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Original Research Article

Histomorphological study in the pattern of thyroid lesions diagnosed by fine needle aspiration cytology

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ABSTRACT

Background: Diseases of the thyroid gland is a common clinical presentation with a prevalence rate of 4-7% in the general population. The presence of thyroid swelling can cause concern to both patient and surgeon as for the diagnosis and treatment is concerned. The current study aims to study the histomorphological pattern of various thyroid lesions.
Methods: A prospective cross sectional study was carried out in Bapuji Hospital and Chigateri district hospital, teaching hospitals attached to J.J.M. Medical College Davanagere over a year from August 2020 to June 2022. All patients with clinical evidence of thyroid swelling were selected. Ultrasonography (USG), fine needle aspiration of thyroid swelling (FNAC) and thyroid function test (TFT) was done and histomorphological pattern of each patient was studied.
Results: The reports of FNAC and USG were similar in most of the patients. Accordingly, accuracy is 100%, sensitivity 90%, specificity 0%, positive predictive value 90%, negative predictive value 0%.
Conclusions: As per the study accuracy of FNAC with USG is 100%. USG neck will help to diagnose the solid and cystic lesions. FNAC is a good diagnostic tool in the diagnosis of neoplasm and thyroiditis, Bethesda categorization helps the surgeon to plan for surgery based on the reports and thyroid profile. USG and FNAC are equally sensitive in diagnosing malignancy, but FNAC is more specific (90%). It is a minimally invasive method which can be used to distinguish malignant from benign lesions with a high degree of accuracy (90%).

Keywords: Fine needle aspiration cytology, Thyroid gland, Ultrasonography

INTRODUCTION

Diseases of the thyroid gland are a common clinical presentation with prevalence rate of 4-7% in the general population.[1,2] The incidence being higher in endemic areas.[3] The presence of thyroid swelling can cause concern to both patient and surgeon as for the diagnosis and treatment is concerned.

The disorders of thyroid gland can be due to many causes such as inflammatory, benign or malignant. A multitude of non-invasive and invasive diagnostic tests like ultrasound, thyroid nuclear scan and fine needle aspiration cytology (FNAC) is available to the clinician for the evaluation of thyroid swellings.

FNAC is a simple, cost effective, readily repeated, and quick to perform procedure in the outpatient department with excellent patient compliance. It is often used as the initial screening test for the diagnosis of thyroid diseases. If euthyroid, then FNAC provides direct specific information about the cytology of the nodule from which histology can be inferred. Important factor for satisfactory test includes representative specimens from the nodule and an experienced cytologist to interpret the findings.

There are varieties of thyroid lesions which vary from simple goiter to malignancy, the prevalence and pattern of thyroid disorders will vary depending on factors such as age, sex, race, and location. The aim of this study is to determine the histomorphological pattern of various thyroid lesions which are diagnosed by FNAC and correlate with ultrasonography (USG) and thyroid profile.

METHODS

This prospective cross sectional study was carried out in Bapuji Hospital and Chigateri district hospital, teaching hospitals attached to J.J.M. Medical College Davanagere over a year from August 2020-June 2022 in all patients with clinical evidence of thyroid swelling who fulfilled all inclusion criteria and exclusion criteria. The study group included sixty patients of either sex between the age group of 18-60 years attending the outpatient department of ENT. Ultrasound and fine needle aspiration of thyroid swellings were done after getting informed consent from them and after drawing a detailed clinical history, physical examination and thyroid function test and finally histomorphological pattern of thyroid swelling is studied.

Inclusion criteria

All patients with thyroid swellings with age group of 18 to 60 years were included.

Exclusion criteria

Patients below 16 years of age and above 60 years of age were excluded.

Statistical analysis

Statistical analyses were performed using IBM statistical package for the social sciences (SPSS) statistics for Windows, Version 25.0. Armonk, NY: IBM Corp. Results on continuous measurement is presented as mean±standard deviation (SD). Median (IQR) and categorical as frequency, percentage. Inferential statistics like Fisher exact test was used to check association between the variables. P value <0.05 was considered statistically significant.

Sample size was calculated based on following formula.

$$\text{Sample size} = \frac{Z\alpha^2 P(1-P)}{d^2}$$

Where $Z\alpha^2$= standard normal variate 1.96, P=expected proportion from population, and d=absolute error.

Method of collection of data

Patients attending ENT OPDs with clinical evidence of thyroid swelling who fulfilled all inclusion criteria and exclusion criteria and are willing to participate in this study will be selected. Ultrasound and aspiration of thyroid swellings were done after getting informed consent from them and after drawing a detailed clinical history, physical examination and thyroid function test, histomorphological pattern of each patient is studied.

Ethics approval

The study was done after approval of the institutional ethics committee from JJM Medical College, Davangere, Karnataka, India in accordance with ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

RESULTS

Majority of the patients with thyroid swelling were in the third decade (21-30 years) of life with mean age of 37.10 years shown in Table 1. This is in accordance with study by Chaudhary et al the age ranged from 18 to 70 years with mean being 36.64, which is almost similar to our study.[6] The male to female ratio was 1:11 i.e., 92% were females and 8% males.

Table 1: Age distribution.

Age (in years)	No. of patients (N)	Percentage (%)
<20	05	8.3
21-30	22	36.7
31-40	13	21.7
41-50	08	13.3
51-60	10	16.7
>60	02	3.3
Mean±SD and range	37.10±13.67	18-65

In our study FNAC reporting as per Bethesda classification, the majority of lesions were benign (98.3%) and malignant (1.7%) amongst that Bethesda-II category was the highest (90%) followed by Bethesda-1 (8.3%) and Bethesda-VI (1.7%) shown in Table 2 and Figure 1. This is in accordance with the studies done by Chaudhary et al.[6]

Table 2: FNAC diagnosis.

Parameters	No. of patients (N)	Percentage (%)
Bethesda-I	05	8.3
Bethesda-II	54	90
Bethesda-VI	01	1.7
Total	60	100

USG revealed majority of the patients of thyroid swellings were due to colloid goiter i.e., 20 patients (33.3%), followed by Hashimoto's thyroiditis in 10 patients (16.7%), and multinodular goiter in 10 patients (16.7), cystic nodule in 9 patients (15%), thyroglossal cyst in 7

cases (11.7), malignancy in 4 cases (6.7%) shown in Table 3 and Figure 2.

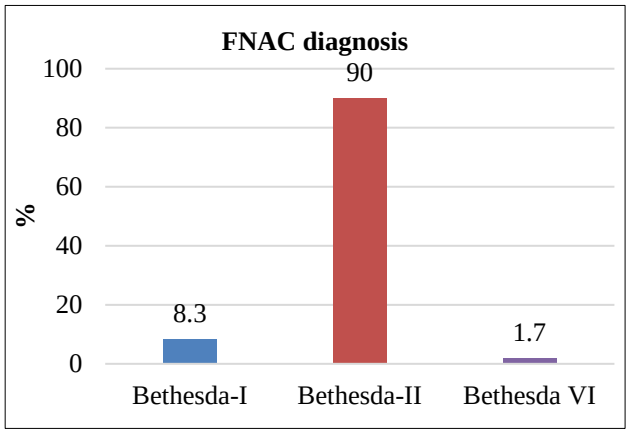

Figure 1: FNAC diagnosis in respect to Bethesda classification.

Table 3: USG diagnosis.

Parameters	No. of patients (N)	Percentage (%)
Colloid Goitre	24	33.3
Cystic Nodule	12	15.0
Degenerative nodules thyroid, TIRADS-low risk of neoplasia	4	6.7
Hashimotos thyroiditis	10	16.7
Multinodular goiter	10	16.7
Total	60	100.0

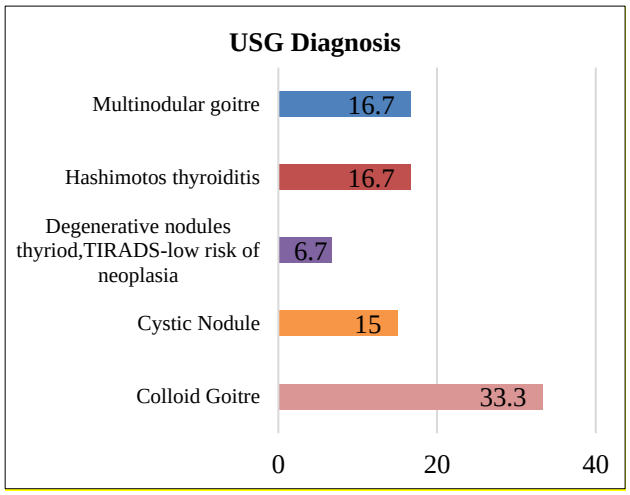

Figure 2: USG diagnosis.

In our study correlating FNAC with thyroid profile the results are as follows, Bethesda–II category, euthyroid cases were 38 (63.3%), hyperthyroid patients were 4 (6.7%), hypothyroid patients were 12 (20%). Bethesda-I category, euthyroid patients were 4 (6.7%), no hyperthyroid patients, hypothyroid patients were 1 (1.7%). Bethesda-IV category, euthyroid patients were 1 (1.7%), no hyperthyroid patients, no hypothyroid patients shown in Table 4 and Figure 3.

Table 4: Thyroid profile based on Bethesda classification.

Parameters	Bethesda-I	Bethesda-II	Bethesda-VI
Euthryroid	04 (6.7)	38 (63.3)	01 (1.7)
Hyperthyroid	0	04 (6.7)	0
Hypothyroid	01 (1.7)	12 (20)	0
Total	05 (8.3)	54 (90)	01 (1.7)

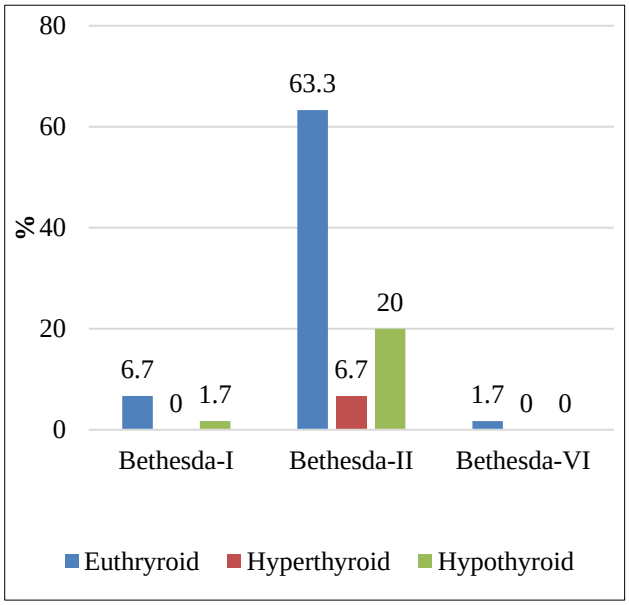

Figure 3: Thyroid profile based on Bethesda classification.

Our study showed FNAC is highly useful initial tool in the evaluation of thyroid swelling along with USG and thyroid profile with sensitivity of 96.61% and specificity and NPV is 0%, the PPV is 100%.

DISCUSSION

Disorders of thyroid gland are the most common endocrine disorder, with a prevalence rate of 4-7% in the general population with much higher incidence in endemic areas.[1-3]

Thyroid gland enlargements are easily diagnosed as a result of its relatively superficial locations where they are often inspected and palpated easily. The enlargement whether it is diffuse or in the form of a nodule leads to the need for investigations, mainly to look for the possibility of a neoplasm. Due to easiness and cost effective technique, fine needle aspiration cytology (FNAC) is considered as the choice of investigation in any type of thyroid swellings. This is a safe, simple and quick

technique with a very low complication rates and guides us for further management.[3-5]

As per the study conducted by Basavaraj et al over all sensitivity and specificity of FNAC in diagnosing neoplastic lesions of thyroid were 83.33% and 95.55%, respectively, but our studies show a higher value.[7]

In the study by Tariq et al diagnostic accuracy of FNAC of thyroid swellings ranged from 6–99%, with sensitivity of 75% specificity 97.6%.[8] As per Bhatta et al in Nepal the accuracy was 87-97%, specificity 98.9%, sensitivity 77.7%.[9] As per study conducted by Hajmanoochehri et al sensitivity of FNAC was 95.2%, specificity 68.4%, PPV of 83.3%, NPV of 89.6% and a total accuracy of 85.14%.[10]

According to Mahar et al the sensitivity of FNAC was 98%, specificity 70%, PPV 91%, NPV 93%. Diagnostic accuracy was 91% which almost co–relates with our study.[11]

Therefore, USG will help to diagnose the solid and cystic lesions whereas FNAC is a good diagnostic tool in the diagnosis of neoplasm and thyroiditis.

Limitation of the study is more sample size is required.

CONCLUSION

As per the study accuracy of FNAC with USG is 100%. USG neck will help to diagnose the solid and cystic lesions. FNAC is a good diagnostic tool in the diagnosis of neoplasm and thyroiditis, Bethesda categorization helps the surgeon to plan for surgery based on the reports and thyroid profile. USG and FNAC are equally sensitive in diagnosing malignancy, but FNAC is more specific (90%).It is a minimally invasive method which can be used to distinguish malignant from benign lesions with a high degree of accuracy (90%).

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Ethical approval: The study was approved by the Institutional Ethics Committee

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