e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2024; 16(3); 495-498

Original Research Article

An Observational Assessment of the Range of Cytopathological Abnormalities Seen in Thyroid Lesions

Shailesh Kumar Pankaj[1], Manoj Kumar[2], C P Jaiswal[3], Asim Mishra[4]

[1]Tutor, Department of Pathology, NMCH Patna, Bihar, India

[2]Assistant Professor, Department of Pathology, ANMMCH, Gaya, Bihar, India

[3]Professor & Head, Department of Pathology, NMCH Patna, Bihar, India

[4]Professor & Head, Department of Pathology, ANMMCH, Gaya, Bihar, India

Received: 03-01-2024 / Revised: 14-02-2024 / Accepted: 25-03-2024
Corresponding Author: Dr. Manoj Kumar
Conflict of interest: Nil

Abstract

Aim: To investigate the range of cytopathological abnormalities seen in thyroid lesions in a tertiary care hospital.

Material and Methods: This study was conducted in the department of pathology, NMCH Patna, Bihar, India from June 2019 to May 2020. A total of 801 thyroidectomy specimens received in the histopathology laboratory, were included in the study. All biopsies were fixed in formalin and embedded in paraffin. The sections were stained with haematoxylin and eosin. Special stains like Congo Red, Periodic acid Schiff and reticulin were used whenever needed. After pathological diagnosis, the demographic data and final report were systematically entered into the register. The biopsy registers were reviewed and different lesions were categorized. Age and sex-wise variations of the lesions were noted.

Results: Multinodular goiter is the most common non-neoplastic thyroid lesion (71.5%) followed by thyroiditis. There were only 6 cases of toxic goiter among all the thyroid lesions received. Among the 801 thyroid lesions, there were 151 carcinomas (18.8%). Maximum numbers of carcinomas are seen in age group 31-40 with 43 cases, followed closely by fourth decade. There were no thyroid malignancies upto second decade. The numbers of malignancies were very minimum above 70 years (2.7%). The frequency of carcinomas among the total thyroid lesions is almost same for both males and females (18.82% and 18.85%). Papillary carcinoma was the most frequent malignancy, out of which half were of the micropapillary subtype. One of the thyroidectomy specimens showed two different primary malignancies (follicular carcinoma and papillary micro carcinoma). Anaplastic carcinoma was seen in only one thyroidectomy specimen. There was one metastatic thyroid carcinoma from a primary lung carcinoma.

Conclusion: Multinodular goiter was found to be the most common thyroid lesion in this study. The percentage of malignant thyroid tumors was high compared to other studies done in Bihar. Papillary carcinoma was the most common malignant neoplasm. The micropapillary variant comprised 50% of the papillary carcinoma.

Keywords: Cytopathological, Abnormalities, Thyroid lesions,

Introduction

Thyroid nodules are a common clinical finding, with their prevalence increasing with age and exposure to certain environmental factors. The accurate diagnosis of thyroid nodules is crucial due to the potential risk of malignancy, which necessitates timely and appropriate management. Fine-needle aspiration cytology (FNAC) has become the cornerstone in the evaluation of thyroid nodules, offering a minimally invasive, cost-effective, and reliable diagnostic tool that aids in the differentiation between benign and malignant lesions. The primary goal of cytopathological evaluation in thyroid nodules is to provide a definitive diagnosis that can guide clinical management. [1-3] FNAC plays a critical role by reducing the need for unnecessary surgeries and identifying patients who require surgical intervention. The Bethesda System for Reporting Thyroid Cytopathology (TBSRTC) has standardized the reporting of thyroid FNAC results, categorizing them into six diagnostic categories: nondiagnostic, benign, atypia of undetermined significance (AUS) or follicular lesion of undetermined significance (FLUS), follicular neoplasm or suspicious for a follicular neoplasm, suspicious for malignancy, and malignant. Thyroid nodules exhibit a wide cytopathological spectrum, ranging from benign conditions like colloid nodules and thyroiditis to

malignant neoplasms such as papillary thyroid carcinoma (PTC) and medullary thyroid carcinoma (MTC). [4-7] Benign Lesions: These include colloid nodules, nodular goiter, and Hashimoto's thyroiditis. Colloid nodules are characterized by the presence of abundant colloid and benign follicular cells. Hashimoto's thyroiditis shows lymphocytic infiltration, Hurthle cells, and fibrosis . Follicular Neoplasms: These lesions are challenging to diagnose cytologically due to the overlapping features with benign follicular lesions. They are categorized as follicular neoplasm or suspicious for a follicular neoplasm under TBSRTC and require histopathological examination to differentiate between follicular adenoma and follicular carcinoma . Malignant Lesions: The most common malignant thyroid neoplasm is PTC, which exhibits characteristic nuclear features such as nuclear grooves, pseudo inclusions, and overlapping nuclei. Other malignant lesions include follicular thyroid carcinoma, MTC, and anaplastic thyroid carcinoma (ATC). MTC is identified by the presence of amyloid deposits and calcitonin-producing cells, while ATC shows highly pleomorphic cells and a lack of typical thyroid follicular architecture. Recent advancements in cytopathology, including molecular testing and immunocytochemistry, have enhanced the diagnostic accuracy of thyroid FNAC. Molecular markers such as BRAF, RAS, RET/PTC, and PAX8/PPARγ have been utilized to further classify indeterminate nodules and predict malignancy risk . Immunocytochemical staining for markers such as galectin-3, HBME-1, and cytokeratin-19 also assists in distinguishing benign from malignant thyroid lesions. [8-10]

Material and Methods

This study was conducted in the department of pathology, NMCH Patna, Bihar, India from June 2019 to May 2020. A total of 801 thyroidectomy specimens received in the histopathology laboratory, were included in the study. All biopsies were fixed in formalin and embedded in paraffin. The sections were stained with haematoxylin and eosin. Special stains like Congo Red, Periodic acid Schiff and reticulin were used whenever needed. After pathological diagnosis, the demographic data and final report were systematically entered into the register. The biopsy registers were reviewed and different lesions were categorized. Age and sex-wise variations of the lesions were noted. The study proposal was reviewed and accepted by the hospital ethical committee. Statistical analysis was done using the frequency distribution table in Microsoft Excel Office.

Results

A total of 801 thyroidectomies were performed during the study period. The specimens received ranged from total thyroidectomies to lobectomies. There were 716 females and 85 males. Maximum number of thyroid lesions were seen in the age group 41-50 (31%), followed by third decade (26.8%). The least number of lesions were seen in children under 10 years of age. Incidence of thyroid pathology was found to be very minimum (0.8%) upto 20 years of age. Multinodular goiter is the most common non-neoplastic thyroid lesion (71.5%) followed by thyroiditis. There were only 6 cases of toxic goiter among all the thyroid lesions received. Among the 801 thyroid lesions, there were 151 carcinomas (18.8%). Maximum numbers of carcinomas are seen in age group 31-40 with 43 cases, followed closely by fourth decade. There were no thyroid malignancies upto second decade. The numbers of malignancies were very minimum above 70 years (2.7%). The frequency of carcinomas among the total thyroid lesions is almost same for both males and females (18.82% and 18.85%). Papillary carcinoma was the most frequent malignancy, out of which half were of the micropapillary subtype. One of the thyroidectomy specimens showed two different primary malignancies (follicular carcinoma and papillary micro carcinoma). Anaplastic carcinoma was seen in only one thyroidectomy specimen. There was one metastatic thyroid carcinoma from a primary lung carcinoma.

Table 1: Age wise distribution of thyroid lesions.

Age group (years)	N	%
0-10	1	0.1
11-20	6	0.7
21-30	79	9.9
31-40	215	26.8
41-50	248	31
51-60	175	21.8
61-70	59	7.4
71and above	18	2.2

Table 2: Proportion of various thyroid lesions in males and females.

Diagnosis	Male	Female	N	%
MNG	50	382	432	53.9
MNG+thyroiditis	9	132	141	17.6
Papillary carcinoma	4	53	57	7.1
Papillary micro carcinoma	5	52	57	7.1
Hashimoto's thyroiditis	5	32	37	4.6
Follicular carcinoma	6	29	35	4.4
Follicular adenoma	3	24	27	3.3
Toxic goiter	1	5	6	0.7
Lymphocytic thyroiditis	0	5	5	0.6
deQuervain thyroiditis	0	1	1	0.1
Hyalinising trabecular tumor	0	1	1	0.1
Anaplastic carcinoma	1	0	1	0.1
Metastatic carcinoma	0	1	1	0.1

Table 3: Age wise distribution of thyroid carcinomas.

Age group (years)	N	%
0-10	0	0
11-20	0	0
21-30	22	14.7
31-40	43	28.8
41-50	42	28.2
51-60	31	20.8
61-70	9	6.04
71 and above	4	2.7

Table 4: Sex wise distribution of carcinomas.

Sex	N	%
Male	16/85	18.82
Female	135/716	18.85

Table 5: Histopathologic subtypes of carcinomas.

Type of carcinoma	N	%
Papillary micro carcinoma	57	37.7
Papillary carcinoma	57	37.7
Follicular carcinoma	35	23.2
Anaplastic carcinoma	1	0.7
Metastatic carcinoma	1	0.7

Discussion

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. [9] Thyroid enlargement may be in the form of multinodular, solitary or diffuse goiter. [10] Thyroid diseases are generally more prevalent in females. [11] Benign neoplasms outnumber thyroid carcinomas by a ratio of nearly 10:1. [12] In the present study, thyroid lesions were found to be most prevalent in the third and fourth decades. The number of female patients (716) far outnumbered males (85). Multinodular goiter accounted for 71.5% (573) cases, forming the most common pathologic lesion. This is similar to studies by B. Tsegaye et al and Ashwini Kolur et al. [13,14] Among the non-neoplastic category of thyroid lesions, thyroiditis was the next common pathology accounting for 22.97% of the total. This included Hashimoto's, Lymphocytic and deQuervain thyroiditis. Thyroiditis was seen as an associated finding in 17.6% of multinodular goiters. Thyroid malignancy accounted for 151 cases (18.8%). This high prevalence of malignancy among surgically resected thyroid specimens in our hospital could be due to the fact that it is a tertiary care centre with a large

number of referral cases. The percentage of malignancy was only 8.37 in a similar study from Central Kerala. [14] Like the non-neoplastic lesions, thyroid malignancies were also found to be more common in third and fourth decades. Out of the 151 thyroid malignancies, 16 were males (10.73%) and 135 were females (89.3%). The total number of males in the present study was only 85, out of whom 16 had malignant thyroid pathology (18.8%), whereas the number of females was 716, with 135 thyroid malignancies (18.9%). Thus the proportions of malignancy among the thyroid lesions were almost the same in both males and females. Papillary carcinoma was the most common thyroid malignancy (75%) as seen in previous studies. [7,14] Of these, 57 cases (50%) were of the micropapillary subtype, with a diameter less than 1 cm. The second most common type was follicular carcinoma (22.1%), of which 20 had capsular invasion alone, 2 had vascular invasion alone and 13 had both capsular and vascular invasion. None of these showed distant metastasis at the time of presentation. Other types included well differentiated carcinoma and anaplastic carcinoma. There was one case of metastasis from carcinoma lung.

Conclusion

Multinodular goiter was found to be the most common thyroid lesion in this study. The percentage of malignant thyroid tumors was high compared to other studies done in Bihar. Papillary carcinoma was the most common malignant neoplasm. The micropapillary variant comprised 50% of the papillary carcinoma.

References

1. Cibas ES, Ali SZ. The Bethesda System for Reporting Thyroid Cytopathology. Thyroid. 2009;19(11):1159-1165. doi:10.1089/thy.2009.0274.
2. Bongiovanni M, Spitale A, Faquin WC, Mazzucchelli L, Baloch ZW. The Bethesda System for Reporting Thyroid Cytopathology: A meta-analysis. Acta Cytol. 2012;56(4):333-339. doi:10.1159/000339959.
3. Gharib H, Papini E, Garber JR, et al. American Association of Clinical Endocrinologists, Associazione Medici Endocrinologi, and European Thyroid Association Medical Guidelines for Clinical Practice for the Diagnosis and Management of Thyroid Nodules. Endocr Pract. 2010;16(Suppl 1):1-43. doi:10.4158/EP.16.S1.1.
4. Ali SZ, Cibas ES. The Bethesda System for Reporting Thyroid Cytopathology: Definitions, Criteria, and Explanatory Notes. Springer; 2017.
5. Rosai J, Carcangiu ML, DeLellis RA. Tumors of the Thyroid Gland. Atlas of Tumor Pathology. 3rd series, fasc. 5. Washington, DC: Armed Forces Institute of Pathology; 1992.
6. Baloch ZW, LiVolsi VA. Pathology of the thyroid gland. In: Diagnostic Surgical Pathology. 4th ed. Philadelphia, PA: Lippi ncott Williams & Wilkins; 2009:1305-1371.
7. Xing M. BRAF mutation in thyroid cancer. Endocr Relat Cancer. 2005;12(2):245-262. doi:10.1677/erc.1.0978.
8. Nikiforov YE, Steward DL, Robinson-Smith TM, et al. Molecular testing for mutations in improving the fine-needle aspiration diagnosis of thyroid nodules. J Clin Endocrinol Metab. 2009;94(6):2092-2098. doi:10.1210/jc.2008-2484.
9. Bartolazzi A, Orlandi F, Saggiorato E, et al. Galectin-3 expression in thyroid fine-needle aspirates as a presurgical marker of thyroid nodules with high-risk of malignancy. Cancer. 2002;95(2):170-176. doi:10.1002/cncr.10663.
10. Cooper DS, Doherty GM, Haugen BR, et al. Revised American Thyroid Association management guidelines for patients with thyroid nodules and differentiated thyroid cancer. Thyroid. 2009;19(11):1167-1214. doi: 10.1089/thy.2009.0110.
11. Morganti S, Ceda GP, Saccani M, Milli B, Ugolotti D, Prampolini R, et al. Thyroid disease in the elderly: sex-related differences in clinical expression. J Endocrinol Invest. 2005;28(11 Suppl Proceedings):101-4
12. Elhamel A, Sherif I, Wassef S. The Pattern of Thyroid Disease in Closed Community of 1.5 Million People. Saudi Med J. 1988;9:481-4.
13. Tsegaye B, Ergete W. Histopathological pattern of thyroid disease. East African Med J. 2003;80:525-8.
14. Ashwini K, Anitha B, Letha P. Pattern of thyroid disorder in thyroidectomy specimen. Inter J Med Scie Pub Health. 2014;3:1446-8