



A CORRELATIVE STUDY OF FNAC OF THYROID SWELLING WITH THYROID HORMONE PROFILE AMONG TRIBAL POPULATION OF JHARKHAND: A PROSPECTIVE STUDY

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ABSTRACT **INTRODUCTION:** Fine needle aspiration cytology ((FNAC) is the most sensitive, accurate and cost effective initial method for the thyroid lesion. Serum thyroid stimulating hormone (TSH) estimation is helpful as an initial test. Out of the total population of 3 crore in Jharkhand, India, 27% constitute the tribal population. There are few studies related to prevalence of thyroid lesion among tribal population. The health seeking behavior of Tribals particularly from rural areas is very low due to their believe in traditional customs, norms, sorcery, etc

AIM: To determine the correlation between different morphological patterns of thyroid swelling by FNAC and Thyroid hormone profile (T3, T4 and TSH) among tribal population of Jharkhand.

MATERIAL AND METHODS: We have selected ninety two Tribal patients having enlarged thyroid swelling. Prior doing FNAC on these patients thyroid hormone profile had been done. Then FNAC was done in every patient in the Cytopathology section of department of Pathology, RIMS, Ranchi.

RESULTS: The study found that out of 92 cases of thyroid swelling, 72 patients are female and 20 patients are male. On the basis of thyroid hormone profile we found that maximum no of patients are Euthyroid. By FNAC, we got 31 cases of colloid goiter, 22 cases of colloid cyst, 4 cases of Grave's disease, 6 cases of Hashimoto's thyroiditis, 13 cases of lymphocytic thyroiditis, 7 cases of follicular neoplasm, 2 cases of papillary carcinoma.

CONCLUSION: It renders unnecessary the need for excisional biopsy in advanced disease, elderly patients or in case where treatment is non-surgical. All the fine needle aspiration diagnosis must be viewed in the light of the clinical picture and thyroid hormone profile to minimize the risks of a false-negative report.

KEYWORDS : FNAC, Thyroid hormone profile, Tribal population.

INTRODUCTION

Thyroid FNAC was first used by Martin and Ellis in New York in 1930 but it was first commonly used in Sweden during the 1950s and 1960s [1]. It is the most simple, accurate, fast and economical, reliable method to distinguish a benign lesion from a malignant one, that dramatically reduced the unnecessary surgeries [2, 3]. Adequacy of FNAC is satisfied by the presence of 5-6 groups of well-preserved follicular epithelial cells with each group containing 10 or more cells on at least two slides [1]. Despite iodine supplementation colloid goiter is a common clinical presentation with a prevalence rate of 4-7% in the general population [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 medically [5]. Thyroid hormones have pervasive effects on the growth and development in the fetus, children and adolescent regulating calorogenesis and metabolic rate throughout life.

As per 2011 census, the scheduled tribe population of Jharkhand state is 8,645,042 of the total population 32,988,132 of the state. The Scheduled Tribes are primarily rural as 91.7 percent of them reside in villages. Gumla district has the highest population of STs (68.41 percent). The tribes of Jharkhand consist of 32 tribes.

It has been found that till now few studies related to thyroid diseases have been reported in Jharkhand. The geographical location of the state along with optimal annual rainfall leads to a low soil iodine content. Previous studies by Patro et al, have also concluded Jharkhand to be iodine deficient area.

MATERIAL AND METHODS

A prospective study to determine the correlation between FNAC and thyroid hormone profile was performed on ninety two Tribal patients who came to cytopathology section with requisition of FNAC of enlarged thyroid swelling in department of Pathology, RIMS, Ranchi. Duration of study was 6 months from December 2018 to May 2019.

Inclusion criteria

- All tribal patients having enlarged thyroid swelling were included.

Exclusion criteria

- Non-tribal patient were excluded from study.
- Patients who have been referred with other causes of neck swelling.

In all cases before doing FNAC, thyroid hormone profile has been done. The reference range of thyroid hormones is given as:

- Free T3: 1.71 - 3.71 pg/mL
- Free T4: 0.70 - 1.48 ng/dL
- TSH: 0.3500 - 4.9400 uIU/mL

Thyroid status was defined as:

- Euthyroid (fT3, fT4 and TSH levels are in normal reference range)
- Hypothyroidism (fT3 or fT4 levels are low and TSH level is high)
- Subclinical Hypothyroidism (fT3 and fT4 levels are in normal range and TSH level is high)
- Hyperthyroidism (fT3 or fT4 levels are high and TSH level is low)
- Subclinical Hyperthyroidism (fT3 and fT4 levels are in normal range and TSH level is low)

After a detailed clinical examination along with making note of any doubtful sites on the thyroid gland the patient was investigated with a thyroid function test. After taking consent of the patient, the patient was subjected to the FNAC. Procedure of FNAC- After making the patient comfortable on a couch, a small pillow is placed below the shoulder blades of the patient to extend the neck. A hollow needle of fine gauge (22G) is attached to a syringe (10cc). After fixing the lesion with the fingers the patient is advised not to swallow.

The needle is inserted into the lesion and suction is applied by pulling back the plunger of the syringe. The needle is then passed back and forth through the lesion several times. On completion of aspiration, suction is released and pressure within the syringe allowed equalizing. The needle is then withdrawn; the contents of the needle are then sprayed onto a glass slide for examination. Some of the smears were fixed in methanol and stained by Papanicolaou stain, the others were

air dried and stained by Leishman Giemsa (LG) stain.

RESULTS

Among 92 cases, 89 cases were adequate and 3 cases were inadequate for interpretation.

In present study the age of presentation ranged from 10 to 65, majority of patients belong to age group 21-30. Out of 92 patients, 72 were females (78.3) and 20 patients are male(21.7). On the basis of thyroid hormone profile we found that 57 patients were euthyroid, 24 were hypothyroid, 6 were hyperthyroid, 3 were subclinical hypothyroid and 2 were subclinical hyperthyroid. By FNAC, we got 31 cases of colloid goiter, 22 cases of colloid cyst, 4 cases of Grave's disease, 6 cases of Hashimoto's thyroiditis, 13 cases of lymphocytic thyroiditis, 7 cases of follicular neoplasm, 2 cases of papillary carcinoma. 3 samples were inadequate for reporting containing only blood.

On the basis of correlation between cytological finding by FNAC and thyroid hormone profile, finally we found that, out 22 cases of colloid cyst, 20 were euthyroid and 2 were hypothyroid. 31 cases of colloid goiter, 15 were euthyroid, 14 were hypothyroid, 2 were subclinical hypothyroid, 6 cases are hyperthyroid in which we got 4 cases were grave's disease and 2 cases of hyperplastic goiter.

13 cases of lymphocytic thyroiditis, we found 5 cases were euthyroid, 7cases were hypothyroid, and 1 case was subclinical hypothyroid.

All 6 cases of Hashimoto's thyroiditis were positive for antiTPO antibody, in which 4 cases were hypothyroid and 2 cases were euthyroid.

Papillary carcinoma of thyroid and thyroglossal cyst, all were euthyroid

TABLE: 3 showing correlation between cytological finding and thyroid hormone profile

	EUTHYROID	HYPOTHYROID	HYPERTHYROID	SUBCLINICAL HYPOTHYROID	SUBCLINICAL HYPERTHYROID	Total
COLLOID CYST	20	2	0	0	0	22
COLLOID GOITRE	15	14	0	2	0	31
FOLLICULAR NEOPLASM	4	1	0	0	2	7
GRAVE'S DISEASE	0	0	4	0	0	4
HASHIMOTO'S THYROIDITIS	2	4	0	0	0	6
HURTHLE CELL NEOPLASM	0	1	0	0	0	1
HYPERPLASTIC GOITRE	0	0	2	0	0	2
LYMPHOCYTIC THYROIDITIS	5	7	0	1	0	13
PAPILLARY CARCINOMA	2	0	0	0	0	2
THYROGLOSSAL CYST	1	0	0	0	0	1
INADEQUATE SAMPLES	3	0	0	0	0	3
Total	57	24	6	3	2	92

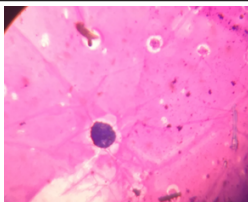


Figure 1:LGX40: Colloid cyst showing colloid in the background (crazy pavement) with foamy macrophages

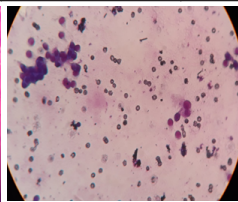


Figure2: LGX40, Colloid goiter showing clusters of benign follicular cells against colloid in the background.

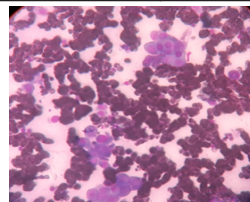


Figure3:LGX40 follicular neoplasm, Cellular smears showing microfollicles with pleomorphism.

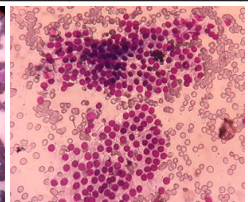


Figure 4 LGX40, Lymphocytic thyroiditis, cellular smear showing Lymphoid cells impinging on follicular cells

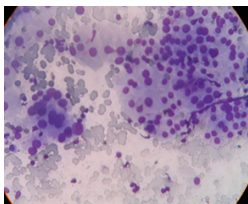


Figure 5 LGX10, Hurthle cell neoplasm, showing Large polygonal cells with abundant, basophilic cytoplasm with mild to moderate nuclear pleomorphism

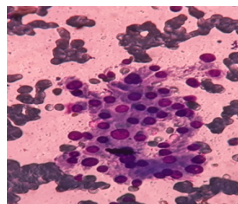


Figure 6 LGX 40, Hashimoto's Thyroiditis, showing Lymphoid cells impinging on follicular cells

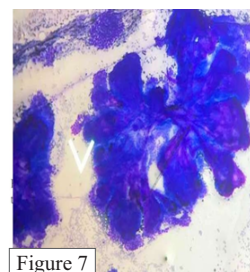


Figure 7

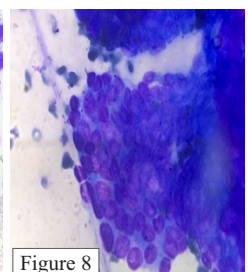


Figure 8

Fig.7, LGX10& Fig.8, LGX40, Papillary carcinoma of thyroid showing Finger-like papilla with fibrovascular core nuclear crowding and overlapping

One case of Hurthle cell neoplasm showed hypothyroidism; whereas Follicular neoplasm showed variable thyroid hormone profile. Out of 7 cases, 4 were euthyroid, 1 was hypothyroid and 2 were subclinical hyperthyroid.

TABLE: 1: Showing frequency distribution of gender

GENDER	Frequency	Percent
MALE	20	21.7
FEMALE	72	78.3
TOTAL	92	100.0

SEX DISTRIBUTION

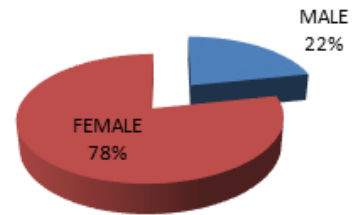


TABLE: 2 Showing Age Group Distributions

AGE GROUP	FREQUENCY	PERCENTAGE
0-10	4	4.3
11-20	18	19.6
21-30	36	39.1
31-40	19	20.7
41-50	13	14.1
51& Above	2	2.2
TOTAL	92	100.0

DISCUSSION:

Thyroid nodules are very common occurring in 4% of the population aged between 30 and 60^[10]. Most are benign and only between 10% and 20% are malignant^[11,12]. Therefore, surgery as the initial intervention or investigation will have a very low yield. There have been various studies done on FNAC of thyroid swellings. In the study by Ritica Chaudhary, Zulfikar Ahmed, Umaru N^[13], The mean age of patients in their study is 39.66 years and age range is 1-76 Years. In this study total number of females were 142 (94.6%) while males were 8 (5.4%). Out of 150 cases maximum number of patients (92) were euthyroid while minimum number of patients (4) were found to be hypothyroid. 17 cases were hyperthyroid, 23 cases were subclinical hyperthyroidism while 14 cases were of subclinical hypothyroidism respectively. Thyroid hormone status distribution in non-neoplastic cases was as follows: Out of 141 cases 61% were euthyroid, 12% were hyperthyroid, 2.8% were hypothyroid while 15.6% and 8% were subclinical hyperthyroidism and subclinical hypothyroidism respectively.

The study conducted by Syed Obaid, Anand Auti^[14], Majority of the patients were in the age group of 41-50 years (36.4%). In this study out of the 110 patients, 92 were females (83.6%). By FNAC they found that benign cases were as follow, Colloid goitre or nodular goiter 90, Hashimoto's Thyroiditis 3, Adenomatous hyperplasia 2, Hyperplastic nodule 2, Adenomatous nodule 1 and malignant cases were like as Follicular neoplasm 4, Papillary carcinoma 3, Follicular neoplasm 4 Papillary carcinoma 3 respectively.

There is some study done on benefits and limitations of FNAC in the thyroid diseases, by Mohammed Arif*, Sunil H^[15], they found that The sex ratio of study population was Male = 18 patients & Female = 132 patients. Most of the patients in our study were in the age group of 21-40 yrs and accounted for 54.66% of the patients. The mean age was 40.84 yrs. By FNAC, multinodular goitre were 80, Colloid goitre were 28, Thyroiditis were 6, Papillary carcinoma were 16, Follicular neoplasm were 18, Hyperplastic goitre were 2 respectively.

The study done by V. Karuna, P. GuPta, V. Kumar, K. GroVer, M. rathi, N. Verma^[16], they concluded following results, A total of 502 thyroid FNAC cases were reported. The common age group of thyroid swellings was between 31-40 years comprising 274 cases (54.58%) in total. Females (91.43%) were commonly involved with M: F ratio of 1:10. Cytology showed common non-neoplastic lesions was colloid goitre (n=258/496; 52.02%) followed by Hashimoto thyroiditis (n=94/496; 18.95%) and least common was granulomatous thyroiditis. The common neoplastic lesion on FNAC was found to be follicular neoplasm (n=52/496; 10.49%) followed by papillary carcinoma (n=29/496; 05.85%).

There was one study done in the Jharkhand by B. Kumar, U.S. Singh, R.K. Mandhan^[1], in their study found that 86% of Nodules came out to be Benign Adenomas, 4% of Nodules were of suspected cytology, 4% of the patients with dysphagia and breathing problem was suspicious of malignancy, 6% cases having large thyroid gland no symptoms were insignificant.

The study done by K. Vijaya, R. Shyamala and A. Durga Prasad^[18], found that out of 120 FNACs studied, 3 were inadequate to report, 109 were benign, 8 cases were malignant. These lesions occurred more commonly in the females, (94 cases, 78.3%) than males (26 cases, 21.7%), and the female to male ratio is 3.6:1. The peak age of incidence was observed in second and third decade of life. By FNAC, the diagnosis made by them as follow, Colloid goiter were 70, Colloid goiter with cystic degeneration were 06, Follicular neoplasm were 16, Hashimoto's thyroiditis were 9, Carcinoma thyroid were 8.

One more study done in our state Jharkhand by S. Nath Paul, A. Kumari, S. Kumar^[19], they observed that The greater number of the cases (75.90%) were diagnosed as colloid goitre. Follicular carcinoma was detected in 7.14% and anaplastic carcinoma in 3.57% of cases.

CONCLUSION:

In conclusion the results of our study are comparable to current published data. FNAC is an accurate, simple and safe diagnostic modality for investigating thyroid swellings. We found that maximum no of cases seen third and fourth decades of life. Female are more prone for thyroid diseases as compare to male. We found that there is some correlation between benign thyroid lesions and thyroid hormone profile, like in cases of hashimoto's thyroiditis and lymphocytic

thyroiditis maximum patient were hypothyroid and subclinical hypothyroid. But we didn't find any correlation between malignant thyroid lesion and thyroid hormone profile. Thyroid function tests, these are not useful in the assessment of patients with thyroid nodules because most patients with thyroid cancer are euthyroid, like the cases of follicular neoplasm showed variable thyroid hormone profile. All the fine needle aspiration diagnosis must be viewed in the light of the clinical picture and thyroid hormone profile to minimize the risks of a false-negative report. Being iodine deficient area in Jharkhand, it was observed that maximum no of cases were colloid goitre and colloid cyst, which were more prevalent in children, adolescents and females. So proper awareness and understanding is required for the control of disease so that its prevention and associated diseases can be minimized. Finally we concluded that by using FNAC, can reduce the unnecessary excisional biopsy in advanced disease, elderly patients or in case where treatment is non-surgical.

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