www.jmscr.igmpublication.org
Impact Factor 3.79
ISSN (e)-2347-176x
crossref DOI: http://dx.doi.org/10.18535/jmscr/v3i10.24

IGM Publication
Journal Of Medical Science And Clinical Research
An Official Publication Of IGM Publication

# Evaluation of Thyroid Swellings by FNAC in Greater Gwalior Region- A Nine Year Retrospective Study

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**Abstract**
*Fine Needle Aspiration Cytology (FNAC) of thyroid has been introduced as the most reliable and cost-effective method for diagnosing of clinically important thyroid disorders. The aim of our study is to demonstrate the effectiveness of FNAC as a simple and cost effective procedure for diagnosis of thyroid lesion, to differentiate between benign and malignant lesions of thyroid and to explore the pattern of distribution of different thyroid lesions in greater our region. Thyroid fine-needle aspiration cytology (FNAC) of 791 patients from January 2006 to December 2014 was evaluated in our center. Only patients which had a solitary or multiple thyroid nodules were selected for FNA. The FNAC results are classified as benign, malignant, suspicious, and unsatisfactory. A total of 791 cases of thyroid swellings were aspirated during the study period of which 761 cases were adequate for reporting. Among the reported cases female outnumbered the male patients and ratio came out to be 5.7:1 and maximum thyroid lesions were in age group 21-40 yrs. Colloid goiter was prevalent among all age groups whereas anaplastic carcinoma was diagnosed in age group >50 yrs. Majority of cases reported on cytology were non neoplastic. FNA is a sensitive, specific, accurate initial diagnostic test for pre operative evaluation of patients with thyroid swellings, it's an invasive safe, quick and easily performed procedure and should be promoted by clinicians as primary modality in the evaluation of thyroid lesions*

**Key words:** *FNAC; Thyroid lesions; Accurate.*

## Introduction

Thyroid nodular (TN) lesions are a common clinical problem in the world. These are more common in women and in areas of iodine deficiency. Exposure to ionizing radiation in childhood and adolescence increases the risk of solitary thyroid nodule and thyroid carcinoma. In the United States, 4 to 7% of the adult population has a palpable thyroid nodule [1]. A solitary thyroid nodule is a palpable swelling in thyroid gland that has otherwise a normal appearance [2].

A variety of tests have been employed to separate benign from malignant thyroid nodules [2,3].

These tests include isotope scanning and fine needle aspiration cytology. Combined use of isotope scanning, fine needle aspiration cytology,

and histopathology of thyroid offers the best diagnostic strategy [4].

However, fewer than 5% of adult thyroid nodules are malignant, and the vast majority is non-neoplastic lesions or benign neoplasms. It is preferred to operate only on those patients with suspicion of cancer, thereby avoiding unnecessary surgery and possible injury of the recurrent laryngeal nerve, hypoparathyroidism, and thyroid hormone dependence in patients with benign thyroid nodules. However, the distinction of these benign lesions from malignant nodules cannot be based reliably on the clinical presentation alone.

Different imaging techniques are now used for diagnosis of thyroid nodules like radionucleotide scanning, high-resolution ultrasonography, etc. However, FNAC is still regarded as the single most accurate and cost-effective procedure, particularly if ultrasound is used as a guide for better sample collection, especially for cystic lesions. It is an outpatient procedure used in primary diagnosis of thyroid swellings. A correct cytological diagnosis can be achieved in a majority of cases, thus obviating the need for a second surgical intervention[5].

Fnac is very cost effective technique and efficient method of differentiating benign and malignant thyroid nodules with an accuracy exceeding 80 % as per most of the studies conducted [6&7].

Published data suggest that FNA has an overall accuracy rate around 95% in the detection of thyroid malignancy. Nevertheless, like any other test, FNAC has its limitations and diagnostic pitfalls. These limitations include false negative and false positive results and a proportion of FNA results that are not obviously benign or malignant and fall into the indeterminate or suspicious group.

**Materials and methods**

This is a retrospective study done in a period of yrs 2006-2014 in cytopath section of Pathology Department in coherence with dept of surgery and medicine of our center. Total 14405 FNA were done during this period out of which 791 cases were diffuse /nodular thyroid enlargement. Informed consent was taken from the patients. The records of these 791 patients who undergone FNA during study period were retrieved & information about age, sex, cytomorphological diagnosis were recovered and corresponding original studies were reviewed (corresponding histopathology was not available in most of the cases in our setup). FNAC in all these patients was performed by experienced cytologists without local/general anaesthesia with 22-25 g needle. The procedure was well tolerated by the patients without any complication. Air dried smears were prepared from aspirated material and stained with MGG following recommended steps. Cytological smears were reviewed according to standard guidelines and diagnosis was accordingly classified and correlated with age and sex to explore the pattern and association.

The data from the past nine years were retrieved, compiled, summarized and analyzed statistically using frequency distribution and percentage proportion.

**Results**

A total of 791 cases of thyroid swellings were aspirated during the study period out of which 761 were adequate for reporting. Among the reported cases female outnumbered the male patients and ratio came out to be 5.7:1 and maximum thyroid lesions were in age group 21-40 yrs. Colloid goiter was prevalent among all age groups whereas anaplastic ca was diagnosed in age group >50 yrs. Cytomorphological lesions were categorized into 4 categories- 1. Inadequate 2. Benign 3. Suspicious 4. Malignant. Majority of cases reported on cytology were non neoplastic . Among the benign category the most common lesion was found- colloid goiter (42.4%) followed by nodular colloid goiter (26.1%). Two cases worth mentioning among benign category are nodular colloid goiter with microfilaria. Thyroiditis included hashimoto's (6.1%) followed by lymphocytic (1.97%) de quervain's (1.4%) and granulomatous (1.31%) grave's disease was

reported in 1.05 % of cases. Follicular neoplasm were 8.54% and follicular adenoma reported were 3.94% .

Among the suspicious for malignancy group most cases were given differential diagnosis (D.D) of nodular goiter, D.D follicular neoplasm, D.D hurthle cell neoplasm. Malignant category included papillary carcinoma (1.97%) followed by anaplastic carcinoma (1.44%) & medullary carcinoma (1.05%).

The following tables show the spectrum of various thyroid lesions and male/ female preponderance in our study (table no.1,2,3).

**Table No.1.** Spectrum Of Different Thyroid Lesions In 9 Years.

| S.No | Diagnosis | Total no. of cases | Percentage (%) |
|---|---|---|---|
| 1. | Colloid goiter | 323 | 42.4 |
| 2. | Nodular colloid goiter | 200 | 26.2 |
| 3. | Hashimoto's disease | 47 | 6.17 |
| 4. | Lymphocytic | 15 | 1.97 |
| 5. | De quervain's | 11 | 1.44 |
| 6. | Granulomatous thyroiditis | 10 | 1.31 |
| 7. | Grave's disease | 08 | 1.05 |
| 8. | Papillary carcinoma | 15 | 1.97 |
| 9. | Anaplastic carcinoma | 11 | 1.44 |
| 10. | Medullary carcinoma | 08 | 1.05 |
| 11. | Colloid cyst | 18 | 2.36 |
| 12. | Follicular neoplasm | 65 | 8.54 |
| 13. | Follicular adenoma | 30 | 3.94 |

**Table no. 2 :** Age wise distribution of number of cases

| Age group | Number of cases | Percentage |
|---|---|---|
| < 20 years | 98 | 12.38% |
| 21- 40 years | 498 | 62.95% |
| 41-60 years | 104 | 13.14% |
| >60 years | 91 | 11.50% |

**Table No.3** Male/ Female Distribution.

| Gender | Total no. of cases | Percentage (%) |
|---|---|---|
| Male | 279 | 35.2 |
| Female | 512 | 64.7 |

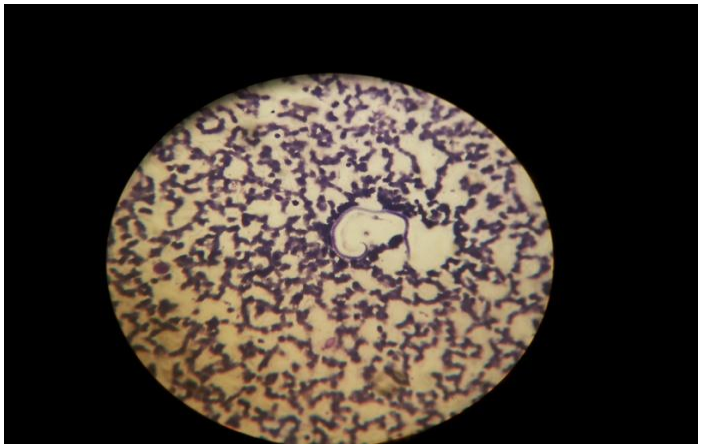


Figure Showing Microfilaria In Thyroid Lesion MGG 10X

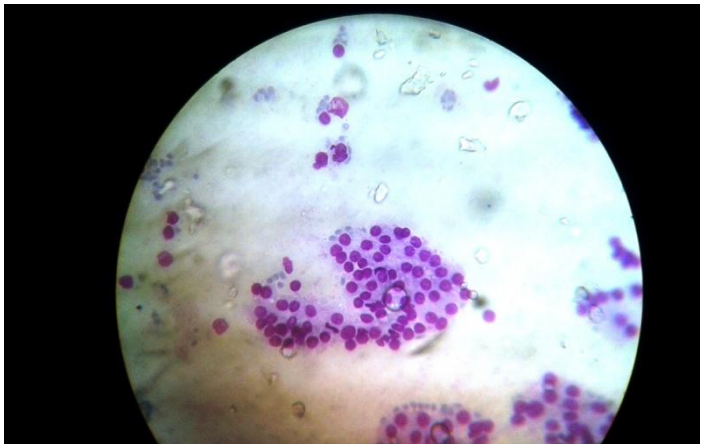


Figure Showing Hashimoto's Thyroiditis MGG 40X

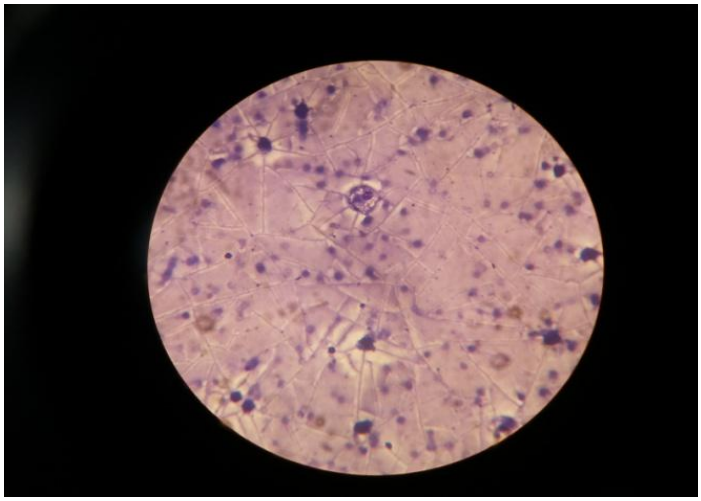
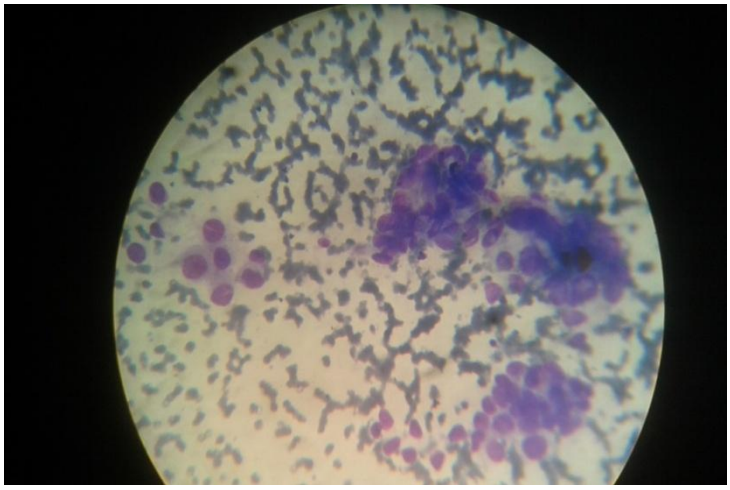


Figure Showing Colloid Goitre MGG 40 X



Follicular Neoplasm MGG 40X.

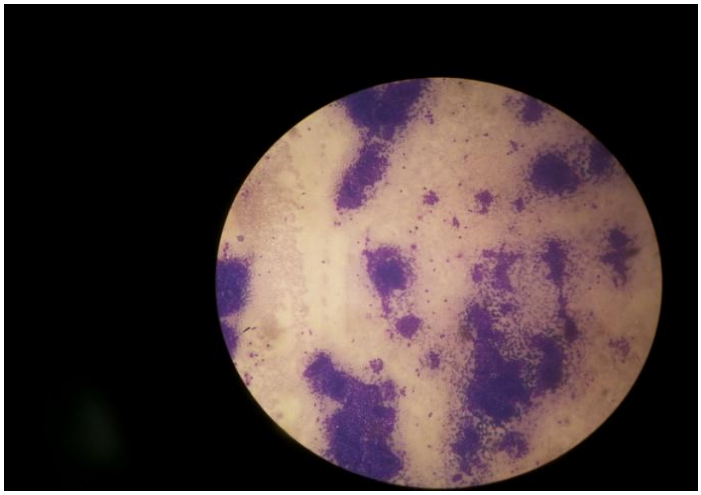


Figure Showing Papillary Carcinoma MGG 10X

**Discussion**

FNAC was first proposed in 1904 to sample lymph node in sleeping sickness. In 1930 Martin & Ellis described it as a valuable step in the workup of neck lumps included in thyroid nodules[8].

The management of patients with thyroid illness has been drastically changed after the evolution of FNAC. FNAC of thyroid swellings is reported to have sensitivity range of 65-98% & specificity of 70-100%.

Cytological categorization of thyroid lesions into benign and malignant is very helpful to clinicians in the management of patients with specific reference to the need of thyroid surgery, as most of the benign conditions can be managed medically.

It is useful to remind that there are different classification systems for thyroid FNA reporting.

Systems range from three to six or more diagnostic categories. The system currently and most commonly used (Bethesda System) contains six categories as follows: benign, lesion (atypia) of undetermined significance, follicular neoplasm, suspicious for malignancy, malignant, and non-diagnostic. The classification system used in this article contains four diagnostic categories: benign, suspicious, malignant, and insufficient.

As mentioned before, many studies show that 2–15% of FNAC are unsatisfactory, 50–70% benign, 15–30% suspicious, and 5–10% are malignant.

In our study of 791 FNACs, showed 3.7% unsatisfactory, 79.8% benign, 12.01% suspicious and 4.2% malignant. Our results are in the ranges reported by others.

The benign category included Colloid Goiter, Nodular Colloid Goiter, Thyroiditis (Hashimoto, Lymphocytic, De Quervain's, Granulomatous), Grave's Disease & Colloid Cyst. Suspicious category included- Follicular Adenoma & Follicular Neoplasm and malignant category included- Papillary Carcinoma, Anaplastic Carcinoma & Medullary Carcinoma.

Kumar et al in their study on 89 patients with enlarged thyroid gland reported a sensitivity of 100% & diagnostic accuracy of 97.7% [9].

Our study and other expertise [10] strongly suggest that FNAC is more specific than sensitive in detecting thyroid malignancy, therefore it should be adapted as a reliable initial diagnostic test in all tertiary hospitals like ours, in developing countries like India. In the published data[11,12,13] the sensitivity, specificity and accuracy of thyroid FNAC in detecting malignancy ranges from 52-86%,52-86.6% and 79.1% respectively. Two rare cases- finding microfilaria in nodular colloid goiter with cystic degeneration further emphasize the significant role of FNAC in management of thyroid swellings[14,15].

## Conclusion

FNA is a sensitive, specific, accurate initial diagnostic test for pre operative evaluation of patients with thyroid swellings, it's an invasive safe, quick and easily performed procedure and should be promoted by clinicians as primary modality in the evaluation of thyroid lesions. FNAC is an important adjunct to the careful physical examination and evaluation of patients with thyroid swellings.

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