ISSN:0975 -3583,0976-2833 VOL14, ISSUE 12, 2023

Original research article

STUDY ON CYTOLOGICAL FINDINGS OF FINE NEEDLE ASPIRATION CYTOLOGY IN THYROID LESIONS IN A TERTIARY CARE HOSPITAL

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Abstract

Background: Thyroid lesions are frequently encountered condition. An effective screening tool to rule out malignancy is necessary to start therapy. This study was done to evaluate the cytological findings profile of FNAC and its correlation with histo-pathological examination findings

Materials and Methodology: A total of 350 aspirates were studied from Dec 2020 to Nov 2022, in the Department of Pathology. Patients presenting to the medical, surgical, paediatrics, and ENT department with thyroid lesions were included in this study.

Results: Majority of the study population consisted of females. Nodular or colloidal goiter was the commonest FNAC findings. FNAC was able to detect malignant lesions accurately.

Conclusion: FNAC is an effective screening tool to detect malignant lesions.

Keywords: Thyroid nodule, FNAC, histo-pathological examination, goiter

Introduction

Thyroid gland is a butterfly shaped endocrine gland located in the neck over the trachea. Thyroid disorders are the most frequently encountered endocrine disorders after diabetes worldwide. With rise in incidence of thyroid disorders, the incidence of thyroid lesions have also increased. A thyroid nodule is a palpable swelling in a thyroid gland with a prevalence of 4-10% in general adult and 0.2 to 1.5% in children. Thyroid nodules are more common in women because of presence of estrogen receptors in thyroid tissue.

Majority of the nodules are benign and only 5 to 10% of these nodules are malignant. Identifying the type of nodule and its management is important [1]. Physical examination and history although are essential, but a definitive diagnosis is needed.

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Hence, an effective screening test is required [2, 3].

Fine needle aspiration cytology (FNAC) is an effective screening tool to decide upon the course of management in patient with thyroid lesions. It was introduced initially in 1926 by Martin and Ellis at memorial Hospital, New York for the diagnosis of tumors [4, 5].

FNAC is a relatively painless, simple, and inexpensive procedure that can access sites which are inaccessible for surgical biopsy. This being an out-patient procedure, reduces the need for hospital stay, has low risk of complications, and has no scars post procedure. The procedure results are produced with in a short duration and the procedure can be repeated if necessary [6, 7].

The main limitation of FNAC is that it cannot distinguish between follicular adenoma and follicular carcinoma, which requires histopathological confirmation [8]. Other limitations being specimen inadequacy, sampling techniques, skill of the performer [9].

This study was undertaken to study the cytological features of FNAC in patients with thyroid lesions and to correlate with the histo-pathological findings where ever tissues were available.

Materials and Methods

This prospective observational study was conducted in the Department of Pathology, Andhra Medical College, Vishakapatnam, over a period of 2 years from Dec 2020 to Nov 2022 which included all patients with thyroid lesions attending General Surgery, ENT, General Medicine departments. During the study period aspirations were performed over a total of 350 patients of all age groups, including male and female patients. Slides were prepared and stained with H & E dyes.

Out of the 350 cases, only 310 aspirations were able to collect sufficient material for examination. Rest of the 40 aspirates had only RBC's and occasional thyroid acinar cells.

Out of the 300 aspirates which were studied, 280 (90.3%) belonged to females and the rest 30 (9.7%) were males. This study was female predominant and the rest 50 were males. Female to male ratio was 9.3:1.

Out of the 310 cases, majority (n = 105) belonged to 31-40 years of age group followed by 21-30 years of age (n = 114). The mean age of study was 38.6 years.

Most of the thyroid lesions were non-neoplastic (n= 250) and the rest were neoplastic (n= 60).

ISSN:0975 -3583,0976-2833 VOL14, ISSUE 12, 2023

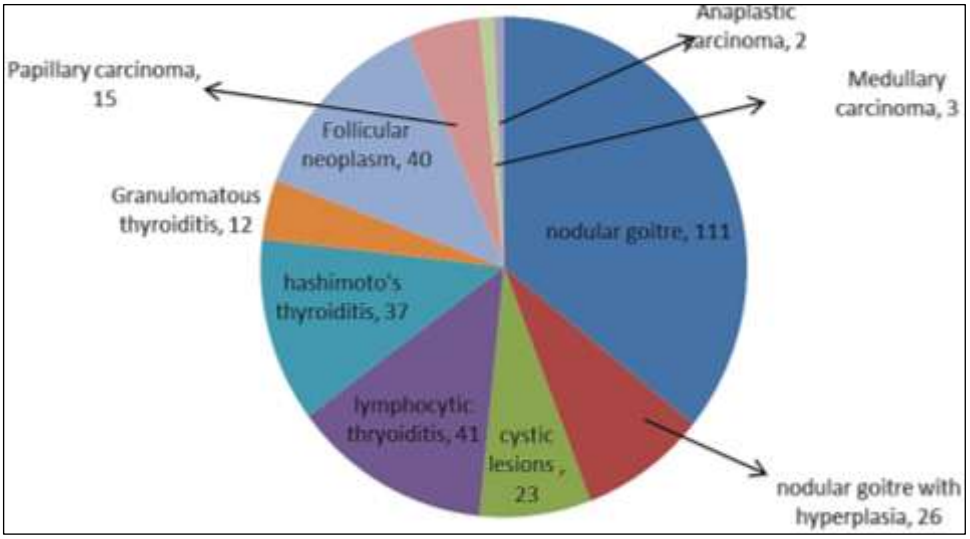

Fig 1: Type of lesions on FNAC

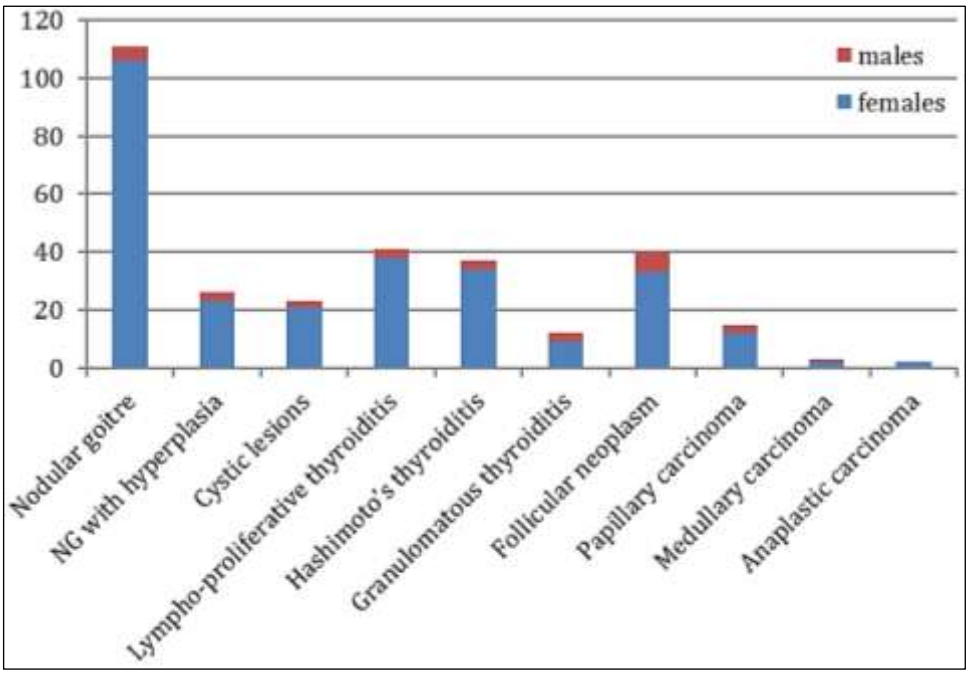

Fig 2: Gender-wise distribution of thyroid lesions

Nodular goiter

Nodular goiter was the most common thyroid lesion (n=111; 35.8%) which had high prevalence in 31- 40 years of age group. Most of cases of nodular goiter were multinodular (n= 95) and the rest were solitary nodules (n=16). Nodular goiter was associated with Hashimoto's thyroiditis in 3 cases. 26 patients had nodular goiter with hyperplasia of which 23 were females. Solitary nodular presentation was seen in 7 cases.

Cystic thyroid lesions

23 cases were of cystic type found commonly in 31- 40 years of age group with female predominance.

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Thyroiditis

90 cases had diffuse swellings of entire gland predominantly seen in 2nd-4th decades. Lymphocytic thyroiditis was seen in 41 cases, Hashimoto's thyroiditis was seen in 37 patients and granulomatous type of thyroiditis was seen in 12 patients. In all types, there was female predominance.

Neoplastic lesions

Neoplastic lesions accounted for 19.35% of the cases (n=60). Among the neoplastic lesions, 40 cases had follicular neoplasms which presented as solitary nodules. They were most commonly seen in 3rd-5th decades of life.

Malignant thyroid lesions accounted for 6.4% of all cases (n=20). Amongst the malignant lesions, papillary carcinoma was most common (n= 15) followed by medullary carcinoma (n=3) and anaplastic carcinoma (n=2). Both anaplastic carcinoma and medullary carcinoma were common in 5th-6th decades.

Table 1: Age and gender wise distribution of cases

Type of lesion	1-10 years	11-20 years	21-30 years	31-40 years	41-50 years	51-60 years	61-70 years	Total
Nodular goitre	1	8	34	44	15	6	3	111
NG with hyperplasia		2	8	7	7	1	1	26
Cystic lesions	1	3	2	8	5	2	2	23
Lympho-proliferative thyroiditis		11	12	9	9			41
Hashimoto's thyroiditis		6	11	16	4			37
Granulomatous thyroiditis		4	5	2	1			12
Follicular neoplasm		3	18	17		2		40
Papillary carcinoma			7	3	2	2	1	15
Medullary carcinoma					1		2	3
Anaplastic carcinoma					1		1	2
Total	2	37	97	106	45	13	10	310

Histo-pathological findings

Out of the 310 cases on whom FNAC was done, 61 patients underwent surgical excision.

Out of the 30 cases with Nodular goiter on FNAC, 21 had consistent finding on histo-pathological examination of biopsy. The rest 9 cases were inconsistent and of the 9 cases, 6 cases proved to have follicular adenoma and 3 cases with papillary carcinoma on histo pathological examination.

21 cases which showed follicular neoplasm on FNAC had follicular carcinoma in 4 cases, multinodular goiter in 9 cases and the rest 8 cases showed adenoma on histo-pathological examination.

6 cases with cystic lesions were subjected to surgical excision and sent for histo-pathological examination. Out of these 6 cases, 5 were consistent with the cystic findings while 1 case showed thyrotoxicosis.

2 cases of papillary carcinoma and 2 cases of medullary carcinoma diagnosed on FNAC showed consistent findings on histo-pathological examination.

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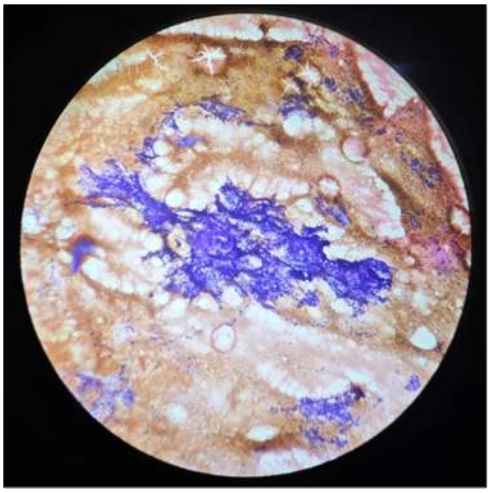
Table 2: Correlation of FNAC findings with histo-pathological findings

Type of lesion on FNAC	No. of cases sent for HPE	No. of cases consistent with HPE findings	% of correlation
Nodular goitre	30	17	57%
Cystic lesion	6	5	83.3%
Follicular neoplasm	21	8	38.09%
Papillary carcinoma	2	2	100%
Medullary carcinoma	2	2	100%
Total	61	34	

In present study, all cases of malignant lesions detected on FNAC were confirmed to be malignant on HPE. The sensitivity, specificity of FNAC in detecting malignant lesions is 100% in present study.



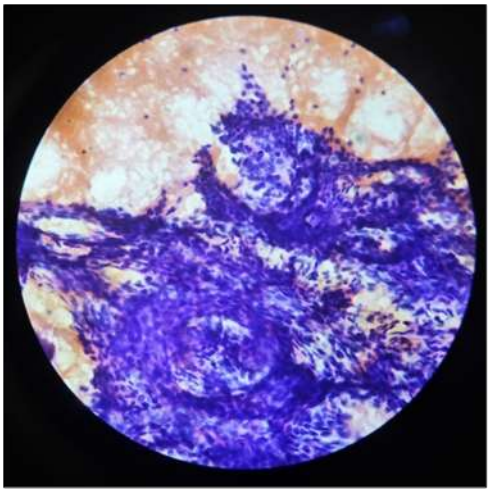
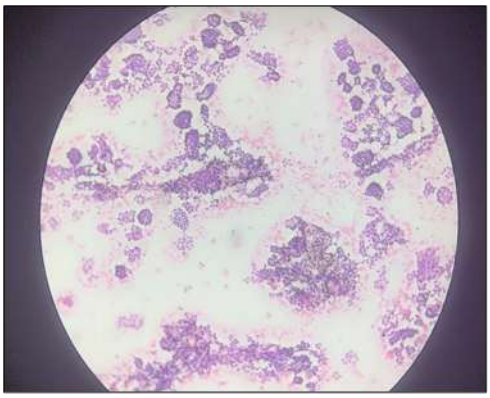


Fig 2: Follicular neoplasm under 10x **Fig 3:** Follicular neoplasm under 40x



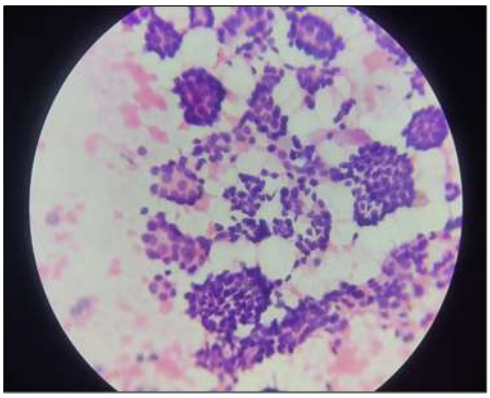


Fig 4: Papillary carcinoma under 10x **Fig 5:** Nodular Goitre under 40x

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Discussion

Thyroid lesions are frequently encountered in daily practice worldwide. An effective screening tool is required to assess the type of lesion and start appropriate therapy, medical or surgical. FNAC is a simple, cost-effective diagnostic modality which can be used to screen neoplastic lesions.

In the present study FNAC of Thyroid was done in 350 cases. Out of these 350 cases, only 310 cases were studied due to the rest of the 40 aspirates having insufficient material. The rate of inadequacy in present study is 11.4%. Adequate sampling depends on the skills of aspirator, size of nodule, accessibility, type of lesion, number and duration of aspirations. Aspirates done with 23 and 24G needles yielded sufficient material. 25 G needle yielded scanty tissue and 22G needle yielded hemorrhagic tissue. Amrikachi *et al*. [10] have commented on the experience of the aspirator and the criteria used to define a satisfactory report as the most important factor which influences the accuracy of aspiration.

In present study, females accounted for 90.3% of the sample population. This is in accordance with Ahmed *et al*. [11] Kamal *et al*. [12] and Afroze *et al*. [13] (76-85%).

The mean age in present study is 38.6 years, with range of 5-69 years. Majority of the cases belong to 31-40 years of age (34.2%), followed by 21-30 years (31.2%). The mean age is in accordance with Hirachand *et al*. [14] (38.5 years).

80.64% (n=250) of the lesions were non-neoplastic, while the rest 19.35% (n=60) were neoplastic lesions. Of these 60 cases, only 20 cases were malignant (6.4%), with the rest being benign lesions. In studies done by Kamal *et al*. [15] and Safirullah *et al*. [16], the incidence of non-neoplastic lesions was similar to present study (87% and 88.3% respectively).

In present study, nodular goiter was the most common lesion observed on FNAC (n = 111). Handa *et al*. [17] studied a total of 406 aspirates, of which 250 had nodular/colloid goiter on FNAC followed by thyroiditis. They also had similar distribution of malignant neoplasms.

Out of the 310 samples of aspiration, 61 patients had surgical excision of the lesion, which was sent for histo-pathological examination. The sensitivity and specificity of FNAC in detecting malignant lesions is 100% in present study. Hyang MiKo *et al*. [18] observed 78.4% sensitivity and 98.2% specificity of FNAC in detecting malignancy.

Conclusion

FNAC is a safe and simple diagnostic procedure in the evaluation of thyroid swellings. In present study, FNAC was very much accurate in detecting malignant lesions, thus making it an effective screening tool.

Acknowledgment

The authors would like to thank the staff of Department of pathology, Medicine, Surgery, paediatrics and ENT for providing all the facilities to conduct this study.

Conflicts of Interest: Nil.

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