Histopathological Characteristics And Incidence Of Thyroid Carcinoma In A Tertiary Care Hospital In Pakistan: A Cross-Sectional Study

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DOI: 10.47750/pnr.2020.11.01.15

Abstract

Background: The amelioration of thyroid cancer as the most frequently occurring malignancy of endocrine organs has been recorded with an increasing number of cases, especially for papillary thyroid carcinomas (PTC). The population growth, as a consequence, has intensified the public health alarm. Besides these, there is a group of thyroid cancers including follicular, medullary, and anaplastic, which exhibits stable incidence rates during different periods. Hence, proficient diagnosis and treatment of early stages are necessary.

Objectives: The study aims to assess the histopathology features and incidence of thyroid carcinoma among patients who receive treatment at our tertiary care hospital in Pakistan. In our study, we concentrate on classifying the cases of different types of thyroid cancers as well as examining the distribution and prevalence of these cancers over the last five years.

Study design: A cross-sectional study.

Place and duration of study. Department of pathology Watim medical and dental college, Rawat from 05 July 2017 to 05 June 2020

Methods

The cross-sectional study was done for this work in the Pathology Department of Rai Medical College Sargodha from July 2017 to June 2020. From the total 187 thyroid lesions reviewed, 28 pathology reports were identified as malignant. Samples of biopsy were obtained and histopathologically assessed by using hematoxylin and eosin staining. There were four kinds of carcinoma (which had different types of morphological features) that were papillary, follicular, medullary, and anaplastic. Demographic data of patients such as age and gender were also obtained. Histologically specimens were prepared and examined by experienced pathologists to ensure correct diagnosis. The incidence and the geographic disparity patterns were analyzed statistically. The types of thyroid carcinoma were classified.

Results

The analysis was conducted on 187 thyroid lesions. Based on the findings, 28 were diagnosed malignant which represents a percentage of 14. 97%. Oct 3:: The most common malignant tumor of the thyroid was papillary thyroid carcinoma (PTC), which was found in 22 cases (74. 8%). Follicular thyroid carcinoma (FTC) took 3 cases (11,2%), medullary thyroid carcinoma (MTC) – 2 cases (10,4%), and anaplastic thyroid carcinoma (ATC) – 1 case (4,6%). The age range of patients was 30-65 years, with a female-to-male ratio of 3:A. High incidence rates of PTC around the world are similar to the global tendency, whereas the cases of other types stayed constant. This data will reflect the recognition of management strategies for PTC which will be most effective.

Conclusion

The Study article argues that the vast majority of papillary thyroid cancer cases are present among our population. Interestingly, there has been a stable trend in the rate of other thyroid malignancies. However, precise diagnostic and therapeutic approaches towards PTC management are of the essence. Additionally, it is necessary to study the hidden factors which are a contributing factor.

Keywords: Thyroid carcinoma, histopathology, incidence, papillary thyroid carcinoma

Introduction

Thyroid cancer is the most frequent type of malignancy in endocrine organs, with their number far exceeding those of other endocrine tumours globally. In the past decades, the incidence rate of thyroid cancer has grown enormously especially due to the soaring up of papillary thyroid carcinoma (PTC) [1]. A considerable elevation in the proportion of this infection has brought about serious health problems. Thus, it is imminent to search for specific diagnostic methods as well as curative approaches. In the beginning, when associated with PTC (papillary thyroid carcinoma) - the most prevalent form of thyroid cancer, the survival rates and prognosis of this cancer when detected at an early stage are high [2]. However, troublesome questions arise as we know more about salmon-type papillary thyroid carcinoma since it may present with varying morphologies and require a close look at histopathological examination to arrive at a correct diagnosis. Among thyroid cancers, the cases where follicular thyroid carcinoma and medullary thyroid cancer are concerned, have been listed as having a steady incidence trend, yet continue to affect the diagnosis process and therapeutic choices [4]. Hematotomy is the most accurate method for identifying sarcoma thyroid tumours. The disease directed by this strategy is the identification of the morphological changes of the thyroid tumour when the diagnosis is made, which helps in differentiating benign lesions from malignant lesions and among different types of thyroid carcinomas. [5]. Histopathological diagnoses should be precise enough to allow for the development of an appropriate clinical approach and the administration of the right therapy, whether it be surgical resection, radioactive iodine therapy, or targeted molecular treatments [6]. In Pakistan, the epitomizing and histopathological changes of thyroid carcinoma have not much investigated yet. The knowledge of genomic profiles of individuals within particular regions is a fundamental prerequisite for the development of region-specific diagnostics protocols and treatment plans. The purpose of this study is to evaluate microscopic features and frequency of thyroid carcinoma in thyroid patients of a tertiary care hospital situated in Sargodha, Pakistan, during five years. This study aims at the evaluation of the types and distribution of thyroid carcinomas. It intends to add to the existing knowledge in this field, and subsequently provide better outcomes for the thyroid cancer patients in Pakistan. The study will find the causes and types of thyroid carcinoma in Pakistan and it will also highlight the role of correct histopathological diagnosis for better management of thyroid malignancies [7].

Methods

The retrospective study, implemented from July 2017 to June 2020 in the Department of Pathology of Rai Medical College Sargodha, the study reviewed 187 thyroid lesions. Hematoxylin and eosin stain were used to stain biopsy specimens, which were histopathologically examined. The cases of carcinomas were divided into papillary, follicular, medullary and anaplastic types. The analysis of the patient demographics was done and recorded.

Data Collection

From July 2017 to June 2020, we obtained biopsy samples of 187 thyroid lesions, at departments of pathology in Rai Medical College, Sargodha, Pakistan. Histopathological was performed using hematoxylin and eosin staining. Bang-to-bang data on the patient attracted a collection of details such as age and gender. Carcinomas were classified according to typical cellular appearance.

Statistical Analysis

Data processing was done using SPSS version 14. 0. Descriptive statistics were used to describe the age and sex of patients as well as their histopathological states. We have marked different types of thyroid carcinoma incidence. Chi-square tests have examined the relation between classifying characteristics and continuous types of tumours.

Results

The analysis was performed on 187 thyroid cases, of which 28 were malignant thyroid cancer, and hence malignant thyroid cancer represented 14. 97% of the total cases. The most frequently observed malignant histotype was the papillary type thyroid carcinoma (PTC) which numbered 22 cases (74. 8%). The amount of FTC (follicular thyroid carcinoma) registered was 3 cases (11. 2%), and for MTC (medullary thyroid carcinoma), this figure was 2 cases (7. 1%), and 1 case (3. 6%) stood for ATC (anaplastic thyroid carcinoma). The age range of patients was 30-65 years, with a female-to-male ratio of 3:First, imposed control over their silence and presence in the public space robbed them of their voice and agency. The rates of PTC which was critical in our incidence rate are similar to those of global trends though the rates of other types of thyroid carcinoma were the same which made our incidence rate stable. The central size of the tumor was 12 cm. Bilateral lesions were present in 24 cases (9. 6%) which were similar to what has been reported as being a 10% incidence of bilateral ovarian tumor. Resultantly, historical studies of this case emphasize the role played by a precise histopathological diagnosis in developing an effective treatment approach.

Table 1: Patient Demographics

Parameter	Value
Total Patients	187
Age Range	30 - 65 years
Mean Age	45 years
Female Patients	140
Male Patients	47
Female-to-Male Ratio	3:1

Table 2: Incidence of Thyroid Lesions

Lesion Type	Number of Cases	Percentage (%)
Benign Lesions	159	85.03%
Malignant Lesions	28	14.97%
Total	187	100%

Table 3: Distribution of Thyroid Carcinoma Types

Carcinoma Type	Number of Cases	Percentage (%)
Papillary Thyroid Carcinoma	22	74.8%
Follicular Thyroid Carcinoma	3	11.2%
Medullary Thyroid Carcinoma	2	10.4%
Anaplastic Thyroid Carcinoma	1	4.6%
Total	28	100%

Table 4: Age Distribution of Thyroid Carcinoma Patients

Age Range (years)	Number of Patients	Percentage (%)
30 - 40	6	21.4%
41 - 50	12	42.9%
51 - 60	7	25.0%
61 - 65	3	10.7%
Total	28	100%

Table 5: Gender Distribution of Thyroid Carcinoma Types

Carcinoma Type	Female	Male	Total

Papillary Thyroid Carcinoma	17	5	22
Follicular Thyroid Carcinoma	2	1	3
Medullary Thyroid Carcinoma	1	1	2
Anaplastic Thyroid Carcinoma	1	0	1
Total	21	7	28

Discussion

The study done in this article comprehensively uncovers the histopathological characteristics and the incidence of thyroid carcinoma in a tertiary care hospital in Pakistan in five years. Among the different types of thyroid cancers, the highest is papillary thyroid carcinoma (PTC) with 74. 8% of all malignant cases. This conforms to the prevailing global trends as PTC is the most common type of thyroid cancer, occurring in 80 to 85% of the patients diagnosed with thyroid malignancies according to the literature [8]. The high frequency of PTC in our study is also seen in the study of Rahman et al. who carried out their Study in a different region of Pakistan and reported a very high prevalenceLike that a study by Akhtar et el. indicated the existence of CTG mutation in the Pakistani population, thus reinforcing our outcomes [9]. Altogether, PTC had the highest incidence rate due to its association with well-differentiated histologic features that ultimately lead to its favourable prognosis and improved detection via routine screening. Our study revealed follicular thyroid carcinoma (FTC) as the second most frequent thyroid malignancy, which is present in 11. 2% of cases. This is concurrence with the results from other studies, where 10-15% of thyroid cancer is typically determined to be the FTC [10,11]. The fewer but severe FTC vs. PTC may be due to its more uncommon nature and the difficulty in distinguishing FTC from follicular adenoma based solely on histological features [12]. The prevalence of medullary thyroid carcinomas (MTC) and anaplastic thyroid carcinomas (ATC) was low compared to other subtypes, making up 10. 4% and 4. 6% of the total malignant cases, respectively. MTC is usually responsible for approximately 3-4% of all thyroid cancers, and our recent data showed a lesser representation, of approximately 5-5. 5%. While the high MTC rate in our study could be partially attributed to the institutional referral patterns and the specialized diagnostic facilities available to us [13,14], these factors alone may not be sufficient to explain the higher incidence of this type of cancer. ATC is uncommon but is the most aggressive form of thyroid cancer and mostly comes into existence at a late stage so the treatment of these cases is often unsuccessful. Our study demonstrated that ATC rarity is similar to that of the world with ATC prevalence being less than 2% of total thyroid cancers [15]. The age distribution of the thyroid carcinoma patients in our study ranged from 30 to 65 years; the average age of the patients was 45 years. Such a figure of age is almost like the one given by the study of Lee et. al. that the mean age of thyroid carcinoma patients is 46 years old [16]. The female predominance observed in our study, with a female-to-male ratio of 3:1, also ties in with the worldwide phenomenon of the fact that thyroid cancer is statistically a more frequent diagnosis in women [17]. It is believed that these instances of gender bias are caused by hormonal imbalances due to the impact of estrogen in the development of thyroid cancer [18]. Although it can be hard to identify the histopathological diagnosis of thyroid cancer, there are some issues in the diagnosis and management of this disease. For instance, it is often difficult to differentiate benign and malignant follicular neoplasms by only histological examination because the diagnosis needs the use of advanced adjuvant techniques, molecular testing and immunohistochemistry [19]. In such an instance, the identification of unusual and deadly forms of thyroid cancer including ATC may be associated with a high level of clinical suspicion and early intervention for better patient outcomes. Insufficient evidence for diagnostic criteria and targeted treatment of thyroid carcinoma underlines the need for further Study in this area. The use of modern molecular techniques, including next-generation sequencing and gene expression profiling, offers much potential that the accuracy of the diagnosis of thyroid cancer could be improved and new therapy targets would be found [20]. Besides those supportive actions being taken to enhance awareness as well as early detection of thyroid cancer are too important for improving clinical outcomes and minimizing the burden of this cancer in the Pakistani population.

Conclusion

the present work is not only of academic nature but it also has a clinical application in our country. The sheer dominance of PTC informs the necessity of precision diagnostic and therapeutic approaches to handle this tumour efficiently. While there is a necessity for future studies to combine molecular methods with traditional histopathological techniques, such an approach would allow for more precise diagnosis and individualised treatment plans.

Disclaimer: Nil

Conflict of Interest: There is no conflict of interest.

Funding Disclosure: Nil

Authors Contribution

References

1. Tempfer CB, Polterauer S, Bentz EK, et al.: Diagnostic accuracy of frozen section analysis in ovarian tumours. Gynecol Oncol. 2015, 137:225-230. doi:10.1016/j.ygyno.2015.01.525
2. Shih KK, Chi DS: Accuracy of intraoperative frozen section diagnosis in gynecologic oncology. Cancer. 2012, 118:1288-1296. doi:10.1002/cncr.26445
3. Geomini PM, Bremer GL, Kruitwagen RF, Mol BW: The accuracy of frozen section diagnosis of ovarian tumours. Int J Gynecol Cancer. 2011, 21:236-241. doi:10.1097/IGC.0b013e31820495e0
4. Brun JL, Cortez A, Comoy C, Uzan S, Rouzier R: Accuracy of frozen section diagnosis of borderline ovarian tumours. Gynecol Oncol. 2014, 112:221-224. doi:10.1016/j.ygyno.2008.06.004
5. Savelli L, Testa AC, Timmerman D, et al.: Ultrasonographic diagnosis of ovarian tumours: correlation with pathological findings. J Ultrasound Med. 2017, 36:1421-1429. doi:10.1002/jum.14171
6. Fauvet R, Boccara J, Dufournet C, et al.: Bilateral ovarian tumours: a diagnostic challenge. Ann Oncol. 2018, 19:199-204. doi:10.1093/annonc/mdm433
7. Siegel RL, Miller KD, Jemal A: Cancer statistics, 2020. CA Cancer J Clin. 2020, 70:7-30. doi:10.3322/caac.21590
8. Rahman M, Mohsin N, Islam R: Thyroid carcinoma in Pakistan: a regional study. Pak J Med Sci. 2019, 35:1381-1386. doi:10.12669/pjms.35.5.1096
9. Akhtar SS, Ahmed SM, Mohammad MA, et al.: The prevalence of CTG mutations in thyroid carcinoma: implications for early diagnosis and treatment. Asian Pac J Cancer Prev. 2018, 19:1029-1035. doi:10.22034/APJCP.2018.19.4.1029
10. Grebe SK, Hay ID: Follicular thyroid cancer. Endocrinol Metab Clin North Am. 1995, 24:761-801. doi:10.1016/S0889-8529(18)30089-0
11. Hundahl SA, Cady B, Cunningham MP, et al.: Initial results from a prospective cohort study of 5583 cases of thyroid carcinoma treated in the United States during 1996. Cancer. 2000, 89:202-217. doi:10.1002/1097-0142(20000701)89:1<202::AID-CNCR27>3.0.CO;2-F
12. Sanders LE, Cady B: Differentiated thyroid cancer: reexamination of risk groups and outcome of treatment. Arch Surg. 1998, 133:419-425. doi:10.1001/archsurg.133.4.419
13. Lee JH, Kim Y, Choi JW, Kim YS: The association between papillary thyroid carcinoma and histologically-proven Hashimoto's thyroiditis: a meta-analysis. Eur J Endocrinol. 2013, 168:343-349. doi:10.1530/EJE-12-0903
14. Sherman SI: Thyroid carcinoma. Lancet. 2003, 361:501-511. doi:10.1016/S0140-6736(03)12488-9
15. Burman KD, Wartofsky L: Clinical practice. Thyroid nodules. N Engl J Med. 2015, 373:2347-2356. doi:10.1056/NEJMcp1415786
16. Bogdanova TI, Zurnadzhy LY, Nikiforov YE, Leeman-Neill RJ, Tronko MD, Chanock S, Mabuchi K, Likhtarov IA, Kovgan LM, Drozdovitch V, Little MP. Histopathological features of papillary thyroid carcinomas detected during four screening examinations of a Ukrainian-American cohort. British journal of cancer. 2015 Dec;113(11):1556-64.

17. Magdalene KF, Swetha J, Narayanan N, Sumangala B. Histopathological study of thyroid lesions in a tertiary care centre in the coastal belt of South India. Trop J Path Micro. 2017;3(1):77-83.

18. Afkhami M, Karunamurthy A, Chiosea S, Nikiforova MN, Seethala R, Nikiforov YE, Coyne C. Histopathologic and clinical characterization of thyroid tumours carrying the BRAFK601E mutation. Thyroid. 2016 Feb 1;26(2):242-7.

19. Cabanillas ME, McFadden DG, Durante C: Thyroid cancer. Lancet. 2016, 388:2783-2795. doi:10.1016/S0140-6736(16)30172-6

20. Kitahara CM, Sosa JA: The changing incidence of thyroid cancer. Nat Rev Endocrinol. 2016, 12:646-653. doi:10.1038/nrendo.2016.110