



CYTOLOGICAL SPECTRUM OF THYROID LESIONS BY BETHESDA THYROID REPORTING SYSTEM: A TWO YEAR STUDY

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ABSTRACT Most of the thyroid lesions clinically present as either diffuse enlargement of the gland or a solitary thyroid nodule. Thyroid lesions can be differentiated into non-neoplastic or neoplastic by FNAC. The present study is two year study including 358 cases of thyroid lesions with the aim to study age and sex distribution of thyroid lesions along with various cytomorphological patterns and classification of thyroid lesions by Bethesda Thyroid Reporting System 2017. The majority of patients (25.4%) were seen in the age group 31-40 years with female predominance. In the present study, the majority of patients presented with non-neoplastic lesions (86.5%) followed by neoplastic lesions (13.4%). Among non neoplastic lesions, colloid goiter was the commonest (56.1%) while among neoplastic lesions, majority cases were of papillary thyroid carcinoma (4.1%). However, thyroid FNAC has limitation to differentiate between follicular adenoma and follicular carcinoma where histopathological correlation becomes mandatory.

KEYWORDS : FNAC, Thyroid, Colloid, Bethesda

INTRODUCTION

Thyroid fine needle aspiration cytology was first time introduced in 1950 and became popular worldwide in 1980.^{1,2} Most of the thyroid lesions clinically present as either diffuse enlargement of the gland or a solitary thyroid nodule. Thyroid nodule is one of the most common clinical presentation with an annual incidence being 4% of general population.^{3,4} The clinical assessment of a thyroid nodule is done by considering its size, texture, nodularity, fixation and tenderness of the lesion.³ Different imaging techniques like high resolution ultrasonography and radionuclide scanning can be used for preoperative diagnosis of thyroid lesion but thyroid FNAC is more accurate and cost effective procedure.⁵ Thyroid lesions can be non-neoplastic or neoplastic causing various signs and symptoms like hoarseness of voice, dysphagia, neck pain and symptoms related to hypofunctioning or hyperfunctioning of thyroid. In neoplastic lesions, some may have malignant potential. So, accurate diagnosis of thyroid lesions is very difficult. There are various non invasive methods used for diagnosis of thyroid lesions but are not able to make definitive diagnosis of malignant lesions. Therefore, most clinicians rely on FNA for making the preoperative diagnosis of benign thyroid lesions. As a result, the incidence of malignancy in thyroidectomy has raised from 10% to 30-50% in recent years.²

The main purpose of thyroid FNAC is to differentiate between benign and malignant lesions of thyroid so that unnecessary surgeries can be avoided. The aim of the present study was to study age and sex distribution of thyroid lesions along with various cytomorphological patterns and classification of thyroid lesions by Bethesda System 2017.

MATERIAL AND METHODS

This study is retrospective study. The present study was carried out on patients presenting with diffuse thyroid enlargement or nodule in the Cytopathology section of GMC, AKOLA over a period of 2 years from January 2018 to December 2019. FNA procedure was performed upon patients referred from ENT, Medicine and Surgery departments. A total of cases 358 cases to be studied with detailed clinical history, clinical examination, thyroid function tests and ultrasound imaging. Due consent was taken from all the patients before the procedure. All FNA were done by trained Cytopathologists as the outpatient procedure and when required USG guided FNA were also performed.

Non-aspiration technique of FNA was applied in all cases of thyroid lesions. Three slides were made from aspirated material, two were fixed with isopropyl alcohol and stained with Haematoxyline & Eosin and Papaniculou stains, while third slide was air dried and stained with May Grunwald Giemsa stain. FNA results were obtained after correlation with clinical history, thyroid profile and radiological findings and classified according to Bethesda System 2017. Lastly, they were compared with findings of other studies in the literature.

RESULTS

The present study included 358 cases with detailed evaluation and following results were obtained. In the present study, the majority of patients (25.4%) were seen in the age group 31-40 years with female predominance followed by age group 21-30 years with female predominance. The least number of patients were noted in age group 0-10 years and of these 3 patients were females. The highest number of male patients were observed in age group of 51-60 years as shown in table 1.

Table 1: Age and sex distribution of thyroid lesions (n= 358)

Age group	Male	Female	Total	%
0-10	0	3	03	0.8
11-20	3	21	24	6.7
21-30	9	78	87	24.3
31-40	11	80	91	25.4
41-50	9	53	62	17.3
51-60	12	32	44	12.2
61-70	3	34	37	10.3
71-80	2	08	10	2.7
Total	49	309	358	100

Table 2: Distribution of thyroid lesions in neoplastic and non neoplastic lesions (n=328)

(Excluding 30 cases of inadequate Cellularity- Category I):

In the present study, the majority of patients were presented with non-neoplastic lesions (86.5%) followed by neoplastic lesions (13.4%) as shown in table 2.

Thyroid lesions	Number of patients	%
Neoplastic	44	13.4

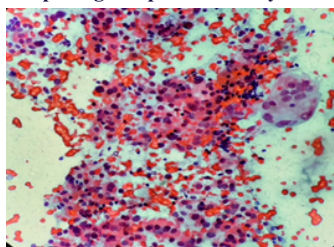
Non-neoplastic	284	86.5
Total	328	100

Table 3: Distribution of thyroid lesions according to Bethesda Thyroid Reporting System 2017 (n=358)

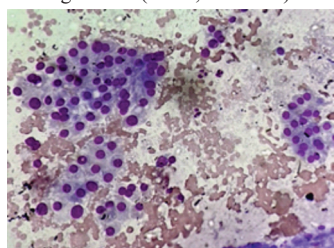
Bethesda Category		Thyroid lesions	Number	%
I	Nondiagnostic	Inadequate/ only blood	30	8.3
II	Benign	Colloid goiter	201	56.1
		Colloid cyst	16	4.4
		Thyroglossal cyst	05	1.3
		Lymphocytic thyroiditis	33	9.2
		Hashimoto's thyroiditis	20	5.5
		Granulomatous thyroiditis	09	2.5
III	Atypia of undetermined significance / follicular lesion of undetermined significance	-	00	0
IV	Follicular neoplasm	Follicular Neoplasm	10	2.7
		Hurthle cell neoplasm	04	1.1
V	Suspicious for malignancy	Suspicious of Papillary thyroid carcinoma	05	1.3
VI	Malignancy	Papillary thyroid carcinoma	15	4.1
		Medullary thyroid carcinoma	06	1.6
		Anaplastic thyroid carcinoma	04	1.1
		Total		358

In the present study, the thyroid lesions were categorized according to Bethesda Thyroid Reporting System 2017 in to six categories (Table 3). The highest number of patients were noted in category II (Benign lesions) as colloid goiter (56.1%), colloid cyst (4.4%), lymphocytic thyroiditis (9.2%), Hashimoto's thyroiditis (Figure 1a) (5.5%), granulomatous thyroiditis (2.5%) and thyroglossal cyst (1.3%) as shown in table 3. Category IV included follicular neoplasm (2.7%) and hurthle cell neoplasm(Figure 1b) (1.1%). Category V included 1.3% suspicious cases of papillary thyroid carcinoma. In category VI, the cases included were papillary thyroid carcinoma (Figure 1c) (4.1%), medullary thyroid carcinoma (1.6%) and anaplastic carcinoma (Figure 1d) (1.1%). Category I included non diagnostic cases (8.3%) where we observed either only blood or cellularity was inadequate to opine. We could not find any case in category III. Thyroglossal cyst was commonly noted in children. The cases of thyroiditis were frequently observed in younger females. Among malignant lesions, papillary thyroid carcinoma was common in younger age while anaplastic thyroid carcinoma was common in older age.

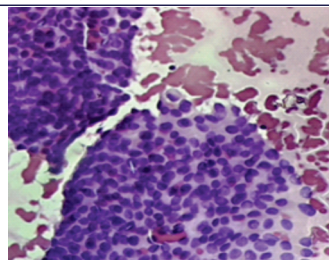
Figure 1: Cytomorphological spectrum of thyroid lesions



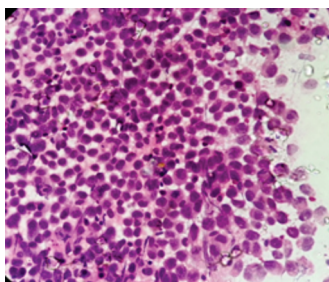
a) Hashimoto thyroiditis: Hurthle cells with overlapping lymphocytes and giant cell (200X, PAP stain)



b) Hurthle cell neoplasm: Clusters and sheets of hurthle cells (400X, HE)



c) Papillary thyroid carcinoma: Intranuclear cytoplasmic inclusions and nuclear grooves (400X, HE)



d) Anaplastic thyroid carcinoma: Highly pleomorphic cells with binucleation and mitosis.

DISCUSSION

The present study is a retrospective study conducted over a period of two years from January 2018 to December 2019. FNAC of thyroid gland provides specific preoperative diagnosis differentiating into benign, malignant and inflammatory lesions. This procedure is very easy, cost effective and has got excellent patient acceptance with no morbidity.^{6, 7, 8} The results of the present study were compared with various other studies in literature.

In the present study, the highest number of patients (25.4%) was noted in the age group 31-40 years followed by 21-30 years (24.3%) and female predominance was observed in both the age groups. Overall, all thyroid lesions were common in females with female to male ratio 6.3:1 in the present study. These findings were comparable to those of Chaudhari S et al.⁷, Arif M et al.⁹ and Gogoi G et al.¹⁰

Table 4: Comparison of neoplastic and non-neoplastic lesions with other studies

Study	Non neoplastic	Neoplastic	Ratio
Silverman JF et al. ¹¹	193	80	2.4:1
Godinho-Matos L et al. ¹²	109	22	4.9:1
Uma H et al. ¹³	381	31	12.2:1
Sengupta et al. ¹⁴	148	30	4.9:1
Akhila Sekhar et al. ¹⁵	118	31	3.8:1
Sathiyamurthy et al. ¹⁶	100	10	10:1
Present study	284	44	6.4:1

In all the studies as shown in table 4, the ratio between non-neoplastic and neoplastic was 2.4:1 to 12.2:1. The ratio in the present study was similar to study done by Godinho-Matos L et al.¹² and Sengupta et al.¹⁴ Among non-neoplastic lesions, we found colloid goiter (56.1%) as the most common thyroid lesion which was also observed by Sarma U³ and Gogoi G et al.¹⁰ Goitrous enlargement of thyroid is very common in this part of Eastern Vidharbha due to iodine deficiency. While among neoplastic lesions, papillary thyroid carcinoma was the commonest lesion which showed similarity with findings of studies done by Sarma U³ and Gogoi G et al.¹⁰ In the present study, we reported 30 cases as nondiagnostic which may be due to sclerotic or calcific nodule or cystic degeneration.

CONCLUSION

FNAC is cost effective, safe, simple, reliable and well tolerated preoperative diagnostic procedure for thyroid lesions with minimal complications. It helps to classify nodular and multinodular thyroid lesions into neoplastic (benign & malignant) and non neoplastic (goitre & inflammatory) lesions. Based on cytomorphological findings, patients can be followed up in cases of benign neoplasm, goiter & inflammatory lesions and subjected to surgery in malignant lesions thereby significantly decreasing the rate of unnecessary surgeries. Overall, thyroid lesions are commonly seen in young females. Among

non-neoplastic thyroid lesions, colloid goiter is very common, while in neoplastic category papillary thyroid carcinoma is very common. Among inflammatory lesions, lymphocytic thyroiditis is predominant lesion. Among children, thyroglossal duct cyst is the commonest lesion. All cases of thyroiditis were commonly noted in younger females. Papillary thyroid carcinoma is relatively common in younger age while Anaplastic & Medullary carcinoma are common in older age group. However, certain factors such as inadequate sampling, inexperience of cytopathologist and overlapping of cytomorphological features reduce efficacy of FNAC. The main limitation of thyroid FNAC is that it cannot differentiate between follicular adenoma and follicular carcinoma where histopathological correlation becomes mandatory.

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