

Fine Needle Aspiration Cytological Study of Various Thyroid Lesions and its Clinical Correlation in a Tertiary Health Care Centre - A Prospective Study

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Abstract

Background: Thyroid gland is the largest endocrine gland in the body and the first to develop in fetal life. Its superficial location allows evaluation of thyroid lesions by FNAC (fine needle aspiration cytology). **Aims and Objective:** To study cytological profile of thyroid lesions and correlate the results with clinical features. **Material and Methods:** This prospective study was carried out on 112 patients who came to the department from period of August 2014 to December 2016. FNAC of patients was performed and results of FNAC were correlated with clinical features of the patient. **Results:** Out of 112 cases studied, 78(69.6%) cases were diagnosed as Benign, 13 (11.6%) cases were diagnosed as Inflammatory, 19 (16.9%) cases were diagnosed as Follicular lesions and 2 (1.7%) cases were diagnosed as malignant. **Conclusion:** FNAC is one of the useful primary diagnostic tool for thyroid lesions.

Keywords: Thyroid Lesions, FNAC

1. Introduction

Thyroid gland is unique among endocrine organs as it is the largest endocrine gland in the body and the first to develop in fetal life. Even after 100 years, thyroid gland has been the subject of intense research and considerable attention due to the vast array of developmental, inflammatory, hyperplastic and neoplastic disorders which are exceedingly common in clinical practice¹.

Fine Needle Aspiration Cytology (FNAC) is now a day's worldwide accepted as a cost effective, minimally invasive, low complication, non-operative diagnostic tool having high sensitivity and specificity in most of thyroid lesions².

Martin and Ellis of Memorial hospital for cancer in New York first used FNAC to study thyroid in 1930³.

Incidence of Palpable Thyroid nodule in India in general population is 4-5 %⁴.

As diagnostic test, it can diagnose most benign lesions (e.g. Colloid goiter, Thyroiditis, cystic lesions, Grave's lesions), papillary, medullary, anaplastic, poorly differentiated carcinoma as well as metastatic malignancy. The test can be used to differentiate thyroid lesions which require surgical excision from conditions which can be

managed medically³. Sensitivity and specificity of FNAC is upto 94% and 98% for diagnosis of malignant lesions and about 90% accuracy rate for identification of malignancy, if follicular lesions are excluded⁵.

2. Material and Methods

- This prospective study was carried out on 112 patients who attended the OPD or IPD of Dr. Vasant Rao Pawar Medical College, Nashik, Maharashtra, from August 2014 to December 2016. FNAC was carried out on 112 patients with thyroid swelling attending OPD, smears were prepared, stained with haematoxylin and eosin stain as well as Giemsa stain and Cytological findings were noted. Cytology findings were correlated with clinical features.
- Patient Selection
- It was based on following criteria:
- Patients undergoing FNAC for palpable thyroid lesions
- Age of patient should be more than 18 years.
- Exclusion criteria:
- Uncooperative patients, not willing for FNAC.

3. Results

Out of 112 cases studied, 78 (69.6%) cases were diagnosed as Benign, 13 (11.6%) cases were diagnosed as Inflammatory, 19 (16.9%) cases were diagnosed as Follicular and 2 cases (1.7%) were diagnosed as malignant.

4. Discussion

4.1 Age Distribution

As shown in Table 1, in the present study majority of the patients referred for FNAC of Thyroid lesion were 87 (78%) in the age group of 18-47 years. Similar to the observation of Sengupta et al² 135 (75%) where most of patients were in age group of 21-40 years, whereas in the study of Chetan VR et al most of the patients 57 (78%) were in the age group of 15-49 years. Similarly, in the study of Dhanadia et al⁷ (2014) most of cases 72 (72%) were in the age group of 20-49 years.

Table 1. Distribution of cases depending on age

| Age in (years) | No. of patients | Percentage |
|----------------|-----------------|----------------|
| 18-27 | 29 | 25.89% |
| 28-37 | 25 | 22.32% |
| 38-47 | 33 | 29.46% |
| 48-57 | 14 | 12.50% |
| 58-67 | 10 | 8.93% |
| 68-78 | 1 | 0.89% |
| Total | 112 | 100.00% |

4.2 Gender Distribution

In the present study majority of the patients 101 were females and 11 were males with male to female ratio of 1:9. This sex ratio is comparable with study by Chandanwale S et al⁸ where sex ratio was 1:9. Similar observations are seen in the study of Uma Handa et al⁹ where sex ratio was 1:6.35. Similarly, the sex ratio was comparable with study by Likhari K S et al¹⁰ with sex ratio of 1:7. In the study by Dhanadia Ankush et al⁷ the sex ratio was 1:2.

4.3 Clinical Presentation

As shown in Table 2, Table 3 and Table 4, in the present study complaint of neck swelling in front was present in all 112 (100%) cases. On gross appearance of swelling 94 (83.9) cases were having diffuse enlargement of thyroid and 18 (16%) cases had solitary nodule. Movement with deglutition was present in 111 (99.1%) cases; in only 1 case swelling was moving with protrusion of tongue but not with deglutition. Pain in the swelling was present

in 9 (8.04%) cases. Pressure symptoms that is dyspnea, dysphagia, hoarseness of voice was present in 10(8.9%), 16(14.3%), 7(6.25%) cases respectively. Regional lymph node involvement was present in 25 (22.3%) cases.

The results were comparable with findings in the study by Uma H et al⁹ where complaint of neck swelling in front was present in all 434 (100%) cases. On gross appearance of swelling 380 (87%) cases were having diffuse enlargement of thyroid and 54 (12.5%) cases had solitary nodule. Movement with deglutition was present in 432 (99.5%) cases, in only 2 cases swelling was moving with protrusion of tongue but not with deglutition. Pain in the swelling was present in 10 (2.3%) cases. Pressure symptoms that is dyspnea, dysphagia, hoarseness of voice was present in 7 (1.6%), 6 (1.3%), 10 (2.3%) cases respectively. Regional lymph node involvement was present in 4 (0.9%) cases.

Also in the study by Dhanadia A et al⁷, complaint of neck swelling in front was present in all 100 (100%) cases. 44 (44%) cases were having diffuse enlargement of thyroid and 56 (56%) cases had solitary nodule. Movement with deglutition was present in 100 (100%) cases. Pain in the swelling was present in 15 (15%) cases. Pressure symptoms that is dyspnea, dysphagia, hoarseness of voice was present in 13 (13%), 12 (12%), 13 (13%) cases respectively.

Table 2. Showing distribution of clinical symptoms

| Sl. No. | Clinical symptoms | No. of patients | Percentage |
|---------|---------------------------|-----------------|------------|
| 1 | Swelling in front of neck | 112 | 100 % |
| 2 | Pain | 9 | 8.04 % |
| 3 | Dyspnoea | 10 | 8.9 % |
| 4 | Dysphagia | 16 | 14.29 % |
| 5 | Hoarseness of voice | 7 | 6.25 % |

Table 3. Distribution of cases depending on appearance of swelling

| Appearance | No. of patients | Percentage |
|-----------------|-----------------|----------------|
| Diffuse | 94 | 83.93% |
| Solitary nodule | 18 | 16.07% |
| Total | 112 | 100.00% |

Table 4. Distribution of cases depending on consistency of swelling

| Consistency | Frequency | Percentage |
|--------------|------------|----------------|
| Soft | 76 | 67.86% |
| Firm | 33 | 29.46% |
| Hard | 3 | 2.68% |
| Total | 112 | 100.00% |

4.4 FNAC was done in 112 Cases and Cytology Findings were Noted

As shown in Table 5, Out of 112 cases studied 91 (81.25%) cases were diagnosed as Benign including inflammatory, 19 (16.9%) cases were diagnosed as Follicular lesions and 2 (1.7%) cases were diagnosed as malignant.

Table 5. Distribution of cases depending on FNA diagnosis

| FNA category | FNA Diagnosis | No. of patients | Percent-age |
|---------------|--------------------------------|-----------------|----------------|
| Benign | Colloid cyst | 14 | 12.50% |
| | Colloid Goitre | 60 | 53.57% |
| | Graves disease | 1 | 0.89% |
| | Infected Colloid Cyst | 1 | 0.89% |
| | Follicular Adenoma | 1 | 0.89% |
| | Thyroglossal Cyst | 1 | 0.89% |
| | Sub Total | 78 | 69.64% |
| Inflam-matory | Granulomatous Thyroiditis | 4 | 3.57% |
| | Lymphocytic Thyroiditis | 8 | 7.14% |
| | Acute Suppurative Thyroid-itis | 1 | 0.89% |
| | Sub Total | 13 | 11.61% |
| Follicular | Follicular Lesion | 5 | 4.46% |
| | Follicular Neoplasm | 14 | 12.50% |
| | Sub Total | 19 | 16.96% |
| Malig-nant | Anaplastic ca of Thyroid | 2 | 1.79% |
| | Sub Total | 2 | 1.79% |
| Total | | 112 | 100.00% |

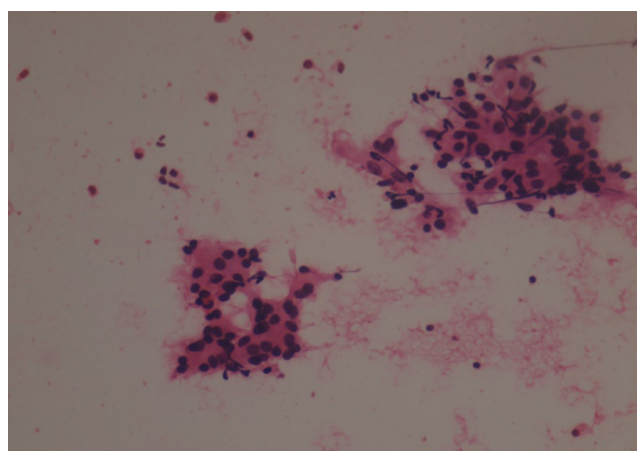


Figure 1. Showing Follicular neoplasm with cluster of follicular cells forming follicular structures and relatively uniform nuclei without colloid (H&E, x400).



Figure 2. Showing irregular diffuse enlargement of Thyroid gland with hard consistency causing dysphagia in case of Anaplastic carcinoma of Thyroid.

Also in the comparable study by Sengupta et al (2011)², 148 (83.14%) cases were diagnosed as Benign including inflammatory, 27 (16.2%) cases were diagnosed as Follicular lesions and 7 (3.93%) cases were diagnosed as malignant.

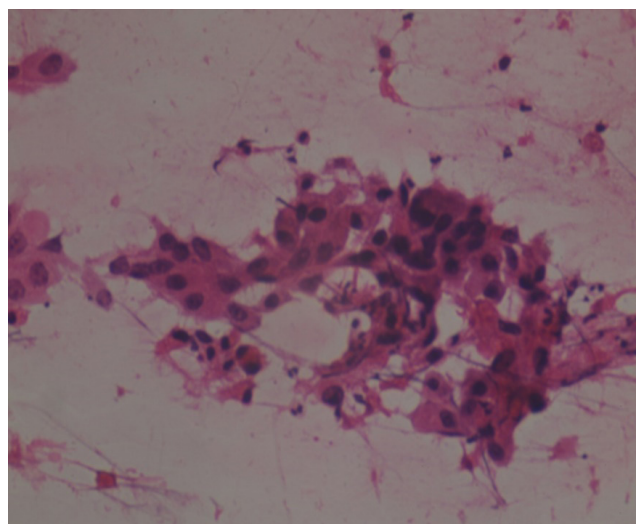


Figure 3. Showing Anaplastic carcinoma of thyroid with groups of bizarre tumoral cells with pleomorphic nuclei and prominent nucleoli (H&E, x400).

In the study by Bagga PK et al¹¹, 228 (90.5%) cases were diagnosed as Benign including inflammatory, 17 (6.7%)

cases were diagnosed as Follicular lesions, 3 (1.2%) cases were diagnosed as malignant and 4 (1.6%) cases were unsatisfactory.

In the study by Afroze N et al¹², 115 (67.6%) cases were diagnosed as Benign including inflammatory, 37 (21.7%) cases were diagnosed as Follicular lesions, 14 (8.2%) cases were diagnosed as malignant and 4 (2.3%) cases were unsatisfactory.

In the study by Venkatachalapathy et al¹³, 122(61%) cases were diagnosed as Benign including inflammatory, 58 (29%) cases were diagnosed as Follicular lesions and 20 (10%) cases were diagnosed as malignant.

Also in the study by Richasharma et al¹⁴, 50 (53.16%) cases were diagnosed as Benign including inflammatory, 35 (37.2%) cases were diagnosed as Follicular lesions and 7 (7.4%) cases were diagnosed as malignant and 2 (2.12%) cases were unsatisfactory.

5. Conclusion

From our study we can conclude that the thyroid swelling was more common in females. The commonest presenting complaint was swelling in front of neck. On FNAC, benign category constituted the major cause of thyroid swelling. The commonest benign lesion was colloid goitre and the commonest malignant lesion was anaplastic carcinoma. From our study we can conclude that for proper diagnosis of thyroid lesion, FNAC is the main diagnostic modality. Along with clinical examination it helps to come to the proper diagnosis.

6. References

- Vander JB, Gaston EA, Dawber TR. The significance of non-toxic thyroid nodule: Final report of a 15 year study of incidence of thyroid malignancy. *Ann Int Med.* 1968; 69:537. <https://doi.org/10.7326/0003-4819-69-3-537> PMID:5673172
- Sengupta A, Pal R, Kar S, Zaman FA, Sengupta S, PaL S. Fine needle aspiration cytology as the primary diagnostic tool in thyroid enlargement. *Journal of Natural science, Biology and Medicine.* 2011 Jan; 2(1):113–8. <https://doi.org/10.4103/0976-9668.82308> PMID:22470244 PMCid:PMC3312690
- Davidson HG, Gonzalez-Campora R. Thyroid (Fine needle aspiration of various organs and Body sites). In Bibbo M, editor. *Comprehensive cytopathology.* 3rd ed. Saunders company; 2008. p. 633–70.
- Bamanikar S, Soraisham P, Jadhav S, Kumar H, Jadhav P, Bamanikar A. Cytohistology and clinical correlation of Thyroid gland lesions. *Journal of Clinical Cancer Investigation.* 2014 May-Jun; 3(3):208–12. <https://doi.org/10.4103/2278-0513.132112>
- Orell RS, Gita J. Thyroid. In: Orell RS, Sterrett FG, editors. *Fine needle aspiration cytology.* 5th ed. Elsevier Missouri: Churchill Livingstone; 2012. p. 119–55.
- Chetan VR, Veeresalingam B, Kumar KM, Teja P, et al. A study on the clinical manifestations and the incidence of benign and malignant tumors in a solitary thyroid nodule. *Int J Res Med Sci.* 2013 Nov; 1(4):429–34. <https://doi.org/10.5455/2320-6012.ijrms20131123>
- Dhanadia A, Shah H, Dave A. Ultrasonographic and FNAC correlation of thyroid lesions. *Gujarat Medical Journal.* 2014 Mar; 69(1):75–81.
- Chandanwale S, Singh N, et al. Clinicopathological correlation of thyroid nodules. *Int J Pharm Biomed Sci.* 2012; 3(3):97–102.
- Handa U, Garg S, Mohan H, Nagarkar N. Role of fine needle aspiration cytology in diagnosis and Role of fine needle aspiration cytology in diagnosis and management of thyroid lesions: A study on 434 patients. *Journal of cytology.* 2008 Jan; 25(1):13–7. <https://doi.org/10.4103/0970-9371.40652>
- Likhar KS, Hazari RA. Diagnostic accuracy of fine needle aspiration cytology in thyroid lesions: A hospital-based study. *Thyroid Research and Practice.* 2013 May-Aug; 10(2):68–71.
- Bagga PK, Mahajan NC. Fine needle aspiration cytology of thyroid swellings: How useful and accurate is it? *Indian Journal of cancer.* 2010 oct-dec; 47(4):437–42. <https://doi.org/10.4103/0019-509X.73564> PMID:21131759
- Afroze N, Kayani N, Hasan SH. role of fine needle aspiration cytology in the diagnosis of palpable thyroid lesions. *Indian Journal of Pathology and Microbiology.* 2002 Jul; 45(3):241–6. PMID:12785159
- Venkatachalapathy TS, Sreeramulu PN, Krishna MR. A prospective study of clinical, sonological and pathological evaluation of thyroid nodule. *Thyroid Disorders and Therapy.* 2012; 1(2):109.
- Mathur DR, Sharma R. Diagnostic accuracy of Fine Needle Aspiration Cytology (FNAC) of the thyroid gland lesions. *International Journal of Health Sciences and Research.* 2012 Nov; 2(8):1–7.