

Clinicopathological features of papillary thyroid carcinoma: A single-centre experience in Turkey

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Abstract

Aim: The goal of this study was to determine the incidence of papillary thyroid carcinoma (PTC) at our centre and examine the clinicopathological features of the tumours.

Material and Methods: The study included 823 patients who underwent thyroidectomies in our centre between January 2013 and June 2017 and were examined histopathologically at the Pathology Clinic. We examined their demographic characteristics, preoperative diagnoses, operative procedures, FNAC diagnoses, histopathological characteristics, and postoperative prognoses.

Results: Out of the 823 patients, 16.3% were diagnosed with malignancy. Of these diagnoses, 89.6% were papillary carcinomas, 3.7% were follicular carcinomas, 3% were lymphomas, 1.5% was medullary carcinomas, 1.5% were anaplastic carcinomas, and 0.7% were poorly differentiated carcinomas. The rate of PTC incidence in thyroidectomy specimens was 14.6%. In our cases, the multifocality rate of tumours was 31.7%, and the rate of bilateral disease was 24.2%. Neck dissection was performed in 11 PTC patients. Seven of these patients (5.8%) had lymph node metastasis. Of all patients, 46.7% received postoperative radioactive iodine (RAI) therapy. No recurrence or distant metastasis was detected in any of the cases.

Conclusion: PTC is the most common type of thyroid carcinoma at our centre. Fine-needle aspiration cytology (FNAC) is valuable for diagnosing classical PTC. Because of the high occurrence of bilateral and multifocal disease in PTC, performing total thyroidectomy is appropriate. Long-term life expectancy is good for these patients.

Keywords: Fine-needle aspiration cytology; papillary thyroid carcinoma; total thyroidectomy

INTRODUCTION

Thyroid carcinomas are the most common endocrine carcinomas and account for 90% of all endocrine malignancies (1,2). The incidence of thyroid carcinomas has increased over the last few decades(3,4). Potential causes include hormonal effects, increased iodine intake, chronic lymphocytic thyroiditis, radiation exposure, nitrates, and environmental pollutants such as heavy metals (4,5).

There are several types of thyroid cancers. Differentiated thyroid cancers include papillary carcinoma and follicular carcinoma and originate from thyroid follicle cells. Medullary thyroid carcinoma develops from parafollicular cells. Anaplastic thyroid carcinoma is the most aggressive thyroid carcinoma (6).

Fine-needle aspiration cytology (FNAC) is the gold standard for differential diagnosis of thyroid nodules(7). Due to the greater number of nodules in multi-nodular goiter (MNG) cases, the diagnostic value of FNAC decreases in the diagnosis of malignancy. Incidental thyroid carcinoma

is a frequent finding in MNG (8,9). For this reason, many authors recommend total thyroidectomy for nonmalignant thyroid diseases such as MNG, chronic thyroiditis, and Graves' disease (10).

MATERIAL and METHODS

This retrospective study is based on 823 patients who underwent thyroidectomy surgery at our centre between January 2013 and June 2017 and were examined histopathologically in the Pathology Clinic. Classical papillary thyroid carcinoma (PTC) cases (tumors larger than 1 cm) and papillary microcarcinoma (PMC) cases (tumors 1 cm or smaller) were included in the study. Patient information was obtained from computer records and phone calls. This information included age, sex, FNAC diagnoses, operative procedure, and histopathological findings.

The histopathological findings of PTC cases were evaluated based on tumor type, tumor size, bilaterality, multifocality status, non-tumor findings, and lymph node metastasis.

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Postoperative prognosis indices were investigated such as postoperative treatments, recurrence, metastasis, and survival. The follow-up period was calculated as the period starting from the date of diagnosis to either the date of relapse or the date of the last follow-up. The patients were followed-up for a mean period of 34 (9-59) months. Cervical lymph nodes were evaluated by ultrasonography (USG). Cervical USG was performed annually and serum levels were measured for TSH, FT4, TG, and Tg Ab.

Ethical approval was obtained for the current study from the ethics committee at the Kayseri City Hospital. The study was conducted according to the principles of Helsinki Declaration.

RESULTS

The 823 thyroidectomies took place over a period of 4.5 years. Of these, 134 (16.3%) were diagnosed with malignancy. Of these, 5 (3.6%) were diagnosed with follicular carcinoma, 4 (2.9%) with lymphoma, 2 (1.5%) with anaplastic carcinoma, 2 (1.5%) with medullary carcinoma, 1 (0.7%) with poorly differentiated carcinoma, and 120 (89.6%) with papillary carcinoma. The rate of PTC was 14.6% (120 cases). Of the PTC cases, 51 (42.5 %) were diagnosed with classical PTC and 69 (57.5%) were diagnosed with PMC (Table 1).

Table 1. Malign tumors detected in thyroidectomy specimens	
Malignancy	Total (n=134) (%)
Follicular carcinoma	5 (3.6 %)
Lymphoma	4 (2.9 %)
Anaplastic carcinoma	2 (1.5 %)
Medullary carcinoma	2 (1.5 %)
Poorly differentiated carcinoma	1 (0.7 %)
Papillary carcinoma	120 (89.6 %)
Classical PTC	51 (42.5 %)
PMC	69 (57.5 %)

PTC: Papillary thyroid carcinoma; PMC: Papillary microcarcinoma

FNAC was performed in 100 of all PTC cases. Seven patients were diagnosed with atypia of undetermined significance (AUS), 3 with suspected follicular neoplasia, 22 with suspected papillary carcinoma, 14 with malignant/papillary carcinoma, 51 with benign follicular nodules, and 3 with nondiagnostic cytology. FNAC was performed in 45 of 51 classical PTC cases and FNAC positivity rate was 91%. In 69 PMC cases, FNAC positivity rate 20 %.

The average age in papillary thyroid carcinoma cases was 56 (range: 25–88). Most patients (102) were female and 18 were male. Total thyroidectomy surgery was performed in 96.7% of PTC cases and in the other 3.3% of cases, subtotal thyroidectomy followed by complementary thyroidectomy. Papillary microcarcinoma foci were found in two of these cases.

In PTC cases, the tumor size range was 11–45 mm and the average size was 23 mm. Of the PTC cases, 40 (33.3 %) were in the right lobe, and 51 (42.5%) were in the left lobe. The multifocality rate of tumors was 31.7 % and the bilaterality rate was 24.2% (Table 2).

Table 2. Clinicopathologic characteristics of papillary thyroid carcinoma cases	
	Total (n=120) (%)
Age, median (range) 56 (25-88)	
Sex	
Female	102(85 %)
Male	18(15 %)
Other histopathological findings	
Colloidal goiter	92(76.7 %)
Lymphocytic thyroiditis	28(23.3 %)
Tumor localization	
Right lobe	40(33.3 %)
Left lobe	51(42.5 %)
Bilateral (right + left)	29(24.2 %)
Multifocal	38(31.7 %)
Surgical treatment	
Total thyroidectomy	116(96.7 %)
Subtotal thyroidectomy	4(3.3 %)
Lymph node dissection	11(9.2 %)
Lymph node metastases	7(5.8 %)
RAI treatment	56(46.7 %)

RAI: Radioactive iodine

Of the 120 PTC cases, 63 were classical variants, 52 were follicular, 2 were trabecular, 1 was oncocytic, 1 was tall cell, and 1 was cystic papillary. Cells that usually form papillary structures by lining up around the fibrovascular core and show nuclear clarity were observed in the histopathological examination (Figure 1). In some of them, the tumor comprised cells that did not form a papillary structure, consisted of follicular structures, and showed nuclear clarity (Figure 2). Tumor cells were positively stained with immunohistochemical markers such as Cytokeratin 19 (Figure 3) and HBME (Figure 4). Thyrocytes with nuclear pseudoinclusion and grove structures in FNAC examination (Giemsa, x400)(Figure 5). Other histopathological findings from the PTC cases were colloidal goiter in 92 cases (76.7%) and lymphocytic thyroiditis in 28 cases (23.3%).

Neck dissection was performed in 11 PTC cases. Seven (5.8 %) had lymph node metastasis. FNAC was performed on the lymph node of 3 of these cases, 1 case was diagnosed as malignant and 2 cases suspected of malignancy. Fifty-six PTC cases (46.7%) received postoperative radioactive iodine (RAI) therapy. Five were PMC cases with capsule invasion and the others were classical PTC cases.

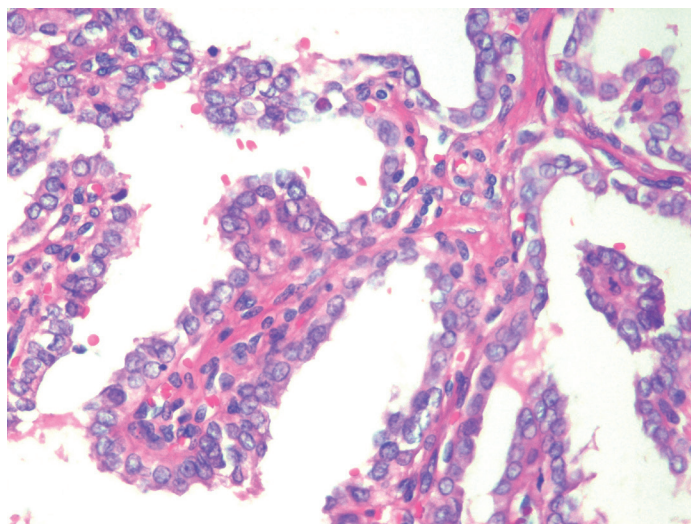


Figure 1. Classic variant papillary thyroid carcinoma with papillary structures and nuclear clarity (H&E, 200×)

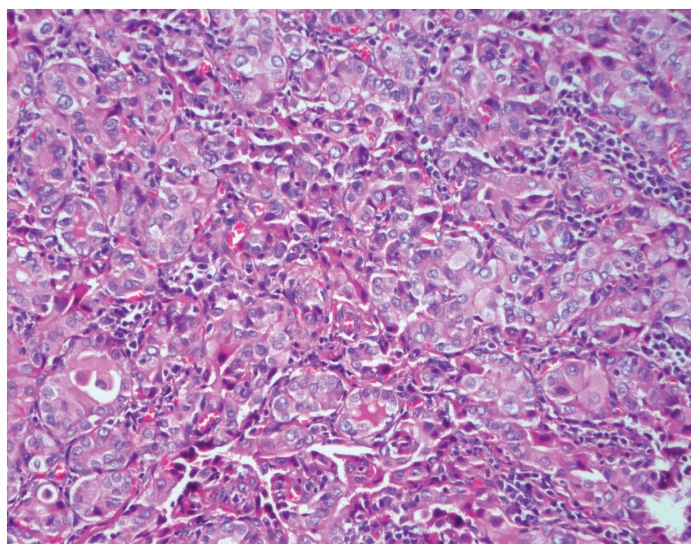


Figure 2. Follicular variant papillary thyroid carcinoma with follicular structures and nuclear clarity (H&E, 200×)

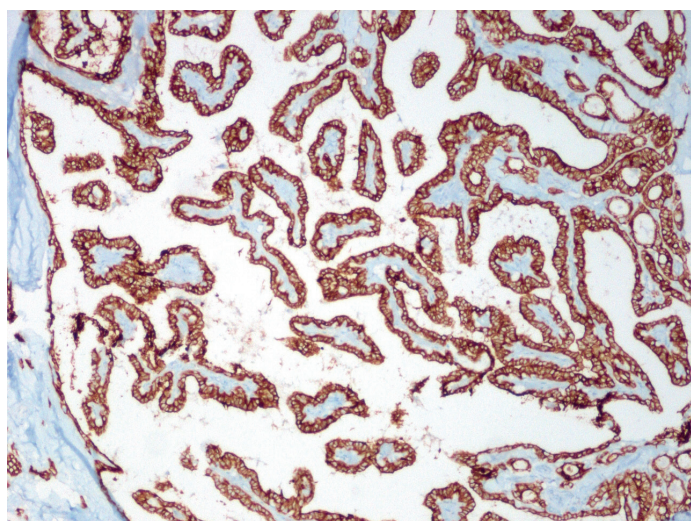


Figure 3. Positive staining with Cytokeratin immunohistochemical markers in tumor cells (IHC,200X)

Patients underwent cervical USG every six months for the first two years after surgery and then annually. Serum levels of TSH, FT4, TG, and Tg Ab were measured. None of the patients had recurrence or distant metastasis. All patients are alive today.

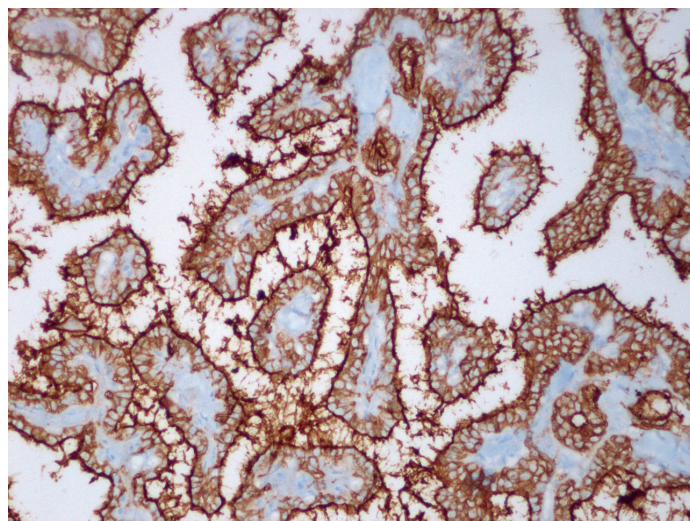


Figure 4. Positive staining with HBME immunohistochemical markers in tumor cells (IHC,200X)

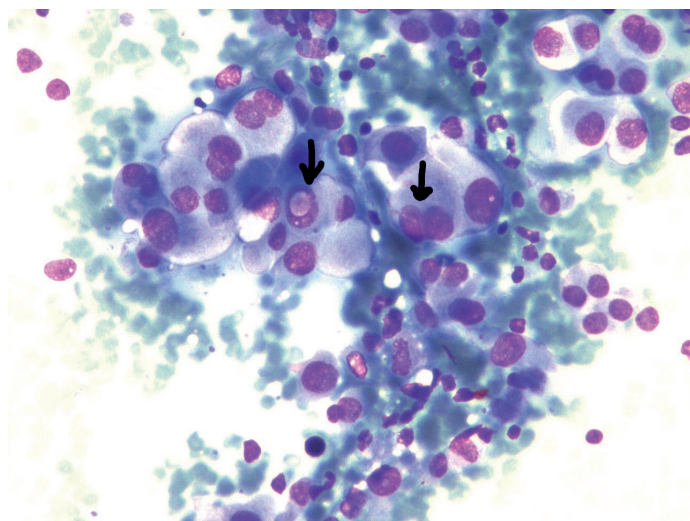


Figure 5. Thyrocytes with nuclear pseudoinclusion and grove structures in FNAC examination (Giemsa, x400)

DISCUSSION

Papillary thyroid carcinoma is the most common histopathological type of thyroid carcinoma (11,12). PTC is reported to account for 80% of all thyroid malignancies (13). In our study, PTC incidence was 89.6%. Some studies (14,15) have reported a 0.5ratio of PMC: PTC; in our study, it is higher as1.4.

In our study, females are 6 times more affected than males. It has been reported in the literature that thyroid carcinoma affects females 3 times more than males (16,17). The most common histopathological variants of PTC are classical and follicular variant (18). Consistent with the literature, 52.5 % of our cases were classical and 43.3% were follicular variant. ClassicalPTC has been

reported to form more lymph node metastases than the follicular variant (18). In our study, six of the seven patients with lymph node metastasis had the classical variant and one had the oncocytic variant, which is also consistent with the literature.

The important properties of papillary thyroid carcinomas are multifocality and bilaterality. Multifocality is the presence of tumor in more than one focus in the same thyroid lobe or the presence of tumor in both lobes. The presence of tumors in both lobes is called bilaterality. In published studies, the rate of multifocal thyroid cancer is 23–40% and it is often associated with aggressive tumor behavior (19, 20). In our study, the multifocality rate was 31.7%, and the bilaterality rate was 24.2%. In our study, tumor cases with bilaterality or multifocality were not more aggressive than the others.

Fine-needle aspiration cytology is valuable in diagnosis. FNAC is the primary diagnostic tool for evaluating and diagnosing thyroid lesions regardless of patient age. It is used worldwide because of its simplicity, safety, and cost-effectiveness (21). In our study, FNAC was performed in 45 of 51 classical PTC cases and FNAC positivity rate was 91%. In PMC cases (69 cases), FNAC positivity rate was 20%. FNAC positivity rate is lower in PMC cases because of small tumor size.

Adjuvant radioiodine therapy is indicated in the presence of tumor multifocality, lymph node metastasis, and vascular invasion (22). In our study, 46% of cases received adjuvant radioiodine therapy. Five were PMC cases with capsular invasion and the others were classic PTC cases.

In the treatment of patients with differentiated thyroid carcinoma, in cases with hemithyroidectomy, the suppression of TSH with complementary thyroidectomy, RAI therapy, and LT4 therapy. Total thyroidectomies are preferred in our center because of high bilaterality and multifocality rates in PTC. Total thyroidectomies were performed in 96.7% of our cases, and subtotal thyroidectomy surgery was performed in 3.3% of our cases. Afterward, complementary thyroidectomy was performed in three cases and papillary microcarcinoma foci were detected in two patients.

Lymph node involvement is common in papillary carcinoma cases. The regional lymph node metastasis was observed in 29%–40.9% of cases (23,24). In the presence of cervical lymphadenopathy, identified clinically or with USG, central neck dissection or modified neck dissection is recommended (25,26). Neck dissection was performed in 11 of our cases in whom cervical lymphadenopathy was detected and there was lymph node metastasis in 7 of them.

The five-year survival rate in thyroid cancers has been reported as 98–100% (27,28). In our study, all of the patients are alive today.

CONCLUSION

IPTC is the most common type of thyroid carcinoma at our center. At our center, the PMC rate was higher than

the rate of classical PTC. FNAC is valuable for diagnosing classical PTC. Because the bilaterality and multifocality rates are high in PTC, total thyroidectomy surgery is appropriate. Long-term life expectancy is good.

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