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RESEARCH ARTICLE

Clinico-cytomorphological features and thyroid function tests of different thyroid lesions – A hospital-based cross-sectional study

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ABSTRACT

Background: Thyroid gland is an endocrine organ. The non-neoplastic and neoplastic conditions affecting the gland can manifest as the swelling of the gland with thyroid dysfunction. Based on cytology, the diseases can be categorized into non-neoplastic, benign neoplastic, and malignant neoplastic conditions and according to hormone status, the lesions of thyroid can be categorized in hypothyroid, euthyroid, or hyperthyroid condition. **Aims and Objectives:** Our study was done to find out the various cytomorphological spectrum of thyroid diseases and to record their common clinical presentation along with hormonal status in a tertiary care hospital in Northern Odisha. **Materials and Methods:** A total of 220 cases of thyroid disorder were taken for analysis over a period of 2 years. Patients demographic data, brief clinical features, finding on FNAC (cytomorphology), and thyroid function status were analyzed with appropriate statistical method. **Results:** The predominant age group affected was 21–40 years and total female to male patient ratio was 5.5:1. Most common presentations were heat intolerance (22.27%), cold intolerance (28.63%), and tachycardia (27.72%) apart from thyroid enlargement. Most common non-neoplastic lesion were multinodular and colloid goiter constituting 38.18% of total cases and most common neoplastic lesion was papillary carcinoma constituting 14.55% of total cases. Thyroid function test showed predominantly euthyroid states for all conditions. **Conclusion:** As the rest part of India, this part of Odisha also showed that thyroid disorders are more common in females and the most affected age group is 21–40 years. Multinodular and colloid goiter are the most common thyroid lesions. Most of the cases present with euthyroid state.

KEY WORDS: Thyroid Gland Disorders; Nodular Colloid Goitre; Hashimoto Thyroiditis; Papillary Carcinoma Thyroid; FNAC; Thyroid Function Test

INTRODUCTION

Thyroid gland is an endocrine organ with important physiological roles, affecting almost all the systems in the human body. The thyroid hormones maintain the level of metabolism at the cellular level, and thereby, are essential for their normal functioning. Various diseases including benign and malignant conditions can manifest as the swelling of the gland with thyroid dysfunction. The prevalence of thyroid swelling in the general adult population and in children varies between 4% to 7% and 0.2% to 1.8%, respectively.[1,2] The diseases of the gland can be screened easily by FNAC and sonography, there by guiding the treatment modalities. Thyroid being an endocrine organ produce hormones like triiodothyronine (T3) and thyroxin (T4) which are under control of thyroid stimulating hormone released by anterior pituitary gland. Based on cytology, the diseases

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can be categorized into non-neoplastic, benign neoplastic, and malignant neoplastic conditions and according to hormone status, the lesions of thyroid can be categorized in hypothyroid, euthyroid, or hyperthyroid condition.[1,3,4]

In spite of its tremendous importance, no such study was previously done in Northern Odisha to find out the various clinical presentations affecting the thyroid gland along with the hormonal status.

Our study was done to find out various cytomorphological spectrum of thyroid diseases and their common clinical presentation along with hormonal status according to thyroid function test in a tertiary care hospital in a tribal area of Northern Odisha.

Aims and Objectives

The aims of this study were as follows:

1. To find out, various cytomorphological spectrum of thyroid diseases and their common clinical presentations
2. To correlate the clinical presentations with thyroid hormone status in the subjects.

MATERIALS AND METHODS

After the ethical clearance was obtained from the Institutional Ethics Committee, the study was conducted between the time period, July 2019 and June 2021. This was a 2-year cross-sectional study. Patients presenting with thyroid diseases of all age group and sex coming for FNAC test to Pathology Department of PRM Medical College and Hospital, Baripada, Odisha, were included in the study.

We included the symptomatic and patients presenting with enlargement of thyroid gland in the study. All the patients included in the study were also assessed for thyroid function test like T3, T4, and TSH hormone levels. Cytologically undiagnosed cases due to insufficient material and cases without any enlarged gland were excluded from the study. The Thyroid Function Test was performed using Cobas E411 Electro Chemiluminescence immunometric assay method (Roche diagnostics) in the Department of Biochemistry of PRM Medical College. Relevant clinical data regarding age, sex, thyroid swelling, and clinical symptoms and signs were collected from the patients directly.

Finally, a total of 220 cases (n = 220) were taken for analysis in the study and appropriate statistical analysis was done after entry of the data in Microsoft Excel spread sheet.

RESULTS

Out of total 220 cases, female patients were 84.55% (186 cases) and male were 15.45% (34 cases). Hence, in this study, female to male ratio was 5.5:1 [Table 1].

The range of age was from 9 years to 85 years with mean age of 43.9 years. Out of total 220 cases, the age group 21–40 years was most prevalent consisting of 98 cases (44.54%) followed by age group 41–60 years consisting of 76 cases (34.54%) [Table 2].

Result in clinical presentation showed out of 220 cases, cold intolerance, tachycardia, and irregular pulse and heat intolerance were three most common features comprising of 63 cases (28.63%), 61 cases (27.72%), and 49 cases (22.27%), respectively. The next three clinical features were edema 42 cases (19.09%), tremor 45 cases (20.45%), and menstrual irregularities 36 cases (16.36%). Weight gain, weight loss, and exophthalmos each were more than 10%. Asymptomatic cases (enlarged gland but no other clinical features) which constituted 12.72%. Dysphagia and hoarseness of voice were only 7.72% [Table 3].

Various disease conditions as diagnosed by FNAC (Total 220 cases) revealed that the total non-neoplastic conditions (Nodular and colloid goiter, Hashimoto Thyroiditis,

Table 1: Percentage of gender in the study (n=220)

Gender	No. of cases	Percentage
Male	34	15.45
Female	186	84.55
Total	220	100

Table 2: Age group distribution in percentage (n=220)

Age group in years	No. of cases	Percentage
0–20	7	3.17
21–40	98	44.54
41–60	76	34.54
61–80	34	15.45
>80	5	2.30
Total	220	100

Table 3: Various clinical signs and symptoms in percentage (n=220)

Sign and symptoms	Frequency	Percentage
Weight gain	31	14.09
Weight loss	23	10.45
Heat intolerance	49	22.27
Cold intolerance	63	28.63
Edema	42	19.09
Tremor	45	20.45
Tachycardia and irregular pulse	61	27.72
Exopthalmus	32	14.54
Dysphagia and hoarseness voice	17	7.72
Menstrual irregularity	36	16.36
Asymptomatic	28	12.72

Granulomatous Thyroiditis, Primary hyperplasia, and Colloid cyst) were 146 (66.36%). Among the non-neoplastic conditions, nodular and colloid goiter were most common with 84 cases (38.18%) followed by Hashimoto thyroiditis 41 cases (18.64%). The total neoplastic diseases including benign and malignant conditions (Follicular neoplasm, Hurthle cell neoplasm, papillary carcinoma, medullary carcinoma, and anaplastic carcinoma) were 58 cases (26.36%). Among the neoplastic conditions, the most common was papillary carcinoma consisting of 32 cases (14.55%) followed by Follicular neoplasm with 17 cases (7.74%). Suspicious for malignancy and lymphoma and conditions with undetermined significance was all together 16 cases (7.27%). In our study, maximum cases were non-neoplastic followed by neoplastic conditions [Table 4].

Table 4: Disease conditions in percentage diagnosed by FNAC (*n*=220)

(Diseases conditions) cytological finding	No. of cases	Percentage of cases
Multinodular goiter and colloid goiter	84	38.18
Hashimoto thyroiditis	41	18.64
Granulomatous thyroiditis	6	2.72
Primary hyperplasia	12	5.44
Colloid cyst	3	1.36
Atypia of undetermined significance/follicular neoplasm of undetermined significance	6	2.72
Follicular neoplasm	17	7.74
Hurthle cell neoplasm	4	1.83
Suspicious malignancy	7	3.19
Papillary carcinoma	32	14.55
Medullary carcinoma	3	1.36
Anaplastic carcinoma	2	0.91
Suspiciuos lymphoma	3	1.36
Total	220	100

Thyroid function test was done in all 220 cases. Out of which euthyroid cases were 157 (71.36%), hypothyroid cases were 33 (15%), and hyperthyroid cases were 30 (13.64%). Three most common conditions presented with euthyroid status were colloid goiter, Hashimoto thyroiditis, and papillary carcinoma. Most common hypothyroid states were found in colloid goiter and papillary carcinoma. Hyperthyroid states were more among Hashimoto thyroiditis, primary hyperplasia, and follicular neoplasm [Table 5].

DISCUSSION

Thyroid gland can be affected by varieties of non-neoplastic and neoplastic conditions which may be asymptomatic or may present with different signs and symptoms. The gland may be normal in size or may enlarge variably. FNAC, thyroid function test, and ultrasound are three important and initial investigations available for thyroid disorders.[5,6] In the present study which is a 2 years hospital-based cross sectional study, we included 220 cases to analyze the demographic profile, clinical features, cytological spectrum, and thyroid function status of different thyroid disorders. The demographic data showed that our study had patients with age range between 9 and 85 years and the mean was 43.9 years. The gender ratio showed, male to female ratio was 1:5.5. While analyzing the clinical features, we found heat intolerance in 27%, cold intolerance in 28%, tachycardia/irregular pulse in 27% of patients which were the three most predominant clinical features in our study. Edema, tremor, menstrual irregularities, and weight abnormalities were also very common presenting

Table 5: Thyroid function test status in various disease conditions (*n*=220)

Cytological finding (diseases conditions)	Thyroid function status			
	Euthyroid	Hypothyroid	Hyperthyroid	Total
Multinodular goiter and colloid goiter	71	9	4	84
Hashimoto thyroiditis	28	2	11	41
Granulomatous thyroiditis	2	3	1	6
Primary hyperplasia	7	1	4	12
Colloid cyst	3	0	0	3
Atypia of undetermined significance/follicular neoplasm of undetermined significance	4	0	2	6
Follicular neoplasm	10	3	4	17
Hurthle cell neoplasm	3	0	1	4
Suspicious malignancy	3	3	1	7
Papillary carcinoma	22	8	2	32
Medullary carcinoma	3	0	0	3
Anaplastic carcinoma	0	2	0	2
Suspiciuos lymphoma	1	2	0	3
Total	157	33	30	220
Percentage according to thyroid function status	71.36	15	13.64	100

clinical features in our study. The cytomorphological analysis in our study showed that non-neoplastic conditions (66.36%) were predominant over neoplastic conditions (26.36%). Multinodular goiter and colloid goiter (38.18%) were the most common non-neoplastic conditions followed by Hashimoto thyroiditis (18.64%). Among the neoplastic conditions, papillary carcinoma was most common being 14.55% followed by follicular neoplasm constituting 7.74% cases. While considering the thyroid function status, our study revealed that euthyroid state (71.36%) was more common than hypothyroid (15%) and hyperthyroid (13.64%) states for both non-neoplastic and neoplastic conditions. Nodular and colloid goiter were predominant in euthyroid states. Hashimoto thyroiditis was predominant in hyperthyroid state.

The demographic findings were in accordance with studies done by Gupta *et al*., study in India and Sang *et al*., study in Africa.[7,8] The clinical features were similar to Toyib *et al*.[9] study in Ethiopia. Similar study results showing clinical features were found in parts of Africa and Europe.[9-11] The cytomorphological analysis is in accordance to Magdalene *et al*., study which found that the non-neoplastic conditions were 66.7% and neoplastic conditions were 33.3%. Ahmed *et al*. have also similar finding showing non-neoplastic conditions more than neoplastic conditions.[2,12] Among the neoplastic conditions, our findings are similar to Magdalene *et al*.[12] in India, Albasri *et al*.[13] of Saudi Arabia and Yang *et al*.[14] of China. The thyroid hormone status findings is similar to Jain *et al*.[1] and Devi and Aziz[15] study in India.

Our study gives complete spectrum of clinical presentations of patients presenting with thyroid diseases and compares the same with thyroid hormone status. Anti-thyroid drug history has not been considered in our study. Work involving a larger patient population, preferably, a multi-centric study would be more beneficial.

CONCLUSION

Our study revealed that the majority of patients of thyroid disorders are among the age group 21–40 years with female gender preference. Apart from thyroid enlargement, the common clinical features are cold and heat intolerance, irregular pulse, tremor, weight abnormalities, and menstrual irregularities. Colloid goiter is the most common non-neoplastic condition followed by Hashimoto thyroiditis and papillary carcinoma is the most common neoplastic condition in this part of Odisha. Most of the thyroid disorders present with euthyroid state. However, the treatment history with thyroid drugs has not been taken into consideration in our study.

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