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Histomorphological pattern of thyroid lesions: A prospective study

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Abstract: *Background:* Thyroid disorders are the commonest endocrine disorders worldwide. 15–20% of the thyroid nodules are indeterminate on cytological results. The definite diagnosis of these nodules is provided by examination of thyroidectomy. *Objective:* Aim was to describe various histomorphological patterns of thyroid lesions and their frequency in relation to age and sex of the patients. *Material and methods:* A prospective cross-sectional study was carried out on all thyroidectomy specimens received in the department of Pathology from July 2015 to June 2017. A total of 110 specimens were included in the study. *Statistical analysis:* Statistical analysis was carried out using SPSS (version 14) software. Descriptive analysis was performed using frequencies and percentages. *Results:* Thyroid diseases were predominantly seen in females. Peak age of presentation was 3rd to 5th decade. Out of 110 cases studied, 77 cases (70%) were non neoplastic lesions and 33 cases were (30%) neoplastic lesions. Adenomatous goiter was the most common nonneoplastic lesion (84.41%) followed by Hashimoto thyroiditis (11.68%). Among neoplastic lesions, malignant neoplasms (23 cases, 69.69%) were more common than benign neoplasm (9 cases, 27.27%). Borderline neoplasm was seen in 3.03% (1 case). Papillary carcinoma was the most common malignant neoplasm (78.26%), which was predominantly seen in females (94.44%) and most common age of presentation was in 3rd to 4th decade (66.66%). Overall, the most common lesion was adenomatous goiter (59.09%) followed by papillary carcinoma (16.36%), Hashimoto's thyroiditis (8.18%) and follicular adenoma (7.27%). *Conclusion:* Histopathological examination plays a major role in definitive diagnosis of thyroid lesions. Adenomatous goiter was the most common lesion followed by Papillary carcinoma which suggests increasing prevalence of thyroid malignancy in the population.

Keywords: Thyroidectomy, Histopathology, Neoplastic lesion, Non neoplastic lesion.

Introduction

Thyroid gland is one of the most important organs, which plays wide physiological roles [1]. About 42 million people in India suffer from thyroid diseases [2]. Studies have shown that 12% of adults have a palpable goiter [3]. The principal diseases of thyroid are simple goiter, thyroiditis and neoplasms [4]. Thyroid nodules are more common in women, in older individuals [5]. Most of these thyroid nodules are benign, and malignant disease accounts for 1.1% of all cancers annually [6].

A standard protocol in thyroid nodule is to perform a thyroid ultrasound, subsequently FNA biopsy. However, 15–20% of the nodules are indeterminate on cytological results. The definite diagnosis of these nodules is provided by examination of thyroidectomy [7-8]. The objectives of present study were to describe various histomorphological patterns of thyroid lesions and their frequency in relation to age and sex of the patients.

Material and Methods

The present study was two years prospective cross-sectional study and included all the thyroidectomy specimens received from July 2015 to June 2017 at the Department of Pathology. Total of 110 samples were received during the study period. Details of all cases consisting of clinical history, gross

features, microscopic features and final diagnosis were analysed. Approval by a local Ethical Committee was taken. Statistical analysis was carried out using SPSS (version 14) software. Descriptive analysis was performed using frequencies and percentages

Results

During the study period, 110 thyroidectomy specimens were received. Thyroid diseases were seen in patients with age ranging from 9 years to 72 years. Females were more commonly affected in all age groups except in 71-80 age group. Present study showed Female: Male ratio of 6.3:1(Table 1).

Out of 110 cases, 77 (70%) cases were non neoplastic and 33 (30%) cases were Neoplastic (Table 2). Among the neoplastic lesions, 8.18% (9 cases) were benign, 0.9% (1 case) were borderline and 20.90% (23 cases) were malignant. The most common non-neoplastic lesion was adenomatous goiter accounting for 84.41% of nonneoplastic lesion and 59.09% of cases studied (Table 2).

Hashimoto's thyroiditis was the second most common non neoplastic lesion. Among neoplastic lesions, malignant neoplasms were more common than benign neoplasm accounting for 20.90% (23 cases) of cases studied and 69.69% of all the neoplastic lesions. Benign neoplasm accounted for 8.18% (9 cases) of the cases studied and 27.27% of the neoplastic lesions. Borderline neoplasm accounted for 0.9% (1 case) of cases studied and 3.03% of the neoplastic lesions.

Table-1: Age and sex distribution of all the cases

Age group (in years)	Females	Males	Total
1-10	1 (0.90%)	0 (00%)	1 (0.90%)
11-20	5 (4.54%)	0 (00%)	5 (4.54%)
21-30	26 (23.63%)	3 (2.72%)	29 (26.36%)
31-40	27 (24.54%)	2 (1.81%)	29 (26.36%)
41-50	19 (17.27%)	5 (4.54%)	24 (21.81%)
51-60	11 (10%)	1 (0.90%)	12 (10.90%)
61-70	6 (5.45%)	3 (2.72%)	9 (8.18%)
71-80	0 (00%)	1 (0.90%)	1 (0.90%)
Total	95 (86.36%)	15 (13.63%)	110 (100%)

Table-2: Spectrum of thyroid lesions in relation to age group

Nature of lesion	HP Diag.	Age Group (in years)								Total	%
		01-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80		
Nonneoplastic (n=77)	AG	1	4	15	14	16	7	8	0	65	59.09
	HT	0	0	2	4	3	0	0	0	9	8.18
	PH	0	0	1	1	0	0	0	0	2	1.81
	EPCY	0	0	0	0	1	0	0	0	1	0.9
Neoplastic; Benign (n= 9)	FA	0	0	1	5	1	0	0	1	8	7.27
	HTA	0	0	1	0	0	0	0	0	1	0.90
Neoplastic; Borderline (n=1)	NIFTP	0	0	0	0	1	0	0	0	1	0.90
Neoplastic; Malignant (n=23)	PTC	0	1	8	4	1	4	0	0	18	16.36
	FC	0	0	1	0	1	1	0	0	3	2.72
	MC	0	0	0	1	0	0	1	0	2	1.81
Total		1	5	29	29	24	12	9	1	110	100

AG: Adenomatous goiter, EPCY: Epidermal cyst, FA: Follicular adenoma, FC: Follicular carcinoma, HP Diag.: Histopathologic diagnosis, HT: Hashimoto's thyroiditis, HTA: Hyalinising trabecular adenoma, MC: Medullary carcinoma, NIFTP: Noninvasive Follicular Thyroid Neoplasm with Papillary-like Nuclear Features, PH: Primary hyperplasia, PTC: Papillary thyroid carcinoma

Papillary carcinoma with its variants were the most common malignant neoplasm, which was seen in 16.36% (18 cases) of cases. The majority of the malignant neoplasms were seen 3rd to 5th decade (Table 2). Females were the most common to be affected by all the spectrum of lesions (Table 3).

Table-3: Spectrum of thyroid lesions in relation to sex

Diagnosis	Females	Males	Total
AG	54	11	65
HT	9	0	9
PH	2	0	2
EPCY	0	1	1
FA	7	1	8
HTA	1	0	1
NIFTP	1	0	1
PTC	17	1	18
FC	3	0	3
MC	1	1	2
Total	95	15	110

AG: Adenomatous goiter, EPCY: Epidermal cyst, FA: Follicular adenoma, FC: Follicular carcinoma, HP Diag.: Histopathologic diagnosis, HT: Hashimoto's thyroiditis, HTA: Hyalinising trabecular adenoma, MC: Medullary carcinoma, NIFTP: Noninvasive Follicular Thyroid Neoplasm with Papillary-like Nuclear Features, PH: Primary hyperplasia, PTC: Papillary thyroid carcinoma.

Discussion

Thyroid gland is one of the most important endocrine organs and there is enormous burden of thyroid diseases in the general population. The enlargement of the thyroid gland is seen in 3-5% of the population [9]. The peak incidence of thyroid diseases was seen in the third to fifth decades (Table 1, 2) which was similar to the studies by Bouq et al [9], Tsegaye and Ergete [10] and, Ijomone et al [11] who have reported 74.6%, 79.16%, 78.94% of the cases respectively in same age group. Females were the majority to be affected by thyroid diseases (Table 3). Similar results were reported by Qureshi et al, with F: M ratio of 6.5:1 [12].

In present study, 77 (70%) cases were non-neoplastic and 33 (30%) cases were neoplastic. Similarly, in a study conducted by Ijomone et al, non-neoplastic lesions constituted for 66.91%, whereas neoplastic lesion accounted for 31.57% of the cases [11].

In another study 82.05% of the lesions were nonneoplastic and 17.94% were neoplastic lesions [12]. Among neoplastic lesions, 27.27% (9 cases) were benign, 3.03% (1 case) were borderline and 69.69% (23 cases) were malignant. Various studies showed prevalence of neoplastic lesions ranging from 18% - 39%. Tsegaye and Ergete observed neoplastic lesion in 21.03% of cases [10]. Ijomone et al [11], Qureshi et al [12] and Htwe et al [13] reported 31.57%, 17.94%, 24.75% of neoplastic lesions respectively. Adenomatous goiter was the most common nonneoplastic lesion, followed by Hashimoto's thyroiditis similar to Qureshi et al[12] and Pradeep Kumar et al[4](Table 4).

Table-4: Comparison of distribution of nonneoplastic lesions in present study with other studies

Non neoplastic lesion	Qureshi et al [12] (n=512)	Pradeep Kumar et al [4] (n=169)	Htwe et al [13] (n= 617)	Bukhari et al [14] (n=743)	Present study (n=77)
Adenomatous Goiter	94.92%	69.82%	93.51%	91.3%	84.44%
Hashimoto's Thyroiditis	3.12%	24.85%	1.13%	1.07%	11.68%
Primary Hyperplasia	0.78%	5.32%	5.34%	0.3%	2.59%
Chronic Lymphocytic Thyroiditis	0.39%	0	0	4.03%	0
Miscellaneous	0.78%	0	0	1.07%	1.2%

Prevalence of neoplastic lesions in present study was higher as compared to most of other studies, which could be because of indication of surgery, which is mainly medical rather than cosmetic reason in developing country like India and also because of increasing incidence of well differentiated carcinoma as reported by Vanderpump and Unnikrishnan [15, 2]. Benign neoplastic lesions accounted for 8.18% (9 cases) of cases studied and 27.27%

of the neoplastic lesions. Among these, most common lesion was follicular adenoma and its variants, which accounted for 7.27% (8 cases) of cases, followed by one case of hyalinizing trabecular adenoma accounting for 0.9% of cases studied. In a study conducted Salama et al, adenoma accounted for 11.12% of cases studied and 26.78% of neoplastic lesions [16].Albasri et alhad reported lower incidence of these lesions where adenoma constituted 2.4% of the cases and 8.6% of neoplastic lesions [17].

One case was categorized as borderline neoplasm (NIFTP) according to 2017 updates of WHO classification of thyroid tumors, which accounted for 3.03% of neoplastic lesions [18]. Similarly, Koyuncuer et alhave reported borderline neoplasms in 3.33% of the cases [19]. Malignant neoplasms were more common than benign neoplasms, which constituted 20.9% of the cases studied, whereas benign neoplasms were seen in 8.18%. Similarly, Nanjappa et alreported malignancy in 21.1% of thyroidectomy specimens [20]. Qureshi et al, observed benign and malignant neoplasms in 7% and 11% of cases respectively [12].

Among malignant neoplasms papillary carcinoma was the most common, which accounted for 78.26% of malignant lesions. This was also the second most common lesion among all the cases studied (16.36%). Similar observation was reported by Bukhari et al, where papillary carcinoma accounted for 90% of malignant neoplasms and 13.82% of cases studied [14].

Among the variants of PTC, most common was classic/conventional variant, which accounted for 50% of these cases, followed by invasive FVPC and microcarcinoma, seen in 27.78% and 22.22% of cases, respectively. In a study conducted by Thompson, 33% were classic type and 30% each were follicular variant and microcarcinoma; rest being other variants [21]. All these studies showed female preponderance.

The second most common malignancy was follicular carcinoma, amounting for 13% of malignant neoplasms, followed by medullary carcinoma constituting 8.6% of the cases which is in concordance with study who have reported 17.7% and 6.5% of follicular carcinoma and medullary carcinoma respectively [22]. Majority of malignant neoplasm were seen from 3rd to 5th decade of life, constituting 72.72% of the cases. Qureshi et al [12] and, Tsegaye and Ergete [10] have reported 76.81% and 65.62% of malignant cases in same age group, respectively. Females were more common to be affected by thyroid malignancy with F: M ratio of 10.5:1. Various studies by Tsegaye et al [10], Qureshi et al [12] and Pradeep Kumar et al [4] have reported F: M ratio of 2:1, 5.3:1, and 10.4 respectively.

Conclusion

Histopathological examination plays a major role in definitive diagnosis of thyroid lesions, especially in solitary nodules as cytology is indeterminate in 15-20%. Adenomatous goiter was the most common lesion encountered emphasizing the importance of public awareness about the iodization of salt and goitrogenic agents. Papillary carcinoma was the second most common lesion encountered which suggests the increasing prevalence of thyroid malignancy in the population.

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