

Correlation Between Fine Needle Aspiration Biopsy and Histologic Findings in Parotid Masses

Parotis Kitlelerinde İnce İğne Aspirasyon Biyopsisi ve Histolojik Sonuçların İlişkisi

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ABSTRACT

Objective: To compare the preoperative fine-needle aspiration biopsy (FNAB) and postoperative histopathologic findings in parotid masses and to determine the diagnostic accuracy, sensitivity and specificity of FNAB which is very important in differential diagnosis of salivary gland masses.

Material and Methods: FNAB and histopathology findings were compared in 32 [13 female (40.7%), 19 male (59.3%)] consecutive patients whose ages ranged between 17 to 76 years (mean 48.59) and operated due to parotid gland masses.

Results: There were 32 benign lesions but no malignant lesions in histopathologic findings: Preoperative FNAB correctly identified 29 of 32 benign masses. In the remaining three cases cytology was not diagnostic. There were no false positive cases. In the present study, the overall diagnostic accuracy of FNAB in parotid gland lesions was 90.625%. The diagnostic sensitivity and specificity were 90.625% and 100%, respectively.

Conclusions: FNAB is the first diagnostic tool for the histologic diagnosis of palpable head and neck masses excluding abscesses and vascular neoplasms. It is a safe, rapid and easy diagnostic procedure, readily carried out causing little discomfort to the patients and there is no need for general anaesthesia. However great skill is required and cytology does not always reach the sensitivity and specificity of postoperative histology. Therefore, in the presence of a palpable head and neck mass, surgery is still strongly indicated however cytology is useful in planning the surgical approach.

Keywords

Parotid neoplasms; diagnosis; biopsy, fine-needle; sensitivity and specificity

ÖZET

Amaç: Parotis kitlelerinin preoperatif ince iğne aspirasyon biyopsi ve postoperatif histopatolojik sonuçlarının karşılaştırılması ve tükürük bezi kitlelerinin ayırıcı tanısında ince iğne aspirasyon biyopsinin tanısal doğruluk, duyarlılık ve özgüllüğünün belirlenmesi.

Yöntem ve Gereçler: Parotis bezi kitlesi nedeniyle opere olan ve yaşları 17 ile 76 arasında değişen (ortalama 48.59), 32 hastanın [13 kadın (%40.7), 19 erkek (%59.3)] ince iğne aspirasyon biyopsi sonuçları histopatolojik sonuçlarla karşılaştırıldı.

Bulgular: Histopatolojik sonuçlarda 32 benign lezyon vardı, ancak hiçbir malign lezyon yoktu: Preoperatif ince iğne aspirasyon biyopsisi 32 benign kitlenin 29 tanesini doğru belirledi. Geri kalan üç olguda, sitoloji tanı koydurucu değildi. Yanlış pozitif olgu yoktu. Bu mevcut çalışmada, parotis bezi lezyonlarının ince iğne aspirasyon biyopsisinin ayrıntılı tanısal doğruluğu 90.625% idi. Tanısal duyarlılık ve özgüllük değerleri ise sırasıyla %90.625 ve %100 idi.

Sonuç: İnce iğne aspirasyon biyopsisi, abseler ve vasküler tümörler dışındaki palpabl olan baş ve boyun kitlelerinin tanı koyuculuğunda ilk tercihtir. Güvenilir, hızlı ve kolay tanı koydurucu bir prosedürdür; hastalara fazla rahatsızlık oluşturmadan yapılabilir ve uygulanmasında genel anestezi gerektirmez. Fakat önemli bir beceri gerektirir ve sitoloji postoperatif histolojinin duyarlılığı ve özgüllüğüne her zaman erişemez. Bu yüzden, palpabl baş ve boyun kitlelerinde cerrahi mutlak endikedir ancak sitoloji cerrahi yaklaşımın planlanmasında yararlıdır.

Anahtar Sözcükler

Parotis tümörleri; tanı; biyopsi, ince-iğne; duyarlılık ve özgüllük

Çalışmanın Dergiyeye Ulaştığı Tarih: 17.06.2009

Çalışmanın Basıma Kabul Edildiği Tarih: 13.02.2010



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INTRODUCTION

Salivary gland tumors which consists of 3-12% of head and neck tumors are usually seen between second and sixth decades. Eighty percent of these salivary gland tumors originate from the parotid gland, 10% originates from submandibular gland and 10% originate from sublingual and minor salivary glands. Eighty percent of them are benign and 20% of them are malignant. There is no known etiology for salivary gland tumors, however infections, traumatic and obstructive disorders heredity and vitamin A deficiency have been accused.¹

Clinical examination alone does not always allow differentiation between benign and malignant lesions, inflammatory disorders or lymph node masses. Radiologic findings provide additional information concerning the size, the site and relationship between the mass and the salivary gland, but its exact nature can not be ascertained. Open biopsies define the histology of the tumor, but the procedure is invasive and may complicate subsequent surgical treatment. If an accurate preoperative diagnosis can be achieved by a combination of imaging and cytology or histology, then many non-neoplastic lesions may not necessitate surgical excision. Surgery may also be avoided for certain parotid neoplasms in the elderly or unfit. Fine-needle aspiration biopsy (FNAB) can provide preoperative cytologic diagnosis; it is a safe, rapid and easy diagnostic procedure, readily carried out causing little discomfort to the patients.² It became popular in the seventies,³ especially for diagnostic studies of palpable head and neck masses, not being, however, uniformly accepted.⁴ With this technique, differentiation of benign and malignant masses and differentiation of edema and recurrence of tumor can be made.⁵

In recent years, retrospective studies confirmed its high sensitivity and specificity of FNAB in the differentiation between malignant and benign tumors. In fact, FNAB is regarded, by some authors, as a diagnostic procedure superior to the combination of physical and radiologic evaluation and an important support in the evaluation of salivary gland tumors in their preoperative management and in the choice of the most appropriate treatment.⁶⁻⁹ In this study we aimed to determine the diagnostic accuracy, sensitivity and specificity of FNAB in the differential diagnosis of salivary gland masses.

MATERIAL AND METHODS

A total of 32 [13 females (40.7%), 19 males (59.3%)] consecutive patients whose ages ranges between 17 and 76 years (mean 48.59) and operated because of salivary gland masses in otorhinolaryngology department of Haydarpaşa Numune Research and Training Hospital between 2005 and 2009 were included in this study. Preoperative FNAB and postoperative excisional biopsy results were recorded and compared. Recurrences of tumors and metastatic masses of known origin excluded from study.

Preoperative FNAB of the parotid mass was performed as a preoperative diagnostic examination in 32 patients. All cytologic examinations were performed in the Department of Pathology of the Haydarpaşa Numune Research and Training Hospital. FNAB was performed by clinicians using a 22 gauge needle attached to a 10 ml syringe holder.¹⁰ A minimum of two or three needle passes were made in each case. The specimens were expelled onto two cover glasses, one fixed in alcohol solution and subsequently stained with Papanicolaou stain, the other air-dried and stained with May-Grunwald Giemsa (MGG) stain. When immediate cover glass examination was non-specific, aspiration was repeated. For the aim of this study, needle aspiration results were classified as non-diagnostic (no cytologic diagnosis was possible based on the material obtained), true-negative (correct indication of absence of malignancy), true-positive (correct indication of presence of malignancy), false-negative (incorrect indication of absence of malignancy), false-positive (incorrect indication of suspected malignancy).

The classification of parotid tumors was based on WHO guidelines¹¹ and, therefore, tumors were classified as benign, of intermediate malignancy and malignant.

The cytologic diagnosis was then compared with the histopathologic diagnosis and evaluated for adequacy, presence or absence of malignancy and correct tumor diagnosis. We informed all patients about the study and their informed consents were obtained.

RESULTS

FNAB of 15 patients (46.9%) revealed pleomorphic adenoma, 13 patients (40.7%) Whartin tumor, three patients (9.3%) as sialoadenitis and one patient (3.1%) as basal cell adenoma (Table 1).

When we compared preoperative FNAB and postoperative excisional biopsy results, we found that preoperative and postoperative results correlated in 15 patients with pleomorphic adenoma, 13 patients with Whartin tumor and one patient with basal cell adenoma. Postoperative excisional biopsy results of three patients with a preoperative FNAB result as sialoadenitis were reported as pleomorphic adenoma (Table 1).

The overall diagnostic accuracy of FNAB in parotid gland lesions was 90.625%. The diagnostic sensitivity and specificity were 90.625% and 100%, respectively.

No hematoma, infection, facial nerve damage, implantation of tumor cells or other complications were observed.

DISCUSSION

Needle-aspiration is a safe procedure which is readily carried out, is well tolerated by patients and there is no need for general anaesthesia.³ The main aim of the cytologic examination of parotid masses is the differential diagnosis between benign and malignant lesions, or better, between operable lesions and lesions for which other therapy is more suitable.⁹ Batsakis et al., in 1992, stated that most parotid masses require surgery and that needle-aspiration plays a minor role in the therapeutic approach.⁴ Other authors consider the cytologic examination as an important diagnostic procedure, superior to the combination of physical and radiological examinations which are not able to definitely differentiate between benign and malignant lesions.^{6,7}

It has been shown that, in the preoperative evaluation, FNAB of parotid masses can reduce the number of patients being treated by surgery by 1/3.¹²⁻¹⁶ In the remaining cases, important information is provided which can play a significant role in the selection of the most suitable therapeutic option: conservative or limited surgery for benign lesions, radical or demolitive surgery

for malignant lesions, radiochemotherapy for inoperable tumors.⁹

It should be stressed that the heterogeneous morphologic patterns of salivary gland tumors contrast with the small size of the needle-aspiration sample which might not be representative of the entire mass. Therefore, great professional skill and experience are required both in performing the aspiration and in the evaluation of the cytologic examination.⁶ In spite of all the precautions adopted, the cytologic examination may not be significant. In previously published studies, the rate of inadequate needle aspirations was between 2 and 10%.^{3,6,16-18} However in the present series, none of the 32 cytologic examinations performed were non-diagnostic. The reasons why a representative sample is not always obtained may be related to the positioning of the needle outside the target area or the presence of hemorrhagic, necrotic or cystic areas in the tumor. However, the rate of non-diagnostic needle-aspirations can be decreased with the examination of frozen sections and with an additional immediate examination when the sample is inadequate.¹⁹ In a recent review on needle-aspiration biopsy, Amedee and Dhurandhar²⁰ have confirmed that, based on the present findings, the accuracy of this diagnostic examination for salivary gland pathology exceeds 90%, even if it is more precise in the identification of benign lesions as compared to malignant lesions with 90% sensitivity and 80% specificity.

According to the various authors, the accuracy of needle aspiration ranges from 80.4% to 97%, sensitivity from 54% to 97.6% and specificity from 86% to 100%.^{6,16,19,21,22} Stewart et al.²³ studied 341 patients of salivary gland masses and found FNAB sensitivity as 92% and specificity as 100%. They concluded that FNAB correlated 98% with postoperative biopsy and it supported approach to salivary gland masses especially in benign lesions. Literature studies showed sensitivity as 54%-95%, and specificity as 86-100%.^{7,24,25} In the present study, the accuracy, the sensitivity and the specificity were 90.625%, 90.625% and 100%, respectively.

Table 1. The preoperatives cytologic and postoperatives histopathologic diagnosis of parotid mass.

	FNAB Cytologic Diagnosis (n)	Histopathologic Diagnosis (n)
Pleomorphic adenoma	15	18
Whartin tumor	13	13
Monomorphic adenoma (basal cell adenoma)	1	1
Chronic sialoadenitis	3	0

FNAB mostly correlates with postoperative excisional biopsy in patients with benign lesions such as pleomorphic adenoma and Warthin tumor. Zurrida et al.⁶ found correlation as 82-94%, and Verma and Kapila²⁶ as 98.2%.

In our study, we observed the false negativity as 9.375% of all tumors (3/32). This result is not in correlation with the ratios reported by Zbaren et al.³ and others.^{6,21,22} However, it should be pointed out that 34% of the false negative examinations had been performed elsewhere. Therefore, for a correct therapeutic approach, all clinically suspicious parotid masses, with negative or nondiagnostic needle-aspiration, should be re-examined by cytology or intra-operative frozen section histology.^{6,21,22} Moreover, the histologic type of 29 of the 32 benign tumors (90.625%) was correctly identified with FNAB examination.

Al-Khafaji et al.,¹⁶ in the classification of the various types of malignant and benign tumors, observed 84% and 92% accuracy, respectively. Our findings, in agreement with reports of others,^{3,6} have underlined a high accuracy of FNAB in the diagnosis of benign lesions.

As mentioned above, benign lesions were correctly diagnosed in 90.625% of cases (29/32 patients) and, in particular, in 83.33% of all pleomorphic adenomas (15/18) and in 100% of Warthin tumors (13/13). Pleomorphic adenoma has an extremely variable histologic pattern and can be easily identified in cytologic examination, with correct typing ranging between 82% and 94%.^{6,27} Pleomorphic adenomas were correctly diagnosed in 83.33% of cases: in three specimens, the cytologic examination was reported as chronic sialoadenitis with suppuration due to the presence of areas of central necrosis which may undergo suppuration within the cystadenolymphoma.

Based on data emerging from this study and on results reported in the literature, it may be concluded that FNAB is a low-cost, complication-free and first choice diagnostic tool for the study of palpable head and neck masses, excluding abscesses and vascular neoplasms.^{28,29} For correct diagnosis great skill is required and, in our opinion, FNAB does not reach the sensitivity and specificity of postoperative histology. Therefore, in the presence of a palpable head and neck mass resistant to medical treatment, surgery is still strongly indicated and cytology is useful in planning the surgical approach.

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