

Original research article:24HISTOPATHOLOGICAL STUDY OF THYROID LESIONSDR Biren Parikh¹, DR Kena Patel², SR Anuradha Chilani³, SR Swati Parikh⁴¹Assistant Professor, Department of Pathology, AMC MET Medical College, Ahmedabad-380008²2nd year Resident, Department of Pathology, AMC MET Medical College, Ahmedabad-380008³1st year Resident, Department of Pathology, AMC MET Medical College, Ahmedabad-380008⁴Professor, Department of Pathology, Smt. NHL Municipal Medical College, Ahmedabad-380006**Correspondence to: Swati Parikh⁴**

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Email: drbirenparikh@gmail.com**Abstract:****Background:**

Thyroid lesions are fairly common worldwide and are commonly encountered in clinical practice. The incidence of various thyroid disorders shows a striking variation; both, on a national and regional basis. Thyroid gland can be affected by a wide spectrum of diseases ranging from functional and immunologically mediated enlargement to neoplastic lesions.

Objective:

This study was carried out to estimate the frequency of thyroid lesions with respect to histopathological types and to correlate thyroid lesions with demographic data and clinical features.

Materials and Methods:

This study included all types of thyroid specimens received in the department of Pathology; AMC MET Medical College, Ahmedabad from June 2019 to December 2020.

Results:

Among the total 40 cases of thyroid lesions studied, the non-neoplastic lesions accounted for 26 cases (65%) and the neoplastic lesions constituted 14 cases (35%). The most common non-neoplastic lesion was multinodular /adenomatoid goiter (50%), followed by Hashimoto thyroiditis (7.5%), thyroglossal duct cyst (5%) and diffuse hyperplasia (2.5%). The most common benign neoplasm was Follicular adenoma (7.5%) and the most common malignant neoplasm was papillary carcinoma (17.5%). Two cases (5%) of Non-invasive follicular thyroid neoplasm with papillary-like nuclear features (NIFTP) of low / unknown malignant potential were reported.

Conclusion:

Histopathological examination of thyroid lesions provides definite diagnosis; which is mandatory for further management of patient.

Key words: Histopathology, Thyroid lesions, Non-neoplastic, Neoplastic

I: INTRODUCTION

Thyroid lesions are one of the most common lesions of the endocrine system encountered in surgical pathology practice. Diseases of the thyroid gland are encountered globally and the incidence of different lesions varies from one geographical region to another. Among all the endocrine disorders, thyroid disorders are the most common in India.¹ Thyroid diseases manifest as enlargement of thyroid gland (goiter) or alterations in its hormonal levels or both.²

There is wide variety of the thyroid lesions; which may possess diagnostic and therapeutic challenges. Thyroid lesions can broadly be categorized into non-neoplastic and neoplastic lesions by histopathological perspective. Non-neoplastic thyroid lesions include congenital / developmental anomalies, hyperplastic lesions and inflammatory lesions (thyroiditis). Neoplastic thyroid lesions include various benign and malignant tumours. In the past decades, there has been continuing updation in the classification of thyroid tumours with addition / replacement of certain entities in the revised WHO classification system of thyroid tumours: 2017. Long standing goiter is regarded as one of the most frequent risk factor for the development of thyroid cancer. Although thyroid tumours account for 1% of all cancers globally, they represent the most common endocrine malignancy.³

Thyroid carcinoma closely resembles its benign counterpart in physical characteristics, measurable physiological parameters such as serum T3/T4 levels and ultrasonic characteristics.⁴ Different investigative modalities are being used for the diagnosis of thyroid lesions. Imaging technique and cytological examination may help in the preoperative diagnosis of thyroid lesions but both have their own limitations and so, histopathological examination proves to be the gold standard for the final diagnosis of thyroid lesions. Correct diagnosis of thyroid lesions has a profound impact on the further management of the patient.

II: AIMS AND OBJECTIVES:

This study was undertaken with following aims & objectives:

1. To estimate the frequency of thyroid lesions with respect to histopathological types.
2. To describe the demographic data and clinical features of thyroid lesions.

III: MATERIALS AND METHODS

Inclusion criteria

All thyroidectomy specimens (lobectomy, hemithyroidectomy, subtotal and near total thyroidectomy) received during the study period.

Exclusion criteria

Autolysed specimens were excluded from the study.

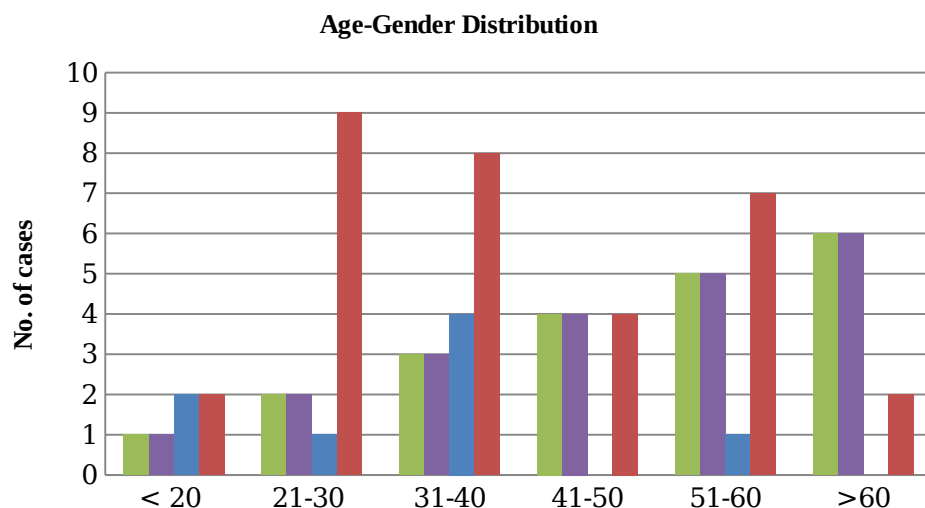
Ethics approval: The study was approved by Institutional Review board and Ethical Committee.

Study Design and methodology: This descriptive, cross sectional study was carried out during the period from June 2019 to December 2020. This study was conducted on 40 thyroid specimens referred to the department of pathology, A.M.C.M.E.T. Medical College, L. G. Hospital, Ahmedabad. Relevant demographic and clinical data including the results of hormonal status were obtained from the case records of patients. Gross features of the specimens were recorded and the specimens were fixed in 10% formalin. Representative tissue sections were taken and they were processed by paraffin embedding method. Thin tissue sections of 4 – 5 µm were cut with a microtome and stained by Haematoxylin and Eosin (H&E) stain. Microscopic examination was done and histopathological diagnosis was rendered. We used the current World Health Organization Classification of Tumors of Endocrine Organs published in 2017 for the classification of various tumors.⁵The data were analyzed using MS Excel and compared with other studies.

IV: RESULTS

The results of the study were inferred from a total 40 thyroidectomy specimens studied during the study period. The thyroidectomy specimens consisted of 1.4% (40/2854) of total surgical specimens received at our set up during the study period. The highest frequency of thyroid lesions was found in the 4th decade with mean age being the 38.25 years and median age being the 37 years. There was a female preponderance with male to female ratio being 1:4.

Figure 1: Age and Gender wise distribution of thyroid lesions



The chief clinical features and the thyroid functional status obtained from the thyroid function studies are depicted in table-1. All patients presented with neck swelling.

Table 1: Common clinical features and thyroid function test results

Symptoms	Cases (%)
Swelling	40 (100%)
Pain in neck	3 (7.5%)
Dysphagia	3 (7.5%)
Hoarseness of voice	2 (5%)
Exophthalmous	1 (2.5%)
Tremors	1 (2.5%)
Weight loss with increased appetite	1 (2.5%)
Weight gain	3 (7.5%)
Menorrhagia	2 (5%)
Cervical lymphadenopathy	1 (2.5%)
Thyroid function tests	
Euthyroid	34 (85%)
Hypothyroid	05 (12.5%)
Hyperthyroid	1 (2.5%)

The frequency of histopathological types of various thyroid lesions is depicted in table – 2. Out of total 40 thyroid lesions studied, 26 (65%) were non-neoplastic and 14(35%) were neoplastic lesions. Amongst the non neoplastic category, multinodular goiter was the commonest. The other reported non-neoplastic lesions include Hashimoto thyroiditis, diffuse hyperplasia and thyroglossal cyst. Amongst the neoplastic category; benign and malignant neoplasms accounted for 10% and 20 % respectively of all the lesions and 28.57 % and 57.14 % respectively amongst all the neoplastic lesions. The benign neoplasms observed were follicular adenoma and hyalinizing trabecular tumour. Two cases of the Non-invasive follicular thyroid neoplasm with papillary-like nuclear features (NIFTP) were observed. This tumour is considered to be the tumour of low malignant potential as per recent WHO

classification. In the category of malignnat tumours, the conventional papillary carcinoma accounted for the highest number of cases. A single case of minimally invasive follicular carcinoma was reported.

Table 2: Frequency of Histopathological types of thyroid lesions

Nature of thyroid lesions		Histopathological diagnosis	No. of lesions (%)
Non Neoplastic lesions n= 26(65%)		Multinodular goiter	20(50%)
		Hashimoto thyroiditis	03(7.5%)
		Diffuse hyperplasia	01(2.5%)
		Thyroglossal cyst	02(5%)
Neoplastic lesions n=14 (35%)	Benign n= 4(10%)	Follicular adenoma	03(7.5%)
		Hyalinizing trabecular tumour (HTT)	01(2.5%)
	Tumours of uncertain / low malignant potential n= 2(5%)	Non-invasive follicular thyroid neoplasm with papillary-like nuclear features NIFTP	02(5%)
		Malignant n=8(20%)	Follicular carcinoma (Minimally invasive)
	Papillary carcinoma		07(17.5%)
		TOTAL	40

V: DISCUSSION

Thyroid lesions are fairly common worldwide and are commonly encountered in clinical practice. Occurrence of thyroid diseases vary according to different geographical areas, age and sex.⁶A wide range of diseases are being observed in thyroid and histopathological examination has been proved to be the gold standard for the diagnosis of thyroid lesions.

In the present study, the peak age group of patients presented with thyroid lesions was in the 4th decade with mean and median age being 38.25 and 37 years respectively. The comparative analysis for age and sex distribution in patients presented with thyroid swelling in different studies is shown in table 3.

The peak age group of patients presented with thyroid swelling was in 3rd and 4th decade in most of the studies including ours. The male to female ratio in the present study was 1:4. Stinking female preponderance was noted in different studies. Historically, the thyroid diseases have been found to have a female preponderance owing to the presence of estrogen receptors in the thyroid tissue.

Table- 3: Comparative analysis for age and sex distribution in patients with thyroid lesions

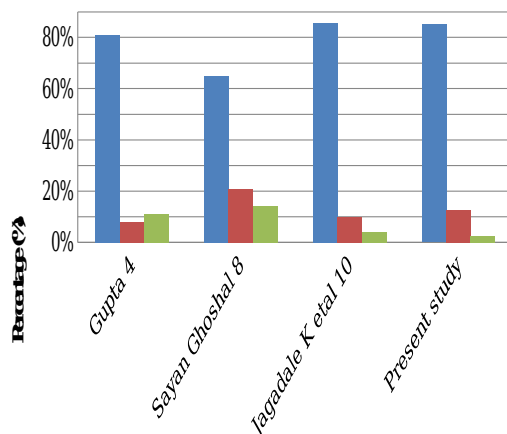
Studies	Age distribution		Sex distribution
	Peak age group	Mean age	M: F ratio
Aahana Gupta ¹ et al ⁴	21-40 years	37.49 years	1:3.4
Islam et al ⁷	21-40 years	41.8 years	1:3.4
Sayan Ghoshal, Krishnaraj Upadhyaya ⁸	31-40 years	37.5 years	1:10
Ramesh V L et al ⁹	30-39 years	-	1:9
Jagadale K et al ¹⁰	51-60 years	-	1:9
Solomon et al ¹¹	30-39 years	36.3	1:6.4
Gole et al ¹²	21-30 years	35.5	1:5
Indhuja Bharathidhasan ¹³	30-39 years	-	1:5.5
M Padmavathi et al ¹⁴	31-40 years	-	1:9
Prabha ¹⁵	31-40 years	-	-
Present study	21- 40 years	38.25	1:4

In our study, the main clinical feature was neck swelling which brought the patients to the hospital to seek medical advice. Solitary nodules were more suspicious of being malignant. The other signs and symptoms were related to the pressure effect due to neck swelling viz: dysphagia, hoarseness of voice, neck pain etc. Some might be due to metabolic effects due to hyper / hypo

functioning of thyroid gland hormones. Classical clinical features of exophthalmos, tremors and weight loss in spite of having increased appetite were present in a case reported as diffuse hyperplasia (Grave's disease) in the subsequent histopathological study. Weight gain was well correlated with Hashimoto's thyroiditis and hypothyroidism. In this study, a single case of cervical lymphadenopathy was proven to be the metastasis of papillary carcinoma.

Correlation of thyroid profile in different studies is depicted in **figure-2**. Most of the patients were euthyroid in all series i.e most of the thyroid gland disorders were non-functional.

Comparison of hormonal status of patients with thyroid lesions



In the present study, non-neoplastic and neoplastic lesions accounted for 65% and 35% respectively. The comparative analysis of non neoplastic and neoplastic thyroid lesions was broadly depicted if the following table-4.

Table-4: Comparison of non-neoplastic and neoplastic thyroid lesions in different studies

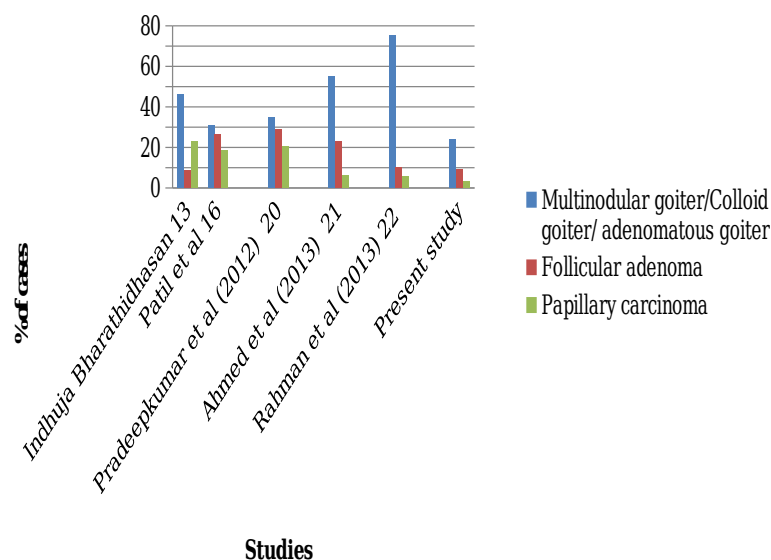
Study	Nature of thyroid lesion				
	Non- neoplastic	Benign	Tumour of uncertain/ low malignant potential	Malignant	Total Neoplastic lesions
Gupta ⁴	72(72%)	18(18%)		10(18%)	28(28%)
Indhuja Bharathidhasan ¹³	266 (64.3%)	35(23.64%)		113(76.4%).	148 (35.7%)
Kunda Jagadale ¹⁰	50(71.4%)	09(12.85%)		11(15.71%)	20 (28.6%)
V Prabha ¹⁵	84 (84%)	12% (12)		04 (4%)	16 (16%)
RAJESH S PATIL ¹⁶	28(41.17%)	28(41.17%)		12(17.65%)	40(58.82%)
Samir Golder ¹⁷	34(68%)	12(24%)		4(08%)	16(32%)
Sherine I. Salama ¹⁸	494(58.5%)	95(11.2%)		256(30.3%)	351(41.5%)
Dr Sreedevi A R1 ¹⁹	509(82%)	24(3.87%)		87(14.03%)	111(17.91%)
M Padmavathi et al ¹⁴	148 (70.1)	14 (22.2%)		49(77.8%)	63(29.9%)
Present study	26(65%)	04(10%)	02(5%)	08(20%)	14(35%)

The proportion of non-neoplastic and neoplastic lesions in this study was 65% and 35% respectively. In majority of the studies, the non-neoplastic lesions outnumbered the neoplastic lesions. The variation in the frequencies of non-neoplastic and neoplastic thyroid lesions in different studies could be due to geographical, racial and environmental factors. In the present study, we reported two cases of Non-invasive follicular thyroid neoplasm with papillary-like nuclear features (NIFTP). This tumour is categorized as the tumour of low malignant potential in the recent WHO classification.

The proportion of common thyroid lesions in the present study is compared with the studies conducted elsewhere (figure3).

Figure3: Comparison of frequency of common thyroid lesions in different studies

Comparison of frequency of common thyroid lesions in different studies



In all above tabulated studies including ours, the most frequent lesion under the category of non-neoplastic lesions was multinodular / adenomatous goiter. Amongst the neoplastic category, follicular adenoma and papillary carcinoma were the most commonly observed benign and malignant lesions respectively in our study; which is in agreement to other studies as depicted in (Fig-3).

A single case of Hyalinizing trabecular tumour was reported in our study. It is considered as a histological variant of follicular adenoma. Hyalinizing trabecular tumour (HTT) has overall good prognosis. However, because of its unclear relationship with malignancy and because rare cases may show invasion (of the tumor capsule or vascular spaces) or metastases, the term *hyalinizing trabecular tumor (HTT)* is currently preferred.²³ The neoplasms with HTT features accompanied by capsular and/or vascular invasion have been designated as hyalinizing trabecular carcinomas.²⁴

In our study, two cases of recently described entity; “Non-invasive follicular thyroid neoplasm with papillary-like nuclear features” (NIFTP) were reported. This diagnosis is given by applying stringent criteria described for its diagnosis.²⁵ It is necessary to correctly identify this lesion, as this tumour has been categorized as the “tumour with low malignant potential” and behaves in a benign fashion in most instances, provided that, the strict diagnostic criteria have been applied. Before the evolution of revised nomenclature for encapsulated follicular-patterned tumours in the WHO classification of thyroid tumours 2017, the same tumour was reported as “Encapsulated follicular variant of papillary thyroid carcinoma”. In the study of S Gole¹² et al, 17.14% of follicular variant of papillary thyroid carcinoma (FVPTC) were reported; which ranked the second most common malignant tumor after Papillary thyroid carcinoma (PTC). However, to obviate cancer overdiagnosis and overtreatment, a working group of the Endocrine Pathology Society has critically reexamined the encapsulated follicular variant of papillary thyroid carcinoma. Nikiforov et al. have introduced the diagnostic term “*noninvasive follicular thyroid neoplasm with papillary-like nuclear features*” (NIFTP) for noninvasive nodules previously diagnosed as follicular variant papillary carcinoma.²⁶

NIFTP is distinguished from follicular adenoma and hyperplastic nodules by the presence of nuclear features of papillary carcinoma, from conventional PTC by the absence of papillae, and from invasive encapsulated FVPTC by the absence of capsular or vascular invasion.

VI. CONCLUSION

Thyroid disorders are commonly encountered endocrine disorders. This study provides insight into epidemiological data on age at presentation, gender distribution and histopathological variants of thyroid lesions in a large tertiary care hospital. In our study, thyroid diseases showed definite female predominance, with peak frequency in the age group of 31–40 years. Thyroid diseases are presented with wide varieties of symptoms depending on hormonal status or pressure effects of the lesions. Commonly observed thyroid lesions are multinodular goiter, follicular adenoma and papillary carcinoma. Recently, certain thyroid tumours have been categorized in the borderline zone between benign and malignant tumours which have uncertain or low malignant potential. Strict adherence to the prescribed criteria is necessary to correctly diagnose and classify the thyroid neoplasms. This is crucial to predict the biological behavior of tumors and so, for the subsequent management of the patients. Though, different preoperative modalities are available for the diagnosis of thyroid diseases, histopathological examination of the thyroidectomy specimens proves to be the gold standard tool for the diagnosis of thyroid lesions.

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