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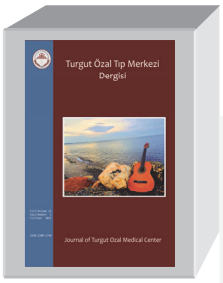

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A Thyroid Cytology Experience: The Comparision of Cytological and Histopathological Findings

Mihriban Gürbüzel[1], Ayşe Nur Akatlı[2], Songül Peltek Özer[1], Şerife Başaran[1], Kamile Altundal[1], Saime Gül Barut[1]

[1]Haseki Training and Research Hospital, Department of Pathology, İstanbul, Turkey
[2]İnönü University, Faculty of Medicine, Department of Pathology, Malatya, Turkey

Abstract

Aim: Thyroid fine needle aspiration cytology (FNAC) is a common technique used for the follow-up and diagnosis of nodules. FNAC is used for differentiating between benign and malignant lesions preoperatively, and therefore, is helpful to determine the type of surgery. The aim of this study is to screen cases that have been evaluated for thyroid cytology and thyroid surgery specimens in our department, and to investigate the experience of the diagnosis using thyroid fine needle aspiration cytology.

Materials and Methods: In the present study, thyroid fine needle aspiration cytology and surgery specimens obtained from 213 cases that were diagnosed in our pathology department in 2012 were screened retrospectively.

Results: One hundred seventy-seven patients out of 213 were female. Seventy-seven cases were diagnosed with benign cytology on fine needle aspiration cytology. In the histopathological examination of surgical specimens, benign lesions were identified in 63 cases and malignant lesions were identified in 8 cases. According to the histopathological examination of 42 cases that had malignant cytology, 22 cases were diagnosed with papillary carcinoma, and 6 cases were diagnosed with well-differentiated tumor of uncertain malignant potential. When the findings of FNAC and histopathology were compared, the specificity was 75.9%, sensitivity was 73.3%, and the test validity was 75.2%.

Conclusions: The present study supports the notion that fine needle aspiration cytology is a reliable tool for the evaluation of thyroid lesions and the management of patients who are considered for surgery due to complaints of mass lesions.

Key Words: Fine Needle Aspiration Cytology; Histopathology; Thyroid.

Tiroid Sitolojisi Tecrübesi: Sitolojik Bulgular ile Histopatolojik Bulguların Karşılaştırılması

Özet

Amaç: Tiroid ince iğne aspirasyon sitolojisi, özellikle tiroid nodülünün ameliyat öncesi değerlendirilmesinde, takibi ve tanısında kullanılan sensitif, spesifik ve düşük maliyeti ile tercih edilen yaygın bir metoddur. İnce iğne aspirasyon sitolojisi ile ameliyat öncesi lezyonun benign ve malign ayrımının yapılması ameliyat şeklinin belirlenmesine yardımcı olmaktadır. Burada, amacımız Patoloji laboratuarımızda sitolojisi ve tiroid ameliyat materyali değerlendirilen olguların taranarak, tiroid ince iğne aspirasyon sitolojisi tanısında tecrübemizi paylaşmak ve literatür bilgileri eşliğinde karşılaştırma yapmaktır.

Gereç ve Yöntemler: Bu çalışmada 2012 yılında patoloji laboratuarımızda tanı alan 213 tiroid ince iğne aspirasyon sitolojisi ve ameliyat materyali geriye dönük olarak taranmıştır.

Bulgular: İki yüz on üç olgunun 177'si kadındır. Sitolojisi benign olarak tanı alan 77 olgunun ameliyat materyalinin histopatolojik incelemesinde 63'ünde benign, 8'inde malign lezyon tanımlandı. Sitolojisi malign olarak değerlendirilen 42 olgunun histopatolojik incelemesinde ise 22 olgu papiller karsinom, 6 olgu da papiller karsinom şüphesi taşıyan tümoral oluşum olarak tanı aldı. Tiroid ince iğne aspirasyon sitolojisi ve histopatolojik bulgular karşılaştırıldığında spesifitenin %75.9, sensivitenin %73.3, ince iğne aspirasyon sitolojisi testinin geçerliliğinin ise %75.2 olduğu görüldü.

Sonuç: Bu çalışma ile tiroid ince iğne aspirasyon sitolojisinin tiroid lezyonlarının değerlendirilmesinde, özellikle operasyon düşünülen ve kitle şikayeti olan hastaların yönetiminde, güvenilir bir araç olduğu tekrar gösterilmiş oldu.

Anahtar Kelimeler: İnce İğne Aspirasyon Sitolojisi; Histopatoloji; Tiroid.

INTRODUCTION

Thyroid fine needle aspiration cytology(FNAC) is a common technique used for the follow-up and diagnosis of nodules (1). FNAC is preferred due to its minimal invasiveness and relevant cost, especially in palpable mass lesions; it is also the first screening test for patients with thyroid nodules. (2,3). FNAC is used for differentiating between benign and malignant lesions preoperatively, and therefore, is helpful to determine the type of surgery (4). During the thyroid cytology examination, there should be at least 6 groups with benign follicular cells, and each group should include at least 10 cells. Smears with intense colloid in which 6 groups are not observed are also considered sufficient, even benign (5). The aim of the present study is to calculate the specificity, sensitivity, and general adequacy of the thyroid FNAC test, and to evaluate our knowledge on thyroid cytology.

MATERIAL and METHODS

The aim of this study is to screen 213 thyroid surgery specimens that were diagnosed cytologically at the Department of Pathology, Haseki Training and Research Hospital, in 2012 to determine the specificity and sensitivity of our FNAC experience, and to evaluate the adequacy of FNAC. Ultrasound guided FNAC was performed at the radiology department of our hospital.

The materials were spread on slides, fixed in 95% ethanol for approximately 30 minutes, and then sent for further analysis. Smears were stained with Papanicolaou (PAP) histochemical dye. The remaining material in the syringe was cytocentrifuged in the laboratory, and was either spread again or prepared for cell block. The cell block material was stained with hematoxylen and eosin (H&E). The cytological diagnoses were classified under 5 main headings: unsatisfactory, benign, suspicious, malignant, and suspicious for oncocytic neoplasia. In cytology cases, true positive (TP), true negative (TN), false negative (FN), and false positive (FP) rates were calculated, and the specificity, sensitivity, general power (generally adequacy), and positive and negative predictive values for the test were calculated using the formulas listed below:

-Sensitivity = (TP / TP+ FN) x 100
-Specificity = (TN / FP+ TN) x 100
-General power of the test (Adequacy of the test) = (TP+ TN / TP+ TN+ FP+ FN) x 100
-Positive predictive value = (TP/TP+ FP)x 100
-Negative predictive value = (TN/FN+ TP)

RESULTS

The total number of cases was 213. One hundred seventy-seven patients (83%) were females, 36 patients (17%) were males. Fifty-two FNAC cases were considered unsatisfactory (24.41%), 77 (36.15%) were benign, 42 (19.71%) were malignant and, thus, recommended excision, 29 (13.61%) were suspicious, and 13 (6.10%) were suspicious for oncocytic neoplasia (Table I).

Table I. Distribution of the cytological and histopathological diagnoses of the cases.

Cytological Diagnoses	Histopathological Diagnosis					
	PC	**NH**	**LT**	**WT**	**FA**	**GT**
Unsatisfactory (52)	10	31	-	9	-	2
Benign (77)	8	59	1	6	2	1
Malign (42)	22	6	8	6	-	-
Suspicious (29)	8	15	-	4	2	-
Suspicious for oncocytic neoplasia (13)	1	4	7	-	1	-

PC: Papillary thyroid carcinoma; NH: Nodular Hyperplasia; LT: Lymphositic thyroiditis; WT: well-differentiated tumor of uncertain malignant potential; FA: Follicular adenoma; GT: Granulomatous thyroiditis.

During the histopathological examination of the 77 benign FNAC cases, 59 had nodular hyperplasia, 8 had papillary thyroid carcinoma (PC), 6 had well-differentiated tumor of uncertain malignant potential, 2 had follicular adenoma, and 2 had lymphocytic thyroiditis and granulomatous thyroiditis diagnosis.

PC was histopathologically identified in 49 cases. Histopathologically, nodular hyperplasia was identified in 115 cases; well-differentiated tumor of uncertain malignant potential in 25 cases; lymphocytic thyroiditis in 16 cases; follicular adenoma was seen in 5 cases; and granulomatous thyroiditis was identified in 3 cases.

Excision was cytologically recommended due to the malignancy in 42 cases. During the histopathological examination, papillary carcinoma was observed in 22 cases, while well-differentiated tumor of uncertain malignant potential was observed in 6 cases.

PC was histopathologically identified in 8 of 77 cytology cases that were diagnosed as benign, in 10 of 52 cases that were diagnosed as unsatisfactory, in 8 of 29 cases that were diagnosed as suspicious, and in 1 of 13 cases that were diagnosed as suspicious for oncocytic neoplasia. Thirty-nine patients (79.6%) with papillary tyhroid carcinoma were females, and 10 patients (20.4%) were males. Histologically, there was no follicular carcinoma diagnosis. Histopathologically, 139 cases (65.2%) were evaluated as benign lesions.

According to the formulas mentioned above:
Specificity: (63/63+20) x 100= 75.9%
Sensitivity: (22/22+8) x 100= 73.3%
General adequacy of the test: (22+63/ 22+63+20+8) x 100= 75.2%
Positive predictive value = (22/22+20) x 100= 52.38%
Negative predictive value= (63/8+22) x 100=210%
(Table II)

Table II. Distribution of the papillary thyroid carcinoma cases in benign and malignant cytologies

FNAC	Papillary carcinoma (+)	Papillary carcinoma (-)	Total
Malign	22 (TP)	20 (FP)	42
Benign	8 (FN)	63 (TN)	71

TP: True positive; FP: False positive; FN:False negative; TN: True negative.

DISCUSSION

FNAC is widely accepted, specific - especially sensitive for the preoperative evaluation of thyroid nodules - and preferred method for its low cost (1). The specificity and sensitivity rates range between 80-100% in various studies (3). However, the specificity rate ranges between 72-100% and the sensitivity rate ranged between 65-98% according to other studies (6). According to Bagga et al., the specificity was 100%, sensitivity was 66%, and the test adequacy was 96.2% in the analysis of a series consisting of 252 cases (1). In the present study, the specificity was 75.9%, the sensitivity was 73.3%, and the test adequacy was 75.2%. Dundar et al. determined a specificity rate of 98%, sensitivity of 62.5%, and a test adequacy of 92% (7). On the other hand, the specificity was 97%, sensitivity was 35%, and test adequacy was 89% in another study (8). As seen in the present study and various other studies, it is striking that the specificity was higher compared to the sensitivity.

As seen in the previous examples, the specificity rates were higher compared to the present study. The FP rate, which is considered as an important component in the evaluation of specificity, was 20 (9.3%) in our study. FP corresponds to the cases for which excision is recommended cytologically, but malignancy cannot be confirmed histologically (1). If the cases with well-differentiated tumor of uncertain malignant potential were considered to be malignant, and 6 cases were removed from the FPs, the specificity would increase to 81.8%. In our department, when the cases that have histologically suspicious nuclear features for papillary tyhroid carcinoma are not confirmed using immunohistochemical examination, they are reported as a "well-differentiated tumor of uncertain malignant potential". The FP rates range between 0-9% in the literature. In the cytology of lymphocytic thyroiditis, the features like nuclear enlargement, nuclear groove and even inclusion, and as well as nodular hyperplasias that contain dense macropapillary structures are confused with malignancy (7, 12). While the smears in which microfollicules consist of numerous follicular cells associated with macrofollicules are considered to be benign or hyperplastic nodules, it is not possible to fully rule out follicular neoplasia (3). The pathologists examining the cytology material should state any suspicion despite the possibility that there are not any malignant lesions during the examination of the surgical specimen.

The recommended stages in the diagnosis of thyroid nodules are first ultrasonography and TSH measurement, and subsequently FNAC. In USG, there is no definite criteria for differentiating benign and malignant thyroid nodules. Microcalcification, irregular border, hypoechogeneity, increased vascularity, and cervical lymphadenopathy are investigated in USG before performing FNAC. FNAC isn't performed for nodules smaller than 1 cm, as these nodules, despite being malignant, carry a little risk of morbidity. It is recommended to repeat the FNAC procedure within 6 months or 1 year in patients who are suspected for malignancy on USG examination despite a negative FNAC result (9, 13). The evaluation of cytologies that have a high number of Hurthle cells presents a difficulty. According to the histopathological examination of 139 cases that were diagnosed with Hurthle cell nodules, 83 cases were diagnosed as benign Hurthle cell lesions, and 56 cases were diagnosed as Hurthle cell neoplasia (15). In our department, 13 smears (6.10%) that had a low number of lymphoplasmocytic inflammatory elements with rich for Hurthle cells were reported as cases with suspicious for oncocytic neoplasia. Histopathologically, lymphocytic thyroiditis was observed in 7 cases, nodular hyperplasia was observed in 4 cases, papillary carcinoma was observed in 1 case, and follicular adenoma was observed in 1 case.

FNAC is performed by an expert doctor, radiologist, or a cytopathologist (2). At our hospital, the procedure is performed by the same expert radiology physician at the Department of Radiology, while the operating physician changes occasionally. The adequacy of FNAC depends on the operator's technique and experience and the features of the thyroid tissue – especially cystic nodules, sclerotic, and calcified lesions. The inadequacy rate decreases in fine needle aspiration cytologies that are performed with guided ultrasonography (1, 10). The inadequacy rates range between 10.4-28.2% in the literature (3, 4, 7). Fifty-two (24.4%) of the cytologies were inadequate in the present study. According to the histopathology of the inadequate cases, nodular hyperplasia was observed in 31 cases, papillary carcinoma was observed in 10 cases, suspicious for papillary thyroid carcinoma was observed in 9 cases, and granulomatous thyroiditis was observed in 2 cases. It is recommended to repeat the procedure for inadequate cytologies (11). In the present study, the cytologies were not repeated for unsatisfactorily diagnosed cases.

The FN rate corresponds to the cases that are cytologically benign, but histologically malignant (1). In the present study, FN was observed in 8 cases (3.7%), while this rate ranges between 11.6-28% in the literature. Considering that thyroidectomy is not performed for all cytologies that have benign cytology, it is clear that the actual rate is not determined (1, 3, 11). The FN rate may depend on the inability to obtain samples from the lesion, the presence of a microcarcinoma in a dominant nodule, false evaluation, or lymphocytic thyroiditis (8, 14). The thyroid cytology diagnosis includes nodular goiter, thyroiditis, follicular

neoplasia, papillary thyroid carcinoma, medullary carcinoma, anaplastic carcinoma, and high grade lymphoma (14). Histopathologically, the majority of the cases had benign lesions in the present study. Previous studies have reported that the rate of differentiated thyroid carcinoma is generally low, and there is no significant difference between the development of benign and malignant nodules (9).

In conclusion, in addition to being specific and sensitive, FNAC is an affordable, reliable, and the most important technique for the evaluation of thyroid nodules, as seen in the present study. The lack of a cytopathologist in our department may be seen as a disadvantage, while it is clear that sharing knowledge and experience through intradepartmental consultations is important. Nevertheless, the use of immunohistochemical techniques to evaluate lesions with histopathologically suspicious for "papillary carcinoma" will be useful.

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Correspondence/İletişim

Ayşe Nur AKATLI
İnönü Üniversitesi Tıp Fakültesi, Patoloji Anabilim Dalı, MALATYA, TÜRKIYE
E-mail: aysenurakatli@gmail.com

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