



## Fine Needle Cytology of Thyroid in a Tertiary Care Hospital

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### Abstract

**Background:** *Thyroid fine needle aspiration cytology is a valuable tool used for diagnosing and classifying thyroid lesions.*

**Material and Methods:** *The present prospective cytological study of thyroid lesions by fine needle aspiration was undertaken in the Department of Pathology from July 2010 to June 2012. A detailed clinical history was obtained before aspiration. Wet fixed smears were stained with haematoxylin and eosin and papanicolaou. Air dried smears were stained with May-Grunwald Giemsa stained.*

**Result:** *Out of 543 adequate thyroid aspirates, 144 (52.74%) cases of goitre, 72 (26.37%) cases of thyroiditis, 4 (1.46 %) cases of Grave's disease, 1 (0.36%) case of thyroid cyst, 28 (10.25%) cases of indeterminate neoplasm and 25 (9.15%). cases of malignancies.*

**Conclusions:** *FNAC plays a pivotal role in diagnosing thyroid lesions, classifying them into benign and malignant and also to study the salient features of each lesion.*

**Keywords:** *thyroid, neoplasm, goitre, neck mass, malignancy, fine needle aspiration cytology.*

### Introduction

When a patient presents with enigmatic mass in the thyroid region, an evaluation is initiated which take in to account a myriad of possibilities. The traditional workup consists of a detailed clinical history and examination. FNAC of such masses is rapid, safe and direct procedure for obtaining material for cytological analysis. An intelligent diagnosis and therapeutic rationale thus evolves. The lesions range from inflammatory lesions to developmental anomalies, benign to malignant neoplastic lesions involving of thyroid gland. Early recognition and categorization of these lesions is

helpful to increase the number of cures and further management of patients. Fine needle aspiration cytology (FNAC), is of particular relevance in thyroid lesion because of the easy accessibility of target sites and excellent patient compliance due to the minimally invasive nature of the technique.<sup>[1]</sup> The important aspect of this technique is to avoid the surgeries in situations like non neoplastic, inflammatory and metastatic lesions and also it helps in rationally planning surgery<sup>[2]</sup>. Use of FNAC for palpable masses in the head, face and neck region is well established and its accuracy is well documented. <sup>[3],[4],[5]</sup>.

### Aims and objectives of the study

1. To classify thyroid lesion in to benign and malignancy
2. To study the salient cytomorphological features of each lesion
3. To discuss the utility of the fine needle aspiration technique in diagnosing various thyroid lesions and its usefulness as a preliminary guideline for further management of patients.
4. To evaluate the diagnostic accuracy of fine needle aspiration technique by correlating cytological and histopathological diagnosis.

### Methodology

The present prospective cytological study of thyroid lesions by fine needle aspiration was undertaken in the Department of Pathology from July 2010 to June 2012. The patients referred to the cytology section from clinical O.P.D. as well as patient admitted in wards were included in the study. Prior to aspiration detailed clinical history was obtained. The method of aspiration cytology used in the present study is same as described by Franzen and their colleague, Frable<sup>[6]</sup>. Before aspirating a swelling, thorough knowledge of the anatomy of area is required. Procedure was described in detail to the patient for his co-operation during actual procedure and written consent was taken from patient. The patient was made to lie in supine position, placing the pillow under the neck which tends to expose the gland more, bringing it away anteriorly from sternomastoid muscle and surrounding soft tissues.

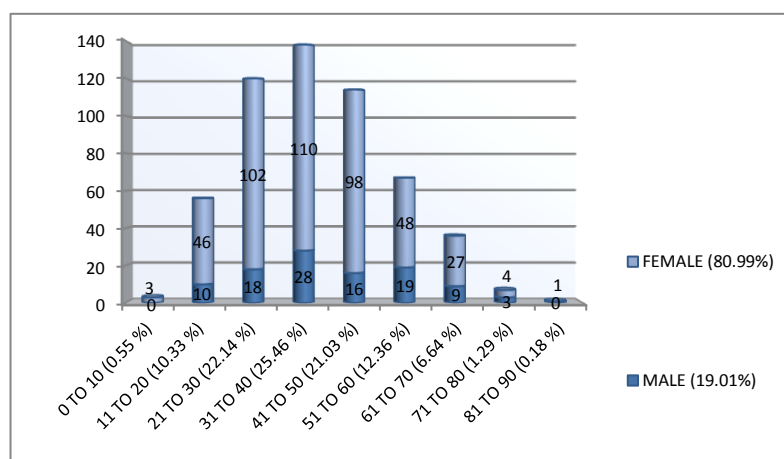
This is particularly useful when a small diffuse goitre is being aspirated. It is also useful manoeuvre during a palpation of gland. The aspirate which had been deposited on the glass slide was first macroscopically inspected. Prepared smears were wet fixed and air dried. Wet fixed smears were stained with haematoxylin and eosin and papanicolaou. Air dried smears were stained with May-Grunwald Giemsa stained. These stains were used routinely in all the cases.

### Observations

**Table 1** Clinical Features of Thyroid Gland Lesions

SYMPTOM	NO. OF PATIENT
Asymptomatic	368 (67.77%)
Dysphagia	63 (11.60 %)
Palpitations	30 (5.52 %)
Tremors	22 (4.05 %)
Increased sweating	27 (4.97 %)
Loss of weight	15 (2.76 %)
Anxiety	12 (2.76 %)
Dyspnoea	12 (2.20 %)
Hoarseness of voice	10 (1.84 %)
Increased appetite	10 (1.84 %)
Pain	9 (1.65 %)
Menstrual disturbance	8 (1.47 %)
Fever	3 (0.55 %)
Fatigability	4 (0.73 %)
Diarrhoea	3 (0.55 %)

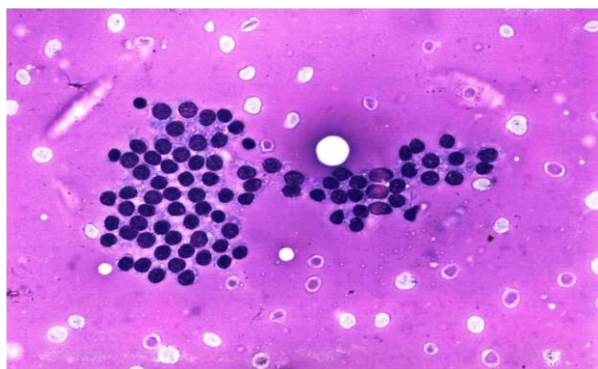
Majority of the patients were in asymptomatic (67.77%), followed by complaint of dysphagia (11.60%), palpitations (5.52 %), increased sweating, loss of weight, anxiety, dyspnea, hoarseness of voice, increased appetite, pain, menstrual disturbance fever, fatigue bality diarrhea.



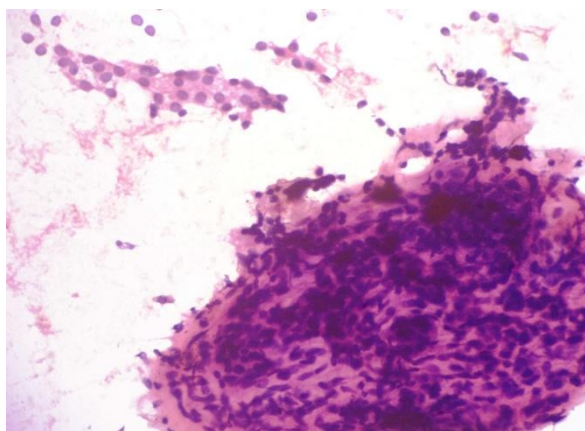
**Charts 1:** Age and Sex Distribution of Thyroid Gland Lesions

Male to female in our study is ratio 4.26 :1. Majority of the cases were in 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> decade of life with incidence of 22.14%, 25.46% and 21.03 % respectively.

No.	Cytological Diagnosis	ASPIRATE					No. of Cases (%)
		Hemorrhagic	Colloid	Haemorrhage colloid	Fluid	Purulent	
1	NON NEOPLASTIC ( 489 cases)						(90.05%)
	Colloid goitre	115	129	75			319 (58.74%)
	Nodular goitre	16	10	9			35(6.44%)
	Adenomatous goitre	13	14	12			39(7.18%)
	Thyroiditis	82(15.10%)					
	Hashimoto	37	1	6			44(8.10%)
	Lymphocytic	31		2			33(6.07%)
	Granulomatous thyroiditis	2					2(0.36%)
	Subacute thyroiditis	1					1(0.18%)
	Acute on chronic inflammation	1				1	2(0.36%)
	Graves disease	4					4(0.73%)
	Thyroglossal cyst		1		8		9(1.65%)
	Thyroid cyst	1					1(0.18%)
2	SUSPICIOUS ( 29 cases)						(5.34%)
	Follicular Neoplasm	25					25(4.60%)
	Hurthle cell lesion	3		1			4(0.73%)
3	MALIGNANT ( 25 cases)						
	Papillary Carcinoma	17		1			18(3.31%)
	Anaplastic Carcinoma	2					2(0.36%)
	Medullary Carcinoma	5					5(0.92%)
	TOTAL	273 (50.27 %)	155 (28.54 %)	106 (19.52 %)	8 (1.47 %)	1 (0.18 %)	543 (100%)

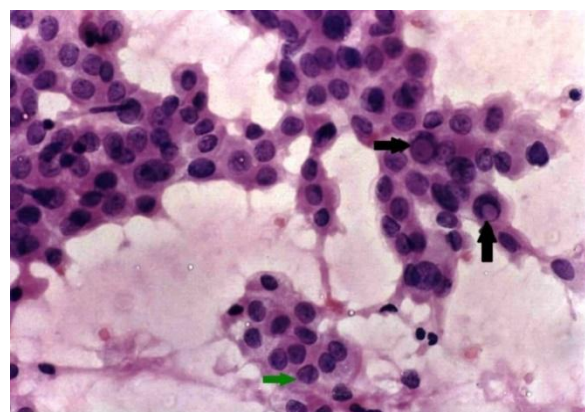


**Fig 1** Colloid goitre: Background of abundant colloid with benign follicular epithelial cells arranged in honey combed sheets (Giemsa X 200)



**Fig 2** Granulomatous Thyroiditis (de Quervain's thyroiditis): Numerous Epithelioid cells with multinucleated giant cell against a dirty background

along with thyroid follicular cells and inflammatory cells (H and E X 200)



**Figure 3** Papillary carcinoma thyroid :Monolayered sheets of cells with irregular 'papilleroïd' outline. Intranuclear cytoplasmic pseudoinclusions (arrow) and intranuclear groove (green arrow) are seen (H and E X 200)

### Discussion

Of total 569 thyroid-gland aspirates, 26 (4.56%) were found to be inadequate for reporting. This correlates well with inadequacies reported by other studies ranging from 0% to 12.7%.<sup>[7],[8],[9],[10]</sup>. Thus the technical success rate was 95.43%.

An age range was a 6 year to 82 year and majority patients presented in 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> decade of life with

incidence of 22.14%, 25.46% and 21.03 % respectively. The female to male ratio was 4.26: 1 which showed that females are commonly affected with the thyroid swellings. Others studies reported a ratio ranging from 3.54:1 to 4.71: 1 <sup>[11],[12],[13]</sup>. Thus, young females were commonly presented with thyroid swelling. All the patients presented with a midline neck swelling (100%) of which, majority 368 (67.77%) were asymptomatic. The other symptoms in decreasing order of frequency were dysphagia in 63(11.60%), palpitation in 30 (5.52%), increased sweating in 27 (4.97%), tremors in 22 (4.05%), weight loss in 15 (2.76%), dyspnoea in 12 (2.20%), anxiety in 12 (2.76 %), increased appetite in 10 (1.84%), hoarseness of voice in 10 (1.84%), pain in 9 (1.65 %), menstrual disturbance in 8 (1.47%), fatigability in 4 (0.73 %) and fever and diarrhoea in 3(0.55%) each. Clinical presentation in study done by Tariq M. et al<sup>[14]</sup> was similar to present study.

Out of 543 adequate thyroid aspirates, 273 (50.27%) were haemorrhagic, which included 144 (52.74%) cases of goitre, 72 (26.37%) cases of thyroiditis, 4 (1.46 %) cases of Grave's disease, 1 (0.36%) case of thyroid cyst, 28 (10.25%) cases of indeterminate neoplasm and 25 (9.15%). cases of malignancies Thus approximately 50% of all haemorrhagic aspirates were goitres. All follicular neoplasm and Grave's disease yielded haemorrhagic aspirate while 99.06% of malignancies and 95.45% of thyroiditis had haemorrhagic aspirate. A total of 155 (28.58 %) cases had colloid aspirate. Out of these 153 (98.70%) were goitres comprised of 143 (93.46%) colloid goitres and 10 (6.45%) nodular goitres. One case (0.64%) each of Hashimoto thyroiditis and thyroglossal cyst had colloid aspirate. Of the total 543 adequate aspirates, 106 (19.52%) yielded haemorrhage admixed with colloid of which, 96 (90.56 %) cases were goitres, 8 (7.54 %) cases were of Hashimoto thyroiditis and 1case each of papillary carcinoma (0.94 %) and Hurthle cell lesion (0.94 %).8 (1.47 %) cases showed fluid aspirate, all being thyroglossal cysts. One thyroglossal cyst revealed colloid aspirate.

In one case the aspirate was purulent and it was diagnosed as acute on chronic thyroiditis. Our findings of aspirates and their relationship to diagnosis correlates well with study of Kung and Yuen.<sup>[15]</sup> Thus, out of total 543 reported cases 393 (72.37%) were goitres which included 329 colloid goitres (81.17%), 39 (9.92 %) adenomatous goitre and 35 (8.90%) nodular goitres. Thyroiditis was reported in 82 cases (15.10 %) which included 33 (40.24 %) of Lymphocytic thyroiditis, 44 (53.65 %) of Hashimoto's thyroiditis, 2 (2.43 %) of granulomatous thyroiditis, 2 (2.43 %) of acute on chronic inflammation and one case (1.21 %) of subacute thyroiditis. Our study areincorcodance with the study done by Praveen et al <sup>[16]</sup>

Study	Hashimoto	Lymphocytic	Granulomatous	Non specific	Total
Praveen et al (2009)(171)	26 (37.14 %)	21 (30.00 %)	7 (10.00 %)	10 (22.8 %)	70
Present study (2012)	44 (53.65 %)	33 (40.24 %)	2 (2.43 %)	3 (3.63 %)	82

19 (3.49%) cases were reported as follicular neoplasm. Amatya B.B. et al<sup>[17]</sup> and in Handa U. et al <sup>[18]</sup> reported follicular neoplasm in 5.1% and 3.22% respectively. There were 4 cases of Grave's disease (0.73%). 25 cases (4.60 %) of malignant thyroid lesion were reported. Most malignant lesions picked up were papillary carcinoma (18 cases) followed by medullary carcinoma (5 cases) and anaplastic carcinoma (2 cases). In FNAC, follicular adenoma and carcinoma cannot be differentiated because of requirement of capsular or vascular invasion for diagnosis which cannot be seen on the smears. Hence, they are simply termed as follicular neoplasm and require histopathological confirmation.

Thus in the final analysis there were 489 (90.05%) non neoplastic lesion, 29 (5.34 %) were suspicious while malignant lesions were seen in 25 cases (4.60%).

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