

The role of fine-needle aspiration cytology in papillary thyroid carcinoma cases

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Abstract

Aim: Thyroid diseases are among the most common diseases in our country and all over the world. Fine-needle aspiration cytology (FNAC) is a useful and simple method for diagnosing papillary thyroid carcinoma (PTC) and can be used as a first step. The aim of this study was to determine the diagnostic value of FNAC in PTC cases by comparing FNAC and histopathological findings and to present our experiences.

Material and Methods: This retrospective study evaluates 800 cases who underwent thyroidectomies in our center and had a histopathological examination in the pathology clinic. The age, gender, operation procedure, FNAC findings, and histopathological results of PTC cases were recorded.

Results: Of 800 thyroidectomy cases, 119 (14.9%) were diagnosed with PTC; 50 (42%) were classic PTC cases and 69 (58%) were papillary microcarcinoma (PMC) cases. Of the 50 classic PTC cases, 45 had FNAC, which were included in the study. Of these, the positivity rate was 84.5% when atypia of undetermined significance (AUS) cases and suspected malignancies were included with those diagnosed with malignancy. Of 45 PTC cases, 3(6.6 %) were inadequate, 4 (8.9 %) were benign, 7 (15.5 %) were AUS, 4 (8.9 %) were suspected of follicular neoplasm, 18 (40 %) were suspected of malignancy, and 9 (20 %) were diagnosed as malignant.

Conclusion: In our study, the false positivity rate was 0.5% and the false negative rate was 8.9%. Carcinomas in the follicular pattern can only be diagnosed by histopathological approach. FNAC is currently the gold standard for diagnosing PTC. However, a benign FNAC diagnosis should be viewed with caution as false-negative results do occur. When a benign FNAC diagnosis is given, surgery is necessary if there is any clinical suspicion of malignancy.

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

INTRODUCTION

Thyroid cancer constitutes approximately 1% of newly diagnosed cancer cases in the United States every year (1). Papillary thyroid carcinoma (PTC) constitutes 80% of all thyroid malignancies (2).

Radiological imaging of patients with thyroid nodules is very important for early diagnosis and proper follow-up and treatment. The aim of the diagnosis is to evaluate possible surgical removal of rare malignant nodules and to protect patients with benign nodules from unnecessary surgery (3). Fine-needle aspiration cytology (FNAC) is the first choice for diagnosis. FNAC distinguishes well between benign nodules and malignancies. The rate of diagnosis is especially good in deep and small nodules when FNAC is performed with ultrasonography (US) (4). FNAC is the gold standard for evaluating thyroid nodules because it is simple, inexpensive, and reliable, which is why it is recommended by the American Thyroid Association (5, 6, 7). This study evaluates the diagnostic value of FNAC by

comparing its results to histopathological results in PTC cases.

MATERIAL and METHODS

This retrospective study examines 800 cases who underwent thyroidectomies in our center between 2013 and 2017 and who were histopathologically examined in the pathology clinic. Forty-five classic PTC cases (a tumor larger than 1 cm) with FNAC were included in the study. Five classic PTC cases without FNAC were not included in the study. Papillary microcarcinoma (PMC) cases (a tumor of 1 cm or smaller) were also excluded. The age, gender, operation procedure, FNAC findings, and histopathological results of the patients were recorded.

The preparations of the cases with ultrasound-guided FNAC were stained with Papanicolaou and Giemsa stains and evaluated by the pathologist. The cytologic findings included cellularity, background (colloid, cyst contents, blood), architectural features (single cells, microfollicles, cohesive tissue fragments), and nuclear features (the

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presence or absence of nuclear features of PTC). FNAC findings were categorized according to the 2017 Bethesda classification system (8).

RESULTS

Of the 800 total cases, 119 (14.9%) were diagnosed with PTC. Of the PTC cases, 50 (42%) were classic and 69 (58%) were PMC. Of the 50 PTC cases, 45 had FNAC. Total thyroidectomies were performed in 44 of these 45 cases; 1 case underwent a subtotal thyroidectomy and then a completion thyroidectomy operation. In this case, a papillary microcarcinoma focus was detected in the opposite lobe. All of the cases were diagnosed with PTC by the histopathological examination.

The FNAC results for 45 PTC cases show that 3 were inadequate, 4 were benign, 7 were AUS, 4 were suspected of follicular neoplasm, 18 were suspected of malignancy, and 9 were diagnosed as malignant. The positivity rate of FNAC was 84.5% when malignant, suspected malignancy/follicular neoplasm, AUS cases, and suspected malignancies were included with our PTC cases.

After histopathological examination of our PTC cases (45 cases), 21 (46.7%) were diagnosed as classical variant, 19 (42.2%) as follicular variant, and 2 (4.4%) as solid-trabecular variant.

After histopathological examination of our cases (4 cases) diagnosed with suspected follicular neoplasm, 3 were diagnosed as follicular variant and 1 as solid variant. After histopathological examination of our AUS cases (7 cases), 4 were diagnosed as classical variant, 2 as follicular variant, and 1 as solid-trabecular variant.

The mean age of PTC cases was 50 years (range: 25–76). The female to male ratio was 5 to 1 (Table 1).

Table 1. Clinicopathologic characteristics of papillary thyroid carcinoma cases	
Age, median (range)	Total (n=45) (%)
Sex	50 (25-76)
*Female	37 (82%)
*Male	8 (18%)
Other histopathological findings	
* Colloidal goiter	35 (78%)
* Lymphocytic thyroiditis	10 (22%)
FNAC diagnosis	
*Nondiagnostic	3 (6.6%)
*Benign	4 (8.9%)
*AUS	7 (15.5%)
*Follicular neoplasm suspicious	4 (8.9%)
*Malignancy suspicious	18 (40%)
*Malign	9 (20%)
Surgical treatment	
*Total thyroidectomy	44 (97.85)
*Subtotal thyroidectomy	1 (2.2%)
ASA FNAC: Fine needle aspiration cytology	
AUS: Atypia of undetermined significance	

According to the histopathological examinations of PTC cases, tumor size was 11–45 mm with a mean of 23 mm. Thyrocytes with a papillary image or forming microfollicular structures with nuclear pseudoinclusion, overlaps and nuclear enlargements, and groove structures were also observed (Figures 1, 2). Tumors were accompanied by lymphocytic thyroiditis in 10 cases, nodular colloid goiter in 22 cases, and diffuse colloid goiter in 13 cases.

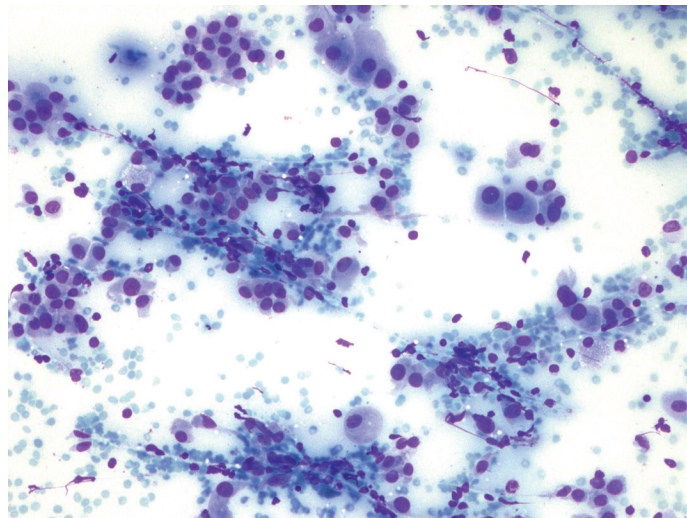


Figure 1. Thyrocytes with a papillary image or forming microfollicular structures in FNAC examination (Giemsa, x400)

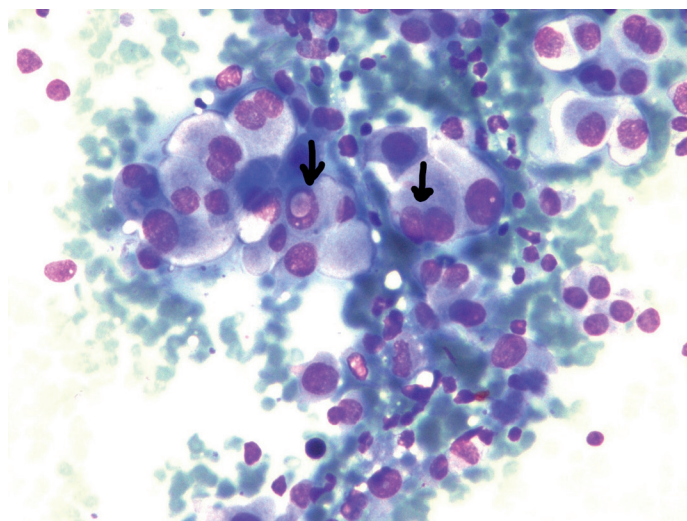


Figure 2. Thyrocytes with nuclear pseudoinclusion and groove structures in FNAC examination (Giemsa, x400)

DISCUSSION

Thyroid diseases are among the most common diseases in our country and all over the world. Nodules were detected in the US in 10–67% of the adult population and in more than 50% of the autopsy series. The detection of malignancy in 9.2–14.8% of these nodules in cytological diagnosis makes the malignant–benign distinction important (9). FNAC is a fast, minimally invasive, easily repeatable, and cost-effective method for diagnosing thyroid nodules (10). It has been demonstrated that US-guided FNACs decreased the rate of insufficient material and increased

the accuracy of diagnosis (11). The factors that decrease efficiency in FNAC are inadequate sampling, inexperience of the cytopathologist, and difficulty in distinguishing malignant and benign follicular lesions (12). The rate of inadequacy reported in the literature is 10–28.2% (13, 14). The rate of inadequacy in our study was 6.7%. Different calculations were used in different studies on the accuracy rate of FNAC. Öner et al. reported an accuracy rate of 90.7% and 76.5% when cases diagnosed with a suspicion of malignancy were included (15). In the literature, FNAC accuracy rate varies between 80% and 99% (16, 6). In our study, the positivity rate was 84.5% when we included malignant, suspected malignancy/follicular neoplasm, and AUS cases. It was 68.9% when we took into account cases diagnosed with suspected malignancy/follicular neoplasm.

In the literature, rates of AUS, suspected follicular neoplasm, and malignant aspirates were reported to be 3–18%, 0.7%, and 5–23%, respectively (4,16). In our study, these rates were 15.6%, 8.9%, and 20%. While two of these rates are consistent with the literature, the suspicion of follicular neoplasm in our study was much higher than reported in the literature.

We found that most of the cases (75%) diagnosed with suspected follicular neoplasia were PTC follicular variant. In our study, the rate of follicular variant was found to be higher than in the study of Udul et al. (17). Lesions showing a follicular pattern have cytomorphological features that cannot be clearly distinguished by FNAC alone (18).

Erdem et al. examined 52 thyroidectomy cases and 7 were diagnosed with PTC based on the histopathological examination of the resection material (19). Only 1 of these 7 cases was diagnosed with malignancy by FNAC, resulting in a FNAC success rate of 14.3%. In our study, 9 of 45 PTC cases were diagnosed with malignancy by FNAC, for a success rate of 20%. This rate increased markedly to 60% when we included patients diagnosed with a suspected malignancy. It has been argued that false-positive and false-negative rates should be used to evaluate FNAC success (20). Some researchers found that the false-positive rate of FNAC (cytologically malignant but histologically benign FNACs) was less than 5% (21, 22). The false-negative rate (cytologically benign but histologically malignant FNACs) was 1–16% (6, 23). In our study, the false-positivity rate was 0.5% and the false-negative rate was 8.9%, which is consistent with the literature.

Although all of the cases in our study were histopathologically diagnosed with PTC, not all of them could be categorized as malignant by FNAC. False-negative diagnoses may have been caused by the aspiration of lesions from the surrounding thyroid tissue or from different nodular areas or the large and heterogeneous nodule size.

Thyroid cancers are more common in females compared to males (24). In our study, the female to male ratio was 5 to 1.

CONCLUSION

In our study, the false positivity rate was 0.5% and the false negative rate was 8.9%. Carcinomas in the follicular pattern can only be diagnosed by histopathological approach.

FNAC is a useful and simple method for diagnosing PTC and can be used as a first step. A benign FNAC diagnosis should be viewed with caution as false negative results do occur and these patients should receive follow-up. When a benign FNAC diagnosis is given, surgery is necessary if there is any clinical suspicion of malignancy.

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Informed consent: Informed consent was not obtained.

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