



CLINICOPATHOLOGICAL STUDY OF SOLITARY THYROID NODULE WITH CYTOHISTOPATHOLOGICAL CORRELATION

Pathology

Dr. Soreiphy Ruiva	G. Student, Department of Pathology, Jawaharlal Nehru Institute of Medical Sciences, Imphal, Manipur.
Dr. Shikha Ngairangbam*	Assistant Professor, Department of Pathology, Jawaharlal Nehru Institute of Medical Sciences, Imphal, Manipur.*Corresponding Author
Dr. Sunita Haobam	Associate Professor, Department of Pathology, Jawaharlal Nehru Institute of Medical Sciences, Imphal, Manipur.
Dr. L. Sushila Devi	Professor & HOD, Pathology, Jawaharlal Nehru Institute of Medical Sciences, Imphal, Manipur.

ABSTRACT

Background: Solitary thyroid nodule poses significant risk of malignancy. The study was prospective, conducted in the Jawaharlal Nehru Institute of Medical Sciences, Imphal, Manipur. **Method:** In this study the clinical presentation in different age group, race and the diagnostic methods by FNAC and Histopathology and their co-relation were evaluated. **Results:** A Total of 64 patients with solitary thyroid nodule were included in the study, majority of the patients were in the age group of 41 to 50 years (28%) followed by 51 to 60 years (22%). Advantage of FNAC vis a vis Histopathological examination was evaluated. **Conclusion:** Early evaluation of the solitary thyroid nodule by FNAC and HPE is highlighted. Advantage of FNAC as first line of diagnostic tool requires its space in the management of solitary thyroid nodule.

KEYWORDS

Thyroid Nodule, Fine Needle Aspiration Cytology (FNAC) Histopathological Examination (HPE), Malignancy, Neoplastic, Metastasis, Hurthle Cell Carcinoma FVPTC (Follicular Variant of Papillary Thyroid Carcinoma).

INTRODUCTION:

Solitary thyroid nodule is defined as a distinct lesion of the thyroid gland that is palpable or radiological distinct from thyroid parenchyma. The solitary nodules occur in 4-7% of the adult population and 0.2-1.2% in children². They are present in 5% of persons at an average of 60 years. They are more common in females (6-4%) than males (1.5%)³ but they are more likely to be malignant in males⁴. Most of the clinically diagnosed thyroid nodules are non neoplastic only 5% - 30% are malignant and require surgical intervention.

Malignant thyroid nodules can be classified as papillary carcinoma, follicular carcinoma, mixed papillary follicular carcinoma, medullary carcinoma, anaplastic carcinoma, malignant lymphoma and metastatic malignancy.

Evaluation of thyroid nodule needs a thorough systematic & methodical approach with detailed clinical approach followed by FNAC & HPE. Among the investigations, histopathological examination of thyroid nodule is the most accurate way of determining the pathology. However it needs surgery with its associated procedural parameters⁵.

Fine Needle Aspiration Cytology (FNAC) is considered as first line diagnostic test in the pre - operative evaluation of thyroid lesions because of its simplicity, diagnostic accuracy and cost effectiveness^{6, 7, 8}.

MATERIAL AND METHODS:

The study was prospective observational study conducted in the Pathology Department, Jawaharlal Nehru Institute of Medical Sciences, Imphal, Manipur for two years from September, 2017 to August, 2019 among 64 patients with solitary thyroid nodules from Surgery and Otorhinolaryngology Department.

All patients irrespective of age with solitary thyroid nodule who underwent both fine needle aspiration cytology and histopathological examination. Standard equipments, standard techniques and procedures for FNAC & HPE were used.

RESULTS:

Out of 64 cases studied 54 (84%) were females and 10 (16%) were males showing Male:Female ratio. 1:5.4 (Fig. I).

Majority of patients fall into the age group of 41 to 50 years (Fig. 2) accounting for 28% of cases, followed by 51 to 60 years (22%). The youngest being 16 years and oldest being 75 years. 65.6 % of the patients were from Meitei Community, 22% were from Naga Tribes, 4.7% each from Muslims & Kuki and 3.1% from Paite Tribe (Table I).

Table 1: Race of the patients.

Race	Number of Case	Percentage (%)
Meitei	42	65.6
Naga	14	22
Muslim	2	4.7
Kuki	3	4.7
Paite	2	3.1

Patients in this study were from 10 districts of Manipur (Table 2) 16 (25%) were from Imphal East District followed by Imphal East 13 (20.3%), Bishnupur 8 (12.3%), Thoubal 7 (10.9%), Ukhul 6 (9.4%), Senapati 5 (7.8%), 4 (6.3%) from Tamenglong, 2 (3.1%) from Kakching District. Thyroid nodule was marginally predominant in the right lobe.

Table 2: District wise distribution

District	Number of Cases	Percentage (%)
Imphal West	16	25
Imphal East	13	20.3
Bishnupur	8	12.5
Thoubal	7	10.9
Ukhul	6	9.4
Senapati	5	7.8
Tamenglong	4	6.3
Kakching	2	3.1
Churachandpur	2	3.1
Kangpokpi	1	1.6

63 (98.4%) of the patients presented in the outpatient Department with complaints of swelling in the neck while 01 (1.6%) case was diagnosed incidentally during health check up. Other complaints were dyspnea in 02 cases (3.1%), dysphagia in 02 cases (3.1%), cervical lymphadenopathy in 02 cases (3.1%) and pain over the swelling in 01 patient (1.6%).

The thyroid swelling of 18 patients were less than 3 months (28%) of 3 to 6 months in 18 patients (28%), in 24 patients more than 6 months to 3 years (38%), more than 3 years in 4 patients (6%).

50 cases had firm solitary nodule (78%) while 3 (5%) cases had hard in consistency and cystic among 11 cases (17%).

On FNAC (Table 3), 38 (59.4%) cases were non - neoplastic and 26 (40.6%) neoplastic. In non - neoplastic condition, 27 (42%) cases were nodular goiter and 11(17%) were colloid cyst. Among neoplastic thyroid nodule, Papillary carcinoma constituted the majority with 16 (25%) followed by Follicular neoplasms 7 (10.9%), Hurthle Cell Tumour 1 (1.6%) and suspicious for malignancy 2 (3.1%).

Table 3: Fine needle aspiration cytology diagnosis of the solitary thyroid nodules

FNAC	Number of Cases	Percentage (%)
Nodular goiter	27	42
Colloid cyst	11	17
Follicular neoplasm	7	11
Hurthle Cell Tumour	1	2
Papillary carcinoma	16	25
Suspicious for malignancy	2	3
Total	64	100

On histopathological examination out of 64 cases of solitary thyroid nodule 29 (45%) cases were diagnosed as nodular goiter, 9 (14%) cases colloid goiter with degenerative change, 4(6%) cases follicular adenoma and 21 (33%) cases as papillary carcinoma. Only 1(2%) case was diagnosed as follicular carcinoma.

On comparison between FNAC and histopathological diagnosis (Table 4) 2 nodular goiter on FNAC were diagnosed as follicular adenoma on histopathology. 2 colloid cyst on FNAC turned out to be papillary carcinoma. 1 case each of follicular neoplasm and Hurthle cell tumour were diagnosed as nodular goiter in histopathological examination.

Table 4: Correlation of cytologic and histopathological diagnosis (n=64).

FNAC DIAGNOSIS	HISTOPATHOLOGICAL DIAGNOSIS					TOTAL
	Nodular goiter	Colloid cyst	Follicular adenoma	Follicular carcinoma	Papillary carcinoma	
Nodular goiter	25	0	2	0	0	27
Colloid cyst	0	9	0	0	2	11
Follicular neoplasm	1	0	4	1	1	7
Papillary carcinoma	0	0	0	0	16	16
Hurthle cell tumour	1	0	0	0	0	1
Suspicious for malignancy	0	0	0	0	2	2
Total	27	9	6	1	21	

Statistically the sensitivity, specificity, positive predictive value, negative predictive value and accuracy of FNAC compared with gold standard histopathological evaluation was 79.16%, 95%, 90.47%, 88.37% and 89.06% respectively. The associated P-Value by using fisher test was 0.0001.

DISCUSSION:

FNAC is found to be the most useful first line of investigation than other investigation like USG, TFT, Thyroid scan and serological studies. FNAC leads to earlier detection and helps in the treatment of thyroid lesions.

Nodular Goitre was the most common finding among the benign lesions which agrees with other studies 16, 15. The malignant diseases

in this study were 34% which is in higher side as compared to other studies of Gupta 16 and Baloch 11 having 26% & 29% respectively.

On cytohistopathological correlations in this study; out of 27 cases of nodular goiter 25 correlated with histopathological diagnosis and 2 cases were diagnosed as follicular adenoma on histopathology. One case of follicular neoplasm on FNAC was diagnosed as nodular goiter on histopathology.

Cytological differentiation between colloid-rich macrofollicular adenoma from nodular goiter is difficult due to the presence of various overlapping cytologic features¹⁹. Aspiration from hypercellular areas of adenomatous goiter may lead to over diagnosis of follicular neoplasm. Architectural pattern of regular follicles and honeycomb sheets of adenomatous goiter versus syncytial – type fragments with crowding and overlapping of nuclei and irregular follicles of follicular neoplasm is an important criteria for distinguishing the two entities¹³.

One case of follicular neoplasm on FNAC turned out to be follicular variant of papillary carcinoma thyroid. Follicular variant of papillary carcinoma (FVPTC) can pose a diagnostic challenge due to abundance of monolayer sheets and / or micro follicles with subtle nuclear features mimicking follicular neoplasm¹². Misdiagnosis has also been observed in other studies 19, 20. Prudence is recommended to evaluate nuclear features of cell to avoid pit fall of FVPTC.

In the 11 cases of colloid cyst on FNAC, 9 correlated histopathologically and 2 cases turned out to be papillary carcinoma. Sampling of areas of cystic change rather than cellular areas lead to inaccurate diagnosis. Aspiration from multiple sites and from solid areas are useful in preventing sampling error. In this study, 16 cases of papillary carcinoma on FNAC were correlated with histopathological findings, 2 cases of suspicious for malignancy were found to be papillary carcinoma. One case of hurthle cell tumour in this study was diagnosed as nodular goiter with cystic change. Hurthle cell rich areas in nodular goiter being erroneously diagnosed on hurthle cell neoplasm is a known diagnostic pitfall²¹.

The cytohistopathological concordance rate was 89%. Hand et al 21 also found 90% concordance rate false negative rate of 8% and false positive rate of 30% were found in this study. Previous studies reported false negative rate of 1-11% & false positive rate 1-8% 9-21. The statistical analysis using fisher test showed a significant agreement between FNAC of solitary thyroid nodules and histopathological evaluation technique with associated P-value of 0.0001. This study gives credence to the rejection of our null (The two test procedures are independent) hypothesis at 5% level significance. Thus we conclude that the two tests (FNAC and Histopathological evaluation) have a significant level of overall agreement.

CONCLUSION:

An attempt was made to study age, sex, racial variation and clinical parameters of patients in the study group having solitary thyroid nodule. The diagnostic accuracy and convenience of FNAC vis a vis histopathological examination (HPE) is highlighted.

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