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The Role of Fine Needle Aspiration Biopsy in The Diagnosis of Parotis Masses

Parotis Kitlelerinin Teşhisinde İnce İğne Aspirasyon Biyopsisinin Rolü

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Abstract

Objective: The aim of this study is to determine the accuracy and usefulness of fine needle aspiration biopsy(FNAB) in the diagnosis of parotid masses.

Materials and Methods: FNAB findings of 123 patients who were operated over a last ten years period were retrospectively analyzed and compared with histopathological findings. We examined the sensitivity, the specificity, the positive predictive value (PPV), the negative predictive value (NPV) of FNAB.

Results: FNAB results of the patients who participated in the study are as follow; non-diagnostic for 7 patient (%5.7), atypia of undetermined significance for 7 patients (%5.7), bening neoplasm for 98 patients (79.7%) and malign cytology for 11 patients (%8.9). Histopathological results were maligned found in 1 out of 98 patients with benign neoplasm in cytology results in FNAB. The histopathological result was benign in 2 of 11 patients with malignant neoplasm in the cytology findings with FNAB. The specificity of FNAB in the diagnosis of parotid masses was found as 98% and the sensitivity was 90%. The positive predictive value (PPD) was detected as 86% and the negative predictive value was detected 98%.

Conclusion: Since malignant masses of the parotid are rare and diverse, diagnosis with FNAB can be difficult. Another complicating factor is the similarity of low-grade malignant tumor and benign tumor. As a result, FNAB has high accuracy for benign parotid tumors, but low for malignant parotid tumors.

Keywords: Parotid Masses, Fine Needle Aspiration Biopsy, Parotidectomy, Salivatory Gland

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Öz

Amaç: Bu çalışmanın amacı; parotis kitlelerinin teşhisinde ince iğne aspirasyon biyopsisinin doğruluğu ve yararlılığını belirlemektir.

Gereç ve Yöntemler: 10 yıllık süre içinde parotis bezinde kitle nedeniyle opere edilen 123 hastanın ince iğne aspirasyon biyopsisi bulguları retrospektif olarak incelendi ve histopatolojik bulgularla karşılaştırıldı. İnce iğne aspirasyon biyopsisinin(İİAB) duyarlılık, özgüllük, pozitif prediktif değer (PPV), negatif prediktif değerlerine (NPV) bakıldı.

Bulgular: Çalışmaya katılan 123 hastanın 67'si erkek (%54.4), 56'sı bayandır(%45.6). Hastaların yaş ortalaması 52'dir (yaş aralığı: 38-84). Çalışmaya katılan hastaların İİAB sonuçları 7 hastanın non-diagnostik (%5.7), 7 hastanın atypia of undetermined significance (%5.7), 98 hastanın bening sitoloji (79.7), 11 hastanın ise malign sitoloji (%8.9) gelmiştir. İİAB'de sitoloji sonucu bening neoplazm gelen 98 hastanın, 1 tanesinde histopatojik sonuç malign olarak gelmiştir. İİAB 'de sitoloji sonucu malign neoplazm gelen 11 hastanın, 2 tanesinde histopatoji sonucu bening olarak gelmiştir. Parotis kitlelerinin tanısında İİAB'nin özgüllüğü %98, duyarlılığı %90 olarak bulundu. Pozitif prediktif değer %86, negatif prediktif değer %98 olarak tespit edildi.

Sonuç: Malign karakterli parotis kitlelerinin nadir olması, malign tümör çeşitliliğinin çok olması nedeniyle malign parotis kitlelerinin ince iğne aspirasyon biyopsisi ile tanısı zordur. Diğer zorlaştırıcı faktör bening tümörler ile düşük dereceli malign tümörlerin benzer yapıda olmasıdır. Preoperatif İİAB'nin tanısal doğruluğu, iyi huylu tümörler için yüksek ve kötü huylu tümörler için düşüktür.

Anahtar Kelimeler: Parotis Kitlesi, İnce İğne Aspirasyon Biyopsisi, Parotidektomi, Tükrük Bezi

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Introduction

Salivary gland tumors constitute 3-5% of all head and neck tumors and 0.5% of all malignant tumors. The overall incidence of salivary gland tumors is 0.99/1000 in female and 1.49/1000 in males (1). 85% of salivary gland tumors originated from the parotid. Pleomorphic adenoma is the most common benign parotid tumor with a rate of 70%, and mucoepidermoid carcinoma is the most common malignant parotid tumor (2). Benign and malignant parotid lesions cannot be diagnosed by simple physical examination. It may be necessary to use the fine-needle aspiration biopsy(FNAB) together with the radiological examination. Ultrasonography (USG), Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) are required radiologically. FNAB combined with USG, a commonly used diagnostic tool to evaluate both neoplastic and inflammatory lesions of the salivary glands. FNAB is a minimally invasive, simple, reliable, low-cost, reproducible procedure that does not require general anesthesia (3).

FNAB helps to distinguish between inflammatory masses, benign and malignant masses of the salivary glands. The sensitivity of FNAB for parotid tumors is between 57-98% and the specificity is between 86-100% (4). FNAB showed a low sensitivity of 58.8% in the most common malignant squamous cell carcinoma of the parotid (5).

The purpose of this study is to analyze the data of patients who underwent parotidectomy retrospectively and compare the cytological findings obtained as a result of FNAB with the histopathological findings.

Materials and Methods

Between 2010-2020, 123 patients who applied to the ENT clinic of Adiyaman Education and Research Hospital due to parotid mass and underwent surgery were included in this study. Parotid masses that were operated without FNAB were not included in this study. Superficial parotidectomy was performed on all patients participating in this study. Ethics committee approval was obtained at Adıyaman University on 05.02.2021 and the consent of the patients was obtained.

The records of all patients were reviewed retrospectively. FNAB results and postoperative histopathological results of the patients were examined. FNAB findings of parotid masses were compared with histopathological findings. We utilise SPSS version 2.0 for statistical analysis, looking at sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV).

We compared the results of the cytological sample obtained with FNAB and the histopathological sample obtained after surgery. We examined the sensitivity and specificity of FNAB in distinguishing between malignant and benign tumors.

Results

The gender of the 123 patients who participated in the study, 67 were male (54.4%) and 56 were female (45.6%). The mean age of the patients is 52 (age range: 38-84). FNAB results of the patients included in the study were non-diagnostic (5.7%) in 7 patients, atypia of undetermined significance in 7 patients (5.7%), benign neoplasm in 98 patients(79.7%), and malignant cytology in 11 patients(8.9%). Considering the histopathological results of the patients who participated in this study, 63 patients had pleomorphic adenoma (51.2%), 32 patients had whartin tumor (26%), 9 patients had basal cell adenoma (7.3%), 5 patients had pleomorphic adenoma ex carcinoma (4%), Mucoepidermoid carcinoma was reported in 3 cases (2.4%), adenoid cystic carcinoma (0.8%) in 1%, and others (8.3%) in 10 cases. Whartin tumor (57.1%) in 4 out of 7 patients whose FNAB results were non-diagnostic , it was reported as pleomorphic adenoma in 2 (28.6%) and local lymph node (14.3%) in 1. Whartin tumor in 25 (25.5%) out of 98 patients with benign FNAB results, basal cell adenoma in 8 (8.1%), reactive lymph nodes (4%) were found in 4 cases. Pleomorphic adenoma ex carcinoma in 4 cases (40.9%) and in 3 out of 11 patients whose FNAB results were malignant (Table 1).

Table 1

Cytopathology and Histopathology Results

Diagnoses	Number of Patients	Rate Of Patients (%)
A. Benign neoplasm	**98**	**79.7**
1) Pleomorphic adenoma	57	58.4
2) Warthin tm	25	25.5
3) Basal cell adenoma	8	8.1
4) Lenf Nodu	4	4
5) Branchial cyst	2	2
6) Myoepithelioma	1	1
7) Pleomorphic adenoma ex carsinom	1	1
B. Malign neoplasm	**11**	**8.9**
1) Pleomorphic adenoma ex carsinom	4	40.9
2) Mucoepidermoid carsinoma	3	27.2
3) Pleomorphic adenoma	2	13.9
4) Adenoid cystic carsinom	1	9
5) Malign melanom metastasis	1	9
C. Non-diagnostic	**7**	**5.7**
1) Warthin tm	4	57.1
2) Pleomorphic adenoma	2	28.6
3) Intraparotid lymphadenopthy	1	14.3
D. Atypia of undetermined significance	**7**	**5.7**
1) Warthin tm	3	42.8
2) Pleomorphic adenoma	2	28.6
3) Basal cell adenoma	1	14.3
4) Sialoadenitis	1	14.3

FNAB has an important role in the diagnosis of parotid masses. In our study, the histopathological result was malignant in 1 out of 98 patients whose cytology results were found to be benign neoplasms in FNAB. Histopathological result was benign in 2 out of 11 patients whose cytology results were found to be malignant neoplasms in FNAB. The specificity of FNAB in the diagnosis of parotid masses was found as 98% and the sensitivity was 90%. The positive predictive value (PPD) was detected as 86% and the negative predictive value was detected 98%. The accuracy rate of FNAB in the diagnosis of parotid masses was found to be 97% (Table 2).

Table 2

Accuracy Rate of FNAC

Cytopathology	**Histopathology**		
	Bening	**Malign**	**Total percantage(%)**
Bening	97	1	
Malign	2	9	
Sensitivity			90
Specificity			98
PPV(Positive predictive value)			86
NPV(Negative predictive value)			98
Diagnostic accuracy			97

Discussion

FNAB has an important place in the diagnosis of parotid masses. The cytological examination findings obtained as a result of FNAB help us to have an idea about the malignant or benign cytological structure of the masses. Thus, the type of surgical procedure to be performed is decided. In various studies, the sensitivity of FNAB varies between 39.1% and 90%, and the specificity varies between 86% and 100%. In our current study, the sensitivity of FNAB in the diagnosis of parotid masses was found 90% and the specificity was found 98% (Table-3).

Table 3

Comparison of Our Current Study Result Between Literature.

	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
Jeong et al. [10]	39.1	99.3	90	90.5
Bartels et al. [11]	83	86	83	86
Feinstein et al. [12]	75	95.1	84.9	91.2
Ghantous et al. [13]	90	98	90	98
Weerasinghe et al. [14]	75	97.5	96	83
Hartimath et al. [15]	90.9	96.6	90	96.7
Marzouki et al. [16]	50	100	100	91.4
Present study	90	98	86	98

FNAB is good at diagnosing benign parotid masses. In study of Gudmundsson et al. 63% of the parotid masses were pleomorphic adenoma and 17.5% were warthin tumors. The sensitivity rate of FNAB in malignant tumors was found 73% and the specificity rate was found 97%. It was found that FNAB was correctly diagnosed in parotid masses with a rate of 95% (6).

In malign parotid masses in a study of Galli et al. was detected before surgery by FNAB in 32 cases (48.5%) among 66 parotid tumors with histopathologically malignant results. The sensitivity rate of FNAB in detecting malignancy was found to be weak (7).

In different organs, sensitivity and specifity of FNAB varies. For example; Dallar et al. In their study to determine the accuracy rate of FNAB in 168 patients with thyroid nodule, salivary gland mass and cervical mass; Kappa statistics for the degree of agreement between FNAB and histopathology (good > 0.6 and excellent > 0.8) were 0.74 for thyroid nodules, 0.83 for parotid masses, and 0.71 for submandibular and cervical masses(8).

Hanege et al. In their study on 268 patients with parotid mass, no diagnosis could be made in 13 (4.54%) patients. Atypia of undetermined significance was reported in 12 (4.1%) patients, 196 (68.5%) benign neoplasms, and 43 (15%) patients were reported as suspicious for malignancy. In the histopathological examination of 13 patients who could not be diagnosed with FNAB, 7 (53.8%) Warthin tumors, 4 (30.7%) pleomorphic adenomas, and 2 (15.5%) lymph nodes were reported. Thus, the sensitivity rate of FNAB was low in malignant parotid masses and high in benign parotid masses (9).

Limitations of this Study

Low number of patients, the fact that cytological and histopathological examinations were not performed by the same pathologist, and FNAB was not taken by the same person(s) cited as factors limiting our study. Studies to be performed on a large number of patients with different centers may yield different results.

Conclusion

Since the malignancy rate is low in parotid masses, there is a wide variety of carcinomas, and benign masses and low-grade carcinomas are cytologically similar, it is difficult to diagnose malignancy with FNAB. Although benign tumor diagnosis is easy with FNAB, malignant tumor diagnosis is difficult. Especially in malignant masses, the accuracy of FNAB decreases, so the risk of inadequate surgery is high. With an experienced pathologist and properly collected cytology samples, the rate of correct diagnosis can be increased with FNAB.

Ethics Committee Approval: The study was approved by the Ethical Committee of Non-Invasive Clinical Research of Adıyaman University (date: 16.02.2021 and approval number: 2021/02-7).

Informed Consent: Written consent was obtained from the participants.

Conflict of Interest: Authors declared no conflict of interest.

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