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Evaluation of thyroid lesions by cytology testing along with thyroid function tests in East Nimar Region, India

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Abstract---Background: Thyroid swelling is one of the concerned health issues in middle age female patients. Though majority of the thyroid lesion were benign in nature but its cost-effective preliminary diagnosis is a big challenge. Fine Needle Aspiration Cytology (FNAC) is a simple, cost-effective, highly sensitive and specific test for preliminary diagnosis of thyroid swelling. FNAC accompanying with the thyroid function tests (TFT) may be helpful in the proper assessment and management of thyroid swellings. We aimed to evaluate the thyroid swellings by FNAC and correlate FNAC findings with the TFT. Material & Methods: This study was performed in the Sampurna Sodani Diagnostic Clinic, Khandwa (M.P) for the period of one year from July 2019 to July 2020. Total 50 patients with thyroid swelling enrolled in the current study. Assessment of cytomorphological features of thyroid swelling by using FNAC and also the thyroid function test (TFT) by using chemiluminescence

immunoassay (CLIA) method. Results: Most of the cases belong to age range 41 - 50 years with female predominance. 1:4.6 was male to female ratio. Cytological diagnosis comprised benign thyroid lesion was 88% amongst them colloid goiter (30%) was predominant. Thyroid hormone analysis showed most of the thyroid lesion associated with euthyroid, maximum thyroiditis cases were hypothyroid. Conclusions: FNAC is the simple, specific and gold standard preliminary tool for diagnosis of thyroid swelling. FNAC accompanying with the TFT profile are important for early diagnosis of thyroid lesions.

Keywords---Fine Needle Aspiration Cytology (FNAC), Thyroid lesion, thyroid swelling, Thyroid Function Test.

Introduction

Thyroid swellings, the commonest presentation in ENT, head and neck surgery department, are not only benign in nature including colloid goiter, cysts, inflammatory thyroiditis but also few (<5%) are actually malignant neoplasm [1-2]. Thyroid swellings were common amongst female patients, middle age people, early exposure to ionizing radiation and areas of iodine deficiency [3]. Majority of thyroid nodules was asymptomatic and only few were symptomatic. To distinguish between benign thyroid nodules to malignant tumors was the most challenging issue in the clinical practice. Diagnosis of benign & malignant should help in the management plan. For the diagnosis of benign thyroid lesion from malignant neoplasm many tests have been developed [4]. American Thyroid Association (ATA) recommended FNAC as a gold standard test for preliminary diagnosis of thyroid swelling. ATA investigate any kind of thyroid nodule which is more than or equal to 2 cm with ultrasonography (USG) and later on by FNAC [5]. FNAC is a simple, most sensitive, specific, less time consuming and safe procedure with the excellent compliance for the patients in the department of Pathology [6]. FNAC accompanying with the USG thyroid, thyroid nodule scan, TFT and TPO antibody level are helpful for the selection of thyroid lesion patients manage conservatively or surgically [7].

Thyroid gland produces triiodothyronine (T3) and thyroxine (T4) hormones regulated by thyroid stimulating hormone (TSH) secreted by anterior pituitary gland. Based on the T3, T4 and TSH level thyroid lesion could be classified in euthyroid, hypothyroid or hyperthyroid [8]. We aimed to evaluate cytomorphological features of thyroid swelling, diagnosed different thyroid lesions and its correlation with the thyroid function tests.

Materials and Methods

From July 2019 to July 2020, the study was done at Sampurna Sodani Diagnostic Clinic, Khandwa (M.P.). This study enrolled 50 patients who were already diagnosed and also after taking their informed consent. The Helsinki declaration guidelines for ethical standard were followed.

Before performing the FNAC procedure it was well explained to the patient and obtained patient informed consent. Prior to aspiration a physical examination of thyroid swelling was done. Performing the FNAC procedure to the selected patients by taking all aseptic precautions by using 10 cc sterilized disposable plastic syringes and 23/24-gauge needle. Papanicolaou (Pap) stain was used for the FNAC smears. Presence of atleast 6-8 cellular fragments on each of 2 slides was the criteria to be considered for adequate smear. The biochemical thyroid function test (TFT), serum T3, T4, TSH, was performed in all the selected patients by using CLIA at NABL accredited SampurnaSodani Diagnostic Clinic, Indore. Cytological smear was diagnosed by according to the standard criteria. If the material is insufficient for diagnosis we have requested for repeat FNAC and collect appropriate material.

Statistical analysis: Analysed by using SPSS software version 22. P-value <0.05 was considered as statistically significant.

Reference range for these test were as follow:

T3: 0.6 – 1.81 ng/ml

T4: 4.5 – 12.6 µg/dl

TSH: 0.35 – 5.5 µIU/ml

Results

A total of 50 patients of thyroid swelling enrolled in our study which was clinically diagnosed by physicians and sent to the sodani diagnostic laboratory for FNAC. In our study most of the patients were of aged 41-50 followed by 31-40 years age group. Majority of the patients (82%) were female (table: 1). Male to female ratio was 1:4.6.

In the present study common symptoms was neck swelling (98%) almost in all cases, neck discomfort (22%), neck pain (18%), and difficulty in deglutition (8%) (figure: 1). On FNAC non neoplastic (benign) lesions was observed in most of the cases (88%), amongst them colloid goiter (34%) was the predominant lesion. Neoplastic (malignant lesions) were diagnosed in 12 % cases by FNAC amongst them follicular neoplasm was the predominant lesion. Malignant neoplasm (follicular & papillary) diagnosed by FNAC also confirmed by histopathology (HPE).

Table 1
Age and gender wise distribution of thyroid lesion cases (n=50)

S. No.	Age	Male	Female	Total
1	11 – 20	2 (22.2%)	0(0%)	2(4%)
2	21 – 30	1 (11.2%)	7(17.1%)	8(16%)
3	31 – 40	2 (22.2%)	11(26.8%)	13(26%)
4	41 – 50	2 (22.2%)	13(31.7%)	15(30%)
5	51 – 60	0 (0%)	7(17.1%)	7(14%)
6	61 – 70	2 (22.2%)	3(7.3%)	5(10%)
Total		9 (18%)	41(82%)	50(100%)

Table 2
Distribution of thyroid swelling cases according to the FNAC diagnosis (n=50)

Non-neoplastic lesions (n=44)		No. of cases
1	Cystic lesion	3
2	Colloid goiter	15
3	Nodular goiter	13
4	Non-specific thyroiditis	6
5	Lymphocytic thyroiditis	3
6	Hashimoto's thyroiditis	4
Neoplastic lesions (n= 6)		
1	Follicular neoplasm	5
2	Papillary carcinoma	1

Table 3
Hormonal status of thyroid lesion cases (n=50)

S. No.	Cytological Diagnosis	Euthyroid	Hyperthyroid	Hypothyroid
1	Cystic lesion	2	-	1
2	Colloid goiter	13	-	2
3	Nodular goiter	10	-	3
4	Non-specific thyroiditis	2	1	3
5	Lymphocytic thyroiditis	1	1	1
6	Hashimoto's thyroiditis	-	1	3
7	Follicular neoplasm	5	-	-
8	Papillary carcinoma	1	-	-
	Total	34	3	13

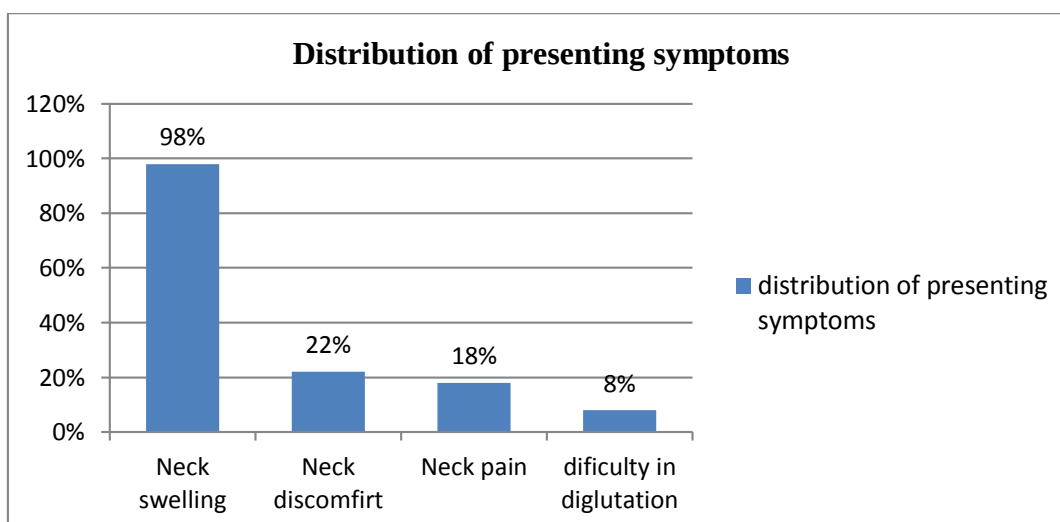


Figure 1: Percentage distribution of presenting symptoms

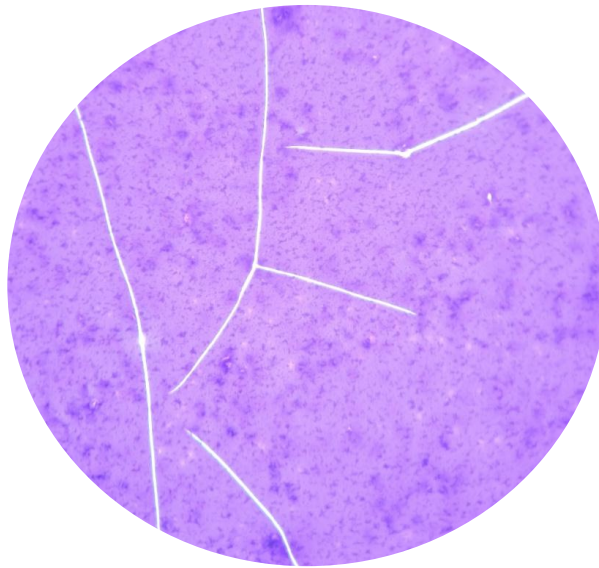


Figure 2: Colloid goiter (40X)

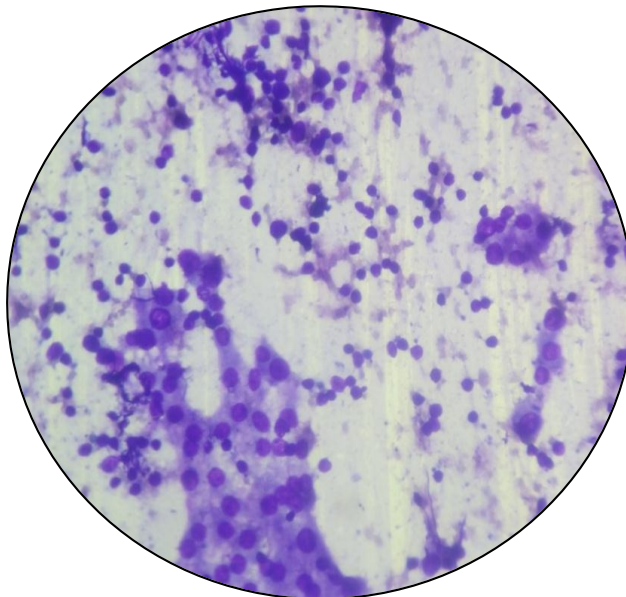


Figure 3: Lymphocytic Thyroiditis (40X)

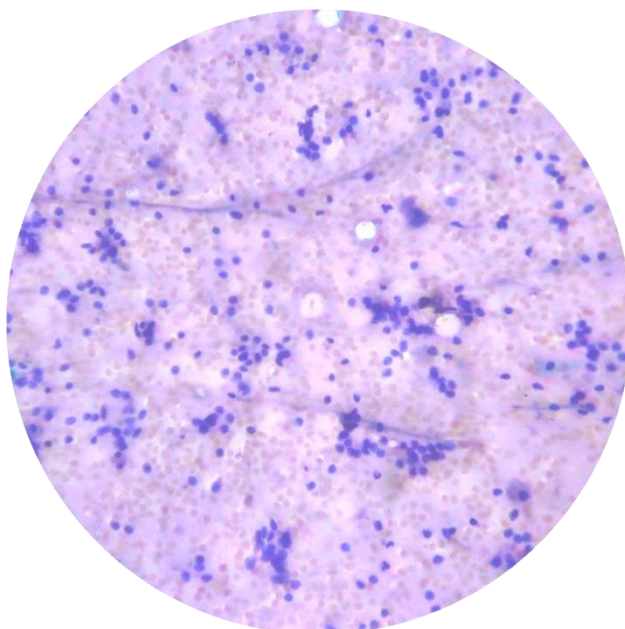


Figure 4: Follicular Neoplasm (40X)

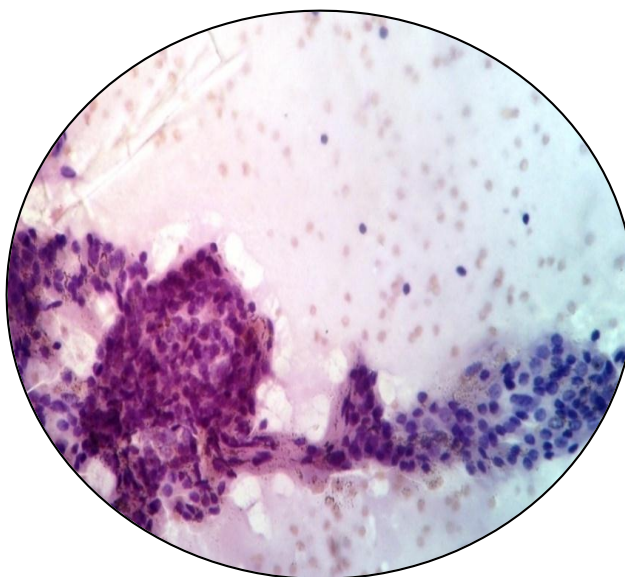


Figure 5: Papillary carcinoma (40X)

Discussion

Thyroid swelling is one of the commonly encountered problems. Benign lesions are more than the malignant thyroid swellings. Prompt and proper diagnosis of thyroid swelling was necessary for its early appropriate management. FNAC is a

simple, reliable, sensitive, non expensive and gold standard procedure for the differentiation of thyroid swellings. To improve the specificity of the diagnosis of thyroid lesions, FNAC are coupled with clinical signs, symptoms, USG and thyroid function tests.

In our study thyroid lesion (nodule) were predominantly (82%) found in female patients when compared the male patients. In our study 1: 4.6 was male to female ratio, concordance to that many other studies also correlate well with this conducted by Daveswar et al [9], Singh et al [10], Muratli et al [11] reported male to female ratio of 1: 5.3, 1: 4.7 and 1:4.8 respectively discordance to that Sood et al [12] reported very high female to male ratio 10:1 in their study. Our study had 52.3% patients of 41-50 year age group quite similar to the study of Poudel et al [13] and Junu et al [14], Bhatia et al [15] observed that 31-40 year were the commonest age group, this may be due to differences in the socio-demographic factors. Thyroid swelling (76% cases) was the most common symptom observed in present study homogenous to Roy et al [16]. In the current study benign lesions (non-neoplastic) were found in 88% cases and malignant lesions were in 12% cases by FNAC reporting. Benign thyroid lesion was most predominant (88%) in our study similar to the studies conducted by Ranabhat S et al [17] reported non-neoplastic lesion 88%, Choudhary R et al -94.1% [18] and Chandanwale S et al [19] - 95% respectively. In our study the most common presentation was Colloid goiter amongst all the benign lesion which is in accordance to the Daveswar et al [9], Siddegowda et al [20] and Tamhane et al [21]. Malignant lesion was found in 12 % cases confirmed by HPE in our study, a concordant finding with the study of H. A. Esmaili et al [22]. Among neoplastic thyroid lesion follicular neoplasm was the predominant in current study whereas other studies like Rabia Basharat et al [23] and H. A. Esmaili et al [22] found papillary carcinoma as a predominant thyroid neoplastic. We have observed stronger correlation between thyroid function test and thyroid lesions which is as per the guidelines given by ATA for the preliminary assessment of the thyroid lesions. In our study majority of the benign thyroid lesion cases was associated with euthyroid (77.3%) which was comparable to Khatib Y et al [24] and Ranabhat S, et al [17]. Amongst thyroiditis cases most of the patients were associated with hypothyroid (53.8%) in current study concordance to the Daveswar et al [9] and Mehrotra et al [25]. In Hashimoto thyroiditis cases most of the patients were associated with the hypothyroid (75%) which was compare with the Minnu Prasanna et al [26]. While correlating the thyroid lesion with the TFT majority of the colloid goiter patients had euthyroid (86.7%) followed by hypothyroid similar finding were observed by Junu et al [14] and Siddegowda et al [20], which may be because of goiter hampering the de novo production of thyroid hormone and stimulating TSH secretion leading to increase thyroid hormone level and achieving euthyroid status. All neoplastic thyroid lesions (papillary & follicular carcinoma) were biochemically associated with euthyroid in our current study concordance to Sang CK et al [27] and Poudel et al [13].

Limitation of Study

1. FNAC is not able to completely differentiate between follicular carcinoma from follicular Adenomas.
2. HPE examination was not done in all cases.

3. Patients with Cystic lesion were lost to follow up.
4. USG report not available in few cases.

Conclusion

We conclude that thyroid lesion was more common in 41-50 years age group with female to male ratio being 4.6:1. Colloid goiter was the predominant in benign lesion associated with euthyroid status. Fine needle aspiration cytology (FNAC) is a cost effective, easy to perform, safe, minimally invasive, less time consuming, highly sensitive and specific diagnostic modality for assessment of different thyroid lesions especially in developing countries like India. We recommended that FNAC accompanying with thyroid hormone function test (TFT) could be much helpful in proper early diagnosis of different thyroid diseases and also to the clinicians to determine the management strategy of patients with thyroid swelling thereby reducing unnecessary surgical intervention.

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Author's Contribution: **UKA**-Concept and design of the study, prepared first draft of manuscript; **HP**- Interpreted the results; reviewed the literature and manuscript preparation; **SS** statistical analysis and interpretation; **RA**-preparation of manuscript, revision of the manuscript and correspondence of the manuscript. **RH**: Concept, coordination, prepare and analyzed data.

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