those patients had malignant changes preoperatively (larger than 4 cm in size, fixity to soft tissue and firm nodules) and hence proceeded with total thyroidectomy in the initial setting.

Table 5: Compilation of statistical data.

FNAC	HPE		Sensitivity	Specificity	P value
	Malignant	Benign	Total		
Positive	6	0	6	66.66%	100%
Negative	3	43	46		
Total	9	43	52		
Positive predictive value	100%				<0.001
Negative predictive value	93.47%				

On a comparative note, the sensitivity of our study was 66.6% when compared to Islam et al (76.68%) and Sreeramulu et al (74%) and the specificity came out to be 100% in ours while other studies Sreeramulu et al and Sengupta et al were 100% and 97.26% respectively.^{6,8,9}

The benign to malignant ratio of our study is 1:4.7, which is similar to a study conducted by Sengupta et al (1:5.5) and other similar studies reported by Sreeramulu et al (1:6.1) Safirullah et al (1:7.6).^{7,9,10}

In this study, a discrepancy was noted between FNAC and histopathology of thyroid swellings. Out of 52 cases 46 were diagnosed benign by FNAC correlated with histopathology whereas three cases contradicted with previous FNAC, wherein it was diagnosed to be papillary carcinoma on histopathology which was similar to a study conducted by Islam et al.⁸

CONCLUSION

Fine needle aspiration cytology of thyroid is now a mandatory tool in the initial workup of a thyroid nodule. The sensitivity and specificity of the FNAC test depend on various factors and inter-observer and intra-observer variation is not uncommon. Cases suspicious of malignancy preoperatively are to be notified beforehand to the pathologist's as frozen histology might be useful in a selective group of patients. Histopathology is the gold standard for evaluation of any nodule and help in prognostication, radioiodine therapy and follows up.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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