

## CYTODIAGNOSIS OF THYROID LESIONS AND ITS CORRELATION WITH HISTOPATHOLOGY

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### ABSTRACT

FNAC is an out patient procedure. It is cost effective, gives quick result with good sensitivity and specificity. It gives accurate information on diagnosis. It gives idea about surgical intervention and clinical follow-up. Present study is about neoplastic and non-neoplastic thyroid lesions by FNAC and correlate with histopathology and establish the sensitivity and specificity of this technique in thyroid lesions. Of the total 73 cases only 13 cases were available for follow-up and histopathology examination. Of these 13 follow up cases, cytological diagnosis and histopathological diagnosis were same in 11 cases (85%) and different in 2 cases (15%). Retrospective study was done in SBMCH, Department Of Pathology, Chennai, Tamilnadu between June 2018 to may 2019. The minimum age of the patient is 10 and maximum age of the patient is 69. Total number of cases were 73, in that 61 (83%) were non- neoplastic, 8 (10.3%) were neoplastic and 4(5.4%) are unsatisfactory. The total number of females were 69(94.5%) and males were 4(5.5%). High incidence are seen in age group 40-49 (21 cases) and least incidence are seen in age group 10-19 (2cases). Thyroid swelling is significant clinical problem but majority of them are non-neoplastic and donot require surgery. The clinical screening procedure includes USG, FNAC and radionucleotide scan. Most of the thyroid lesions in this study are benign. The neoplastic and malignant lesion are few and they well correlated with histopathological examination. Cytological diagnosis of thyroid lesions according to Bethesda system, Nondiagnostic/unsatisfactory, Benign, Atypia of undetermined significance /Follicular lesion of undetermined significance (FLUS), Follicular neoplasm/Suspicious for a follicular neoplasm, Suspicious of malignancy, Malignancy.

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### INTRODUCTION

Acceptable, widely used, minimal invasive procedure, safe, simple and rapid. FNAC of thyroid was documented in the Martin and Ellis paper of 1934. Now FNAC is recognised as first line investigation in solitary thyroid lesion and it can be done in other sites like spleen, liver, breast, lymph nodes, bone marrow. FNAC thyroid have been used since 40 years. Common clinical finding is diffuse enlargement of thyroid or solitary thyroid nodule. Most common are non-neoplastic lesion and also seen common in females. We present our study of 73 cases of thyroid lesion reported on FNAC and its correlation with Histopathology for a period of 1 year. Bethesda system of thyroid cytology reporting makes the reports clinically relevant and help the clinician to take appropriate therapeutic intervention.

#### Objectives

With the use of FNAC to study the thyroid lesions and to correlate the FNAC findings with histopathology and to establish sensitivity and specificity of this technique in thyroid lesion.

### MATERIALS AND METHOD

Study was done in SBMCH, Department of pathology, Chennai, Tamilnadu. 1 year retrospective study was done from june 2018 to may 2019. Patient with palpable thyroid mass are included in the study. The study was conducted between the age group 10 to 69 and the total number of cases are 73. The smears were evaluated and diagnosed according to the Bethesda system as Nondiagnostic/unsatisfactory, Benign, Atypia of undetermined significance /Follicular lesion of undetermined significance (FLUS). Follicular neoplasm/ Suspicious for a follicular neoplasm, Suspicious of malignancy, Malignancy. Aspiration was carried out using 5 or 10 ml disposable syringe with 22-25 gauge needle attached.

Then the material was fixed in 95% ethyl alcohol and routinely stained with hematoxylin and eosin (H&E) stains. The cytomorphological features were studied and final diagnoses were given. The correlation was done with histopathological examination. The received postoperative biopsy or surgical excised specimen were fixed in 10% buffered formalin and subjected to gross examination, processing, paraffin embedding, and section cutting, staining by H&E and mounted. The histomorphological features of various diseases

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thyroid lesions were studied. FNAC and histopathological examination of the same lesions were correlated where required.

**RESULT**

In the study of 73 cases, 61 (83%) were non- neoplastic, 8 (10.3%) were neoplastic and 4(5.4%) are unsatisfactory. The total number of females were 69(94.5%) and males were 4(5.5%).High incidence are seen in age group 40-49 (21 cases) and least incidence are seen in age group 10-19 (2cases).Most common Non -neoplastic lesions are Nodular goitre 27 cases (44%) , followed by Hashimoto's Thyroiditis 21 cases (35%) and least are Lymphocytic Thyroiditis and Colloid cyst which both are 3(4.4%) in number. Similarly most common Neoplastic lesions are Papillary carcinoma 5 cases (62.5%), followed by Follicular neoplasm 2 cases (25%). Out of 73 cases only 13 cases were available for follow-up and histopathology examination. Of these 13 cases, cytodiagnosis and histopathological diagnosis are same in 11(85%) and different in 2 (15%). Out of these 11 cases, 8 cases comes under category II, 2 cases comes under Category IV and 1 case come under Category VI according to Bethesda system.

Out of those 2 cases which donot correlate with histopathological diagnosis one is Nodular hyperplasia of thyroid (category II) and other is medullary carcinoma (category VI) according to Bethesda system.

FNAC result showed Sensitivity 91.2%, Specificity 95.2%, Possitive predictive value 89.8%, Negative predictive value 93.2%, False possitive rate 66.6%, False negative rate 33.3%. Total accuracy is 96.7%.

**Age and Sex Distribution of the Thyroid lesions**

AGE	No.of Cases	Males	Females
10-19	2	0	2
20-29	10	0	10
30-39	14	0	14
40-49	23	2	21
50-59	17	1	16
60-69	7	1	6
TOTAL	73	4	69

**Incidence of Non-Neoplastic lesions**

LESION	Number of Cases	Percentage%
Nodular Goiter	27	44
Colloid Goiter	7	11.4
Colloid Cyst	3	4.9
Hashimoto's thyroiditis	21	34.4
Lymphocytic thyroiditis	3	4.9
TOTAL	61	

**Incidence of Neoplastic lesions**

LESION	Number of Cases	Percentage%
Papillary Carcinoma	5	62.5
Medullary Carcinoma	1	12.5
Follicular Neoplasm	2	25
TOTAL	8	

**FNA diagnosis of thyroid lesions – Bethesda System**

FNA Diagnosis	Number	Percentage
Nondiagnostic/unsatisfactory	4	5.4

Benign	61	83.5
Atypia of undetermined significance/Follicular lesion of undetermined significance (FLUS)	0	0
Follicular neoplasm/suspicious for a follicular neoplasm	2	2.73
Suspicious of malignancy	0	0
Malignancy	6	8.2
TOTAL	73	

**Hashimoto's Thyroiditis -Hurthle cell changes with few lymphocytes seen**

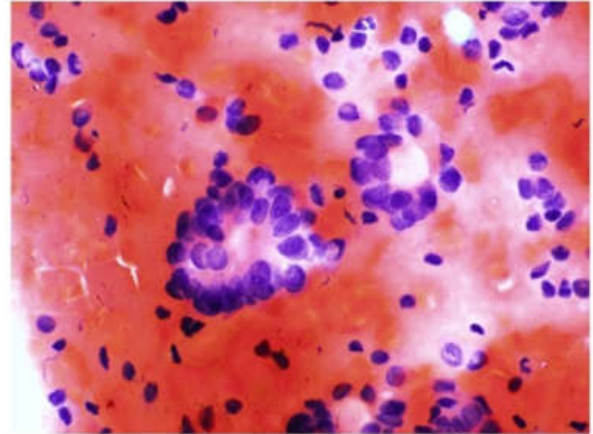


Fig. 1 Fine needle aspiration cytology of Follicular variant of papillary thyroid carcinoma showing cells with nuclear features of papillary carcinoma arranged in follicular pattern (pap stain, X400)

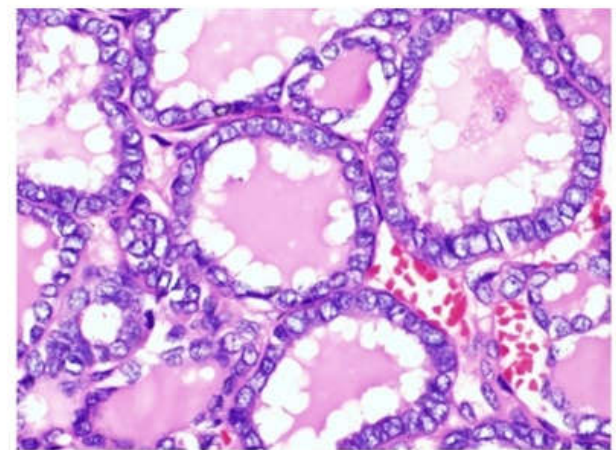
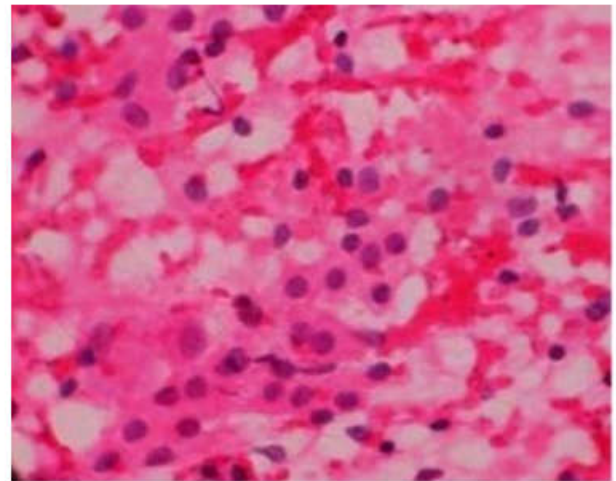


Fig. 2 Histopathology of Follicular variant of papillary thyroid carcinoma showing cells with nuclear features of papillary carcinoma arranged in follicular pattern (H&E, X 400)

## DISCUSSION

Thyroid lesions are common clinical findings and have a reported prevalence of 4–7% in adult population [3]. Fine needle aspiration (FNAC) is an ideal first line diagnostic test in evaluating thyroid nodules [4]. The procedure is regarded as a valuable method of diagnosing various thyroid lesions and distinguishing between malignant lesions from those with benign lesions that can be followed clinically [4]. It has been proposed as a pre-operative screening method to reduce the number of patients with benign nodules for surgery [1,2].

Hashimoto thyroiditis is part of the spectrum of autoimmune thyroid diseases and is characterized by the destruction of thyroid cells by various cells and antibody-mediated immune processes. This condition is the most common cause of hypothyroidism. Microscopy shows pleomorphic Hurthle cells with moderate to abundant cytoplasm, central to peripheral nucleus, increased nuclear- cytoplasmic ratio and sometimes binucleate forms. These cells can be seen arranged in crowded three- dimensional aggregates, sheets, and in micro-follicular pattern.

Colloid nodular goiter is the enlargement of an otherwise normal thyroid gland. Colloid nodular goiters are also known as endemic goiters. They are usually caused by not getting enough iodine in the diet. Colloid nodular goiters tend to occur in certain areas with iodine-poor soil. Risk factors for colloid nodular goiters include-being over age 40, being female, having a family history of goiter, living in an area where there is endemic iodine deficiency, not getting enough iodine in your diet. On cytology, aspirate contains abundant colloid, scant follicular cells, monolayer sheets- the cells are small, uniform with central nucleus. cytoplasm pale and have abundant para vacuolar granules.

Follicular adenoma is a benign encapsulated tumor that shows evidence of follicular differentiation. Generally it is a solitary cold nodule that corresponds to a lesion that can reach 10 cm in diameter. Cellular smears comprising of sheet like, numerous layered cell aggregates of different patterns of varying cell types in colloid and hyperplastic nodules. Clusters made up of small acini with a central lumen may contain small amount of colloid representing the micro follicles. These micro follicles, otherwise referred to as fetal follicles are the characteristic of follicular neoplasm but may be found focally in multinodular goiter. Rosette like groupings without a lumen suggests a more solid growth patterns (embryonal). A trabecular pattern is appreciated if the epithelial cells are arranged in rows and elongated structures made up of cells attaching themselves to the strands of vascular stroma and mimicking a papillary structure. Small blood vessel with adherent epithelial cells can be found in any type of follicular neoplasm (5, 6). The cytological diagnosis of follicular tumors is difficult because the criterion does not rest fundamentally on cellular characteristics but on other aspects, such as capsular or vascular invasion and metastases at a distance.

Papillary carcinoma of thyroid is a malignant epithelial tumor that forms papillary and follicular structures and exhibits characteristic nuclear changes [7]. Papillary carcinoma is the most common histological variant of thyroid carcinoma and it is the thyroid tumor most often associated with irradiation of the head and neck. Female patients are affected 3 times more than male. Aspirations of papillary carcinoma has cytological picture as hypercellular smears, cells arranged in to papillary

structures or monolayers with digitiform projections or in syncytial aggregates or are dispersed. The papillary structures can have varied morphology and dimensions with or without fibro vascular core. The sheets of cells may have distinct anatomical border, nuclear crowding or overlapping [5, 6]. The nuclei are oval, moderately pleomorphic and the nucleolus is generally small. The optically clear or ground glass (orphan Annie) so characteristic of the histological sections is not noted in smear.

Our study is in correlation with the study done by N kukar *et al.*; [8], where the age of presentation of various thyroid lesions ranged from 11 years to 70 years with maximum patients falling in the age group of 31- 60 years.

Thyroid lesions are more prevalent in females than males. In our study 94.5% of cases were females and 5.5% males. Similar findings were reported by N kukar *et al.*; and Dorairagen N *et al.*; [9].

In our study, our incidence of non-neoplastic lesions correlating with the analysis of 1344 cases of thyroid lesions conducted by Hyang Mi KO *et al.*; [10] 83.4% cases were nonneoplastic 1.6% follicular neoplasm, 7.3% malignant, 2.7% indeterminate & 5% unsatisfactory. We have reported 83 % of thyroid lesions as non-neoplastic and remaining 10.3% as neoplastic lesions and 5.45% as unsatisfactory.

In the study by yang *et al* (11) in 2007, of the total cases, 52.97% were of follicular neoplasm, 34.96% of papillary, medullary and anaplastic carcinoma and 12.07% suspicious of malignancy. In our study 83% are Non –Neoplastic, 10% are neoplastic. Out of 10% neoplastic most common is papillary carcinoma (62.5%), follicular neoplasm (25%) and medullary carcinoma (12.5%).

## CONCLUSION

FNAC is patient friendly, out patient procedure, cost effective , gives basic to accurate information regarding lesions with good sensitivity and specificity. Most of them are benign and there were few malignant lesion which correlated with histopathology. FNAC avoids unnecessary surgical interventions. Thus to conclude while excision biopsy remain gold standard for the diagnosis of thyroid lesions. Cytological study can establish the diagnosis of majority of thyroid lesion and can be used as adjunct HPE.

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