



## A Retrospective Cytological Study of All Solitary Thyroid Nodules

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### ABSTRACT

**Background-** *Fine Needle Aspiration Cytology (FNAC) is widely considered as diagnostic study of choice in assessment of thyroid lesions.*

**Aim-** *The aim of this study is to determine the various cytological patterns found in all Solitary thyroid nodules (STNs).*

**Setting and Design-** *The present study is a five retrospective study of FNAC of thyroid STNs performed in pathology department of our institute during the period of January 2009 to December 2013.*

**Material and Methods-** *The records of 185 patients who had undergone FNAC during the study period were retrieved and information about age, sex and cytological diagnosis were extracted and the corresponding original slides were reviewed. Cytological diagnosis were categorized as Neoplastic (benign/malignant), Non-neoplastic (nodular colloid goiter, colloid cyst, thyroiditis) and third category as suspicious (follicular neoplasm).*

**Results:-** *A total of 185 FNACs of STNs were done during the study period. The results of cytological diagnosis showed that 11 cases (5.94%) had neoplastic cytological pictures (benign/malignant), 140 cases (73.37%) had non-neoplastic pictures of STN. The cytological picture also showed 37 cases (19.69%) were suspicious cytomorphology.*

**Conclusion-** *FNAC is a sensitive, specific and accurate initial diagnostic test for preoperative evaluation of STN and can be easily performed as an OPD procedure.*

**Keywords:** *Fine needle aspiration cytology, solitary thyroid nodule.*

## INTRODUCTION

Fine needle aspiration cytology (FNAC) is a well established, low cost, simple technique which is devoid of major complications. This technique has been found to be a very useful for investigating a solitary thyroid nodule to attain a primary diagnosis. FNA in a thyroid has scored far better than thyroid scintigraphy and ultrasonography<sup>[1]</sup>; this is because FNAC gives direct morphological information of the aspirated cells. FNAC distinguishes between benign and malignant lesions quite effectively and it is the preoperative screening method of choice worldwide. This procedure also has limitations like false negative results, false positive results and a proportion of FNA results which have suspicious morphology of cells and cannot be categorized as benign or malignant<sup>[2]</sup>. Its use in recent years has resulted in significant decrease in the number of surgeries performed while increases yield of malignant lesions of patients who have undergone surgery<sup>[3]</sup>. STN that are considered for FNAC include firm palpable, solitary nodules, nodules associated with suspicious clinical or USG features, predominant nodule in MNG, recurrent cystic nodules and nodules associated with palpable lymph nodes.

## MATERIAL AND METHODS

The study aims to determine the cytological pattern of thyroid lesions in addition to the utility and accuracy of FNAC as an initial diagnostic in the investigation of STN.

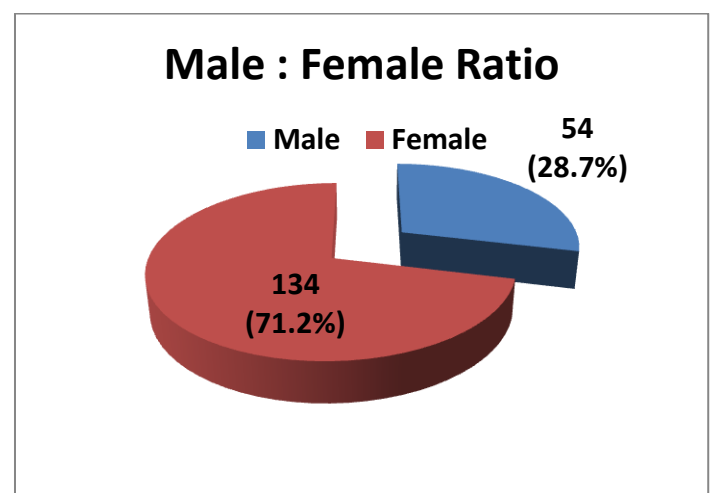
185 FNAs performed on patients with STN in the department of pathology, G.R. Medical college, Gwalior during the period of January 2009 And December 2013 were retrieved from the records and analyzed. All information about the age, sex and FNA diagnosis were extracted from the records and the corresponding slides were reviewed. FNAC was performed in all these patients without local anaesthesia and using aspiration and non-aspiration techniques using 22-23 G needles. Both air dried and wet fixed (fixed in 95% alcohol for 30 minutes) stained with May Grunwald Giemsa (MGG) and Haematoxylin and

eosin (H & E) stain respectively and examined under light microscope.

Cytology results were categorized into Neoplastic (Benign/Malignant), Non-Neoplastic (nodular colloid goiter, colloid cyst, thyroiditis) and a third category as suspicious (follicular neoplasia).

## RESULTS

A total of 188 patients who underwent FNAC of STN were studied. 134 cases were females while 54 were males. Ratio of Male:female was 1:2.5 . Age of patients who presented with STNs ranged from 14 to 78 years.

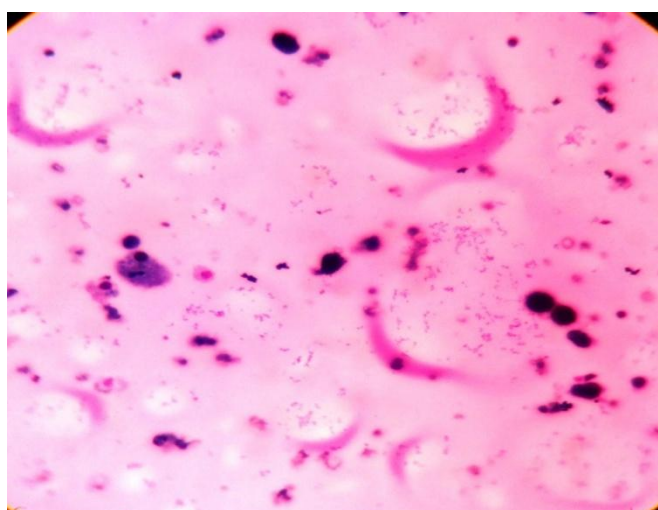


**Figure 1** Male: Female Ratio of solitary thyroid nodule.

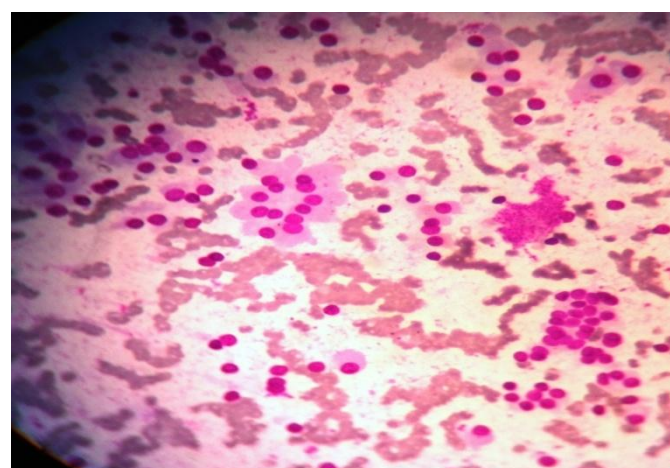
FNAC results were categorized as neoplastic (5.94%), non-neoplastic (74.46%), suspicious (19.68%). The distribution of neoplastic, non-neoplastic and suspicious cases in cytology is shown in table no. 1

**Table 1:** Categorization of lesions.

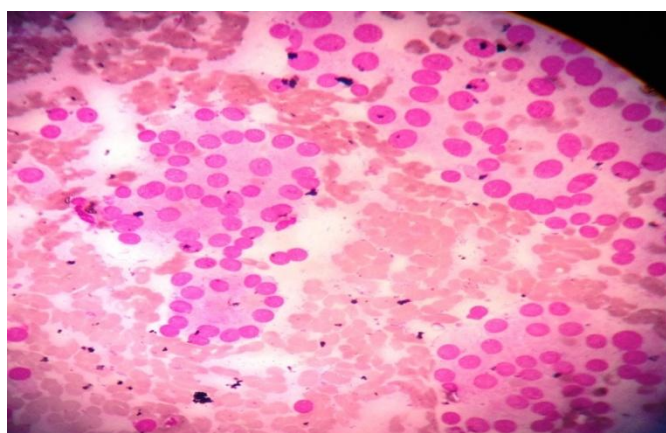
Lesions	No of cases	Cytological diagnosis	Number of cases	Percentages	
Neoplastic	11	Benign/Malignant			
		-Oncocytoma	02	1.08	5.94
		-Medullary carcinoma	01	0.54	
		-Anaplastic carcinoma	02	1.08	
-Papillary carcinoma	06	3.24			
Non-neoplastic	140	Involuting thyroid nodules			74.46
		-Nodular colloid goiter	67	35.63	
		-Colloid cyst	53	28.19	
		Thyroiditis			
-Hashimoto thyroiditis	17	9.04			
-Lymphocytic thyroiditis	03	1.59			
Suspicious	37	Follicular neoplasm	37	19.68	19.68
Total	188		188	100	



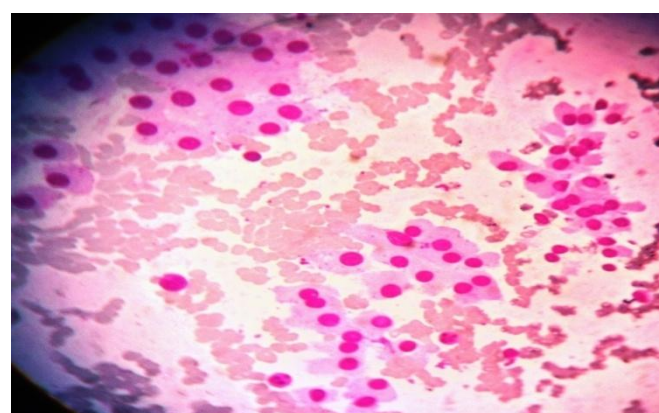
**Figure 2.** Bland follicular epithelial cells with occasional colloidophages in a thin colloid background-Colloid Cyst (x100 magnification)



**Figure 4** Bland follicular cells with oncocytes in a thin colloid background-Nodular Colloid Goiter (x100 magnification)

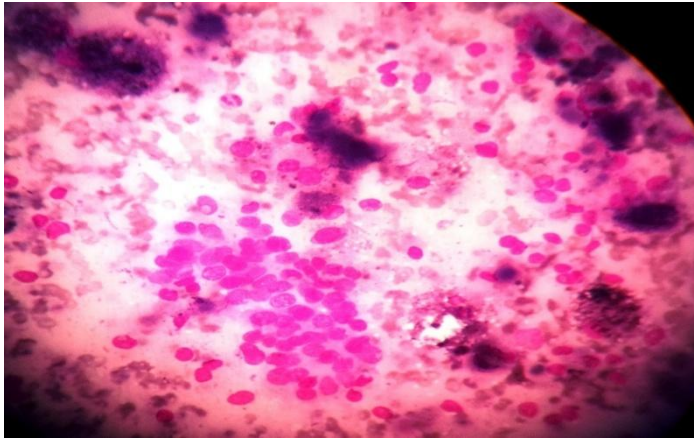


**Figure 3.** Follicular epithelial cells arranged in monolayered sheets and in microfollicles-Follicular Neoplasm (x100 magnification)

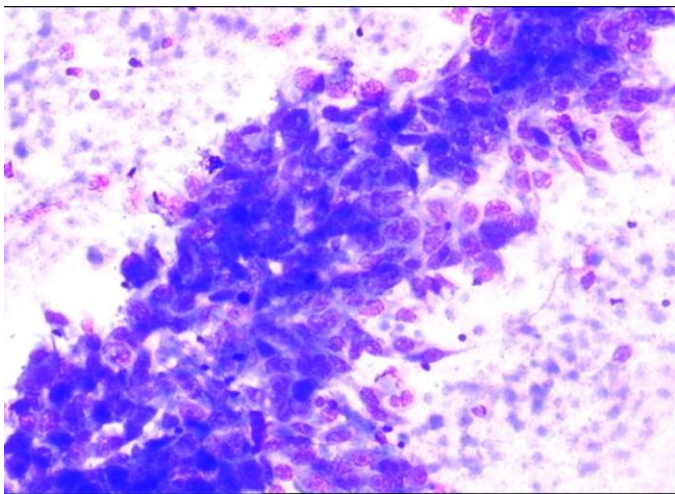


**Figure 5.** Oncocytes arranged in monolayered sheets and in microfollicles-Oncocytoma (x100 magnification)





**Figure 6.** Cells arranged in papillae with palisading cells in the periphery with occasional cyst macrophage-Papillary Carcinoma (x100 magnification)



**Figure 7.** Multi layered sheets of highly anaplastic cells -Anaplastic Carcinoma (x100 magnification)

## DISCUSSION

FNAC is regarded as the gold standard initial investigation of thyroid swellings. This technique is widely accepted as safe, simple, cost effective, quick and with a very low complication rate. We found that the accuracy of FNA analysis in STNs was 80.32% in differentiation of benign nodules from malignant nodules of thyroid gland whereas Gharib H et al in his study observed a differentiation of approximately 95%<sup>[5]</sup>. FNAC has higher sensitivity for detection of malignancy compared with ultrasonography and radioisotope scans as recorded by Fonij et al<sup>[6]</sup>.

There are a group of lesions which overlap benign and malignant features, for instance, the

distinction between a cellular colloid goiter and a follicular lesion may be impossible, cytological diagnosis of follicular adenoma vs carcinoma is also not possible on FNAC.

Whenever the smears were found inadequate, the patient was recalled and FNA was repeated and hence all over smears were adequate for comment. Our study shared the view of other experts in stating that FNAC is a more specific test in detecting thyroid malignancy and therefore its use as a reliable initial diagnostic test cannot be over emphasized. It reduces the need for other time consuming and expensive investigations. Our study showed that FNAC should be adapted as an initial investigation to analyze STNs in all tertiary hospitals in developing country like India as also observed by Bukhari MH et al in his study<sup>[7]</sup>.

We have categorized cytological results into Neoplastic (Benign/Malignant), Non-Neoplastic (nodular colloid goiter, colloid cyst, thyroiditis) and a third category as suspicious (follicular neoplasia). This division is very helpful to clinician in the management of patients with specific references to need of thyroid surgeries.

As most of the benign conditions can be managed medically it saves the patient's unnecessary surgery. Suspicious FNAC results are unavoidable due to overlapping cytological features particularly among hyperplastic adenomatoid nodule, follicular neoplasm and follicular variants of papillary carcinoma.

The advent of ultrasound guided FNA has improved sample acquisition from patients with small thyroid nodules which are difficult or impossible to detect on physical examination. By adopting this USG guided FNA we can reduce the percentage of inadequate samples. Borget et al did an assessment of the cost of FNA C as a diagnostic tool with routine ultrasound guidance in patients with STN and found that this reduced inadequate smears and hence reducing recalling of the patients as in our case and hence reduced cost and morbidity<sup>[8]</sup>.

A study by Sahaha AR showed that there were various pitfalls of FNAC on thyroid lesions. These

were cysts (difficulties with degenerative nodules), follicular lesions (benign/malignant), Hurthle cell lesions (benign vs malignant) and lymphocytic lesions (lymphocytic thyroiditis vs lymphoma)<sup>[9]</sup>. In accordance with this study we found that there was 19.69% of suspicious lesions (benign/malignant/involuntary lesions) and 28.78% colloid cyst. The cytopathologist should be aware of potential diagnostic pitfalls and interpretational errors that can be reduced further if the aspirates are obtained from different portions of the nodule, with expert cytopathologists to perform and interpret the aspirates and with use of immunohistochemical and molecular markers.

### CONCLUSIONS

The results of our study are comparable with the current published data and demonstrate that FNA cytology is a sensitive, specific and accurate initial diagnostic test for preoperative evaluation of patients with thyroid swellings in our setting as well. It is a minimally invasive, safe, easily performed OPD procedure. The clinician should be encouraged to use FNAC as the initial modality in the evaluation of thyroid lesions.

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