



## Cytological Diagnosis of Thyroid Lesions with Age & Sex Incidence in a Rural Teaching Hospital

Authors

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### Abstract

*Diseases of the thyroid gland are very common and comprise a wide spectrum of disorders. Fine needle aspiration is a well-established diagnostic tool for the evaluation of palpable thyroid swellings. FNAC bridges the gap between the clinical evaluation and final surgico-pathological diagnosis and helps to reduce unwarranted surgeries. This study was undertaken to determine the utility and efficacy of FNAC in the diagnosis of thyroid lesions. A two year prospective study was conducted in the Department of Pathology, Rajah Muthiah Medical College and Hospital, Chidambaram, Tamil Nadu, from 1<sup>st</sup> September 2015 to 31<sup>st</sup> August 2017. The study consisted a total of 476 cases diagnosed as thyroid lesions and referred for cytological study by the departments of ENT and Surgery.*

**Keywords:** FNAC thyroid, The Bethesda System for Reporting Thyroid Cytopathology (TBSRTC).

### Introduction

Diseases of the thyroid gland are very common and comprise a wide spectrum of disorders. Lesions of the thyroid gland can be developmental, inflammatory, hyperplastic or neoplastic. It can vary from a localized abnormality in the thyroid gland such as nodular enlargement (goiter) to a systemic disease (Grave's disease) or a tumor mass. Thyroid disorders are more common in countries where iodine intake through diet is low.

A solitary thyroid nodule is defined as a single palpable, clinically detected nodule in the thyroid. There is a higher probability of malignancy in it, ranging from 5 – 35% and hence causes more concern<sup>1</sup>. Nodular lesion comprises those

disorders that produce a clinical nodule and consists of non-neoplastic hyperplasia as well as benign and malignant tumours<sup>2</sup>. Diffuse thyroid lesions affect the entire gland such as hyperplasia and thyroiditis.

Thyroid nodularity is very common and the incidence of malignancy is comparatively low. Hence the goal of a diagnostic workup is to select those patients for surgery who have a higher incidence of harboring malignancy<sup>3</sup>.

Fine needle aspiration is a well-established diagnostic tool for the evaluation of palpable thyroid swellings. Currently this technique is practiced worldwide and is commonly the first line investigation of choice in thyroid and other palpable swellings of breast, salivary glands, soft

tissue, lymph nodes, skin etc. The technique is relatively painless, produces a speedy result and is inexpensive. It also has high patient acceptance. Its accuracy in many situations, when applied by experienced and well trained practitioners, can approach to that of histopathology in providing an unequivocal diagnosis. However aspiration cytology cannot become a substitute for conventional surgical histopathology and should always be regarded as an essential component of pre-operative / pre-treatment investigation of pathological processes.

It is sometimes difficult by clinical evaluation to distinguish a malignant thyroid lesion from its benign counterpart. Thyroid cancers exhibit a wide range of aggressiveness which complicates both the diagnosis and management. In such cases FNAC bridges the gap between the clinical evaluation and final surgico-pathological diagnosis and helps to reduce unwarranted surgeries. The immediate diagnosis helps to relieve the patient's anxiety and to plan a definite line of treatment.

Studies should always be undertaken intermittently to know the overall disease pattern of an organ in a particular region. Evaluation of diagnostic parameters of a frequently used diagnostic modality that is used as basis of patient management is also essential. Hence this study was undertaken to determine the utility and efficacy of FNAC in the diagnosis of thyroid lesions.

### **Aims & Objectives**

1. To study the cytomorphological patterns and features of palpable thyroid lesions by FNAC as per The Bethesda System for Reporting Thyroid Cytopathology (TBSRTC)
2. To study age and sex distribution of thyroid lesions.

### **Materials & Method**

This was a prospective study carried out in the Department of Pathology, RMMCH, Chidambaram, Tamil Nadu, from 1<sup>st</sup> September

2015 to 31<sup>st</sup> August 2017. 476 patients having thyroid lesions, irrespective of their age and sex, referred for cytological study from ENT OPD, Surgery OPD and admitted to ward were included in the study. In each patient a detailed clinical history was obtained and thorough clinical examination was done prior to procuring sample for cytological study. Contraindications were bleeding diathesis and non-compliance. Patients not willing for fine needle aspiration cytology of their thyroid lesions even after explaining the purpose, utility and consequence of the procedure were excluded from the study.

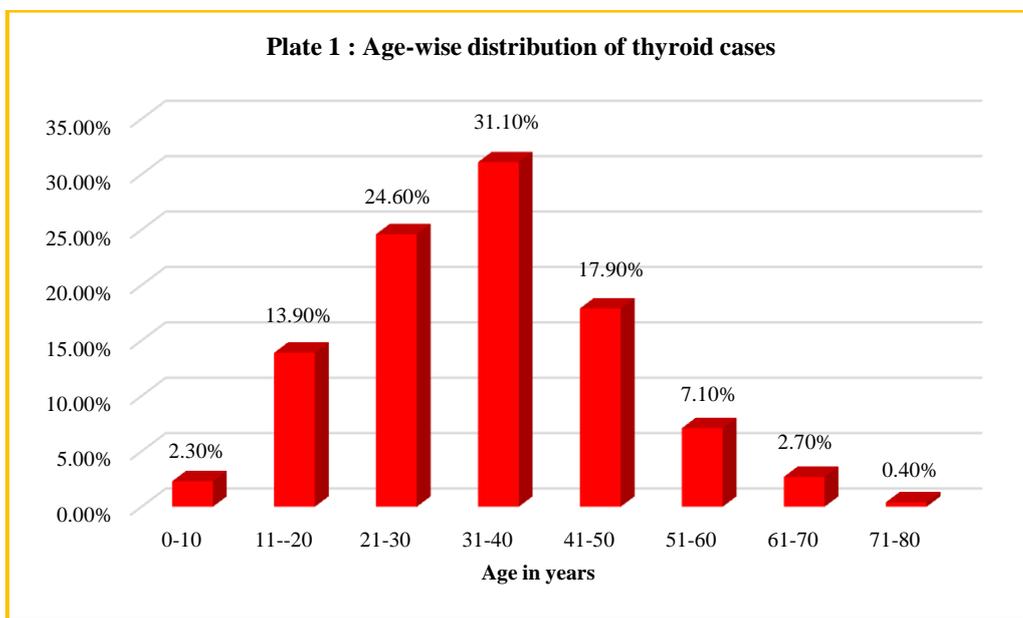
The procedure was explained to the patient to make them comfortable and free of anxiety and fear. Aspiration of the thyroid was performed with 22 or 23 gauge needle by an experienced operator. The patient was given supine position and a pillow was placed below the shoulders which helped extend the neck and make the thyroid lesion prominent. Patients were asked not to speak or swallow during procedure. Proper aseptic precautions were taken and the needle was inserted into the gland. The plunger of the syringe was withdrawn to apply full suction and apply negative pressure. As thyroid is a highly vascular organ, multiple rapid passes with a maintained negative pressure increases bloody aspirates and thus dilutes the cellular component of the sample. The needle was thus rapidly moved in and out along the same track of needle insertion, rather than multiple directions. At the first appearance of aspirate, the plunger was released to equalize the pressure. The needle was dis-engaged from the syringe and then, removed from the mass. Manual pressure was applied at puncture site at least for five minutes. The plunger of the same syringe was retracted, syringe was attached to the needle and the material was pushed out on previously labelled clean glass slides to avoid splattering of the material. After procuring the specimen with the help of another glass slide, tongue shaped smears are prepared on the middle third of the slide. Usually 4-5 slides were prepared, air-dried and stained with Giemsa stain.

**Results**

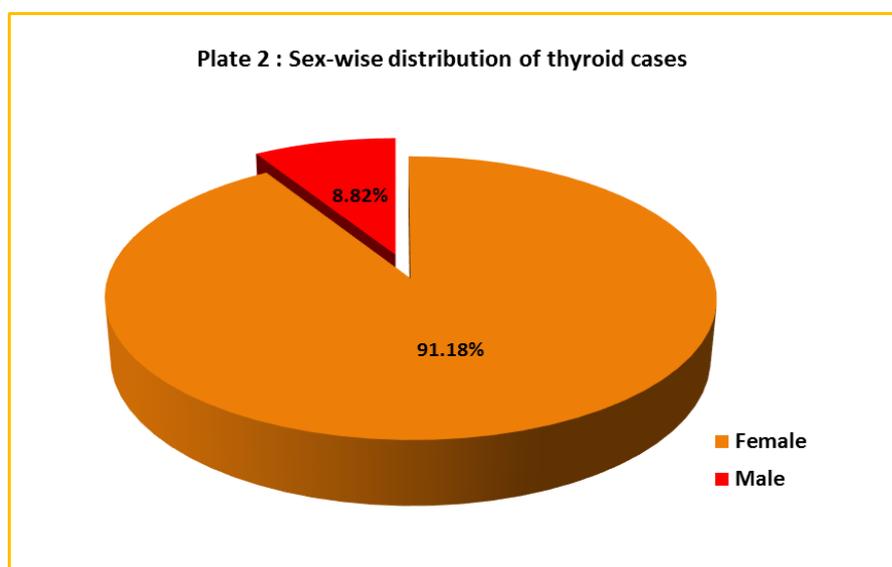
The present study included a total of 476 patients having thyroid lesions. The age of presentation ranged from 2 to 72 years in our study of two years, with a mean age of 34.74 years. The highest incidence was found to be 31.10% in the age group of 31 to 40 years. The age of the youngest patient in this series was two and a half years with the cytological diagnosis of thyroglossal cyst and the oldest patient was of 72 years with cytological diagnosis of nodular colloid goitre with cystic degeneration (Table 1, Plate 1)

**Table 1: Age-wise distribution of thyroid cases**

Age group in years	No. of cases	Percentage (%)
0-10	11	2.3
11-20	66	13.9
21-30	117	24.6
31-40	148	31.1
41-50	85	17.9
51-60	34	7.1
61-70	13	2.7
71-80	2	0.4
Total	476	100.0



Out of the 476 cases, 434 (91.18%) were females and 42 (8.82%) were males. The female to male ratio was 10.33:1. (Plate 2)



Among the routine cytological diagnosis of 476 thyroid lesions, 89.29% of the cases were non-neoplastic and only 2.73% were neoplastic. The most common diagnosis in our study was colloid goiter (62.39%), followed by Hashimoto's thyroiditis (21.23%). Granulomatous thyroiditis was the least common condition, identified only in 1 case. Among the neoplastic lesions, papillary carcinoma was the most common tumor, identified in 6 cases. (Table 2)

The results were further classified based on the 2007 Bethesda Classification into (I) Inadequate/Non-diagnostic; (II) Benign; (III) Atypia with Undetermined Significance (AUS); (IV) Follicular neoplasm or Suspicious for Follicular Neoplasm; (V) Suspicious for malignancy and (VI) Malignant

In the present study, maximum lesions belonged to Category II (89.29%) followed by Category I (7.98%). No case was reported under Atypia of Undetermined Significance. (Table 3)

**Table 2:** Routine cytological diagnosis

Routine cytological reporting	No. of cases	Percentage
Non-neoplastic	425	89.29
( I ) Colloid goiter	297	62.39
Nodular colloid goiter	161	33.82
Nodular colloid goiter with cystic degeneration	89	18.70
Nodular colloid goiter with lymphocytic thyroiditis	34	7.14
Nodular colloid goiter with toxic changes	13	2.73
( II ) Thyroglossal cyst	2	0.42
( III ) Thyroiditis	126	26.48
Granulomatous thyroiditis	1	0.21
Lymphocytic thyroiditis	21	4.41
Hashimoto's thyroiditis	101	21.23
Acute thyroiditis	3	0.63
Neoplastic	13	2.73
Follicular neoplasm	3	0.63
Papillary carcinoma	6	1.26
Suspicious of neoplasm	4	0.84
No opinion possible	38	7.98
Total	476	100

**Table 3:** Diagnostic categorization based on The Bethesda System of Classification

Categories	No. of cases	Percentage
Group I : Inadequate/Non-diagnostic	38	7.98
Group II : Benign	425	89.29
Group III : Atypia with Undetermined Significance (AUS)	0	0
Group IV : Follicular neoplasm or Suspicious for Follicular Neoplasm	3	0.63
Group V : Suspicious for malignancy	4	0.84
Group VI : Malignant	6	1.26

### Discussion

Thyroid disorders are the most common endocrine disorders worldwide and observed in 4-7% of the population. It has been estimated to affect 42 million people in India<sup>4</sup>. Thyroid enlargement whether nodular or diffuse needs thorough investigation, mainly to differentiate malignancy from thyroiditis. Early diagnosis of thyroid cancer provides higher life expectancy. Excision of all thyroid lesions is not possible. Hence an effective screening test is essential to avoid unnecessary surgery. FNAC is extremely valuable and recommended as first choice of investigation.

In the present study, FNAC of thyroid lesions was performed in 476 patients. The age of patients ranged from 2 to 72 years. The mean age was 34.74 years and maximum cases were in the age group of 31 – 40 years which was consistent with other studies like Renuka I V et al ( 2011)<sup>5</sup> and Kumar A et al (2017)<sup>6</sup>.

Thyroid disorders are more common in females owing to the presence of estrogen receptors in thyroid tissue<sup>7</sup> and our study shows the same. The females outnumbered males in the ratio of 10.33:1 which was in concordance with previous studies by Hirachand et al (2013)<sup>8</sup> and Anil Kumar et al (2016)<sup>9</sup>.

Out of 476 cases, no opinion was possible in 38 cases due to faulty technique or inadequate sampling of a sclerotic lesion.

Benign nodular goiter formed majority of cases (62.39%) in the present study. Cytological study

revealed monolayered sheets of thyroid follicular cells along with abundant colloid. Among these 18.70% showed features of cystic degeneration with abundant foamy macrophages.

Following colloid goiter, thyroiditis was the next common lesion seen consisting of 26.48%. Among these Hashimoto thyroiditis (21.23%) revealed prominent hurthle change with lymphocytic infiltrate.

Papillary carcinoma was the most common tumor in the present study, which revealed high cellularity, syncytial sheets and clusters of follicular epithelial cells showing nuclear grooves, intracytoplasmic inclusions and scanty cytoplasm.

### Conclusion

FNAC is the primary tool of investigation in thyroid lesions. It helps to triage patients into operative and non-operative groups. Thus, with the present study we conclude that FNAC is a cost-effective procedure that helps to minimize surgical burden. Non-neoplastic lesions were commonly encountered in our study, which was consistent with other studies.

### References

1. Ananthkrishnan N, Rao KM, Narasimhans R, Veliath, Smilet SR, Jagadish S. The Single Thyroid Nodule: A South Indian Profile of 503 Patients with Special Reference to Incidence of Malignancy. *Indian J Surg.* 1993; 55(10):487-92.
2. Baloch Z, Livolsi V. Pathology of thyroid and parathyroid disease. In: Sternberg's diagnostic surgical pathology. 4th ed. Edinburgh: Lippincott Williams & Wilkins. 2004:557-95.
3. Kamaljit Kaur, Nishi Sonkhya, A.S.Bapna, Pradeep Mital. A comparative study of fine needle aspiration cytology, ultrasonography and radionuclide scan in the management of solitary thyroid nodule: a prospective analysis of fifty cases. *Indian Journal of Otolaryngology and Head and Neck Surgery* Vol.54(2) April-June 2000:96-101
4. Raniwala A, Wagh DD, Dixit-Shukla A, Shrikhande N, Padmawar M. Study and correlation of clinical, radiological, cytological, and histopathological findings in the diagnosis of thyroid swellings. *J Datta Meghe Inst Med Sci Univ* 2017;12:138-42.
5. Renuka IV, Saila Bala G, Aparna C, Kumari R, Sumalatha K. The Bethesda System for Reporting Thyroid Cytopathology: Interpretation and Guidelines in Surgical Treatment. *Indian Journal of Otolaryngology and Head & Neck Surgery.* 2012;64(4):305-311. doi:10.1007/s12070-011-0289-4.
6. Kumar A, Bhadouriya SKS, Narain P, Chauhan JPS, Bharti B, Singh J. Comparative study of FNAC and histopathology of thyroid swellings, diagnostic accuracy and role in its management. *Int J Otorhinolaryngol Head Neck Surg* 2017;3:885-92.
7. Gupta A, Jaipal D, Kulhari S, Gupta N. Histopathological study of thyroid lesions and correlation with ultrasonography and thyroid profile in western zone of Rajasthan, India. *Int J Res Med Sci* 2016;4:1204-8.
8. Hirachand S et al. Accuracy of fine needle aspiration cytology in diagnosis of thyroid swelling. *Journal of Pathology of Nepal* (2013) Vol. 3, 433 – 436
9. Anil Kumar et al. "A Cytomorphological Study of Thyroid Lesions with Special Reference to Macrophages". *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*. Volume 15, Issue 4 Ver. XIII (Apr. 2016), PP 36-42.