

Original Research Article

Histopathological study of lesions of thyroid: A three years study

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Abstract: Background: The thyroid gland is the largest gland among all endocrine glands. It secretes active hormones (T3 and T4, Calcitonin) influencing various metabolic processes. Diseases of the thyroid include developmental, inflammatory, hyperplastic and neoplastic disorders. The present work is an attempt to study the histopathological details of various thyroid lesions, to analyze them and to correlate them with clinical data.

Aim and Objectives: To study frequency and histopathology of non-neoplastic and neoplastic lesions of thyroid.

Material and Methods: The present study, 'Histopathological study of Lesions of Thyroid', was undertaken at Histopathology section of Department of Pathology, Government Medical College, Miraj, Maharashtra. The study was of 3 years duration from January 2013 to December 2015. The material was obtained by different surgical procedures such as total thyroidectomy, near total thyroidectomy, hemithyroidectomy, lobectomy and excision of cyst. Tissue samples for H&E sections were fixed in 10% formalin and subjected to routine paraffin embedded processing after which this was then stained with Haematoxylin and Eosin. The thyroid lesions are classified into of non-neoplastic and neoplastic lesions on the basis of the World Health Organization histological classification of the thyroid tumours.

Results: In our study, Out of total 104 cases of thyroid lesions, there were 93 (89.42%) non neoplastic and 11 (10.58%) neoplastic lesions. The most frequently encountered specimen was hemithyroidectomy (58.65%), followed by near total thyroidectomy (22.12%). Out of total cases of 104 thyroid lesions, a maximum number of lesions were seen in patients in the age group of 31-40 years. Thyroid lesions predominantly seen in females with female to male ratio of 6.4:1 for all thyroid lesions Out of total 104 cases of thyroid lesions, there were 93 (89.42%) non neoplastic and 11 (10.58%) neoplastic lesions. Goiter was the most common lesion, which accounted for 80 cases (76.92%) of all the cases followed by thyroglossal cyst 07 cases(6.73%), follicular adenoma 07 cases (6.73%) and Hashimoto's thyroiditis 06 cases (5.76%). The benign tumors were more common (72.73%) than malignant tumors (27.27%).

Conclusion: In our study, thyroid lesions showed a female predominance with most of them occurring in the age group of 31-40 years and most common thyroid lesions were non-neoplastic. Diagnosis by histopathological examination is important for the correct diagnosis and treatment of neoplastic lesions.

Keywords: Thyroid; Goiter; Follicular carcinoma.

1. Introduction

A The thyroid gland is the largest among all endocrine glands. It secretes active hormones (T3 and T4, Calcitonin) influencing various metabolic processes [1]. Thyroid disorders are the most common endocrine disorders in India [2]. Manifestations of thyroid diseases usually include alterations in the hormone secretion (hypo- or hyperthyroidism) and thyroid enlargement, i.e., goiter, which may be diffuse or nodular and is seen more commonly in females than males [3].

Diseases of the thyroid include developmental, inflammatory, hyperplastic, and neoplastic disorders [4]. Although tumors of the thyroid account for only 1% of the overall human cancer burden, they represent the

most common malignancies of the endocrine system [5]. Papillary carcinoma is the most common thyroid cancer, followed by follicular, medullary, anaplastic, and lymphoma. Thyroid tumors pose a significant challenge to pathologists, surgeons, and oncologists. The present work attempts to study the histopathological details of various thyroid lesions, analyze them, and correlate them with clinical data.

2. Material and Methods

The present study, 'Histopathological study of Lesions of Thyroid,' was undertaken in the Histopathology section of the Department of Pathology. The study included '104' cases over three years, from January 2013 to December 2015. Different surgical procedures for histopathological study obtained the material. The nature of the specimen received was total thyroidectomy, near-total thyroidectomy, hemithyroidectomy, lobectomy, and excision of the cyst. After fixation in 10% formalin, the specimens were examined thoroughly and sampled adequately. In the case of encapsulated follicular neoplasms, a technique for total circumferential evaluation of the fibrous capsule described by Yamashina was used. Tissue bits were processed, and multiple paraffin-embedded blocks were prepared. The sections were cut at 5 μ thickness from the blocks, and after deparaffinization and rehydration, the sections were stained with hematoxylin and eosin. The special stains (e.g., Congo red, Periodic Acid Schiff stain) are applied whenever indicated. All clinical information required for the study was obtained from clinical records and requisition forms.

3. Results

The study included 104 cases over three years, from January 2013 to December 2015. [Table 1] Out of a total of 104 cases of thyroid lesions, there were 93 (89.42%) non-neoplastic and 11 (10.58%) neoplastic lesions. The most frequently encountered specimen was hemithyroidectomy (58.65%), followed by near-total thyroidectomy (22.12%). [Table 2] Out of total cases of 104 thyroid lesions, a maximum number of lesions were seen in patients in the age group of 31-40 years. Thyroid lesions predominantly seen in females, with female to male ratio of 6.4:1 for all thyroid lesions. Out of the 104 cases of thyroid lesions, there were 93 (89.42%) non-neoplastic and 11 (10.58%) neoplastic lesions. Goiter was the most common lesion, which accounted for 80 cases (76.92%) of all the cases followed by thyroglossal cyst 07 cases (6.73%), follicular adenoma 07 cases (6.73%) and Hashimoto's thyroiditis 06 cases (5.76%). Among neoplastic lesions, benign tumors were more common (72.73%) than malignant tumors (27.27%). In malignant tumors, female predominance was noted. Follicular carcinoma was observed in females only. A single case of papillary microcarcinoma was noted in a male patient.

Table 1. Relative distribution of non-neoplastic and neoplastic lesions of thyroid

Type of lesions	Total No.	Percentage
Non-neoplastic	93	89.42
Neoplastic	11	10.58
Total	104	100

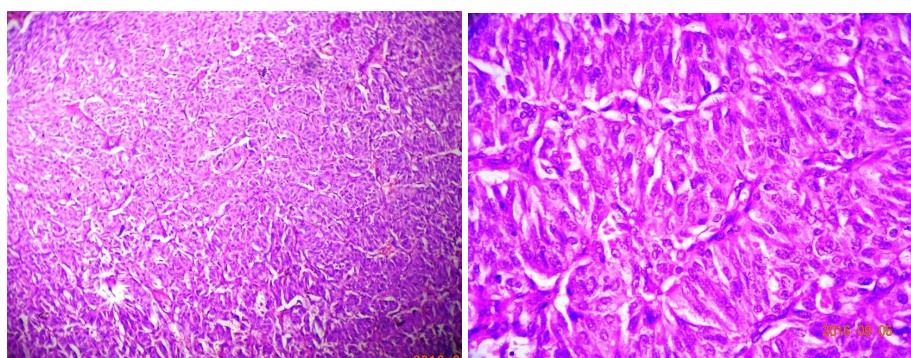


Figure 1. Hyalinizing trabecular tumor: Photomicrograph showing a tumor with a trabecular architecture (H&E, x 40)

Table 2. Frequency of individual thyroid lesion

Type of lesions	Total No.	Percentage
Non-neoplastic lesions -		
Thyroglossal cyst	07	6.73%
Goiter	80	76.92%
Hashimoto thyroiditis	06	5.76%
Neoplastic lesions -		
A) Benign		
Follicular adenoma	07	6.73%
Hyalinizing trabecular tumor	01	0.97%
B) Malignant		
Papillary microcarcinoma	01	0.97%
Follicular carcinoma	02	1.92%
Total	104	100%

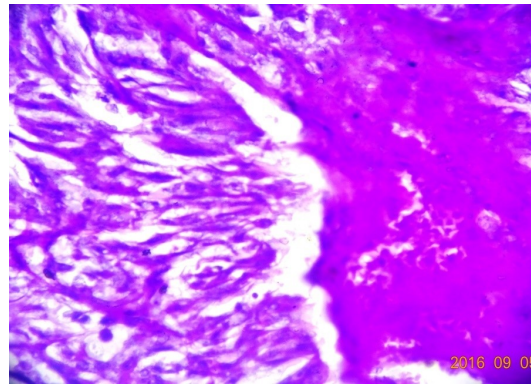


Figure 2. Hyalinizing trabecular tumor: Photomicrograph showing depositions of hyaline material in the centre of cell nests showing PAS positivity

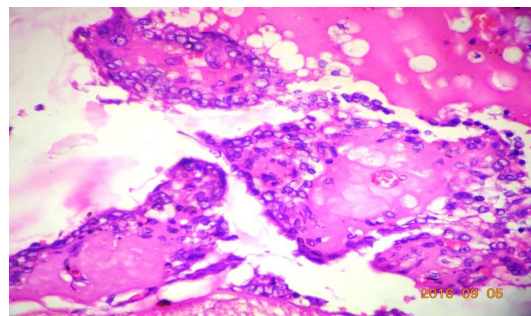


Figure 3. Papillary microcarcinoma: Photomicrograph showing papillae with fibrovascular core and nuclear crowding, overlapping, and clearing (H&E, x 100)

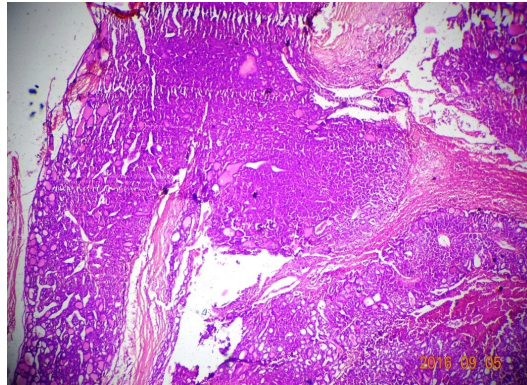


Figure 4. Follicular carcinoma: Photomicrograph showing capsular invasion, the neoplastic proliferation penetrates the entire thickness of the capsule (H&E, x 40)

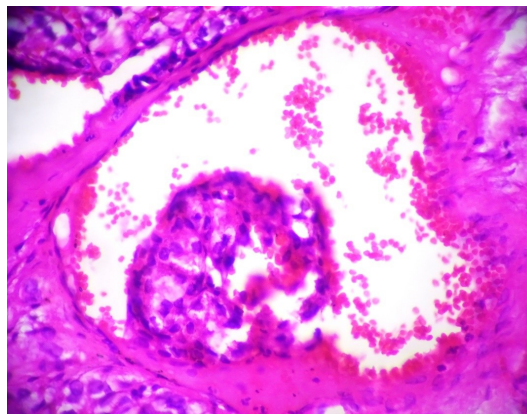


Figure 5. Follicular carcinoma: Photomicrograph showing vascular invasion, aggregates of tumor cells are seen within the vessel lumen attached to the wall (H&E, x 400)

4. Discussion

The thyroid gland secretes active hormones (T3 and T4, Calcitonin), influencing various metabolic processes and maintaining homeostasis. Thyroid disorders are the most common disorder among all the endocrine disorders in India. The present study included 104 cases of thyroid lesions received as surgical specimens. Various literature studies showed the frequency of thyroid lesions ranges from 1.6% to 3.6%. In the present study, the frequency of thyroid specimens was 1.39% of all surgical biopsies. The findings in the present study were comparable to Zulfikar et al. [6] and Ijomone et al. [7]. The most frequently encountered specimen was hemithyroidectomy (58.65%), followed by near-total thyroidectomy (22.12%).

Hemithyroidectomy was the most common surgical specimen in the present study and was comparable to Baskota et al. [8] and Ashwini et al. [9] study. Out of the total cases of 104 thyroid lesions, a maximum number of lesions were seen in patients aged 31-40 years. As in our study, Zulfikar et al. [6], Abdulkader et al. [10], and Qureshi et al. [11] also reported the peak age group of all thyroid lesions in the fourth decade. Thyroid lesions are predominantly seen in females, with a female-to-male ratio of 6.4:1 for all thyroid lesions. The female preponderance in the present study is comparable with all the study series. Out of the total 104 cases of thyroid lesions, there were 93 (89.42%) nonneoplastic and 11 (10.58%) neoplastic lesions. Goiter was the most common lesion, which accounted for 80 cases (76.92%) of all the cases, followed by thyroglossal cyst 07 cases (6.73%), follicular adenoma 07 cases (6.73%) and Hashimoto's thyroiditis 06 cases (5.76%). The frequency of nonneoplastic and neoplastic lesions of the thyroid gland in the present study is close to the studies by Qureshi et al. [11], Champa et al. [12], and Abdul et al. [13]. Goiter was the most common lesion encountered in the present study. There were 80 cases of goiter constituted 76.92% of all thyroid lesions. The frequency of goiter in the present study is comparable with Qureshi et al. [11] and Abdul et al. [13]. In the present study, eleven neoplastic lesions were encountered, out of which 08 (72.73%) were benign and 03

(27.27%) were malignant. The findings in the present study are comparable to Zulfikar et al. [6], Ijomone et al. [7], and Abdulkader et al. [10], Bukhari et al. [14]. There were 07 cases of follicular adenoma and 01 cases of Hyalinizing trabecular tumor. There was female predominance with F: M ratio of 6:1, which is also shown by Abdulla et al. (2006)[15] and Khadilkar et al. (2008) [16]. Grossly, all adenomas were well-circumscribed, encapsulated spherical to oval tumors measuring 4.5 cm to 7.5 cm. Evans et al. [17] found 19 cases of follicular adenoma, all well encapsulated measuring 0.7 to 6cm in size, which was comparable with our study.

Histologically, the microfollicular pattern was predominating, followed by trabecular and macrofollicular. A similar observation was noted by Chellum et al. (1981)[18]. Our case of Hyalinizing trabecular tumor (HTT) showed features as per Kuma et al. [19] a radial arrangement of the tumor cells surrounding the hyaline material, vague, curved nuclear palisading, spindled or elongated cells, ill-defined cell border, faintly stained, filamentous cytoplasm, and hyaline material in the background are useful in diagnosing HTT (Fig.1&2) and distinguishing it from PTC. In the present study, 03 cases of malignant lesions were encountered, constituting a frequency of 2.89% of all thyroid lesions and 27.27% in all neoplastic lesions. In the present study, we encountered 01 cases of Papillary Thyroid Microcarcinoma (PTM), an incidental finding. Papillary microcarcinomas are most frequently 0.1 to 0.3cm in size and comprise papillary or follicular structures or a mixture of both. In the present study, a specimen of right hemithyroidectomy was received. A single nodular cystic mass filled with gelatinous colloid was noted. The adjacent thyroid showed a whitish area measuring 0.5 cm in diameter. Microscopy revealed predominantly features of nodular goiter with cystic degeneration. Sections from the whitish areas revealed well-formed papillae lined by round to oval cells with optically clear nuclei showing nuclear grooves and overlapping features (fig.3) as described by Zafon C et al. [20]. The incidence of follicular carcinoma in all thyroid malignancies, reported in various studies, ranges from 12% to 47%. In our study, there were 2 cases of follicular carcinoma constituting 66.66% of all thyroid neoplasms. Both cases were females. They were 65 years and 70 years of age. The findings are comparable to Ijomone et al. (2014)[7]. Female predominance was noted in Ijomone et al (2014)[7], Ashwini et al (2014)[9]. Both cases showed capsular (Figure 4) and vascular invasion (Figure 5). To diagnose follicular carcinoma, capsular and/or vascular invasion must be present [21–23].

5. Conclusion

The frequency of the thyroid surgical pathology specimens was found to be low among all surgical pathology specimens. Non neoplastic lesions formed the majority of the cases while neoplastic lesions were uncommon. Thyroid lesions show peak incidence in the 4th decade with female predominance. Thorough sampling of the specimen, especially in case of neoplastic lesions or solitary thyroid nodules is necessary to look for capsular or vascular invasion. Proper gross examination helps to detect incidental findings for e.g. papillary microcarcinoma. Though non-invasive techniques can provide a probable diagnosis, the ultimate diagnosis rests on the histopathological examination of the excised specimen which decides the proper management.

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Conflicts of Interest: "The authors declare that they do not have any competing interests."

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