

# A Study of Histopathological Spectrum of Thyroid Lesions

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## Abstract

**Introduction:** Thyroid lesions are fairly common worldwide and are commonly encountered in clinical practice. Thyroid lesions may be developmental, inflammatory, hyperplastic, and neoplastic.

**Aim:** This study aims to study the spectrum of various lesions of the thyroid and various histopathological patterns of thyroid lesions.

**Materials and Methods:** In this retrospective observational study, a total of 100 thyroid tissue specimens were examined. Relevant clinical information such as patient age, gender, and clinical presentation and other information such as fine-needle aspiration cytology, ultrasound, and surgical findings were obtained.

**Results:** Non-neoplastic lesions accounted for 84 cases (84%) and neoplastic lesions constituted 16%. The most common non-neoplastic lesion was multinodular goiter (MNG) (43%), followed by colloid goiter (29%), Hashimoto thyroiditis (9%), and thyroglossal duct cyst (3%).

**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 occurring clinically, radiologically, and cytologically. Follicular adenoma was the most common benign neoplastic disease.

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

## INTRODUCTION

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 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> tracheal rings and weighs around 20–25 gm.<sup>[1]</sup> 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.<sup>[2]</sup> 5% of the thyroid lesions are neoplastic while the rest are due to inflammatory

or developmental reasons. The thyroid gland plays a key physiological role in the body and is responsible for maintaining homeostasis and body integrity.<sup>[3]</sup> Thyroid gland manifests as gland enlargement (goiters) or as alterations in hormone levels or as both.<sup>[4]</sup> Around 42 million people are affected by thyroid diseases in India.<sup>[5]</sup> 4%–5% of the population present with clinically visible thyroid nodules.<sup>[6]</sup> Majority of the thyroid lesions are non-neoplastic and <5% are malignant.<sup>[7]</sup>

USG, thyroid function tests, fine-needle aspiration cytology (FNAC), and radionucleotide scan along with FNAC are the initial screening procedures done for the evaluation of thyroid diseases. Developmental, inflammatory, hyperplastic, and neoplastic diseases are common globally in clinical practice.<sup>[8]</sup> Literature states that an estimated 200 million people present with thyroid diseases worldwide and about one-third of this population lives in iodine-deficient areas. The etiology of thyroid diseases is multifactorial. Iodine deficiency, radiation exposure, hormonal imbalance, genetic, dietary, and goitrogenic factors may play a role in

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its pathogenesis.<sup>[9]</sup> Papillary carcinoma is the most common thyroid carcinoma followed by follicular, medullary, and anaplastic carcinoma.<sup>[10]</sup> These may be associated with clinical conditions of hyperthyroidism or hypothyroidism. Surgical excision and pathological evaluation are crucial to establish a proper diagnosis.

**Aim**

This study aims to study the spectrum of various lesions of the thyroid and various histopathological patterns of thyroid lesions.

**MATERIALS AND METHODS**

In this retrospective observational study, a total of 100 thyroid tissue specimens were examined from June 2017 to June 2018. The study was done in the Department of Pathology, at Coimbatore Medical College and Hospital. 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 register. The study was approved by the Institutional Ethics Committee. The specimens were fixed in 10% formalin and the tissues were processed and stained following standard protocol

procedure. The thyroid diseases were classified on histological grounds into neoplastic and non-neoplastic lesions.

**RESULTS**

Among the 100 thyroidectomy specimens, 7% were obtained from patients <20 years of age and 6% from patients above 61 years of age. Around 26% of the specimens belonged to patients of the age group 21–30 years and 33% (highest) belonged to 31–40 years age group [Figure 1]. Upon correlation with clinical findings of 95% of the patients presented with neck swelling which is significant. Therefore, the chief presentation with any thyroid disease is the presence of a neck swelling. Dysphagia was seen in 4% of the patients and dysphonia is one case (1%). Non-neoplastic lesions accounted for 84 cases (84%) and neoplastic lesions constituted 16% [Figure 2]. The most common non-neoplastic lesion was multinodular goiter (MNG) (43%) followed by colloid goiter (29%), Hashimoto thyroiditis (9%), and thyroglossal duct cyst (3%) [Figure 3]. Of the neoplastic lesions, the most common was follicular adenoma (12 cases) and papillary carcinoma was present in two cases [Figure 4]. Anaplastic and medullary carcinoma of the thyroid was found in one case in each. The only benign neoplasm was follicular adenoma (12%) and the rest of the neoplastic lesions were malignant.

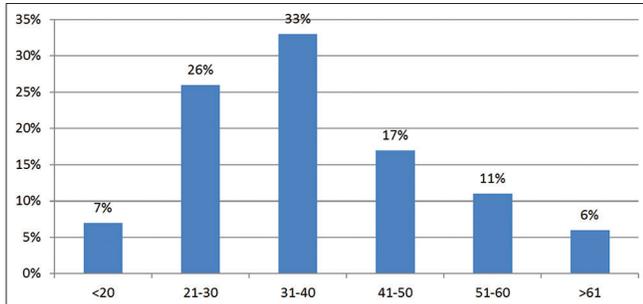


Figure 1: Frequency of the occurrence of thyroid lesions

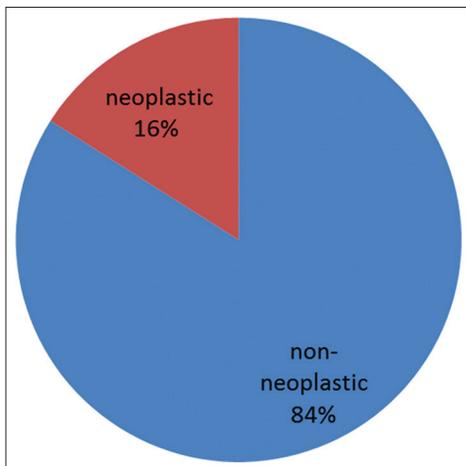


Figure 2: Morphological classification

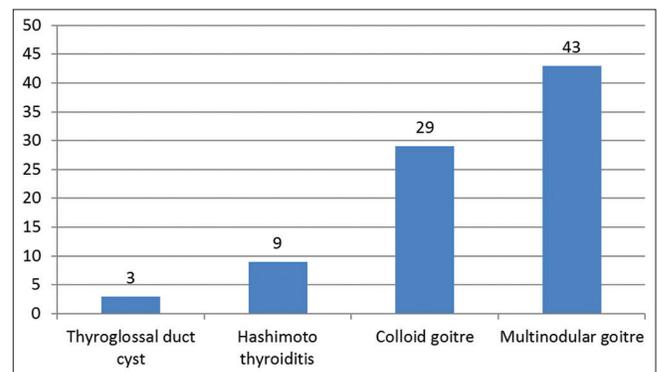


Figure 3: Non-neoplastic lesions

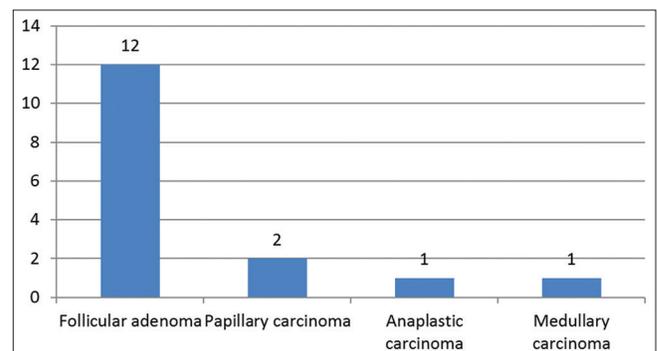


Figure 4: Neoplastic lesions

## DISCUSSION

The occurrence of thyroid diseases varies according to gender, age groups, and racial differences.<sup>[11]</sup> 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. Solitary nodules occur more frequently and this incidence increases throughout life. 100 thyroidectomy specimens were received in this study and the tissues were analyzed histopathologically. Non-neoplastic lesions contributed to 84% and neoplastic lesions constituted 16% 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 4<sup>th</sup> decade (33%) followed by the 3<sup>rd</sup> decade (26%). A study by Ramesh and Shwetha found the age incidence to be common in the 3<sup>rd</sup>–5<sup>th</sup> decade and Jagadale *et al.* found the age incidence to be the 4<sup>th</sup>–6<sup>th</sup> decades.<sup>[12,13]</sup> 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, 43% 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. A goiter appearing during puberty is called puberty goiter and the one developing during pregnancy is called pregnancy goiter. Both these are due to physiological reasons and they eventually develop into an MNG.<sup>[14]</sup> MNG is a result of continuous stimulation by the TSH released from the anterior pituitary. The next common non-neoplastic lesion in this study was colloid goiter (29%). 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.<sup>[15]</sup> 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 puberty goiter, pregnancy goiter, and colloid goiter if left untreated will change to MNG. The next common non-neoplastic lesion was Hashimoto's thyroiditis which occurred in 9% 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.<sup>[16]</sup> Patients develop hypothyroidism followed by weight gain, fatigue, constipation, and depression. Diagnosis is by blood tests for TSH, T4, and antithyroid autoantibodies. It is treated by levothyroxine.<sup>[17]</sup> The thyroglossal duct cyst was seen in three cases in this

study. This is a tubuloembryonic dermoid cyst and arises from the thyroglossal duct which extends from the foramen cecum at the base of the tongue to the isthmus of the thyroid. It is lined by pseudostratified, ciliated, columnar, or squamous epithelial cells.<sup>[18]</sup> It develops from the cells and tissues left over after the formation of the thyroid gland.

Among the 16% of the neoplastic thyroid lesions in this study, 12% was a benign follicular adenoma. The remaining 4% of the lesions were malignant. Almost all thyroid adenomas are follicular adenomas.<sup>[19]</sup> It may be inactive or active (toxic adenoma). It may range in diameter from 3 to 10 cms. Follicular adenomas can be described as cold, warm, or hot depending on their level of function. 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.<sup>[20]</sup> Cautious histopathological examination is necessary to differentiate a follicular adenoma from follicular carcinoma. Regarding malignant lesions, papillary carcinoma was seen in 2% of the cases followed by anaplastic (1%) and medullary carcinoma (1%). 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.<sup>[21]</sup> Medullary carcinoma arises from the parafollicular “C” cells and is sporadic. It may produce hormones such as calcitonin, prostaglandins, serotonin, and ACTH and is frequently seen in middle-aged women.<sup>[22]</sup> Anaplastic carcinoma was seen in elderly women around 60–70 years and is a rapidly growing thyroid swelling in a short duration.

Thus, the present study gives valuable epidemiological and demographical information about various thyroid disorders on a histopathological basis.

## 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 occurring clinically, radiologically, and cytologically. Follicular adenoma was the most common benign neoplastic disease. Papillary carcinoma, medullary carcinoma, and anaplastic carcinoma are the other less frequently occurring malignant lesions. Fine-needle aspiration findings and ultrasonogram findings showed moderate agreement with histopathological findings as far as papillary carcinoma was concerned. This study emphasizes the need for periodic evaluation of middle-aged and young female patients with MNG for early detection

of carcinomatous changes. A combined cytological and radiological approach is expected to yield better results in their prompt diagnosis.

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