

## Histomorphological patterns of thyroid lesions: A study from a Tertiary Care Teaching Hospital of Dr BR Ambedkar Medical College

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### Abstract

**Introduction and Objective:** Thyroid gland lesions are seen worldwide with geographical variation in incidence and histopathological pattern related to age, sex, dietary and environmental factors. This study is aimed to describe the histomorphological spectrum of thyroid lesion in relation to age, sex distribution and also to compare the findings with other studies done in India and elsewhere.

**Materials and Method:** It is a prospective study of all thyroidectomy specimens received from June 2015 - Dec 2016 in department of pathology, Dr. B R Ambedkar Medical College, Bengaluru.

**Results:** A total of 100 cases were studied. Female to male ratio was 6:1. The age group ranged from 12-75yrs with peak incidence seen at 35-45yrs. The lesions were classified as non-neoplastic and neoplastic. Non-Neoplastic lesions were more common and accounted for 82% and neoplastic lesions accounted for 18%. The most common lesion was goiter (68%), followed by thyroid adenomas (16%) and thyroid carcinomas (2%). There were 7 cases of toxic goitre (7%), 4 cases of thyroglossal cyst (4%) and 3 cases of thyroiditis (3%).

**Conclusion:** The study shows that thyroid gland diseases are seen in both genders with female preponderance. Among the varied histomorphological spectrum of surgical lesions of thyroid, colloid goiter is the most common lesion. Follicular adenoma is the commonest benign tumor and a higher incidence of follicular carcinoma was seen.

**Keywords:** Goiter, Follicular adenoma, Follicular carcinoma, Thyroiditis

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### Introduction

The major function of the thyroid gland is to maintain high rate of metabolism, which is done by means of iodine containing thyroid hormones thyroxine (T4) & tri iodothyronine (T3).<sup>(1)</sup>

Thyroid is one of the most labile organs in the body and responds to numerous stimuli such as puberty, pregnancy, physiological stress & various pathological states. Thyroid diseases are quite common and are associated with hyper thyroidism, hypothyroidism and mass lesions.<sup>(2)</sup> The relative frequency of some of these diseases varies in different geographic regions according to iodine intake of a diet consumed. These diseases are important because most of them are amendable to medical or surgical treatment.

**Diffuse and multinodular goiters:**<sup>(2)</sup> Enlargement of thyroid or goiter is caused by impaired synthesis of thyroid hormone which is most often the result of dietary iodine deficiency. Goiters are classified into 2 types: diffuse nontoxic and multinodular.

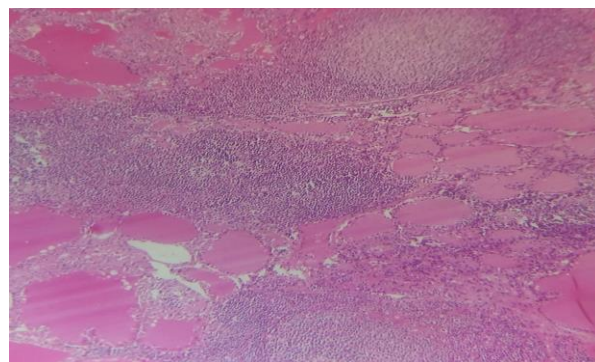
Diffuse nontoxic goiter is identified in hyperplastic and colloid involution stage.

In multinodular goiter, colloid rich follicles lined by flattened inactive epithelium and areas of follicular hyperplasia are seen.

Enlargement of thyroid gland with excessive circulating thyroid hormones (hyperthyroidism) leading

to a hypermetabolic state or thyrotoxicosis is called toxic hyperplasia of thyroid gland. The commonest causes are graves disease, hyperfunctional multinodular goiter and hyperfunctional thyroid adenoma

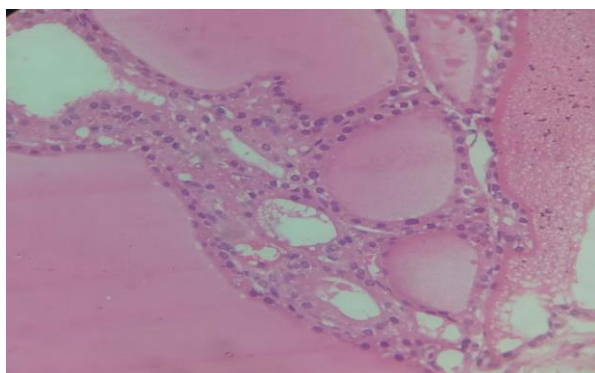
**Thyroiditis:**<sup>(2)</sup> Thyroiditis or inflammation of thyroid gland consists of group of disorders characterized by a form of thyroid inflammation. It is prevalent between 45-65 yrs of age and is more common in women than in men. In Hashimoto's thyroiditis, there is extensive infiltration of parenchyma by lymphocytes, plasma cells and well developed germinal centres. Follicles are atrophic and are lined by Hurthle cells.



**Fig. 1**

Photomicrograph of Hashimoto thyroiditis showing thyroid parenchyma with lymphoid follicles and

prominent germinal centres. Residual thyroid tissue is lined by deeply eosinophilic hurthle cells ((H & E stain x100).



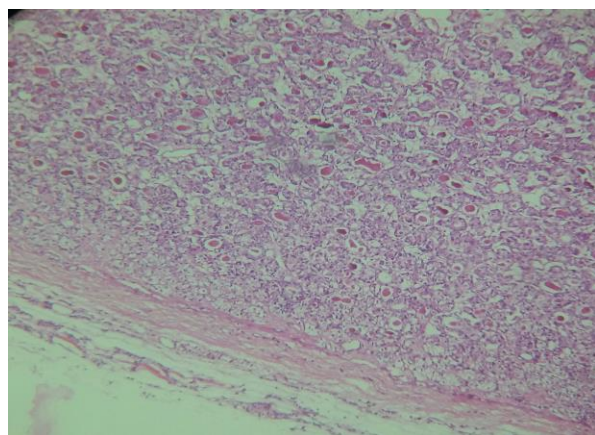
**Fig. 2**

Photomicrograph showing hurthle cells lining the follicles in Hashimoto's thyroiditis (H & E stain x400).

**Lymphocytic thyroiditis:**<sup>(2)</sup> It is seen in middle aged adults and is more common in women. Microscopic examination shows lymphocytic infiltration with large germinal centres within thyroid parenchyma but hurthle cell metaplasia is not prominent.

**Adenoma:**<sup>(2)</sup> Thyroid adenomas are discrete solitary masses derived from follicular epithelium.

Thyroid adenoma is solitary, spherical, encapsulated lesion which is demarcated from surrounding thyroid by a intact capsule. Microscopically the cells form uniform appearing follicles that contain colloid. The neoplastic cells show variation in cell size, cell shape, or nuclear morphology and mitotic figures are rare. Integrity of capsule is critical to distinguish it from follicular carcinoma which show capsular and /or vascular invasion.



**Fig. 3**

Photomicrograph of follicular adenoma with intact capsule (H & E stain x100).

**Carcinomas:**<sup>(2)</sup> The major subtypes of thyroid carcinomas and their frequencies are:

- Papillary carcinoma (>85%)
- Follicular carcinoma (5 to 15%)
- Anaplastic carcinoma(<5%)
- Medullary carcinoma(5%)

**Follicular Carcinoma:** It is more frequent in areas with dietary iodine deficiency. The peak incidence is between 40 and 60 years of age. Follicular carcinomas are single nodules which are well circumscribed or widely infiltrative. Microscopically they are composed of uniform cells forming small follicles containing colloid. The nuclei lack features of papillary carcinoma and psammoma bodies. Presence of vascular and capsular invasion is a feature of follicular carcinoma.

**Thyroglossal duct cyst**<sup>(2)</sup> is the common congenital anomaly of the thyroid. These can occur at any age. A sinus tract persists as a vestige of tubular development of the thyroid gland.

## Materials and Method

This study was conducted in department of pathology Dr B R Ambedkar Medical College, From June 2015 to Dec 2016, 100 cases were studied. The specimen included lobectomy, isthmectomy, sub total thyroidectomy, near total thyroidectomy and total thyroidectomy.

Specimen were fixed in 10% formalin, routinely processed and paraffin embedded. 5 micrometre thick sections were cut and stained with hematoxylin & eosin. Lesions were classified on the basis of light microscopy as congenital, goiter, inflammatory and neoplastic lesions. Neoplastic lesions were classified according to WHO classification of thyroid tumours.<sup>3</sup>

## Results

A total of 100 cases were studied out of which, 86 were female and 14 were male, with female to male ratio of 6:1.

The maximum number of lesions was seen in 35-45 yrs. Over all age ranged from 12-75yrs.

**Goitre:** Multinodular / colloid goiter, was the most common lesion encountered which accounted for 68%. 62 were female, 6 were male and the age group ranged from 18-75 yrs, mean age group was 34yrs. Female: male ratio was :: 10.3:1.

Toxic hyperplasia of thyroid gland accounts for 7% of total cases. The age group ranged from 23-68yrs 6 were females 1 was male, the ratio being 6:1.

**Thyroiditis:** Accounted for about 3% of all the lesions, all patients were females. Age group ranged from 32-48yrs. 2 cases of Hashimotos thyroiditis & 1 case of Lymphocytic thyroiditis were encountered.

**Thyroglossal duct cyst:** It is the only congenital anomaly of the thyroid gland seen in our study which accounted for 4% of all lesions, age group ranged from 12-42yrs and all cases were male.

**Neoplastic Thyroid Lesions:** Accounted for 18% of all lesions which included 16% benign lesions and 2% malignant lesions. Benign lesions consisted mainly of adenoma which accounted for 88.8% of the neoplastic thyroid lesions. Out of 16 cases, 13 were female, 3 were male and age group ranged from 20-65, mean age group was 36 yr, Female: male ratio was 4.3:1.

In malignant lesions follicular carcinoma was common which accounted for 11.2%. Out of 2 cases, 1 was female and 1 was male, age group ranged 41 -50 yrs, mean age group was 48 yrs, female:male: 1:1.

**Table 1: Sex wise distribution of thyroid lesions**

Sex	No.	Age group(yrs)
Male	14	12-72
Female	86	20-75

**Table 2: Distribution of thyroid lesions according to age group**

Age group(yrs)	Colloid goitre	Thyroiditis	Thyroglossal Cyst	Toxic goitre	Benign	Malignant
<20	2	-	1	-	-	-
21-30	20	-	2	2	6	-
31-40	33	2	1	2	5	-
41-50	6	1	-	1	3	2
51-60	3	-	-	1	1	-
>60	4	-	-	1	1	-
Total	68	3	4	7	16	2

**Table 3: Distribution of thyroid lesions according to sex**

Age group (yrs)	Colloid goitre		Thyroiditis		Thyroglossal Cyst		Toxic goitre		Benign		Malignant	
	M	F	M	F	M	F	M	F	M	F	M	F
<20	1	1	-	-	1	-	-	-	-	-	-	-
21-30	0	20	-	-	2	-	-	2	2	4	-	-
31-40	2	31	-	2	1	-	1	1	1	4	-	-
41-50	1	5	-	1	-	-	-	1	-	3	1	1
51-60	1	2	-	-	-	-	-	1	-	1	-	-
>60	1	3	-	1	-	-	-	1	-	1	-	-
Total	6	62	0	3	4	-	1	6	3	13	1	1

## Discussion

Thyroid enlargement is one of the most common disorders of endocrine system.

The incidence of benign and malignant lesion in surgically treated cases shows geographic and regional variation.<sup>(1,2,4)</sup>

The overall frequency of benign lesions was 82 and malignant lesions was 18. Benign lesions were more common as comparable with other studies.<sup>(5,6,7,8)</sup> The mean age group of occurrence of thyroid lesion in our study is 36yrs. Peak incidence was seen in 30-40yrs. These results are similar to Raphea Solomal et al studies.<sup>(5)</sup>

Thyroid lesion affects both the sexes with female preponderance which was also seen in all the lesions in our study except thyroglossal cyst.<sup>(7)</sup>

Female: Male ratio was 6:1 in our study as similar to studies by Raphea Soloman<sup>(5)</sup> and Ilorin.<sup>(9)</sup>

But Raham et al reported a ratio of 4.68:1 Arora Gupta et al reported a ratio of 3.34:1<sup>(10)</sup> and Al Bouq et al.<sup>(11)</sup>

Goitre is the most predominant thyroid lesion encountered. It constituted 68% of all lesions, similar to a study by Ilorin.<sup>(9)</sup>

The high prevalence of goiter is due to physiological demand as in puberty, menstruation, pregnancy & lactation.<sup>(1,2)</sup>

Graves disease is the most common cause of thyrotoxicosis other disease being hyper functional multinodular goiter and adenoma.<sup>(2)</sup> The toxic hyperplasia accounted for 7% this finding is similar to mid east studies. The incidence of toxic hyperplasia of thyroid gland is 20-30% in Europe and America.<sup>(12)</sup>

Thyroiditis is seen in 3% of thyroid lesion,<sup>(8)</sup> Female preponderance seen in this lesion was similar to a study by Raham et al.<sup>(6)</sup>

The only congenital lesion seen in our study is thyroglossal duct cyst was seen in 4% of the cases.<sup>(5)</sup>

It is the most common congenital lesion of thyroid. This lesion are said to have neither sex predilection nor hereditary predisposition. However in our study the lesion had male preponderance.

Thyroid neoplasm were found in 18% of the cases most common were, benign follicular adenoma accounted for 16% of the total cases 88.8% of total neoplastic lesions. This is the second most common benign thyroid neoplasia, as also seen in other studies.<sup>(5,6,9)</sup> Females are more commonly affected and mean age group was 30-40years.

Thyroid cancer is rare, accounting for 0.5-1% of all cancer worldwide. But it is the most frequently encountered endocrine malignancy with variable geographic incidence.

In our study it accounted for 2% of the total cases and both were follicular carcinoma. This result was similar to studies.<sup>(13)</sup> However Papillary carcinoma of thyroid was most common in Raphael Solomon & Raham et al studies and Seleye –Fubara et al.<sup>(14)</sup>

### Conclusion

Thyroid disorders are one of the commonest problem encountered in general population. Among the varied histomorphological spectrum of surgical specimens of thyroid, colloid goiter is the most common lesion. Follicular adenoma is the commonest benign tumor and follicular carcinoma is the commonest malignant tumor encountered in this study.

Thyroid lesions are more common in females.

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