Research Article Available online www.ijsrr.org ISSN: 2279–0543

International Journal of Scientific Research and Reviews

A Comparative analysis on correlation of Fine needle Aspiration Cytology and Histopathology of Thyroid Swellings- A Tertitary Care Center Study.

Jadhav Priyanka Nimbalkar[1]*, Reza Ali [2], Agrawal Pooja B.[3], Anil kumar komal [4], Kaur Anmolpreet [5] and Reddy Subodh[6]

[1]Department of Pathology, MGM Medical college, Navi Mumbai, india piyu85@rediffmail.com
[2,3,4]Department of Surgery, MGM Medical college, Navi Mumbai, India rezasb05@gmail.com

ABSTRACT:

Thyroid swellings are the most common neck swellings. Thyroid tumor is the most common endocrine tumor. 90% of all endocrine malignancies are accounted by thyroid carcinoma making it the most common endocrine malignancy. Our objective is to correlate FNAC(fine needle aspiration cytology) and final histopathological diagnosis of thyroid lesions and to assess accuracy of Fine needle aspiration cytology of thyroid lesions.

It was a retrospective study of two years. 84 cases of thyroid swellings were studied from MGM Medical College and Hospital, Navi mumbai. All the FNAC (fine needle aspiration cytology) findings were correlated with final histopathological diagnosis. In cases of discrepancy Frozen sections were also studied.

Out of 84 cases 60 were female patients and 24 were male patients. Out of 84 cases 4 cases had false cytological diagnosis. Most of the patients were from 6th decade. Most common non neoplastic lesion was Colloid goitre and follicular neoplasm was the most common neoplastic thyroid lesion. Overall sensitivity and accuracy of FNAC(fine needle aspiration cytology) was 95.4%.

FNAC(fine needle aspiration cytology) is a simple, useful technique as it is mimally invasive and comparatively in expensive procedure for diagnosis of thyroid lesions and can be used all over the world for its high accuracy and sensitivity of thyroid lesions. In cases of discrepancy of clinical, radiological and cytological diagnosis frozen and final histopathological findings are the mainstay of diagnosis.

KEYWORDS - FNAC, thyroid swellings, histopathology, colloid goitre, Follicular neoplasm.

*Corresponding Author

Dr. Priyanka Nimbalkar Jadhav

Associate professor, Department of Pathology, MGM Medical college, Navi Mumbai

Seawoods Estate,50/604, NRI, Phase2, Nerul, Navimumbai. Maharashtra, 400706.

piyu85@rediffmail.com

INTRODUCTION:

Thyroid swellings are the most common neck swellings.Thyroid swellings comprises of numerous neoplatic and non neoplastic lesions. Thyroid tumor is the most common endocrine tumor. These are heterogenous group of neoplasms with variable rates of growth, biological aggressiveness, histological appearance and response to therapy. 90% of all endocrine malignancies are accounted by thyroid carcinoma making it the most common endocrine malignancy.[1]

Most of thyroid gland diseases are amenable to medical and surgical management and are therefore of great importance. One of the most challenging tasks is judging the nature of the thyroid lesion and advocating precise and adequate management of thyroid lesions. Malignancy necessitates surgery whereas strict patient follow up is necessary in case of benign lesions. Thus making the differential diagnosis of thyroid lesions crucial.[2]

The diagnosis of thyroid lesions using aspiration cytology was first reported by Martin and Ellis in 1930[3]. Fine- needle aspiration of thyroid is now practised worldwide and proven to be the most economical. It is reliable diagnostic procedure to identify thyroid nodules that need surgical excision and thyroid nodules that can be managed conservatively.[4] FNAC(fine needle aspiration cytology) has allowed a dramatic decrease in the surgical treatment of the patients with thyroid nodular diseases enhancing the percentage of malignant operated nodules over 50%.[5]

The main purpose of FNAC(fine needle aspiration cytology) of thyroid tissue is to confirm cancer preoperatively and to avoid unnecessary surgery in specific benign conditions.

AIMS AND OBJECTIVES:

1. To determine the incidence of thyroid lesions in both male and female patients and various age group.

2. To assess the association between FNAC (fine needle aspiration cytology) and Histopathological findings in thyroid lesions.

3. To evaluate sensitivity and accuracy of fine needle aspiration cytology(FNAC) of thyroid lesions.

Materials and Methods:

This study was a Retrospective study carried out in MGM Medical College and Hospital, Navi mumbai for a period of two years. Patients data was retrieved from their files and assessed from Medical

record section and cytology and histopathology slides where retrived from the department of pathology. A total of 84 cases were studied in detail. All the clinical findings , cytology findings and final histopathological findings where studied and correlated. Sensitivity of FNAC(fine needle aspiration cytology) was calculated using the

formula - $\frac{\text{true positive}}{\text{True positive + false negative}} \times 100$

Inclusion criteria: All patients with thyroid swellings irrespective of the age who have undergone fine needle aspiration cytology of the swelling in MGM Medical College, Navimumbai, followed by its subsequent histopathological examination were included in the study.

Exclusion criteria: Patients having inadequate aspirates on FNAC(fine needle aspiration cytology). Patients in whom either of one Histopathological diagnosis or cytological diagnosis was not available were excluded.

RESULT AND DISSCUSSION:

The sensitivity of FNAC(fine needle aspiration cytology) of thyroid swellings in our study was TP/TP+FP x 100= 84/84+4 x100= 95.45%, where TP is true positive and FP is false positive. So, the sensitivity of FNAC was found to be 95.45% when compared with the histopathological findings in our study, which was similar to Chandwale et al[6] and Moosa et al[7] which showed a sensitivity of 90% and 77.7% respectively.

Table 1:Incidence of the types of thyroid swelling according to FNAC(fine needle aspiration cytology) findings

Types of thyroid swelling	No.of cases	Percentage
Colloid Goitre	39	46.4%
Colloid Goitre with cystic degeneration	18	21.4%
Hashimoto's thyroiditis	13	15.5%
Follicular neoplasm	09	10.7%
Papillary carcinoma	05	6 %
Total	84	100

Table 2: Age wise distribution of thyroid swellings.

Thyroid lesions	Age in Years						
	10-20yrs	21-30yrs	31-40yrs	41-50yrs	51-60yrs	61-70yrs	71-80yrs
Colloid Goitre	00	03	07	09	10	05	05
Colloid Goitre with cystic degeneration	03	03	05	04	02	01	00
Hashimoto's thyroiditis	04	05	00	00	04	00	00
Follicular Neoplasm	00	02	00	03	04	00	00
Papillary carcinoma	01	03	01	00	00	00	00

Table 3: Gender wise distribution of thyroid swellings

Gender	Number of cases	percentage
Male	24	29
Female	60	71
Total	84	100

Table 4: FNAC of neoplastic and non neoplastic thyroid swellings

Diagnosis	No of cases	Percentage
Non Neoplastic lesions	70	83
Neoplastic lesions	14	17
Total	84	100

Colloid goitre was the common thyroid swelling(46.4%) followed by colloid goiter with cystic degeneration(21.4%). In neoplastic lesions follicular neoplasm was the most common thyroid lesion(10.7%) followed by papillary carcinoma(most 6%). In this Study 60 cases were females and 24 cases were males. Thyroid lesions were prominently seen in Females than males with a ratio of 2.5: 1. The peak of age incidence was found in the 6^{th} decade(20 cases) followed by 5^{th} and 3^{rd} decade with 16 cases each. Our findings were similar to Bhansali et al[8] where as it contraindicated with Raut et al[9]

where more number of cases were found in 2nd decade. In our study 83% of cases comprised of non neoplastic thyroid lesions whereas 17% of cases comprised of neoplastic lesions.

Table 5: Correlation of result of FNAC with result of histopathology of thyroid swellings

Fine needle aspiration cytology(FNAC)	No of cases	Correct Cytological diagnosis	False cytological diagnosis	Final Histopathological diagnosis in case of false cytological diagnosis	Sensitivity of FNAC
Colloid goitre	39	37	2	1.Hashimoto's thyroiditis 2.Follicular Adenoma	95.45%
Colloid goitre with cystic degeneration	18	18	0	-	
Hashimoto's thyroiditis	13	13	0	-	
Follicular Neoplasm	9	7	2	1.Follicular variant of papillary carcinoma 2.Medullary Carcinoma	
Papillary carcinoma	5	5	0	-	

Thus out of 84 cases of thyroid lesions majority were cases of colloid goitre39 cases (46.4%) out of which two gave a false cytological diagnosis which was later found on histopathology as Hashimoto's thyroiditis and follicular adenoma. There were 18 cases of colloid goitre with cystic degeneration(21.4%) followed by hashimoto's thyroiditis 13cases(15.5%) followed by follicular neoplasm 9 cases(10.7%) out of which 2 cases showed false cytological diagnosis which was found as follicular variant of papillary carcinoma and medullary carcinoma on histopathology and finally papillary carcinoma 5 cases(6%). The accuracy of FNAC(fine needle aspiration cytology) was found to be 95.4% in our study.

Table 6: correlation of cytological, frozen and final histopathological diagnosis in cases of clinical discrepancy with cytology.

Fine needle aspiration cytology (FNAC)	Frozen	Final Histopathology

Colloid Goitre	Lymphocytic thyroiditis with colloid goitre	Hashimoto's thyroiditis
Colloid Goitre	Follicular neoplasm with extensive areas showing features of Goitre	Follicular Adenoma
Follicular neoplasm	Follicular neoplasm with undetermined status of capsular/vascular invasion with areas of goitrous and cystic change	Follicular variant of papillary carcinoma
Follicular Neoplasm	Invasive Epithelial malignancy of thyroid s/o follicular carcinoma	Medullary carcinoma

Frozen was done in cases of discrepancy of cytological , radiological and clinical findings.

Thus in cases of discrepancy through correlation of FNAC, Frozen and histopathological findings we can conclude that although frozen section helps us in clinching the diagnosis, nuclear features are better appreciated in paraffin sections thus making histopathological diagnosis the main stay in cases of discrepancy. Fine needle aspiration cytology with a sensitivity of 95.45% can be used all over the world for its high accuracy and sensitivity of all the thyroid lesions.

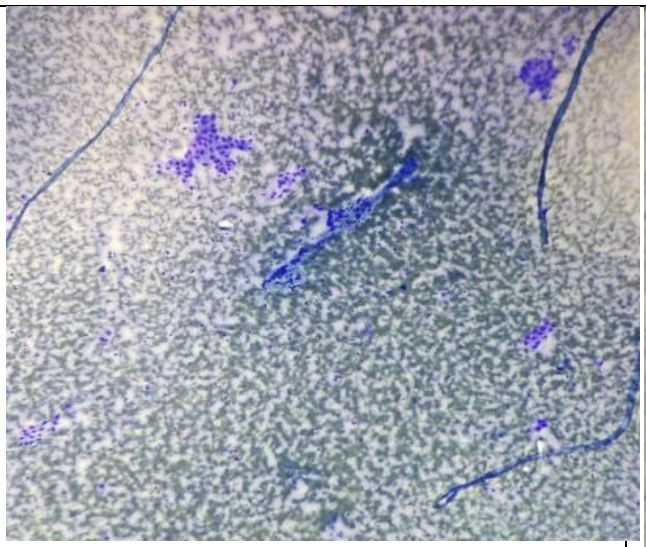

Fig 1:FNAC shows thyroid follicular cells in clusters and follicles in colloid goitre.

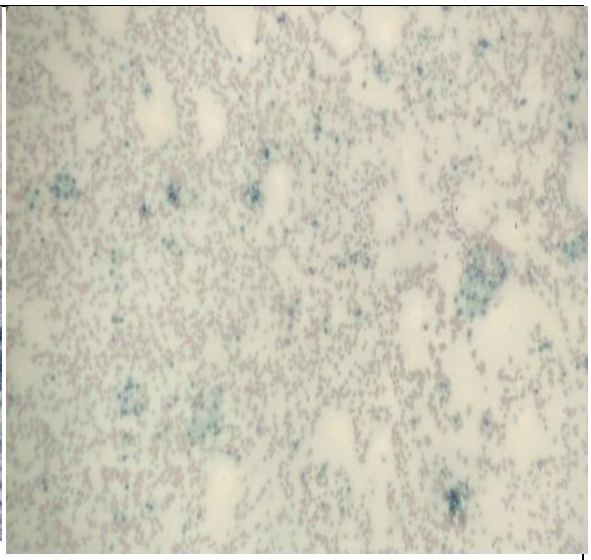

Fig 2: FNAC showing thyroid follicles along with numerous cyst macrophages in colloid goitre with cystic degeneration.

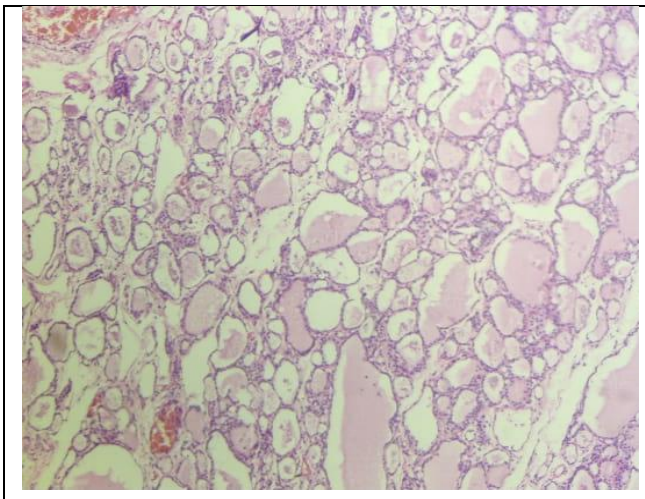

Fig 3: FNAC showing thyroid follicles along with numerous cyst macrophages in colloid goitre with cystic degeneration.

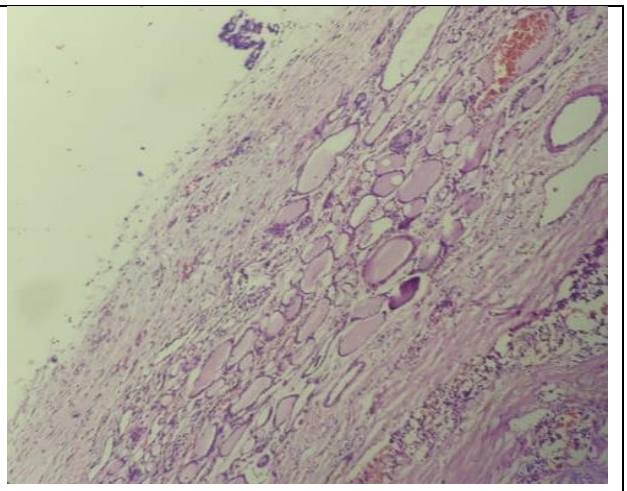

Fig 4: paraffin section showing invasion of capsule in follicular Carcinoma(Hematoxyline & Eosin)

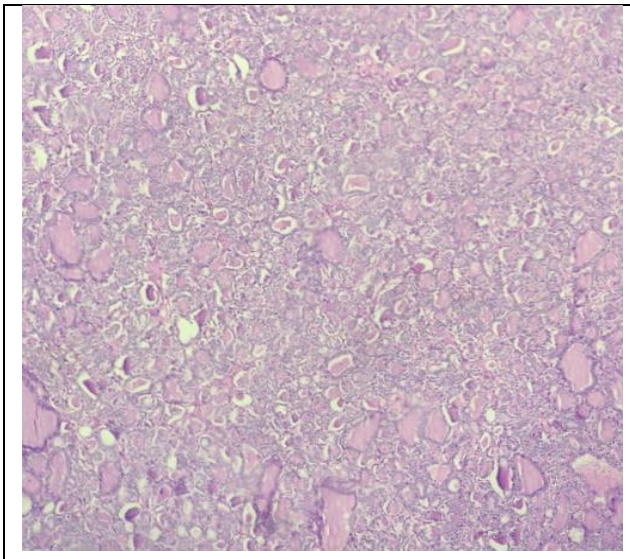

Fig 5: Paraffin section showing small sized thyroid follicular cells in follicular variant of papillary carcinoma (Hematoxylin & Eosin low power view)

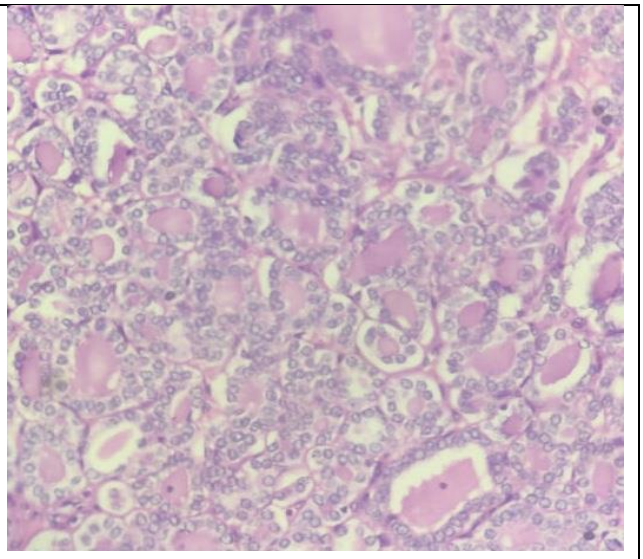

Fig 6: paraffin section showing orphan anne eye appearance in the nucleus of thyroid follicles of follicular variant of papillary carcinoma (Hematoxylin & Eosin high power view)

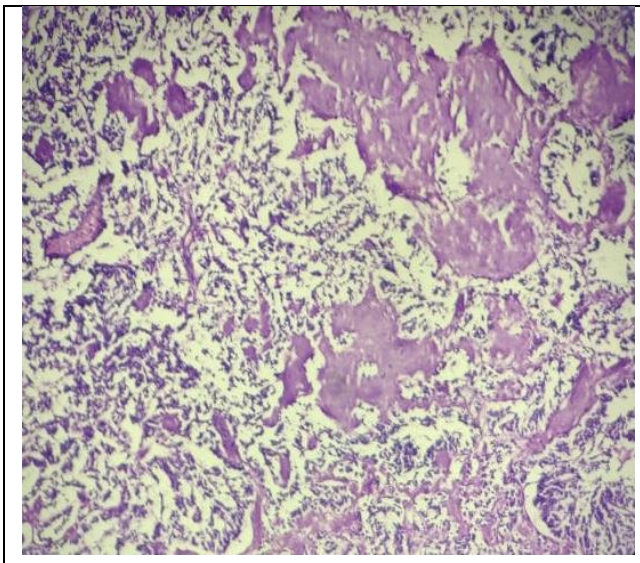	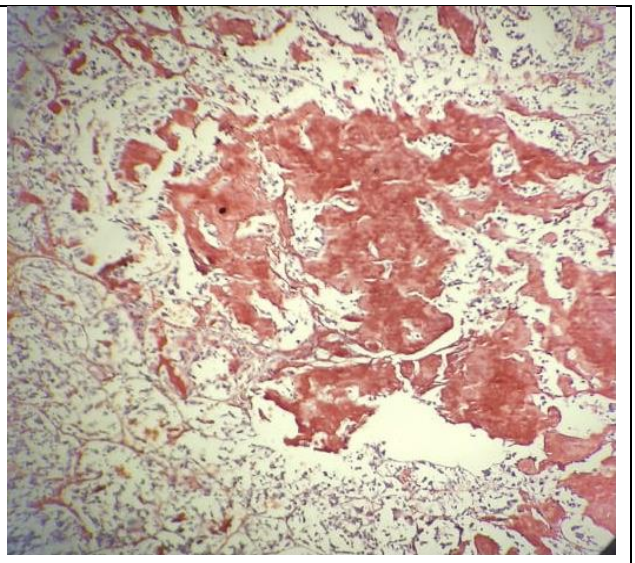
Fig 7:paraffin section showing homogenous eosinophilic amyloid in Medullary carcinoma. (Hematoxylin & Eosin)	Fig 8: paraffin section confirming presence of reddish amyloid on special stain congo red in medullary carcinoma.

CONCLUSION:

FNAC (fine needle aspiration cytology) is a simple, useful technique as it is mimally invasive and comparatively inexpensive procedure for diagnosis of thyroid lesions and can be used all over the world. A experienced and trained pathologist is required for correct aspiration and interpretation of thyroid lesions. In cases of discrepancy of clinical, radiological and cytological diagnosis frozen and final histopathological findings is the mainstay of diagnosis. Fine needle aspiration cytology with a sensitivity of 95.45% can be used all over the world for its high accuracy and sensitivity of all the thyroid lesions.

REFERENCES:

1. Dahl PR, Broadland DG, Goellner JR, HaylD. Thyroid carcinoma metastatic to the skin:a cutaneous manifestation of a widely disseminated malignancy. J Am Acad Dermatol. 1997;36:531-7
2. Polyzos SA,Kita M,Avramidis A.Thyroid nodules-stepwise diagnosis and management.Harmones(Athens)2007;6:101-19
3. Martin HE,Ellis EB.Biopsy by needle puncture and aspiration.AnnSurg 1930;92:169-81.

4. Nguyen GK,Lee MW,Ginsberg J,Wragg T,BiodeauD. Fine needle aspiration of the thyroid: an overview.Cytojournal 2005;2:12
5. Yassa L, Cibas ES,Benson CB.Long term assessment of a multidisciplinary approach to thyroid nodule diagnostic evaluation.Cancer 2007;111:508-516
6. Chandan wale S, Singh N, Kumar H., Clinico pathological Correlation of thyroid nodules.Int J pharm Biomed Sci 2012;3:97-102.
7. Foad Ali Moosa et al: Upto what extent FNAC is accurate in detecting malignancy in solitary thyroid nodule? (A comparison with post-operative histopathology findings). Medical Channel 2010;16(2)
8. Bhansali SK. Fine needle aspiration versus frozen section diagnosis. *Arch Otolaryngol Head Neck Surg.* 1982;112:867–869.
9. Khageswar R, Chinmay SR, Subrat KB, Rudranarayan B.Indian J Otolaryngol Head Neck Surg.2011 Oct;63(4):370-372.