



THYROID CYTOLOGY AND IT'S INTERPRETATION WITH THYROID FUNCTION TEST

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ABSTRACT

INTRODUCTION: The Thyroid gland is unique among the endocrine glands. It is the largest of all the endocrine glands and it is superficial in location. It is the only gland which is easily approachable to direct physical, cytological and histopathological examination.

The thyroid gland is affected by a variety of pathological lesions that are manifested by various morphologies including developmental, inflammatory, hyperplastic and neoplastic pathology which are quiet common in the clinical practice.

AIM OF THE STUDY: In this study, we aimed to assess the cytological findings of palpable thyroid nodules in conjunction with thyroid hormonal profile of the patient. To study the incidence in relevance to age, sex in various categories of thyroid lesions.

MATERIALS & METHODS: Study Design: Institutional based Cross-sectional Study. **Duration of study:** January 2019 to August 2020.

Source of data: Patients presenting to the OPD and admitted in the In-patient ward at Darbhanga Medical College, Bihar. **Place of study:** Department of Pathology, Darbhanga Medical College and Hospital, Laheriasarai, Bihar. **Sample Size:** 60 patients of enlarged thyroid gland.

RESULTS & OBSERVATIONS: We found that the 53.3% Patients are in euthyroid state. Nodular goitre is the most common finding. In the present study among 60 patients, Nodular goiter accounts for 83.3 % of all cases; 41.7% of them were in euthyroid state, 21.7 % in hypothyroid state, 8.3 % in subclinical hypothyroid and remaining 11.7 % in hyperthyroid state.

SUMMARY AND CONCLUSION: FNAC together with thyroid function test (TFT) analysis leads to early and accurate diagnosis of various thyroid diseases and reduces surgical intervention. The study showed that FNA cytologic diagnosis cannot be used to predict thyroid function using total serum T4, T3 and TSH concentrations. Measurement of TSH, free T4, and free T3 would be preferable.

KEYWORDS

Thyroid, cytology, Thyroid Function test, TSH, free T4, and free T

INTRODUCTION

The Thyroid gland is unique among the endocrine glands. It is the largest of all the endocrine glands and it is superficial in location. It is the only gland which is easily approachable to direct physical, cytological and histopathological examination.

The thyroid gland is affected by a variety of pathological lesions that are manifested by various morphologies including developmental, inflammatory, hyperplastic and neoplastic pathology which are quiet common in the clinical practice.

Lesions of thyroid are so common and it presents as diffuse enlargement or solitary or multiple nodules. As the Incidence of malignancy presenting on thyroid lesion is quiet low when compared with the overall incidence of thyroid nodular lesions. Emphasis is placed upon to find diagnostic modalities that may improve the ability to differentiate between nonneoplastic and neoplastic lesions and differentiation of benign and malignant lesions.

Enlargement of thyroid or goitre are a very common problem encountered in clinical practice and it occurs in 4-10% of the population¹. Most of the swellings are benign and frequency of malignancy range from 10 to 20%.¹ Thyroid enlargement whether benign or malignant, needs thorough investigation mainly to rule out the possibility of malignancy and thyroiditis.²

To overcome this dilemma, thyroid nodules in FNAC are classified as benign, malignant, suspicious, and insufficient for diagnosis. By considering this classification, clinicians will be able to decide if the thyroid nodule should be removed by surgery or not. In fact, introduction of FNAC into the field of thyroid diagnostic tests has reduced thyroid surgeries considerably.

FNAC is a simple and inexpensive procedure done in outpatient department for obtaining diagnosis. This procedure has few complications including the tumor implantation along the needle tract.³

Fine Needle Aspiration Cytology has been established as the investigation of choice in thyroid lesions. It has excellent patient

compliance, simple and quick to perform in outpatient department and is cost effective with high degree of sensitivity and specificity.

The main indications for Fine Needle Aspiration Cytology are:

1. Diagnosis of the solitary or nodule of thyroid.
2. To obtain material for special laboratory investigations at defining prognostic parameters.
3. To rule out malignancy or benign nature of the enlarged gland. Diagnosis of diffuse non toxic goiter.

There is continuous discussion for appropriate interpretation and management of thyroid lesions. A need to address this argument and to provide a clinically applicable with cost effective approach to the evaluation of thyroid lesions and its management has prompted to take up this study "Thyroid cytology and its interpretation with thyroid function test" in our centre at Darbhanga Medical College and Hospital, Darbhanga.

Fine needle aspiration cytology is a safe as well as cost effective tool in the study of thyroid lesions. Observations strongly support that Fine needle aspiration cytology should be the initial investigation of thyroid disease and we should embrace this diagnostic procedure in the management of thyroid lesions.⁴

- In this study, we aimed to assess the cytological findings of palpable thyroid nodules in conjunction with thyroid hormonal profile of the patient.
- To study the incidence in relevance to age, sex in various categories of thyroid lesions.

MATERIALS & METHODS

Study Design: Institutional based Cross-sectional Study

Duration of study: January 2019 to August 2020

Source of data: Patients presenting to the OPD and admitted in the In-patient ward at Darbhanga Medical College, Bihar

Place of study: Department of Pathology, Darbhanga Medical College and Hospital, Laheriasarai, Bihar

Sample size: 60 patients of enlarged thyroid gland.

Study Population: Patients of all age, sex demographic and socio-

economic status coming to the Out-Patient department (OPD) and / or admitted in the In-patient ward with enlarged thyroid gland were enrolled in the study.

Schedule of Data Collection: The data collection, analysis and tabulation were done throughout the study period i.e. 18 months. The patients were included in the study for the period of January 2019 to August 2020. Data were collected pre and postoperatively after 1 month, 3 and 6 months.

Inclusion criteria:

- Patients of enlarged thyroid gland.

Exclusion criteria:

- Patient who was on treatment for a thyroid disorder was excluded
- Patients who were not willing to take part in the study.
- Pregnant women

RESULTS & OBSERVATIONS

Our study showed that in this study age group which is involved is 51-60 years. Mean age distribution is 45.93±16.49. This graph clearly shows that females are more affected than males with ratio of 1:0.17. Neck swelling is the most common presenting complaints. Mean duration of complain is 21.91±11.28. Graph shows right lobe is more affected. 36.7% shows presence of comorbidities. 23.3% shows presences family history in thyroid disorders.

We found that the 53.3% Patients are in euthyroid state. Nodular goitre is the most common finding. In the present study among 60 patients, Nodular goitre accounts for 83.3 % of all cases; 41.7% of them were in euthyroid state, 21.7 % in hypothyroid state , 8.3 % in subclinical hypothyroid and remaining 11.7 % in hyperthyroid state .

DISCUSSION

Fine needle aspiration cytology has been used as preoperative diagnostic modality in disorders of a number of palpable or non palpable organs vis enlarged thyroid, lymph node, salivary gland, breast masses, superficial soft tissue masses, prostate, retro peritoneum ,lungs ,orbit, pelvis ,bone and joint spaces etc. More recently from American countries, European countries, Australia and Asia showing successful application of this technique to the diagnosis of the lesions of thyroid gland. Now this procedure has been carried out at several places in our country successfully.

This hospital serves a part of the goiter belt population. Consequently, a large number of patients with thyroid swelling attend and services of this hospital. Fine needle aspiration has been claimed as a very diagnostic tool in identifying various thyroid diseases. The purpose of this study has been to evaluate the efficiency of this diagnostic modality in the diagnosis of thyroid swelling and with the help of thyroid function test mainly TSH in the eastern India setup.

In the present study, majority of patients (21.7%) were of 51 to 60 years of age group. Mean age group is 45.93 ±16.49. Total of 60 patients there are 15% are male and 85% were female. There is increased female predominance is seen in thyroid disorder.

Besides neck swelling which moves on deglutition, other presenting complaints have been: a) history of neck swelling in seven patients (11.7%). b) neck discomfort in 5 patients (8.3%) Here we can see that maximum numbers of cases are long standing cases. More than thirty one patients are presenting with complaints of whose durations are more than twenty four months (51.7%).

Among 60 cases right lobe is affected in thirty six patients (60.0%), and isthmus is least affected which is only seen in seven patients (11.7%).

There is presence of comorbidities in patients with thyroid disorder in 36% among 60 patients.

It shows there are 21.7% of patient having hypothyroidism where as only 7 percentage of patient shows hyperthyroidism and 35% of patients are in euthyroid state.

Cytological examination reported nonneoplastic pathology of 54 patients. These cases showed mainly follicular cells without any features of cellular neoplasia. The cells were regular with small nucleus and didn't show hypercellularity. On the other hand 2 cases with

FNAC, highly cellular malignant cells seen and diagnosed as papillary carcinoma thyroid.

In one patient, a diagnosis lymphocytic thyroiditis was made on aspiration cytology with dispersed lymphoid cells and few follicular cells.

In the present study there was difficulty in diagnosing 4 cases due to haemorrhagic smear. Repeat FNAC was advised after 2 weeks.

In 1 patient thyroglossal cyst was diagnosed which shows macrophages and thyroid follicles against proteinaceous background.

In the present study among 60 patients, Nodular goitre accounts for 83.3 % of all cases; 41.7% of them were in euthyroid state , 21.7 % in hypothyroid state , 8.3 % in subclinical hypothyroid and remaining 11.7 % in hyperthyroid state .

Among them 4 cases were Non diagnostic, 2 were papillary carcinoma , 4 atypia , 1 thyroglossal duct and 1 thyroiditis all were came in euthyroid state which accounts for 16.7 percentage. According to the guidelines put forth by ATC, serum estimation of TSH should be part of initial assessment of thyroid swellings ⁵. If overt or subclinical hyperthyroidism is present, additional evaluation is required. A higher serum TSH level, even within the upper part of the reference range, is associated with increased risk of malignancy in a thyroid nodule, as well as more advanced stage thyroid cancer. In my present study showed that thyroid lesions are common in females with female to male ratio 1:0.17 which is similar to the study done by Poudel et al ⁶, Yang et al ⁷, Sood et al ⁸.

In our study, most of the patients were euthyroid (41.7%) which is similar to the study by Siddegowda et al ⁹, Ranabhat S1*, Parajuli B1 , Poudel S1 , Pun G1 ¹⁰ Karki S1 , Shrestha A1 ¹¹

Table: Distribution OF Presenting Complaint, Duration of Complaints, Site of Affection, TFT Findings and FNAC Findings

		Frequency	Percentage
Presenting Complaint	Neck Swelling	48	80.0
	Neck Pain	7	11.7
	Neck Discomfort	5	8.3
	Total	60	100.0
Duration of Complaints	< 1 month	2	3.3
	1-12 months	19	31.7
	13-24 months	8	13.3
	>24 months	31	51.7
	Total	60	100.0
	Mean Duration	21.91±11.28	
Site of Affection	Right lobe	36	60.0
	Left lobe	17	28.3
	Isthmus	7	11.7
	Total	60	100.0
TFT Findings	Euthyroid	35	53.3
	Hypothyroidism	13	21.7
	Subclinical Hypothyroidism	5	8.3
	Hyperthyroidism	7	11.7
	Total	100	100.0
FNAC Findings	Nodular Goitre	50	83.3
	Non diagnostic	4	6.7
	Papillary carcinoma	2	3.3
	Atypia	2	3.3
	Thyroglossal cyst	1	1.7
	Thyroiditis	1	1.7
	Total	60	100.0

SUMMARY AND CONCLUSION

In the 18 month study period from January 2019 –AUG 2020, 60 patients were taken as sample size in the Department of pathology, Darbhanga medical college, Darbhanga. FNAC of enlarged thyroid gland was done for 60 patients along with thyroid function test. Out of which a correlative cytological and thyroid function study was done.

The following conclusions are made and presented

- Most cases in this study are in the age group of 51 to 60 years

(21.7%)

- In the present study majority of them are females with female to male ratio of 0.17: 1.
- Most common thyroid lesion in the present study is nodular goiter with the incidence of 83.3%
- No patients had a cytological diagnosis of Hashimoto's thyroiditis, subacute thyroiditis, follicular carcinoma, medullary carcinoma, anaplastic carcinoma, malignant lymphoma and metastatic carcinoma.
- Thyroid malignancy is very rare.
- Majority of patients had nodular goiter of which 41.7% had euthyroidism, 7% had hyperthyroidism, 4.8% had subclinical hyperthyroidism and 8.3% had sub-clinical hypothyroidism.
- FNAC is a well-established technique for pre operative investigation.
- Fine Needle Aspiration cytology (FNAC) is a widely recognized practical and useful technique in the diagnosis of thyroid lesions. This technique is simple and rapid and shows excellent cellular details and no expensive instruments are needed.
- FNAC together with thyroid function test (TFT) analysis leads to early and accurate diagnosis of various thyroid diseases and reduces surgical intervention. The study showed that FNA cytologic diagnosis cannot be used to predict thyroid function test using total serum T4, T3 and TSH concentrations.
- Histology which is the 'gold standard' in the diagnosis of the thyroid nodule, together with cytology, and radionuclide scanning would be more sensitive in predicting thyroid function. Measurement of TSH, free T4, and free T3 would be preferable.

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