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## Original Research Article

## Analysis of histopathological pattern of thyroid lesions in a tertiary care hospital

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## ABSTRACT

**Background:** Thyroid gland is unique in having a wide spectrum of disorders and these thyroid disorders are common worldwide. However, the thyroid gland lesions vary in their incidence and histopathological patterns. Hence the present study was undertaken to determine the histopathological pattern of thyroid lesions in Tertiary Care Centre.

**Materials and Methods:** Total 80 thyroidectomy specimens received in the Pathology Department during a period from January 2018 to December 2019 were included in the study. Detailed information regarding age, gender, clinical status, relevant investigations like fine needle aspiration cytology, thyroid scan, ultrasound reports and operation findings were obtained from histopathology request forms and register. Percentages and simple frequency tables were used for data analysis.

**Results:** Out of 80 thyroidectomy specimens, 64 (80%) were from females and 16 (20%) were from males. The age of patients ranged from 21 to 73 years with a mean age of  $43.05 \pm 13.55$  years. 67 cases (83.75%) were non-neoplastic and 13 cases (16.25%) were neoplastic. The most common non-neoplastic lesions were colloid goiter (36 cases; 45%) followed by multi-nodular goiter (10 cases; 12.5%) whereas most common neoplastic lesions were follicular adenoma (8 cases, 10%) and papillary carcinoma (3; 3.75%).

**Conclusion:** The histopathological evaluation of thyroid lesions is challenging and mandatory as the diagnosis varies from non-neoplastic to rare neoplastic lesions. In the present study, non-neoplastic thyroid lesions were more common than neoplastic ones with female predominance. Most common non-neoplastic lesions were colloid goiter while most common neoplastic lesions were follicular adenoma.

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## 1. Introduction

The diseases of thyroid gland are among the most abundant endocrine disorders worldwide second only to diabetes and are one of the common problems encountered in clinical practice. The main diseases of thyroid are simple goiter (diffuse and nodular), hypothyroidism, hyperthyroidism, thyroiditis and neoplasms.<sup>1</sup> According to WHO, 7% of the world population is suffering from clinically apparent goiter. Majority of these patients are from developing countries where the disease is attributed to iodine deficiency.<sup>2</sup>

Thyroid disease is being increasingly diagnosed with greater awareness and is one of the chronic non-communicable diseases affecting women more; though males are not spared of the ailment.<sup>3</sup>

The prevalence and pattern of these thyroid diseases in a given community is variable depending on various factors including age, sex, dietary, environmental factors and geographical patterns.<sup>4</sup> It is most prevalent in mountainous areas but also occurs in non-mountainous areas remote from sea.<sup>1</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> Coastal states like Gujarat, Goa, Kerala and hilly areas like Himalayan regions

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are endemic for thyroid lesions in India.<sup>7</sup> Nodular colloid goitre is estimated to affect at least 200 million people worldwide involving all races in all climates.<sup>8</sup> Twelve percent of Indian adults have palpable goiter.<sup>9</sup>

Moreover, the thyroid lesions were basically classified into non-neoplastic and neoplastic. Pathologic evaluations of lesions of the thyroid gland are of research importance because they directly affect the functioning of other organs of the body and along with that histopathological result forms the basis of highly effective medical and surgical treatment.<sup>10</sup> Different parts around the globe show varying pattern in incidence of different thyroid lesions. Lesions affecting the thyroid can be accurately diagnosed by a careful histopathological examination of thyroidectomy specimens. This is a retrospective histopathological study of lesions affecting the thyroid, in the rural area of Central India.

## 2. Materials and Methods

The present retrospective cross sectional study was conducted in the Department of Pathology at Tertiary Care Hospital during a period of two years from January 2018 to December 2019. All patients presenting with thyroid swelling and who underwent any type of thyroid operation (i.e. lobectomy, subtotal thyroidectomy, near total thyroidectomy or total thyroidectomy) were included in the study. Those patients in whom fine needle aspiration cytology (FNAC) was done but they did not undergo thyroid surgery were excluded from the study.

A total of 80 biopsy specimens of thyroid gland were selected for histopathological evaluation. Detailed information regarding age, gender, clinical status, relevant investigations like fine needle aspiration cytology, thyroid scan, ultrasound reports and operation findings were obtained from histopathology request forms and 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. Percentages and simple frequency tables were used for data analysis.

## 3. Observations and Results

A total of 80 thyroidectomy specimens were studied during the two-year study period. The age of patients ranged from 21 to 73 years with a mean age of  $43.05 \pm 13.55$  years. The maximum number of patients of thyroid lesions were found in the age group of 31-40 years (36.25%) followed by 41-50 years (22.5%). The least number of lesions were reported in patients of age more than 70 years (3.75%), (Figure 1).

Out of 80 thyroidectomy specimens, 64 (80%) were from females and 16 (20%) were from males. The male to female

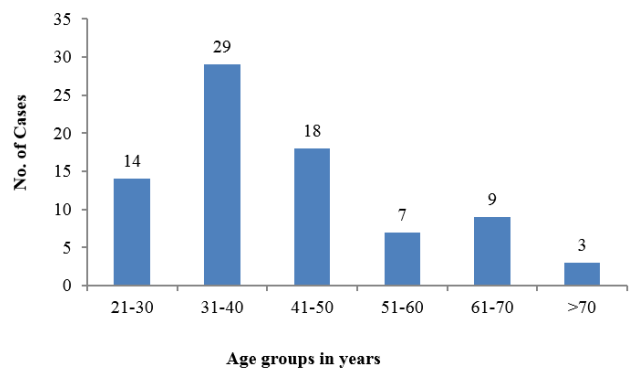


Fig. 1: Distribution of study participants according to age group

ratio was 4:1 (Figure 2).

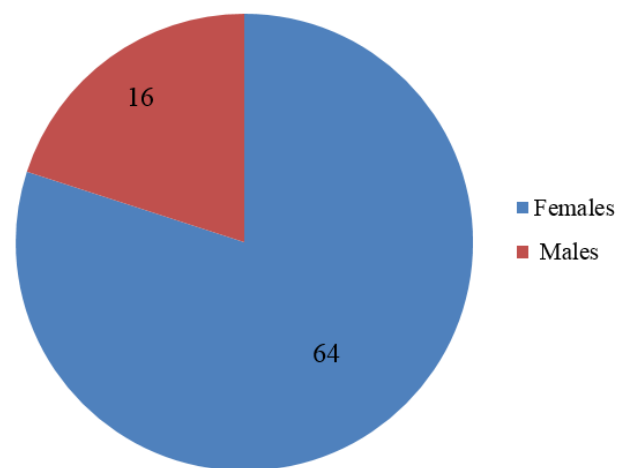


Fig. 2: Sex ratio

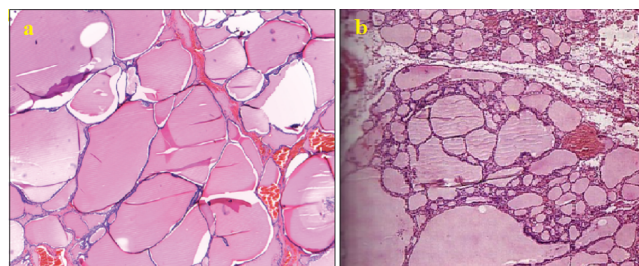
Thyroidectomy specimens were analyzed on morphological basis which showed non-neoplastic lesions 67 cases (83.75%) and neoplastic lesions, 13 cases (16.25%). Analysis of non-neoplastic lesions showed a predominance of colloid goitre 36(45%) cases, (Figure 3a), multi-nodular goiter (10 cases; 12.5%), (Figure 3b), and colloid goiter with lymphocytic thyroiditis (9; 11.25). The most common neoplastic lesions were follicular adenoma (8 cases, 10%), (Figure 4a) and papillary carcinoma (3; 3.75%), (Figure 4b). Medullary carcinoma of the thyroid was found in only one case, (Table 1).

## 4. Discussion

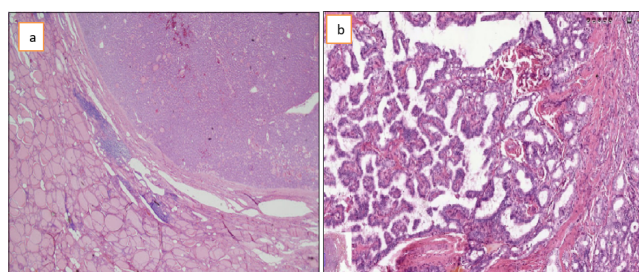
Diseases of the thyroid are of great importance because most are amenable to medical or surgical management. Today thyroidectomy is a routine procedure because of the introduction of safe anesthesia, antiseptics, fine surgical instruments and developments of new techniques, offering the chances of cure to many patients.<sup>11</sup> Various studies

**Table 1:** Proportion of various thyroid lesions in males and females

Diagnosis	Male	Female	Frequency (%)
Colloid goiter	10	26	36 (45%)
Colloid goiter with lymphocytic thyroiditis	01	08	09 (11.25%)
Colloid goiter with degenerative change	00	03	03 (3.75%)
Colloid goiter with lymphocytic infiltration	02	01	03 (3.75%)
Colloid goiter with hashimoto's thyroiditis	00	02	02 (2.5%)
Adenomatoid goiter	00	01	01 (1.25%)
Hashimoto's thyroiditis with hyperplasia goiter	00	01	01 (1.25%)
Multi-nodular goiter	01	09	10 (12.5%)
Multi-nodular goiter with degenerative change	01	00	01 (1.25%)
Multinodular goiter with hyperplasia nodule	00	01	01 (1.25%)
Follicular adenoma	00	08	08 (10%)
Neoplastic			
Medullary carcinoma	01	01	02 (2.5%)
Papillary thyroid carcinoma	00	03	03 (3.75%)
Total	16	64	80 (100%)



**Fig. 3: a:** Photomicrograph of a colloid goitre showing thyroid follicles of varying sizes containing colloid. (H and E,  $\times 200$ ) and **b:** Photomicrograph of a multi-nodular goitre showing numerous thyroid follicles of varying sizes filled with colloid



**Fig. 4:** Histopathology of – **a:** Follicular thyroid adenoma and **b:** Papillary thyroid carcinoma

conducted on thyroidectomy specimens in diverse parts of the world are documented in the literature.<sup>12–14</sup> Disorders affecting thyroid in different geographic areas of India are well documented.<sup>15,16</sup> In the present study out of 80 cases, majority of cases were seen in the age group of 31–40 years (36.25%) which was in comparison to studies conducted by Prabha and Bhuvanewari<sup>17</sup> and Shankar et al.<sup>18</sup> This is probably because, most of malignant and benign lesions are common in these age group. So the load of thyroid

lesions is tilted towards this age group. The youngest patient in this study was 21-year-old two females with thyroid follicular adenoma (one case is mixed variant) and the oldest patient was a female of 73 years, a case of lymphocytic thyroiditis. As identical to many studies,<sup>18,19</sup> the numbers of female patients were more than the male patients with female predominance of 4: 1. It is due to the fact that thyroid disorders are female prone owing to the presence of estrogen receptor in the thyroid tissue.<sup>20</sup> The incidence of non-neoplastic lesions was 83.75% and neoplastic lesions were 16.25%, thus non- neoplastic disorders were more than the neoplastic disorders that was similar to study conducted by Prabha and Bhuvanewari<sup>17</sup> and Magdalene et al.<sup>21</sup> The variation in the incidence rates of neoplastic and non-neoplastic thyroid lesions in different studies could be due to geographical and racial factors.

Among the non-neoplastic lesions, colloid goiter and multinodular colloid goiter formed the majority, which is in agreement to other studies done by Modi and Daveshwar<sup>22</sup> and Raheem et al.<sup>23</sup> The incidence of colloid goiter in current study accounted for 45%. In a study conducted by Meachim et al, the incidence of colloid goiter was 49.18%.<sup>24</sup> The second most common non- neoplastic condition was multi-nodular goiter (10 cases; 12.5%). The incidence of combined colloid goiter with lymphocytic thyroiditis was 11.25%. Combination of colloid goiter and degenerative changes as well as combination of colloid goiter and lymphocytic infiltration was seen in 3.75% cases each. Hashimotos thyroiditis is an autoimmune disease characterized by widespread lymphocytic infiltration, fibrosis along with oxyphilic change.<sup>19</sup> Colloid goiter with hashimoto's thyroiditis was observed in 2.5% cases. Adenomatoid goiter, hashimoto's thyroiditis with hyperplasia goiter, multi-nodular goiter with degenerative change and multinodular goiter with hyperplasia nodule was seen in 1 case (1.25%) each.

The possibility of neoplastic disease is of major common in patients who present with thyroid nodules.<sup>25</sup> Among the 16.25% of the neoplastic thyroid lesions in this study, 10% was a benign follicular adenoma which is comparable with the study done by Prabha and Bhuvanewari.<sup>17</sup> Follicular adenomas can be described as cold, warm, or hot depending on their level of function. A thyroid adenoma is differentiated from a multi-nodular goiter in that an adenoma is solitary, encapsulated and arises from a genetic mutation in a single precursor cell.<sup>26</sup> Cautious histopathological examination is necessary to differentiate a follicular adenoma from follicular carcinoma. Regarding malignant lesions, papillary thyroid carcinoma was seen in 3.75% of the cases followed medullary carcinoma (2.5%). 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>27</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>28</sup>

## 5. Conclusion

Histopathological evaluation of thyroid lesions is challenging and mandatory as the diagnosis varies from non-neoplastic to rare neoplastic lesions. In the present study, non-neoplastic thyroid lesions were more common than neoplastic ones. Most common non-neoplastic lesions were colloid goiter while most common neoplastic lesions were follicular adenoma. Thyroid diseases showed definite female predominance, with most of them occurring in an age group of 31–40 years. Hence, the screening females for neck swellings will be beneficial in management of patients and early detection can change the treatment regimen. The current study emphasizes the need for periodic evaluation of middle-aged and young female patients with colloid goiter for early detection of carcinomatous changes.

## 6. Conflict of Interest

The authors declare that there is no conflict of interest.

## 7. Source of Funding

None.

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