



Histopathology

HISTOPATHOLOGICAL STUDY OF THYROID LESIONS IN A TERTIARY CARE HOSPITAL

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ABSTRACT

Introduction: Diseases of the thyroid gland are common and comprise a spectrum of entities causing systemic disease or a localized abnormality in the thyroid gland such as nodular enlargement or a tumor mass. Significant information regarding the lesions of thyroid can be obtained by histopathological examination of the thyroidectomy specimens. Hence a methodical examination of the thyroidectomy specimens is needed. The aim of the present study is to determine the prevalence of thyroid lesions in thyroidectomy specimens. **Material and Method:** This study was done in the Department of pathology, Maharajah's Institute of medical sciences in Vijayanagaram. About 72 thyroidectomy specimens received in the pathology department were studied prospectively from January 2021 to June 2022. The thyroid diseases were classified into non-neoplastic & neoplastic lesions that were further subclassified as benign and malignant as per WHO histological classification of thyroid tumors. **Result:** Out of the 72 thyroidectomy specimens 68(94%) were from females and 4 (6%) were from males. The female: male ratio was 17:1. The age of the patients ranged from 18 to 70 years with a mean age of 44.6 years. 43 cases (59%) cases were non-neoplastic & 29 cases (41%) cases were neoplastic. The common among the non-neoplastic lesions were multinodular goiter (29 cases; 40.1%), colloid goiter (8 cases, 11.1%) and Hashimoto thyroiditis (6 cases; 8.3%). There were 10 benign tumors & 19 malignant tumors. Follicular adenoma was the most common benign tumor (10 cases, 13.8%) & Papillary carcinoma was the most common malignant tumor (19 cases, 26.3%). **Conclusion:** Neoplastic & non-neoplastic disorders affect thyroid gland. Most of the lesions are non-neoplastic. Multinodular goiter was the most common non-neoplastic lesion. The most common benign tumor was Follicular adenoma, the most common malignant tumor was Papillary carcinoma.

KEYWORDS : Thyroid gland, Neoplastic, Non Neoplastic, Histopathology

INTRODUCTION

Diseases of the thyroid gland are common and comprise a spectrum of entities causing systemic disease or a localized abnormality in the thyroid gland such as nodular enlargement or a tumor mass. There is an enormous burden of thyroid diseases in the general population. Thyroid disorders are the most common among all the endocrine disorders in India which accounts for 42 million people. The thyroid gland is present in the neck which is enclosed by the pretracheal fascia which is a part of the deep cervical fascia. It is located in front of the 2nd, 3rd, and 4th tracheal rings and weighs around 20–25 gm^[1] This endocrine gland can be affected by a variety of diseases that range from functional and immunological mediated enlargement to neoplastic lesions. Thyroid gland lesions vary in their incidence and histopathological patterns. They may also differ in terms of geographical area, age, sex, dietary, and environmental factors^[2] The thyroid gland plays a key physiological role in the body and is responsible for maintaining homeostasis and body integrity^[3] Thyroid gland manifests as gland enlargement (goiters) or as alterations in hormone levels or as both^[4] Majority of the thyroid lesions are non-neoplastic and less than 5% are Malignant^[5]. Developmental, inflammatory, hyperplastic, and neoplastic diseases are common globally in clinical practice^[6] The etiology of thyroid diseases is multifactorial. Iodine deficiency, radiation exposure, hormonal imbalance, genetic, dietary, and goitrogenic factors may play a role in its pathogenesis^[7]. Papillary carcinoma is the most common thyroid carcinoma followed by follicular, medullary, and anaplastic carcinoma^[8] Surgical excision and pathological evaluation are crucial to establish a proper diagnosis.

AIMS AND OBJECTIVES

1. To study the age distribution and relative frequency of various thyroid lesions
2. To determine the histopathological spectrum of various thyroid lesions

Inclusion Criteria

- 1) Patients diagnosed to be having any of the following thyroid lesions such as :
 - A) Goitre
 - B) Solitary / dominant thyroid nodules
 - C) Clinically obvious thyroid lesions
 - D) Congenital and inflammatory lesions.
- 2) Patient of either sex and all age groups with thyroid lesions.

Exclusion Criteria

- 1) Other lesions of the neck unrelated to thyroid gland.

MATERIALS AND METHODS

In this prospective study, a total of 72 thyroid tissue specimens were examined from January 2021 to June 2022 for a period of 18 months. The study was done in the Department of Pathology, at Maharajah's Institute of Medical Sciences in Vijayanagaram. Relevant clinical information such as patient age, gender, and clinical presentation and other information such as FNAC, ultrasound, and surgical findings were obtained from the histopathology request form. The study was approved by the Institutional Ethics Committee. The specimens were fixed in 10% formalin. Detailed information regarding age, gender, clinical status are noted. Gross examination findings of the surgical specimen are taken such as size, external appearance, appearance of cut section, consistency etc. and the tissues were processed and stained following standard protocol procedure. The sections from the suspicious areas of lesion are subjected to processing by routine histopathological techniques.

RESULTS

Among the 72 thyroidectomy specimens, Among the 72 thyroidectomy specimens, 1.39%(least) belonged to <10 years and 39% (highest) belonged to 31–40 years age group.

Non-neoplastic lesions accounted for 43 cases (59%) and neoplastic

lesions constituted 29 cases(41%) . The most common non-neoplastic lesion was multinodular goiter (MNG) , (40.1%) followed by colloid goiter comprising (9.7%), Hashimoto thyroiditis (8.3%), and thyroglossal duct cyst (1.3%). Of the neoplastic lesions, the most common was follicular adenoma (10 cases,13.8%) and papillary carcinoma was the most common malignant tumor(19 cases,26.3%).

Table 1: Non Neoplastic and Neoplastic lesions of Thyroid

Thyroid lesions		No. of cases	Percentage
Non neoplastic	Nodular goiter	29	40.28%
	Thyroglossal cyst	1	1.39%
	Hashimoto's thyroiditis	6	8.3%
	Colloid goitre	7	9.72%
Neoplastic	Follicular adenoma	10	13.89%
	Papillary carcinoma	19	26.39%
Total		72	100%

DISCUSSION

The occurrence of thyroid diseases varies according to gender, age groups, and racial differences^[9] Neoplastic and non-neoplastic thyroid diseases are common all over the world with varying frequency and incidence depending on iodine deficiency and other environmental factors. Thyroid disorders are more common in women than in men.72 thyroidectomy specimens were received in this study and the tissues were analyzed histopathologically. Non-neoplastic lesions contributed to 59% and neoplastic lesions constituted to 41% of the cases. . Thyroid diseases are associated with hyper- or hypo-thyroidism and mass lesions. In the present study, the most common age group presenting with thyroid disorders was the 4th decade (39%) followed by the 3rd decade (25%). A study by Ramesh and Shwetha found the age incidence to be common in the 3rd–5th decade and Jagadale et al. found the age incidence to be the 4th–6th decades^[10,11] The most common clinical presentation was the presence of a neck swelling (95% of the cases) followed by dysphagia (difficulty in swallowing) and dysphonia (difficulty in speech). Among the non-neoplastic lesions, 40.2% of the specimens were multinodular goiter.

MNG is the end-stage result of diffuse hyperplastic goiter. Excessive metabolic demands cause excessive enlargement of the thyroid gland and this is why thyroid enlargement is more common in women during puberty and pregnancy. Both these are due to physiological reasons and they eventually develop in to an MNG^[12] MNG is a result of continuous stimulation by the TSH released from the anterior pituitary.

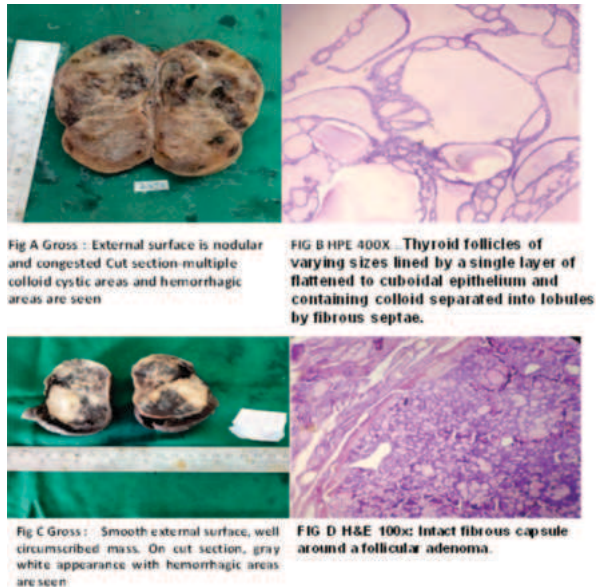


Figure 1: Multinodular Goiter(A&B), Follicular Adenoma(C&D)

The next common non-neoplastic lesion in this study was colloid goiter (9.7%). Iodine deficiency is the main reason for colloid goiter. The daily iodine requirement is about 100–125 µg. It is treated by iodized salt used for food and also iodine-containing preparations^[13]. It is treated by iodized salt used for food and also iodine-containing preparations^[14]. When the iodine deficiency state continues for a long time, it results in the accumulation of colloid material in the gland and causes colloid goiter.

The next common non-neoplastic lesion was Hashimoto's thyroiditis which occurred in 8.3% of the cases. It is also known as chronic lymphocytic thyroiditis or autoimmune thyroiditis where the thyroid gland is gradually self-destroyed. It is a painless goiter and there are no early symptoms^[15] Patients develop hypothyroidism followed by weight gain, fatigue, constipation, and depression. Diagnosis is by blood tests for TSH, T4, and antithyroid autoantibodies.

The thyroglossal duct cyst was seen in three cases in this study. It is lined by pseudostratified, ciliated, columnar, or squamous epithelial cells^[16] It develops from the cells and tissues left over after the formation of the thyroid gland.

Among the 41% of the neoplastic thyroid lesions in this study, 13.8% was a benign follicular adenoma. The remaining 26.3% of the lesions were malignant. Almost all thyroid adenomas are follicular adenomas . It may be inactive or active (toxic adenoma). It may range in diameter from 3 to 10 cms. A thyroid adenoma is differentiated from an MNG in that an adenoma is solitary, encapsulated and arises from a genetic mutation in a single precursor cell^[17] Cautious histopathological examination is necessary to differentiate a follicular adenoma from follicular carcinoma.

Regarding malignant lesions, papillary carcinoma was seen in 26.3% of the cases. Papillary carcinoma appears histopathologically as colloid-filled follicles with papillary projections. Psammoma bodies may be present in calcified lesions. Young females are commonly affected in the age group of 20–40 years. Lymph nodes in the lower deep cervical region may be involved frequently^[18] Thus, the present study gives valuable epidemiological and demographical information about various thyroid disorders on a histopathological basis.

Microscopy Numerous complex, branching papillae with a central fibrovascular core , single or stratified lining of cuboidal cells. Ground glass (optically clear) nuclei, pseudoinclusions, grooves, microfilaments

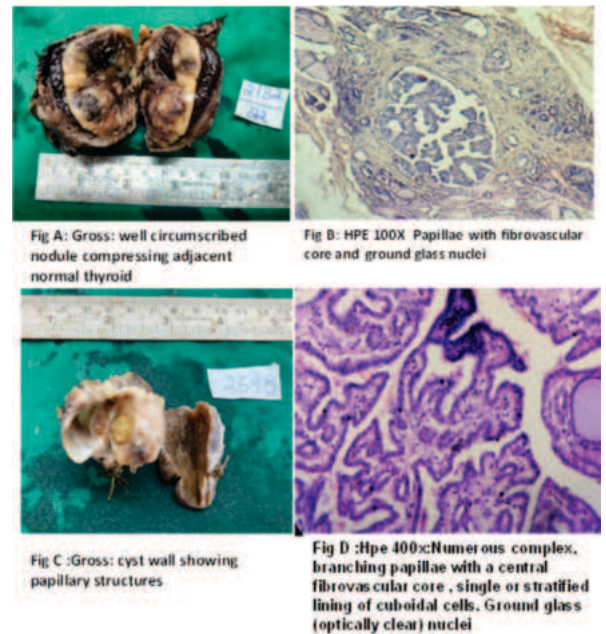


FIGURE 2: Papillary Microcarcinoma(A&B) & Papillary Carcinoma(C&D)

There were 80 neoplastic lesions and 228 non neoplastic lesions in the study by Silverman JF et al, 82 non neoplastic lesions and 7 neoplastic lesions in the study by Kumar S et al. and 192 non neoplastic and 24 neoplastic lesions in the study by Lingegowda JB et al. The 72 cases in the current study had a ratio of 1.4:1 and 43 non neoplastic lesions and 29 neoplastic lesions, which is consistent with the study by Silverman JF et al.

Table 2: Comparative Incidence of Non-neoplastic and Neoplastic Lesions in Different Studies

Study	Non neoplastic	neoplastic	Ratio
Silverman JF et al.[19]	228	80	2.9:1

Kumar S et al.[20]	82	7	11:1
Lingegowda JB et al.[21]	195	24	8:1
Present study	43	29	1.4:1

CONCLUSION

- In our study, thyroid diseases showed definite female predominance, with most of them occurring in an age group of 31–40 years.
- MNG is the most common disease. Follicular adenoma was the most common benign neoplastic disease.
- Papillary carcinoma is the most frequently occurring malignant lesion.
- This study emphasizes the need for periodic evaluation of middle-aged and young female patients for early detection and appropriate treatment.

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