

Original Article

## “Study On Cytological Evaluation Thyroid Swellings At Our Teritiary Care Hospital

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### ABSTRACT

**Introduction:** Lesions of thyroid are predominantly confined to female in the ratio 5:1 to male. Thyroid enlargement may be diffuse or generalized or localized. Both benign and malignant lesions of thyroid commonly present with a nodule. Prevalence of thyroid nodule ranges from 0.2% to 1.2% in children and from 4-10% in general adult population. Presently due to common use of ultra-sonography in the clinical practice the incidence of thyroid nodule has risen to 14-50%.

**Aim and Objective of the study:** The aim and objective of the study is to correlate thyroid function tests with thyroid nodules and to find out the percentage of different thyroid lesions based on Bethesda system of reporting thyroid cytopathology.

**Materials and Methods:** The study included data from all patients of both genders and all ages presenting with diffuse or nodular thyroid swelling. Demographic and clinical details of the patients were recorded on a pre-approved, pre-validated data sheet. Data of thyroid function tests, i.e. the levels of T3, T4 and TSH hormones was recorded. In all the patients, FNA using a 22 or 23-gauge needle was done following standard procedure under aseptic precautions. Smears were made from the aspirates and were immediately fixed with methanol and stained with H&E and PAP stains. Smears were evaluated by pathologist and categorized as per The Bethesda system of reporting thyroid cytopathology (TBSRTC). The Thyroid Function Test (TFT) profile (T3, T4, TSH) was performed using Chemiluminescence immunoassay method.

**Results:** In the present study, we have included a total of 126 subjects presented to ENT OPD of our hospital based on inclusion and exclusion criteria. 77.7% were females and 22.2% were males, the mean age of the patients was  $41.2 \pm 5.62$  years. Gender distribution showed female preponderance. The distribution of thyroid lesions showed that 88.88% had benign lesion, 7.9% had pre-malignant and 3.17 % had malignant lesions. The cytological diagnosis shows, 66% were consistent with benign follicular nodule, 17.8% Consistent with lymphocytic thyroiditis, 7.14% Atypia of Undetermined Significance or Follicular Lesion of Undetermined Significance, 3.57% Suspicious for a follicular neoplasm and 1.7% suspicious of malignancy. Category 1: 5 had euthyroid, 4 with hyperthyroidism and 1 with hypothyroidism, Category II: 62 had euthyroid, 20 with hyperthyroidism and 30 with hypothyroidism, Category III: 8 had euthyroid, none had hyperthyroidism or hypothyroidism, Category IV: 2 were euthyroid and 2 were hypothyroid and none were hyperthyroid, Category V: 2 had euthyroid, none had hyper or hypothyroid and in Category VI: 1 euthyroid, 3 had hypothyroid and none had hyperthyroid.

**Discussion and Conclusion:** In the present study we found that the cytology remains the gold standard for the diagnosis of thyroid lesions. Hormonal status alone does not help in screening of thyroid lesion. Accurate sampling and USG guided FNAC for sub-centimeter size nodules can help in reducing the number of indeterminate, false-positive, and false-negative diagnoses. In cytologically equivocal cases combination of cyto-morphology, clinical features, thyroid hormonal profile, antibody testing and ultra-sonographic features help in the diagnosis of thyroid lesions. It is recommended that surgical indications must not depend solely on cytology. Indeed, the results of medical history, physical examination, laboratory tests and ultrasonography should also be evaluated simultaneously. Further studies correlating the FNAC results and surgical confirmation can help in strengthening the evidence in support of cytological diagnosis.

**Keywords:** thyroid nodule, euthyroid, hypothyroid, hyperthyroid, fine needle aspiration cytology, benign and malignancy.

## INTRODUCTION

Thyroid is a butterfly-shaped endocrine gland located in the neck. Thyroid secretes two hormones: Triiodothyronine (T3) and Thyroxine (T4). These hormones are necessary for normal survival and functioning of cells of the body. Disorders of the thyroid gland are the most common endocrine disease particularly in countries where iodine intake through diet is low. Normally thyroid gland is not palpable. The term “goiter” is used to describe generalized enlargement of thyroid gland. Disorders of thyroid gland present with either an alteration of hormone secretion or as enlargement (increase size) of the thyroid gland. Thyroid enlargement is the most common sign that are indicated for thyroid disease, it may be diffuse or generalized or localized. Which again classified as toxic or nontoxic. The non-toxic goiter is further classified on etiological basis as endemic goiter and sporadic goiter. The sporadic goiter is due to dys hormonogenesis or impaired utilization of trapped iodine. When more than 10% of population shows enlargement of thyroid gland called endemic goiter.

Lesions of thyroid are predominantly confined to female in the ratio 5:1 to male and this has been attributed to variation of thyroid hormones during female reproductive function and physiological event such as puberty, pregnancy and lactation. Typical problems related to thyroid disorder are fatigue, weight gain, depression, lethargy, dry skin, cold or heat intolerance, change in menstrual cycle, muscle cramps. Thyroid enlargement may be present in both hypothyroidism or hyperthyroidism [1-4].

Goitre commonly develops because of iodine deficiency, biosynthetic defects, autoimmune disease, and nodular diseases. Graves' disease and Hashimoto's thyroiditis are also associated with goitre. Both benign and malignant lesions of thyroid commonly present with a nodule. Various forms of thyroid cancer are relatively common and are amenable to be detected by physical examination. Prevalence of thyroid nodule ranges from 0.2% to 1.2% in children and from 4-10% in general adult population. The benign lesions of thyroid are more common and less than 5% are malignant. The scenario in India is quite different. India has world's biggest “goitre belt” in the sub-Himalayan belt and average prevalence of goitre is around 40%. Though goitre is quite common, cancer of thyroid comparatively rare constituting less than 1% cancer [5-6].

Ultrasonography (USG) is safe, cost effective investigation of choice for determining the extent of thyroid nodule. It will help to differentiate between benign and malignant nodules. USG is very important in management of patients for solitary nodule. Thyroid USG is more sensitive than clinical palpation in identifying multiple nodules. TIRAD (Thyroid Imaging Reporting and Data System) is the gold standard for reporting the thyroid nodules on ultrasonography. This utilizes a systematic scoring system for reporting of thyroid nodules. It helps users for directing about the use

fine needle aspiration (FNA) or ultrasound for follow-up of suspicious nodules, and when to leave the nodules that are benign/not suspicious. FNAC is a cost-effective method and quick for sampling superficial masses found in the neck. The technique can be done in outpatient basis. Fine needle aspiration (FNA) is considered an essential tool in providing a rational approach to the clinical management of thyroid nodules. The result of FNA can determine whether a thyroid nodule should be followed clinically or undergo surgical excision. FNAC is clearly no substitute for histology, especially in determination malignant pattern of follicular thyroid tumor. Ultrasonography (USG), computed tomography (CT) and magnetic resonance imaging (MRI) are still the mainstay for imaging of head and neck tumors. USG is particularly useful in examining superficial masses whereas CT and MRI are used to identify the deeper lesions, particularly involving the skull base and CNS [6-9]. The present study was undertaken to evaluate

### **AIM AND OBJECTIVES OF THE STUDY:**

The aim and objective of the study is to correlate thyroid function tests with thyroid nodules and to find out the percentage of different thyroid lesions based on Bethesda system of reporting thyroid cytopathology.

### **MATERIALS AND METHODS**

**Source of data:** This study was conducted at Dept. of ENT at Institute of Medical Sciences & SUM Hospital, Odisha

**Study population:** We included the subjects in the age group of >30 year and <50 years presenting with thyroid nodules to the ENT OPD at our hospital.

**Study Design:** It is an hospital based observational study.

**Inclusion criteria:** We included the subjects presented to our OPD with thyroid nodules.

**Exclusion Criteria:** We excluded the patients with non-diagnostic biopsy, those with incomplete information.

**Data Collection:** The study included data from all patients of both genders and all ages presenting with diffuse or nodular thyroid swelling. Demographic and clinical details of the patients were recorded on a pre-approved, pre-validated data sheet. Data of thyroid function tests, i.e. the levels of T3, T4 and TSH hormones was recorded. In all the patients, FNA using a 22 or 23-gauge needle was done following standard procedure under aseptic precautions. Smears were made from the aspirates and were immediately fixed with methanol and stained with H&E and PAP stains. Smears were evaluated by pathologist and categorized as per The Bethesda system of reporting thyroid cytopathology (TBSRTC). The Thyroid Function Test (TFT) profile (T3, T4, TSH) was performed using Chemiluminescence immunoassay method. The reference range for T3 (triiodothyronine) - 0.6-1.81 ng/ml, Free T3 (triiodothyronine) -2.18-3.98pg/ml; T4 (Thyroxine)-4.5-12.6 µg/dl, Free T4 (Thyroxine)-0.76-1.46ng/dl; TSH- 0.55 - 4.78 µIU/ml.

**Statistical Analysis:** All the data was entered Microsoft excel sheet and SPSS version 17 was used. Descriptive statistics were presented as frequency, percentage, mean, standard deviation using tables.

## RESULTS:

We included a total of 126 patients presented with thyroid lesions based on inclusion and exclusion criteria in the age group >30 year and <50 years.

**Table 1: Baseline Characteristics of Subjects**

VARIABLES	Number 126	Percentage
<b>GENDER</b>		
Female	98	77.7
Male	28	22.2

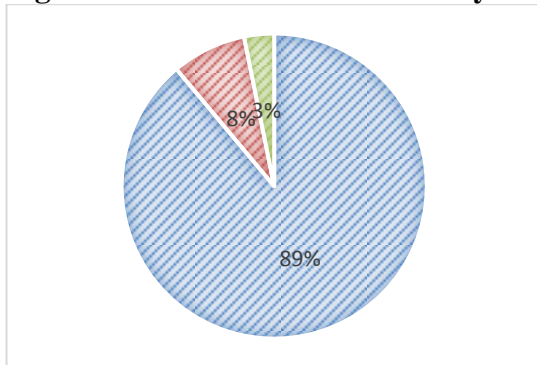
It is evident from the table 1 that 77.7% were females and 22.2% were males, the mean age of the patients was  $41.2 \pm 5.62$  years. Gender distribution showed female preponderance.

**Table 2: Shows Distribution of thyroid lesions based on FNAC and HPE**

Type of Oral Cavity lesion	Number of Subjects	Percentage
Benign	112	88.88
Non-diagnostic	10	7.9
Malignant	4	3.17

It is evident from the above table 88.88% had benign lesion, 7.9% had pre-malignant and 3.17 % had malignant lesions.

**Figure 1: Shows Distribution of thyroid lesions based on FNAC and HPE**



**Table 3: Shows Distribution of cases as per Bethesda system for reporting Thyroid Cytology**

Category	Cytological diagnosis	No of Subjects	Percentage
I	Non-diagnostic/Unsatisfactory	10	7.9
II	Benign	112	88.88
	Consistent with a benign follicular nodule	74	66
	Consistent with lymphocytic thyroiditis	20	17.8
	Consistent with granulomatous thyroiditis	4	3.57
III	Atypia of Undetermined Significance or Follicular Lesion of Undetermined Significance	8	7.14
IV	Suspicious for a follicular neoplasm	4	3.57
V	Suspicious for malignancy	2	1.7
VI	Malignant		
	Papillary carcinoma of thyroid	4	3.17

**Table 4: Shows the correlation of thyroid function test with Bethesda Categories**

TFT	TBSRTC categories					
	I	II	III	IV	V	VI
<b>Euthyroid</b>	5	62	8	2	2	1
<b>Hyperthyroid</b>	4	20	0	0	0	0

<b>Hypothyroid</b>	1	30	0	2	0	3
<b>Total</b>	10	112	8	4	2	4

## DISCUSSION

In the present study, we have included a total of 126 subjects presented to ENT OPD of our hospital based on inclusion and exclusion criteria. 77.7% were females and 22.2% were males, the mean age of the patients was  $41.2 \pm 5.62$  years. Gender distribution showed female preponderance. The distribution of thyroid lesions showed that 88.88% had benign lesion, 7.9% had pre-malignant and 3.17 % had malignant lesions. The cytological diagnosis shows, 66% were consistent with benign follicular nodule, 17.8% Consistent with lymphocytic thyroiditis, 7.14% Atypia of Undetermined Significance or Follicular Lesion of Undetermined Significance, 3.57% Suspicious for a follicular neoplasm and 1.7% suspicious of malignancy. Thyroid function tests report available for the patients which shows, Category 1: 5 had euthyroid, 4 with hyperthyroidism and 1 with hypothyroidism, Category II: 62 had euthyroid, 20 with hyperthyroidism and 30 with hypothyroidism, Category III: 8 had euthyroid, none had hyperthyroidism or hypothyroidism, Category IV: 2 were euthyroid and 2 were hypothyroid and none were hyperthyroid, Category V: 2 had euthyroid, none had hyper or hypothyroid and in Category VI: 1 euthyroid, 3 had hypothyroid and none had hyperthyroid.

Thyroid swelling is a very common endocrine disorder, especially in females worldwide. Due to easy availability of newer investigations, it has become possible to diagnose these swelling early. Thyroid enlargement, whether diffuse or nodular, leads to a battery of investigations, mainly to rule out the possibility of a neoplasm or thyroiditis. FNAC is the first line of investigation and other investigations like ultra-sonography (USG), TFT, thyroid scan and antibody levels are done subsequently for appropriate management [10].

According to the guidelines of American Thyroid Association, serum estimation of TSH should be part of initial assessment of thyroid swellings. Additional evaluation is required when overt or subclinical hyperthyroidism is present. A higher serum TSH level, is usually associated with increased risk of malignancy in a thyroid nodule, as well as more advanced stage thyroid cancer.

The mean age in the present study correlates well with the studies conducted by Thakor T *et al.*, Jain V *et al.* and Das MK *et al.* where the mean age at presentation was 39.6 years, 41.3 years and 40.4 years respectively. The male: female ratio in the present study was which correlates well with the studies conducted by Thakor T *et al.* and Jain V *et al.* which reported a male: female ratio of 1:5.3 and 1:6.2, respectively [11].

Most common thyroid lesions of Bethesda category II in our study were benign follicular nodule and majority were euthyroid which is similar to findings stated by Jain V *et al.* (88.1%). On hormonal assay, majority of patients of lymphocytic thyroiditis in present study showed hypothyroidism, suggesting an advanced stage of the disease at the time of diagnosis and represented destructive phase of the disease.

## CONCLUSION

In the present study we found that the cytology still remains the gold standard for the diagnosis of thyroid lesions. Hormonal status alone does not help in screening of thyroid lesion. Accurate sampling and USG guided FNAC for sub-centimeter size nodules can help in reducing the number of indeterminate, false-positive, and false-negative diagnoses. In cytologically equivocal cases combination of cyto-morphology, clinical features, thyroid hormonal profile, antibody testing and ultra-sonographic features help in the diagnosis of thyroid lesions. It is recommended that surgical indications must not depend solely on cytology. Indeed, the results of medical history, physical examination, laboratory tests and ultrasonography should also be evaluated simultaneously. Further

studies correlating the FNAC results and surgical confirmation can help in strengthening the evidence in support of cytological diagnosis.

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