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Diagnostic value of FNAC in the diagnosis of solid solitary thyroid nodules in the tribal population of Jharkhand

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Abstract: ***The aim of the study was to determine the diagnostic value of FNAC in the diagnosis of solid solitary thyroid nodules. This was cross sectional comparative study between pre-operative FNAC and post operative HPE. This study was performed at the department of pathology, MGM Medical College, Jamshedpur on 164 cases with solid solitary thyroid nodule. This study included 164 cases consisting of 114 (69.51%) female and 50 (30.48%) male with female and male ratio of 2.3:1. The maximum patients with solid solitary nodules were in the age group 31-40 years most of the patients presented in the 3rd and 4th decade of life. In this study, the diagnostic results of FNAC was accuracy 82.92%, sensitivity 88.09%, specificity 77.50%, PPV 80.43%. The study highlights that FNAC is a sensitive and specific diagnostic test for thyroid nodules but this is not a substitute for HPE.***

Keywords: Fine needle Aspiration Cytology (FNAC), Histopathological Examination (HPE), Solid solitary thyroid nodules, Positive predictive value (PPV).

1. Introduction

Incidence of thyroid disease is common in jharkhand and solitary nodule presents a significant diagnostic problem for the surgeon. In India, the thyroid nodule occurs in 12.2% of the population. However, thyroid cancer is quite rare and prevalence is 8.7 per 1 lakh people per years. Although solitary thyroid nodules are common in females. Solitary thyroid nodules in males are more likely to be malignant than in females.

FNAC of thyroid nodules is now a well accepted primary diagnostic test for the assessment of diffuse thyroid lesion as well as of solitary thyroid nodule. The first effort of aspiration of head and neck masses were made by Marles and Ellis at the memorial Sloan-Ketring hospital in 1930. Solderstrom and Franzen used in 1950s and 1960s.

Many investigations have shown that FNAC is the single most sensitive, specific and cost efective method in the investigations of solitary thyroid nodule. Although there is evidence of showing possible limitations and pitfalls of this procedure. The best result of FNAC can be acquired by clinical judgement previous to the procedure, gross finding by the cytologist during the procedure, final microscopic evaluation reports.

2. Material and Methods

It was a transversal study performed at the department of pathology, MGM Medical College, Jamshedpur, Jharkhand. The study period was two years from September 2012 to August 2014. This research included 164 cases of solid solitary thyroid nodule. Patients of all age groups and genders presenting with solitary thyroid nodule were included in this research. All FNACs were taken by the same person and specimens were tested by same cytopathologist. All patients went through thyroid surgery and the thyroid gland specimens was examined by same histopathologist.

3. Solution

This investigation included 164 subjects of solitary thyroid nodule. There were 114 female and 50 male with female and male ratio of 2.3:1 (table 1). Most of the patients presented in the 3rd and 4th decade of life. These cases were from low, middle and high socioeconomic strata of society. The most important complaint of these patients was neck swelling (100%). The solitary nodule was found mainly in right lobe of thyroid and the least involvement was of thyroid isthmus. On palpation of the nodule, 136 cases (82.92%) were firm and 28 cases (17.07%) were hard. In only 3.66% cases the nodule was fixed and 96.34% cases nodule was mobile. In this study FNAC of solitary thyroid nodule disclosed that 84 cases (51.21%) were nodular goitre, 26 cases (15.85%) benign nodule among benign lesions while 26 cases were follicular carcinoma, 16 cases papillary carcinoma and 4 cases were suspicious of neoplasm.

Table 1: Age-sex distribution of the study series

Age group	Number of Cases	Percentage
0-10	6	3.66
11-20	12	7.32
21-30	58	35.36
31-40	66	40.24
41-50	16	9.76
51-60	6	3.66
Females	114	69.51
Males	50	30.48

In our research histopathological finding of thyroid nodule were as 80 cases (48.78%) of colloid goitre, 20 cases (12.19%)

benign thyroid cyst and 02 cases of Hashimoto's thyroiditis among benign conditions while neoplastic lesions were 26 cases (15.85%) follicular adenoma, 20 cases (12.19%) colloid adenoma followed by papillary carcinoma 06 cases and 4 cases of follicular carcinoma (table 2,3).

The diagnostic value of FNAC in this research was that 74 cases (45.12%) were true positive, while 62 cases (37.80%) were true negative. In this study false positive cases were 18 (10.97%), 10 cases were follicular neoplasm on FNAC and on histopathology turned out benign thyroid diseases, 06 cases were papillary carcinoma which was diagnosed benign thyroid cyst on biopsy.

In our research 10 cases (6.09%) were false negative,6 caseswere benign thyroid diseases which were diagnosed papillary carcinoma on HPE, 4 cases were diagnosed as follicular adenoma on HPE. The diagnostic result of FNAC in this study is accuracy 82.92%, sensitivity 88.09%, specificity 77.50% and PPV was 80.43%.

Table 2: FNAC of thyroid nodule

Results of FNAC		**Number of Cases**	**Percentage**
Non Neoplastic Lesions	Nodular Goitre	84	51.21
	Benign Nodule	26	15.85
	Lymphocytic Thyroiditis	6	3.67
	Total	116	70.73
Neoplastic Lesions	Follicular Carcinoma	26	15.85
	Papillary Carcinoma	16	9.75
	Hurthle Cell Lesion	2	1.22
	Suspicious of Neoplasm	4	2.44
	Total	48	29.26

Table 3: Histopathology of thyroid nodule

Results of HPE		**Number of Cases**	**Percentage**
Non Neoplastic Lesions	Solitary colliod nodule	80	48.78
	Benign Thyroid cyst	20	12.19
	Chronic Lymphocytic Thyroiditis	4	2.44
	Hashimoto's Thyroiditis	2	1.22
	Total	106	64.63
Neoplastic Lesions	Follicular adenoma	26	15.85
	Colloid adenoma	20	12.19
	Hurthle cell adenoma	2	1.22
	Follicular carcinoma	4	2.44
	Papillary carcinoma	6	3.67
	Total	58	35.36

4. Discussion

FNAC is the best method for evaluation of solid thyroid nodules and distinguishing between benign and malignant lesions. Most of the thyroid nodules are non-neoplastic which require no surgical intervention. Based on the FNAC findings, patients can be followed who have non-neoplastic and benign diagnosis or exposed to surgery in cases with malignant diagnosis, thereby decreasing the rate of unnecessary surgery.

Thyroid nodules is more common in females and in this research there were 114 female and 50 male, with female and male ratio of 2.3:1 which is comparable to the studies conducted nationally and internationally. Patients in this study belonged to different category of life but solitary thyroid nodule was more common in low socioeconomic group simulating to the study organised by Mehmood Q and collegues.

These patients complained mainly neck swelling (100%) which is in accordance to the study of Thompson and collegue. In our study the solitary nodule was found mainly in right lobe of thyroid and similar finding is also observed by TorreEM and collegues. In this research the FNAC finding was 116 cases (70.73%) had non-neoplastic lesions which in accordance to study of Korah T reporting benign lesions 69%.

The commonest finding among the benign lesions was nodules goitre (51.21%) which is in keeping with studies of Gupta M et al disclosed 39 cases (52%) as colloid nodular goitre. The next common FNAC finding among benign lesions was benign Cyst in 13 cases which was at variance from study of Abu-Salem had thyroid cyst in 43 cases. In FNAC finding the malignant cases were 29.26% which is comparable to the study of Gupta having malignant lesions 26%. Among the malignant diseases follicular carcinoma was as top (15.85%). Papillary carcinoma was the commonest malignancy. In our study papillary carcinoma was diagnosed on FNAC in 9.75% patients. On HPE, non-neoplastic lesions 64.63% and neoplastic lesions were 35.36% while in Mehmood Q study non-neoplastic lesions were 79.49% and neoplastic were 20.51%. On HPE the most commonest non-neoplastic lesion was colloid nodule 48.78% which is comparable to study of Gupta showed (56%) as colloid goitre and other studies.

On FNAC 16 cases (9.75%) were diagnosed as malignant and on HPE they were confirmed benign nodular goitre and one case was suspicious on FNAC and was confirmed as Hashimotos thyroiditis on HPE which is comparable to the study of Gharib H who reported a false negative rate of 1% to 11%, a false positive rate of 1% to 8%. The result of FNAC in Moosa FA was that sensitivity was 77.7%, specificity 98.9% and PPV was 87.5%. Similarly, in Mahmood Q research the sensitivity was 79.17% and specificity 91.40%. FNAC result in our study was that accuracy was 82.92%, sensitivity 88.09%, specificity 77.50% and PPV was 80.43% which are lesser than the study of Korah T.

5. Conclusion

Thyroid FNAC is the most reliable method for screening thyroid nodules. It is not the final diagnostic tool. It has certain limitations such as inability to distinguish follicular adenoma from follicular carcinoma, difficulties in detecting papillary micro carcinoma and probability of over interpreting Hurthle cells as carcinomatous cells. Therefore the malignant of thyroid nodules must not depend only on FNAC. Before surgical intervention, we should correlate the clinical findings with FNAC reports.

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