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Clinicopathological features and surgical treatment of thyroid papillary carcinoma in Hashimoto thyroiditis

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Abstract---Background and Aim: Papillary thyroid carcinoma (PTC) is the most prevalent types of thyroid cancer. The present study aimed to investigate the clinicopathological features and surgical treatment of thyroid papillary carcinoma in Hashimoto thyroiditis. Patients and Methods: A cross-sectional study was carried out on 486 papillary thyroid carcinoma patients in the surgical department of Mardan Medical Complex, Mardan Pakistan from March 2020 to March 2023. All the patients were categorized into two groups: Group-I (papillary thyroid carcinoma with Hashimoto thyroiditis) and Group-II (papillary thyroid carcinoma without Hashimoto thyroiditis). Serum thyroid-stimulating hormone (TSH), age, central compartment lymph node metastasis (CLNM), gender, nodular size, and invasive status were different clinicopathological factors recorded. SPSS version 27 was used for data analysis. Results: The overall mean age was 42.84±10.8

years. Out of 486 patients, Group-I had 76 (15.6%) patients whereas Group-II had 410 (84.4%) patients. There were 52 (10.7%) male and 434 (89.3%) females. The incidence of final diagnosis of benign thyroid nodule and PTC was 53.9% (n=262) and 46.1% (n=224) respectively. The prevalence of PT in Group-I was significantly higher 56.8% 57.9% (n=44) than in Group-II 43.4% (n=178). HT patients with PTC were more likely to be younger, had higher TSH levels, female, and had smaller nodules. PTC were diagnosed based on the various risk factors such as HT presence and elevated TSH levels. Conclusion: Thyroid cancer could be developed by elevated TSH levels caused by long-term HT. The cancer progression could be investigated based on HT and PTC among patients suffering from the invasive diseases.

Keywords---thyroid papillary carcinoma, clinicopathological features, Hashimoto thyroiditis.

Introduction

Thyroid cancer is the most frequent type of endocrine tumor with incidence rate growing at a rate of 4.5% each year. The most frequent malignant tumor of the thyroid is papillary carcinoma. HT is the most common autoimmune illness as well as an endocrine condition [1]. Hypothyroidism is caused by HT excluding the thyroidectomy associated instance causes which are more common in women [2]. Papillary thyroid carcinoma (PTC) contributes to the majority of thyroid malignancies (80%) cases caused by thyroid follicular cells, with survival rate >90% [3]. Despite relatively modest biological behavior and a favourable prognosis, various clinicopathological criteria, such as lateral lymph node metastasis, extensive extra thyroid extension, and distant metastases upon diagnosis, are associated with a poorer clinical result [4]. The non-medullary thyroid carcinoma (NMTC) family history is considered to be a separate risk factor for recurrence, particularly in younger individuals [5].

Chronic lymphocytic thyroiditis or Hashimoto's thyroiditis (HT) is the most common thyroid disease. The global incidence is predicted to be 0.3-1.5 cases per 1000 people [6]. This autoimmune illness is the most prevalent cause of primary hypothyroidism and non-endemic goiter, with women having a 10-15 times greater prevalence. In China, the incidence of HT varies from 0.4% to 1.5% of the population afflicted, accounting for 25% cases of all thyroid disease [7-9]. According to certain publications, the existence of HT in individuals with PTC is associated with a less aggressive clinical presentation and course [10]. Other research, however, have not found similar results [11]. It has also been linked to decreased recurrence rates, better locoregional control, and longer overall survival [12]. Other researchers have shown no link between the presence of HT and tumor aggressiveness [13, 14]. Therefore, the purpose of the present study was to investigate the clinicopathological features and surgical treatment of thyroid papillary carcinoma in Hashimoto thyroiditis.

Methodology

A cross-sectional study was carried out on 486 papillary thyroid carcinoma patients in the surgical department of Mardan Medical Complex, Mardan Pakistan from March 2020 to March 2023. All the patients were categorized into two groups: Group-I (papillary thyroid carcinoma with Hashimoto thyroiditis) and Group-II (papillary thyroid carcinoma without Hashimoto thyroiditis). Serum thyroid-stimulating hormone (TSH), age, central compartment lymph node metastasis (CLNM), gender, nodular size, and invasive status were different clinicopathological factors recorded. Patients with no prior history of PTC, thyroid surgery, and histologically verified benign thyroid nodules were included. All the patients underwent a US examination of thyroid. Ultrasound findings such as infiltrative margin, hypoechoic, and transverse view showing taller than broad, micro-calcification, and enhanced nodular vascularity were the main criteria for thyroid nodules patients to undergo surgery. A suspected malignant nodule was detected based on the presence of any US findings and was selected for surgery.

All patients who did not have surgery were followed up with US exams every 3-6 months, specifically suspected malignant nodules who declined surgery due to the relatively favourable prognosis of PTC and the possible danger of the procedure. Various factors such as age, tumor size, central lymph node, gender, and primary tumor invasion were considered. After the malignant nodule detection, prophylactic CLND was regularly done. The original tumor invasion consisted of gross extra thyroidal extension and microscopic extra thyroidal extension, as determined by pathology.

SPSS version 27 was used for data analysis. The central lymph node and lateral neck lymph nodes were detected based on the final pathological report. All these findings were expressed as mean and standard deviation. Chi-square test was used for statistical analysis when applicable. All the descriptive statistics were done using 95% confidence interval and 5% level of significance.

Results

The overall mean age was 42.84 ± 10.8 years. Out of 486 patients, Group-I had 76 (15.6%) patients whereas Group-II had 410 (84.4%) patients. There were 52 (10.7%) male and 434 (89.3%) females. The incidence of final diagnosis of benign thyroid nodule and PTC was 53.9% (n=262) and 46.1% (n=224) respectively. The prevalence of PT in Group-I was significantly higher 57.8% (n=44) than in Group-II 43.4% (n=178). HT patients with PTC were more likely to be younger, had higher TSH levels, female, and had smaller nodules. PTC were diagnosed based on the various risk factors such as HT presence and elevated TSH levels. The baseline characteristic ticks of patients are shown in Table-I. Table-II represents the clinicopathological features in patients with and without HT. Multivariate analysis stratifying the various risk factors for thyroid carcinoma are shown in Table-III.

Table-I Baseline characteristics

Parameters	Group-I (N=76)	Group-II (N=410)	P-value
Age (years)	44.6±10.8	41.08±10.8	0.086
Gender N (%)			0.001
Male	9 (11.8)	112 (27.3)	
Female	67 (88.2)	298 (72.7)	
Nodule size (cm)	1.82±1.26	2.31±1.52	0.001
PTC N (%)	44 (57.8)	178 (43.4)	0.001
PTC cancer with serum TSH N (%)	42 (55.3)	166 (40.5)	0.001

Table-II clinicopathological features in patients with and without HT

Parameters	HT with PTC	HT without PTC	Benign with HT	Benign without HT
Age (years)	44.4±11.82	45.32±11.32	46.58±11.62	46.42±12.42
Female	118 (52.7)	106 (47.3)	26 (9.9)	236 (90.1)
Nodule size (cm)	1.19±0.89	2.39±1.29	2.59±1.29	3.28±1.32
TSH	3.32±2.48	2.19±2.01	2.21±2.01	1.89±2.02

Table-III Multivariate analysis stratifying the various risk factors for thyroid carcinoma

Parameters	Unadjusted OR (95% CI)	P-value	Adjusted OR (95% CI)	P-value
Gender (M vs. F)	1.049 (0.91-1.28)	0.409	0.932 (0.896-1.081)	0.327
Age	0.519 (0.556-0.579)	0.001	0.503 (0.439-0.583)	0.001
HT	1.229 (1.101-1.439)	0.002	0.862 (0.722-0.989)	0.001
Nodular size	0.010 (0.005-0.015)	0.001	0.008 (0.004-0.015)	0.001
TSH	1.209 (1.346-1.356)	0.001	1.359 (1.312-1.419)	0.001

Discussion

The present study mainly focused on the clinicopathological features and surgical treatment of thyroid papillary carcinoma in Hashimoto thyroiditis and Long-term exposure raised serum TSH levels. In consequence, HT is a primary risk factor for thyroid cancer development. Cancer progression might be studied using HT and PTC in individuals suffering from disease invasiveness and metastasis. Globally, PTC and HT have a significant incidence, and the two disorders may be related. As a result, many people may have both disorders at the same time. The incidence of patients mostly women with HT account for 30% with co-occurring PTC than without HT. Our findings in this patient cohort back up earlier research associating HT to PTC [15-17].

The overall incidence of papillary carcinomas associated with PTC has been reported to range from 3% to 85% [18-19]. Furthermore, Thyroid patients with PTC rearrangement and Hashimoto's thyroiditis, an autoimmune inflammatory illness [20-23]. These findings, however, are debatable and might be due to

contaminated PCR or papillary cancer tiny nodules existence. Pilli et al [24] found that PTC could be caused by elevated serum TSH levels as a major risk factor and numerous research verified these findings [25, 26]. TSH levels must be assessed in cases where PTC is caused by HT as a risk factor. Most of the participants in our research had their serum TSH levels checked before surgery. Furthermore, individuals with coexisting PTC and HT had higher serum TSH levels.

The iodine consumption in China is growing causing the significant increase in hypothyroidism and HT incidence among euthyroid patients [27]. The higher TSH level is a major risk factor for thyroid cancer induced by long-term HT. These findings were comparable to previous studies [28]. HT associated thyroid cancer is less aggressive than without HT [29]. Lee's research had 554 participants, which was approximately similar to our patients. Furthermore, we consider TSH to be a continuous variable, whereas Kim's study regarded TSH to be a dichotomous factor [30].

Patients with tiny benign nodules are often not surgical candidates, but patients with bigger benign nodules, particularly those > 4 cm, are often advised for surgery. A primary tumor larger than 1 cm in PTC patients, on the other hand, is a neck metastasis risk factor. There was an unusual phenomena in which the "PTC with benign disease" cancer size was greater than "PTC only" or "PTC with HT", although "PTC with benign disease" showed less or equivalent invasion. This might be because various forms of PTC have distinct genetic origins. The benign nodule, which is less invasive, might be the source of "PTC with benign nodule" [31].

Conclusion

Thyroid cancer could be developed by elevated TSH levels caused by long-term HT. The cancer progression could be investigated based on HT and PTC among patients suffering from the invasive diseases.

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