



HISTOPATHOLOGICAL SPECTRUM OF THYROID LESIONS- OUR EXPERIENCE

Dr. Prabhavati J. Patil

Associate Professor

Dr. Shilpa Gupta

Associate professor

Dr. Shanu Srivastava*

Professor and Head *Corresponding Author

ABSTRACT

INTRODUCTION: Thyroid disorders are most common endocrine disorders seen worldwide, next to pancreatic disorders. They exhibit wide range of morphological patterns with few challenges, which explains the great interest of pathologists in these lesions.

AIM: To evaluate the histopathological spectrum of lesions in thyroidectomy specimens.

MATERIAL AND METHODS: A retrospective study was conducted in a tertiary care hospital for a period of 3 years. All thyroidectomy specimens received in the department of pathology were studied by routine paraffin processing and haematoxylin & eosin staining. Diseases were classified into various non-neoplastic and neoplastic lesions based on histomorphology.

RESULTS: Total 71 specimens were included in the study. Highest incidence was observed in 5th decade and showed female predominance (87.32%). Non-neoplastic lesions accounted for 53 cases (74.64%) and neoplastic lesions constituted 18 cases (25.36%). The commonest non-neoplastic lesion was multinodular goitre and commonest neoplastic lesion was papillary thyroid carcinoma. However, we faced few challenges in reporting both non-neoplastic and neoplastic lesions.

CONCLUSION: In our study thyroid diseases showed a definite female predominance, most of them occurring in 5th decade. Non-neoplastic lesions predominated over neoplastic lesions. Among the neoplastic, malignant lesions outnumbered the benign ones, major constituent being papillary thyroid carcinoma.

KEYWORDS : Thyroid lesions, Non-neoplastic lesions, Neoplastic lesions, Multinodular goitre, Hurthle cell neoplasm of uncertain malignant potential, Papillary carcinoma thyroid

INTRODUCTION:

Thyroid gland is one of the important organs which plays vital physiological role in our body. It is responsible for maintenance of homeostasis and body integrity (1). Thyroid disorders are most common endocrine disorders seen worldwide, next to pancreatic disorders (2, 3). Studies in Indian population show around 42 million people suffer from thyroid disorders. Recognizable swelling in the neck makes it easier for diagnosis and better management (3). Classifying thyroid lesions histomorphologically into various non-neoplastic and neoplastic lesions helps to decide further course of action in terms of medical management and surgical intervention.

There have been several major developments in our knowledge of thyroid tumours, reinforcing the long-held impression that the accurate classification of these neoplasms is an arduous and sometimes treacherous exercise (4). Thyroid lesions exhibit wide range of morphological patterns, which explains the great interest of pathologists in these lesions.

AIM:

To evaluate the histopathological spectrum of lesions in thyroidectomy specimens.

MATERIAL AND METHODS:

A retrospective study was done in the Department of Pathology, Terna Medical College and Specialty Hospital, Navi Mumbai for a period of 3 years from January 2018 to December 2020. All thyroidectomy specimens received in the department of pathology were studied. They included lobectomy, hemithyroidectomy, subtotal thyroidectomy and total thyroidectomy. Details regarding age and gender were obtained from histopathology request form. The study was approved by institutional ethical committee.

Grossing of the specimens, tissue processing, routine Haematoxylin and Eosin staining were performed following standard protocol (5, 6). Histopathology slides of all the cases were reviewed and lesions were classified on the bases of histomorphology as various non-neoplastic and neoplastic lesions. The data was analysed by standard statistical methods.

RESULTS:

Total 71 specimens were received. The age of the patients ranged from 20 years to 72 years with peak incidence among 5th decade [Figure 1]. There were 62 females (87.32%) and 9 males (25.36%) with a female to male ratio of 6.8: 1 [Figure 2].



Figure 1 : Age Wise Distribution Of Thyroid Lesions

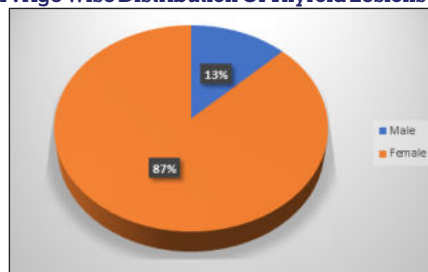


Figure 2 : Sex Distribution Of Thyroid Lesions

The specimens were fixed overnight in 10% buffered formalin.

Thyroidectomy specimens analysed histomorphologically showed 53 (74.64%) non-neoplastic and 18 (25.36%) neoplastic lesions. Non-neoplastic lesions showed predominance of goitre in 48 cases, of which 38 were multinodular goitres (MNG) and 10 were colloid goitres. We found several of our MNGs showing nuclear clearing and papillary processes which prompted us to take more sections and search extensively for foci of papillary carcinoma. We were able to find papillary microcarcinoma in two cases. The other non-neoplastic lesion was Hashimoto's thyroiditis seen in 5 cases [Table 1].

Analysis of neoplastic lesions showed one case of co-existent follicular adenoma and papillary microcarcinoma. Out of 17 remaining cases, five were benign which showed follicular adenoma. Two lesions were of intermediate grade diagnosed as 'Hurthle cell neoplasm of uncertain malignant potential' and 'Non-invasive follicular neoplasm with papillary-like nuclear features'. There were 10 malignant lesions, out of which majority were papillary carcinoma and its variants seen in 7 cases [Table 2]. Two cases of follicular carcinoma and a single case of medullary carcinoma were identified.

Tables And Figures:

Table 1: Histomorphological Distribution Of Thyroid Lesions

	Histomorphological diagnosis	Number of lesions	Percentage %
Nonneoplastic lesions 53 (74.64%)	Multinodular goitre	38	53.52
	Colloid goitre	10	14.08
	Hashimoto's thyroiditis	5	7.04
Neoplastic lesions 18 (25.36%)	Follicular adenoma	5	7.04
	Hurthle cell neoplasm of uncertain malignant potential	1	1.41
	NIFTP	1	1.41
	Follicular carcinoma	2	2.82
	Papillary carcinoma	7	9.86
	Medullary carcinoma	1	1.41
	Co-existent Follicular adenoma & Papillary Carcinoma	1	1.41
	Total	71	100

Table 2: Distribution Of Papillary Carcinoma And It's Variants

Papillary thyroid carcinoma	Total = 8
Microcarcinoma associated with Follicular adenoma	1
Microcarcinoma on a background of MNG	2
Classical type	3
Solid variant	1
Follicular variant	1

DISCUSSION:

Occurrence of thyroid diseases varies according to different geographical areas, age and sex (1,7). Both neoplastic and non-neoplastic diseases of thyroid are common all over the world with varying frequency and incidence (7).

Total 71 thyroidectomy specimens were received during 3 years of study. Thyroid diseases have historically been known to primarily affect female sex (1,2,3,8). In our study the incidence was more in females as compared to males i.e., 87.32% with the ratio of 6.8:1. The most common age group affected was 5th decade followed by 4th decade which was similar to studies done by Sreedevi *et al* (1), Fatima *et al* (3), and Jagadale *et al* (8) i.e. 4th to 5th decade, 3th to 4th decade, and 4th to 6th decade respectively.

Distribution of non-neoplastic and neoplastic lesions correlated well with other studies [Table 3]. Multinodular goitre is most common non-neoplastic lesion. Iodine deficiency and genetic factors are the two most important factors that influence the development of multinodular goitre (3,7). It accounted 38 (53.52%) cases in our study representing

most common thyroid lesion. It was common in 40 to 50 years of age group. This pattern correlated well with studies done by Sreedevi AR *et al* (1), Fatima A *et al* (3), and Jagadale K *et al* (8) [Table 4]. Next common non-neoplastic lesion was colloid goitre formed 10 (14.08%) cases, followed by 5 (7.04%) cases of Hashimoto's thyroiditis. Hashimoto's thyroiditis is an autoimmune disease characterized by widespread lymphocytic infiltration with germinal centre formation, stromal fibrosis, and parenchymal atrophy with oxyphilic changes (1) [Figure 3]. All the cases in our study were females.

Table 3: Comparison Of Non-neoplastic And Neoplastic Lesions With Other Studies

Thyroid lesions	Sreedevi AR (1) n=620, 2018	Fatima A (3) n=120, 2016	Jagadale K (8) n=70, 2016	Present study n=71, 2021
Non-neoplastic	82	83.33	71.4	74.64
Neoplastic	18	16.67	28.6	25.36

Table 4: Comparison Of Various Neoplastic Lesions With Other Studies

Non-neoplastic lesions	Sreedevi AR (1) n=620, 2018	Fatima A (3) n=120, 2016	Jagadale K (8) n=70, 2016	Present study n=71, 2021
Multinodular goiter	56.93	42.5	28.6	53.52
Colloid goiter		29.1	21.4	14.8
Hashimoto's thyroiditis	11.45	9.1	8.57	7.04

The neoplastic lesions accounted for 18 (25.36%) cases. Analysis of which showed predominance of papillary thyroid carcinoma in 7 cases. Comparison with various other studies showed good correlation with Sreedevi AR *et al* (1), and Jagadale K *et al* (8) whereas study done by Fatima A *et al* (3) showed higher incidence of follicular adenoma than the malignant lesions. We had five cases of follicular adenoma. However, one of the cases showed coexistence of follicular adenoma and papillary microcarcinoma [Figure 4].

We reported Hurthle cell neoplasm of uncertain malignant potential in one thyroidectomy specimen of 42-year-old female which showed bilateral well encapsulated nodules having Hurthle cells in solid sheets and trabeculae [Figure 5]. One of the nodules measured 4.5cm in greatest dimension. A size of ≥ 4 cm is strongly correlated with malignancy. Old age, large tumour size (4cm), extensive vascular invasion, presence of solid or trabecular pattern in $>75\%$ of tumour areas identify worse prognosis. As a group the frequency of malignancy is higher for Hurthle cell compared with non-Hurthle cell follicular neoplasms. Hurthle cell carcinomas tend to occur in old age group and be larger compared with Hurthle cell adenomas (10).

Non-invasive follicular thyroid neoplasm with papillary-like nuclear features was diagnosed in one lobectomy with an encapsulated tumour. It showed follicles lined by cells with overlapping oval to round nuclei. Prominent nuclear chromatin clearing, and a few nuclear grooves were identified. There was no evidence of capsular or vascular invasion. Based on three-point scoring system of 'Nuclear Standardized Scoring System for Papillary Carcinoma' by Nikiforov YE *et al* (12), nuclear scoring in our case was 3(1+1+1), which is diagnostic of papillary thyroid carcinoma nuclei [Figure 6]. These tumours have extremely low malignant potential and very low risk of adverse outcome which results in a significant reduction in psychological and clinical consequences associated with the diagnosis of carcinoma (9,12).

By far the most controversial issue that has impacted the field in recent years has been the proposed introduction into the classification of well differentiated follicular tumours of a group of neoplasms that are morphologically and behaviourally intermediate between follicular adenoma and follicular carcinoma or the follicular variant of papillary carcinoma.

These neoplasms can be considered the thyroid representatives of group of tumours that have recently been described in a wide variety of organs, referred to as tumours of uncertain malignant potential (4).

Papillary thyroid carcinoma is most common malignant thyroid tumour representing 85 to 90% of differentiated thyroid carcinomas and occurs across all ages (5,13,14). In the current study papillary thyroid carcinoma accounted for about 72.73% of all malignancies with females outnumbering the males i.e., 5 out of 7 cases. Similar studies were done by Haque WS et al (7) which showed 91% and Sreedevi AR et al (1) which showed 66.6% papillary thyroid carcinomas making it commonest malignant lesion in the neoplastic category. Three cases were classical type among which one was multicentric involving both the lobes [Figure 7]. Three cases were of papillary microcarcinoma, out of which the coexistent lesion with follicular adenoma was incidental finding which measured 2mm in greatest dimension and it was completely encapsulated [Figure 4]. One of our cases showed nuclear features of papillary carcinoma in follicular pattern with thick sticky colloid. Extensive sampling did not show any well-formed papillae. The patient also had no evidence of cervical lymphadenopathy radiologically. The diagnosis of follicular variant of papillary thyroid carcinoma was offered [Figure 8]. Solid variant of papillary thyroid carcinoma [Figure 9] constituted one case in our study.

Follicular carcinoma was diagnosed in two cases, both were females. One of the cases showed extensive areas of invasion into capsule and adjacent thyroid tissue along with prominent vascular invasion whereas, the other case showed only capsular invasion [Figure 10].

Medullary carcinoma was seen in total thyroidectomy specimen of 53-year-old female. Sheets of polygonal and plump spindle shaped cells were traversed by delicate fibrovascular septa. Focal areas of eosinophilic amyloid material and calcification were identified. Capsular and vascular invasion was evident [Figure 11].

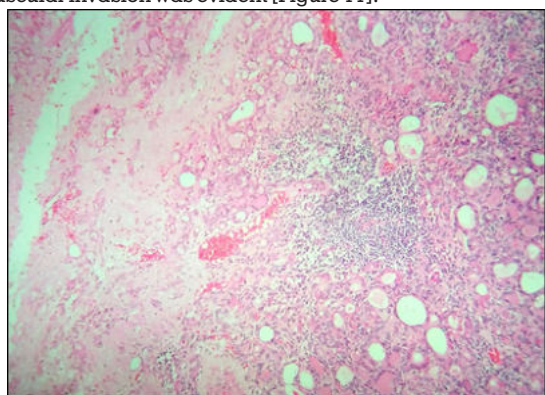


Figure 3: Hashimoto's Thyroiditis (10x H&E).

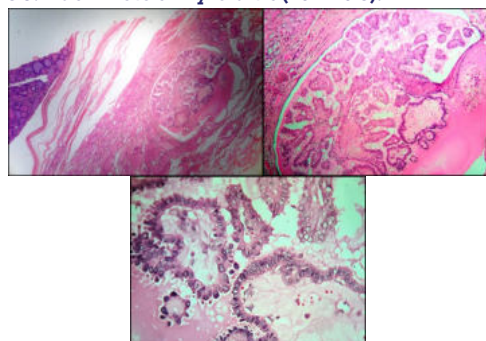


Figure 4: Coexistent Follicular Adenoma And Papillary Microcarcinoma (encapsulated) (2x H&E) Papillary Microcarcinoma (10x H&E) Nuclear Crowding, Clearing And Groves (40x H&E)

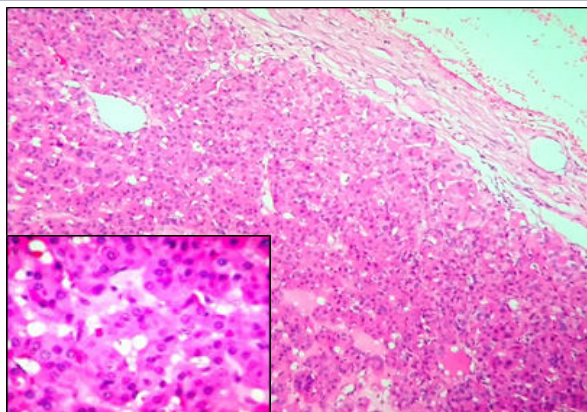


Figure 5: Hurthle Cell Neoplasm Of Uncertain Malignant Potential (10x H&E) Inset - Follicles With Hurthle Cell Lining (40x, H&E)

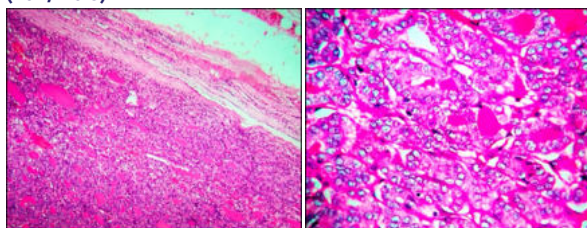


Figure 6: Non-invasive Follicular Thyroid Neoplasm With Papillary-Like Nuclear Features (10x, 40x H&E)

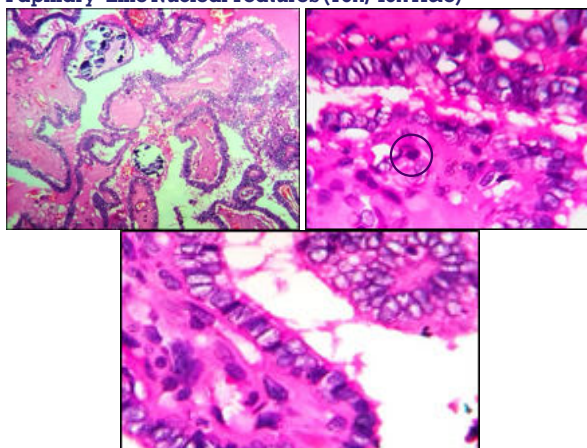


Figure 7: a. Papillary thyroid carcinoma - classical variant with psammoma bodies (10X H&E) b,c . Nuclear grooves and inclusion (circle) (40X H&E)

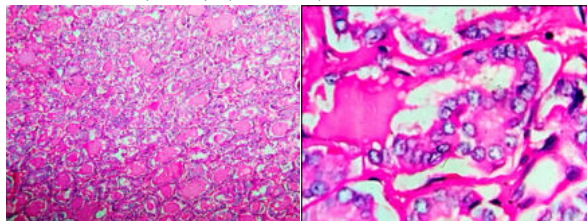


Figure 8: Papillary thyroid carcinoma - Classical Variant With Nuclear Grooves and Pseudoinclusions (10X, 40X H&E)

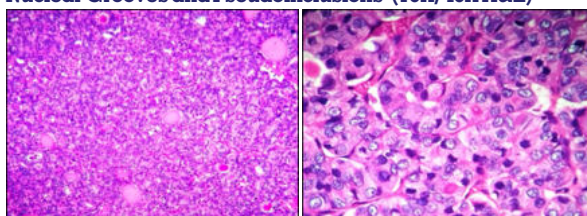


Figure 9: Papillary Thyroid Carcinoma - Solid Variant (10x, 40x H&E)

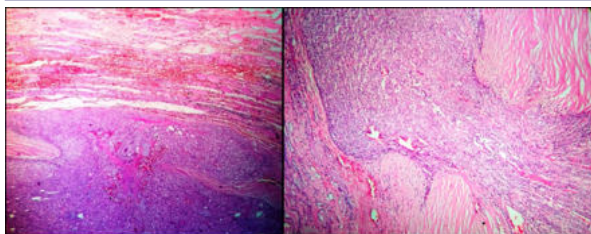


Figure 10: Follicular carcinoma thyroid – extensive capsular invasion (2X H&E)

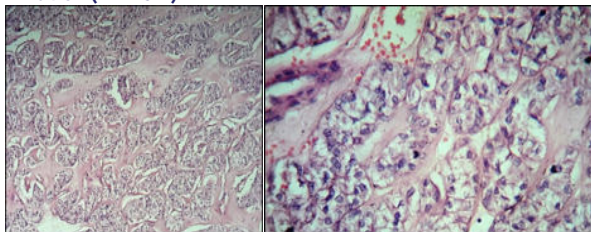


Figure 11 : Medullary Carcinoma Thyroid (10x, 40x H&E)

CONCLUSION:

Our Study Echoed The Historical Facts That-

- Thyroid diseases both benign and malignant primarily affect female sex.
- Common age group affected was 5th decade.
- Non-neoplastic lesions predominated over neoplastic lesions, multinodular goitre being commonest. In our experience nuclear clearing and papillary areas in MNG should not be ignored and a comprehensive search for a focus of papillary carcinoma should be done.
- Malignant lesions outnumbered the benign ones in neoplastic category in our study, and of the malignant lesions major constituent was papillary carcinoma thyroid. Some of the papillary thyroid carcinomas can present without lymph node involvement and no papillary areas, they should not be missed.

Limitation Of The Study:

It is a region-specific study, and dietary as well as other environmental factors can affect the distribution of thyroid lesions. Due to the small sample size the variety of lesions were restricted.

However, the present study highlighted the histological identification of intermediate lesions with low malignant potential based on standard diagnostic criteria.

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