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COMPARATIVE STUDY BETWEEN FNAC AND HISTOPATHOLOGY (HPR) IN DIAGNOSING THYROID SWELLING

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ABSTRACT

Introduction: A multitude of diagnostic tests like ultrasound, thyroid nuclear scan, fine needle aspiration cytology (FNAC) and many more are available to evaluate thyroid swelling but confirmatory diagnosis requires morphological examination of lesions by FNAC and histopathology.

Material and Method: 60 patients of thyroid swellings admitted to indoor and undergoing thyroidectomy were enrolled. Fine needle aspiration cytology was done on outpatient basis and thyroidectomy specimens preserved in 10 % formalin were sent for histopathology examination

Result: Out of 28 cases of colloid goiter diagnosed on FNAC, 2 cases were later diagnosed as Papillary Ca on histopathology. Out of 6 cases of Follicular adenoma diagnosed on FNAC, 2 cases were later diagnosed as Follicular Ca on histopathology. 1 case of Follicular Ca diagnosed on FNAC was later diagnosed as Follicular adenoma on histopathology

Discussion: FNAC Sensitivity was 50 %, Specificity was 98.08 %, PPV was 26.00 and NPV was 0.51

Conclusion: FNAC is a safe, cost-effective method with excellent accuracy and specificity for investigating thyroid illness

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INTRODUCTION

In clinical practice we encounter various types of neck swellings amongst which thyroid enlargement contributes to significant number of cases. Diseases of thyroid gland shows major geographical

variation however incidence is higher in endemic areas¹. Diagnosis of thyroid swelling depends upon different invasive and non-invasive investigation. Vast majority of thyroid swellings are non-neoplastic lesions while only < 5 % are malignant². Clinical

features alone cannot distinguish between benign and malignant swellings. Thyroid cytology not only provides a definite diagnosis of malignancy but also information about tumour type which enables appropriate therapeutic surgery. Surgical biopsy was first advocated by **Rugu and his associate Joham vent (1870)**³ whereas FNAC as a method was first published by **Leyden (1883)**⁴ and aspiration cytology was first reported by **Martin and Ellis (1930)**⁵. Fine-needle aspiration cytology (FNAC) is sensitive, technically easy to perform, cost effective and safe procedure⁴. Practice guidelines set forth by American Thyroid Association and National Comprehensive Cancer Network states that FNAC should be used as initial diagnostic test because of its superior diagnostic reliability and cost effectiveness⁶. FNAC plays a vital role in evaluating patients with thyroid swellings however limitations of FNAC includes false negative and false positive results attributed to specimen adequacy, sampling techniques, skill of performing the aspiration, interpretation of the aspirate and overlapping cytological features between benign and malignant follicular neoplasm. A multitude of diagnostic tests like ultrasound, thyroid nuclear scan, fine needle aspiration cytology (FNAC) and many more are available to evaluate but confirmatory diagnosis requires morphological examination of lesions by histopathological examination⁶. Post-operative histopathological report (HPR) may be different from FNAC. Hence the present study was undertaken to compare sensitivity and specificity of FNAC in palpable thyroid lesions with histopathological report (HPR)

MATERIALS AND METHODS

Present cross-sectional prospective study is conducted in the department of surgery Vitthalrao Vikhe Patil medical college and hospital, Ahmednagar from Jan 2020 to Feb 2021. Approval of the institutional ethics

committee was taken prior to commencement of study.

Inclusion criteria

60 patients of both gender with thyroid swellings with normal thyroid hormone profile admitted to indoor and undergoing thyroidectomy were enrolled. Informed signed consent was obtained from every patient.

Exclusion Criteria

Cases of thyroiditis, patients with comorbidities unfit for surgery, patients who refused surgery, patients with inoperable thyroid malignancy and patients who do not give consent for the study

PROCEDURE

Patients fulfilling inclusion and exclusion criteria were subjected to clinical examination, thyroid function tests, routine hematologic investigations, ultra-sound scans, CT scans, FNAC and histopathology examination of the thyroidectomy specimen. Palpable thyroid swellings were classified according to the number, size, site consistency, mobility on palpation and deglutition, surface texture and tenderness. Fine needle aspiration cytology of thyroid swellings was done on outpatient basis. Thyroidectomy specimens were preserved in 10 % formalin which was sent for histopathology examination to pathology department in our hospital. Preoperative FNAC and postoperative histopathology reports were correlated and conclusions drawn after statistical analysis. Cytopathologists were asked to identify the predominant pattern (primary) first followed by diagnosis followed by next dominant pattern (secondary) and the combined pattern diagnosis. The variation between primary, secondary pattern and final cytological diagnosis was matched with the final histopathological diagnosis for statistical correlation. Data collected was analyzed using SPSS Version 20 and depicted using descriptive statistics. Diagnostic tests were carried out to calculate specificity, sensitivity,

positive predictive value and accuracy of the diagnostic test.

RESULTS

Table 1: Distribution of cases according to clinical history

Sr No.	Age group (Years)	Male N (%)	Female N (%)	Total N (%)
1	< 18	2 (3 %)	3 (6 %)	5 (9 %)
2	18 to 40	15 (25 %)	24 (40 %)	39 (65 %)
3	41 to 60	5 (8 %)	7 (12 %)	12 (20 %)
4	> 60	2 (3 %)	2 (3 %)	4 (6 %)
Total N (%)		24 (39 %)	36 (61 %)	60 (100 %)

Table 1 shows age and sex distribution of cases of thyroid swelling. Highest percentage of cases was found in age range 18 to 40 years (65 %). Male to female ratio was 2:3

Table 2: Distribution of cases according to nature of aspirate

Sr No.	Nature of aspirate	Number of cases (N)	Percentage (%)
1	Haemorrhagic aspirate	28	46 %
2	Blood mixed colloid	22	38 %
3	Frank Colloid	10	16 %
Total		60	100 %

Table 2 shows nature of aspirate with highest being Haemorrhagic aspirate (46 %) followed by Blood mixed colloid (38 %) and Frank Colloid (16 %).

Table 3: Distribution of cases according to type of thyroid swelling

Sr No.	Type of thyroid swelling	FNAC N (%)	HPR N (%)	Diagnostic Accuracy (%)	
1	Benign	Colloid goitre	28 (47 %)	26 (43 %)	92.85 %
		Colloid goitre with cystic degeneration	7 (12 %)	7 (12 %)	100 %
		Hashimoto's thyroiditis	5 (8 %)	5 (8 %)	100 %
		Thyroglossal cyst	9 (15 %)	9 (15 %)	100 %
		Follicular adenoma	6 (10 %)	5 (8 %)	83.33 %
2	Malignant	Follicular Ca	1 (2 %)	2 (4 %)	50 %
		Papillary Ca	4 (6 %)	6 (10 %)	66.66 %
Total N (%)		60 (100 %)	60 (100 %)	-	

Table 3 shows distribution of cases as benign and malignant lesion diagnosed on FNAC and histopathology. Colloid goitre was found in maximum cases. Out of 28 cases of colloid goitre diagnosed on FNAC, 2 cases were later diagnosed as Papillary Ca on histopathology. Out of 6 cases of Follicular adenoma diagnosed on FNAC, 2 cases were later diagnosed as Follicular Ca on

histopathology. 1 case of Follicular Ca diagnosed on FNAC was later diagnosed as Follicular adenoma on histopathology

Table 4: Correlation of cases according to diagnostic modality

Sr No.	FNAC	HPR		Total N (%)
		Malignant N (%)	Benign N (%)	
1	Malignant N (%)	4 (7 %)	1 (2 %)	5 (9 %)
2	Benign N (%)	4 (7 %)	51 (84 %)	55 (91 %)
Total N (%)		8 (14 %)	52 (86 %)	60 (100 %)
		Sensitivity 50 % Specificity 98.08 %		
		PPV 26.00 NPV 0.51		

Table 4 shows correlation of FNAC and HPR results for diagnostic accuracy. FNAC shows Sensitivity 50 % and Specificity 98.08 % in diagnosing thyroid swelling

DISCUSSION

Thyroid gland disorders are the commonest amongst endocrine organs in clinical practice. Fine-needle aspiration cytology (FNAC) plays a vital role in pre-operative and pre-treatment diagnosis of benign and malignant thyroid lesions thus decreasing the incidence of unwanted surgeries. Present study was conducted to assess the role of FNAC in diagnosing the nature of thyroid swelling and comparing its result with histopathology finding.

In present study maximum cases were from age group 18 to 40 (65 %) followed by 20 % cases from 41 to 60, 9 % from <18 and 6 % from >60. In similar study by **Kumar A et al (2017)**⁷ they found in total 295 cases age range was 3 to 75 years and mean 38.41. Female to male ratio was 6.02:1. **Rangaswamy M et al (2011)**⁸ found in total 585 cases age range was 11 to 70 years and mean 40.57. **Handa U et al (2008)**⁹ found in total 434 cases age range was 5 to 80 years and mean 37.69. Female to male ratio was 6.35:1. **Mandal S et al (2011)**¹⁰ found in total 120 cases age range was 15 to 71 years and mean 37.69. Female to male ratio was 5:1. In present study Haemorrhagic aspirate was found in 46 %, Blood mixed colloid in 38 % and Frank Colloid in 16 %. **Kumar A et al (2017)**⁷ found aspirate obtained most of the times from thyroid lesions was haemorrhagic (48.81%),

followed by blood mixed colloid (39.66%). Least number of cases i.e., 11.53% cases were frank colloid in nature. In present study FNAC diagnosed case distribution includes Colloid goitre 28 (47 %), Colloid goitre with cystic degeneration 7 (12 %), Hashimoto's thyroiditis 5 (8 %), Thyroglossal cyst 9 (15 %), Follicular adenoma 6 (10 %), Follicular Ca 1 (2 %) and Papillary Ca 4 (6 %) whereas HPR diagnosed case distribution includes Colloid goitre 26 (43 %), Colloid goitre with cystic degeneration 7 (12 %), Hashimoto's thyroiditis 5 (8 %), Thyroglossal cyst 9 (15 %). Follicular adenoma 5 (8 %), Follicular Ca 2 (4 %) and Papillary Ca 6 (10 %). **Khageswar Rout et al (2011)**¹¹ in their study found Colloid goitre as most common among the thyroid swelling (42.2%) followed by colloid goiter with Cystic degeneration (13.2%). 31 out of 32 cases of colloid goitre diagnosed by FNAC matched with histopathology result where as one case was contradicted which was diagnosed to be papillary carcinoma in histopathology study. Rest of the colloid goitre was correctly diagnosed by FNAC. Four out of six follicular adenoma of thyroid diagnosed by FNAC correlated correctly with their histopathological results where as two cases were diagnosed to be follicular carcinoma by histopathological study. Five cases of papillary carcinoma of thyroid were diagnosed correctly by FNAC. The overall diagnostic accuracy of

thyroid swelling was 96.05% and accuracy of FNAC was 94%. **Kumar A et al (2017)**⁷ study shows that 81.01% of 295 thyroid FNACs were cytologically benign and colloid goitre comprised 65.4%. In present study Sensitivity was 50 % and Specificity was 98.08 %, PPV was 26.00 and NPV was 0.51. **Mundasad et al (2006)**¹² in similar study found that FNAC had a sensitivity 52.6%, specificity 86.6% and accuracy 79.1% for thyroid malignancy. **Handa U et al (2008)**⁹ in a similar study in which FNAC revealed a sensitivity of 97%, specificity 100% a PPV of 96% and a negative predictive value of 100%.

CONCLUSION

FNAC is a safe, cost-effective method with excellent accuracy and specificity for investigating thyroid illness. It is without major complications and can be performed on outpatients with wide patient compliance. However, it can give false negative result where final diagnosis and treatment pattern is based upon histopathology. Suspected results can be resolved with surgical excision and biopsy.

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