

# Ultrasonography guided fine needle aspiration biopsy of parotid gland masses

Parotis bezi kitlelerinde ultrasonografi eşliğinde ince iğne aspirasyon biyopsisi

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**Objectives:** Exact preoperative diagnosis of the parotid gland masses requires highly specific and sensitive diagnostic techniques. The specificity, sensitivity and accuracy of ultrasonography guided fine needle aspiration biopsy of the parotid gland masses performed by an otolaryngologist and evaluated by a same cytopathologist are assessed.

**Patients and Methods:** There were 46 female and 36 male patients. The mean age was 39 (range: 18 to 74 years). Ultrasonography guided fine needle aspiration biopsies were performed and cytologic diagnoses were compared with the postoperative histopathologic findings of specimens.

**Results:** In our series 65 (79%) of the lesions were found to be benign and 17 (21%) malignant. There were one false negative and one false positive result. The sensitivity, specificity and accuracy rates are found to be 94.1%, 98.4% and 97.6% for parotid tumors, respectively.

**Conclusion:** Ultrasonography guided fine needle aspiration biopsy of parotid gland masses have been proven to be a highly specific, sensitive and a safe preoperative diagnostic technique when performed by an experienced clinician and cytopathologist.

**Key Words:** Parotid diseases/diagnosis; parotid neoplasms/diagnosis; biopsy, needle; ultrasonography.

**Amaç:** Parotis bezi kitlelerinde, ameliyat öncesi dönemde doğru histolojik tanıyı koyabilecek, yüksek sensitivite ve spesifite değerlerine sahip bir tanı yöntemine ihtiyaç vardır. Tek bir kulak burun boğaz uzmanı tarafından yapılan ve aynı sitopatoloğun değerlendirildiği parotis bezi kitlelerinden ultrasonografi eşliğinde ince iğne aspirasyon biyopsisi sonuçları araştırıldı.

**Hastalar ve Yöntemler:** Çalışmaya 82 hasta dahil edildi. (46 kadın, 36 erkek; ort. yaş 39; dağılım 18-74) hastalara tek bir kulak burun boğaz uzmanı tarafından ultrasonografi eşliğinde ince iğne aspirasyon yapıldı ve aynı sitopatolog tarafından değerlendirildi. Sitolojik tanı, ameliyat sonrası histopatolojik sonuçlar ile karşılaştırıldı.

**Bulgular:** Hastaların 65'inin (%79) benign, 17'sinin (%21) malign olduğu saptandı. Aspirasyon biyopsisleri ile patoloji spesmenleri sonuçları karşılaştırıldığında bir yalancı negatif ve bir yalancı pozitif sonuç olduğu görüldü. Parotis tümörleri için sensitivite, spesifite ve doğruluk oranları sırasıyla %94.1, 98.4 ve 97.6 olarak bulundu.

**Sonuç:** Parotis bez kitlelerinde tek bir uygulayıcı tarafından yapılan ve aynı sitopatolog tarafından değerlendirilen ultrasonografi eşliğinde ince iğne aspirasyon biyopsisinin yüksek oranda spesifik, sensitif ve güvenli olduğu saptandı.

**Anahtar Sözcükler:** Parotis hastalıkları/tanı; parotis neoplazileri/tanı; biyopsi, iğne; ultrasonografi.

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- ◆ Received - June 13, 2003 (Dergiye geliş tarihi - 13 Haziran 2003). Request for revision - April 3, 2004 (Düzeltilme isteği - 3 Nisan 2004). Accepted for publication - April 28, 2004 (Yayın için kabul tarihi - 28 Nisan 2004).
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Needle aspiration biopsy was first described by Kun in 1847 and fine needle aspiration biopsy (FNAB) of salivary gland was first reported by Linsk in 1985.<sup>[1]</sup> Salivary gland FNAB is now a widely employed and a well established diagnostic technique.<sup>[2-6]</sup>

Although they may not be necessarily diagnostic, history, clinical examination and imaging studies contribute to the assessment of salivary gland lesions. The final diagnosis is achieved by histopathological examination. Preoperative needle biopsy has never been found favourable because of the risk of recurrence due to possible implantation of the tumor in the thick needle tract, bleeding, external fistula or damage to the facial nerve.

Disadvantage of frozen section is the difficulty in the differentiation of the tumor whether benign or malign, because of the nature of parotid gland tumors.<sup>[7,8]</sup> FNAB is recommended in the preoperative diagnosis of parotid gland masses, because it is simple to perform, rapid and cheap.<sup>[9,10]</sup> However some diagnostic difficulties may be encountered due to nature of the tumor, and the experience of the cytopathologist.

In this study, the role of one hand performance in the diagnostic accuracy of ultrasonography (USG) guided FNAB in the parotid gland masses was assessed.

## MATERIALS AND METHODS

This study was done at the otorhinolaryngology, radiology and pathology departments of Ankara University, School of Medicine by a FNAB group including an otolaryngologist, a radiologist and a cytopathologist. Between December 1994 and July 2000, 82 USG guided FNAB were performed for clinically and radiologically detected parotid gland masses. There were 46 female and 36 male patients. The mean age was 39 years (range: 18 to 74).

FNAB of parotid gland masses were done by the same otolaryngologist using a 25-gauge needle attached to a 20 ml syringe holder under the view of USG. The needle was inserted and was probed several times in different directions under contiguous suction of the lesion until a few drops of material appear in the syringe. Then, suction was released and the needle was withdrawn. The specimens were expelled onto three slides, and thin smears were prepared. When enough aspirated material was

obtained, no other attempt was done. After immediate fixing, the slides were stained with Papanicolaou and Wright methods. Light microscopical cytologic examination was performed by the same cytopathologist. Differential diagnosis between benign and malignant tumors were done according to the nuclear cellular atypia, nuclear hyperchromasia and pleomorphism.

Parotid gland neoplasms were classified according to the 1991 classification of World Health Organisation.

Hematoma, facial nerve damage, infection or implantation of tumor cells and other complications associated with FNAB technique were not observed.

All patients underwent surgical procedure including superficial, total or radical parotidectomy with or without facial nerve preservation for accurate histopathological diagnosis. Cytologic diagnoses were compared with the postoperative histopathologic findings of specimens.

## RESULTS

There was no insufficient aspirate in our cases.

The results are shown in Table I. In our series 65 (79%) of the lesions were found to be benign and 17 (21%) were malignant. There were one false positive and one false negative results. One case of pleomorphic adenoma was incorrectly diagnosed as mucoepidermoid carcinoma and a case of mucoepidermoid carcinoma was incorrectly diagnosed as Warthin's tumor. The sensitivity, specificity and accuracy rates are found to be 94.1%, 98.4% and 97.6% for parotid tumors, respectively.

## DISCUSSION

Preoperative cytological diagnosis of a parotid mass, especially for malignant tumors, helps in delineating the extension of surgery, provides a planning of preoperative radiotherapy and adjuvant chemotherapy scheme and also is necessary to inform the patient for his prognosis.<sup>[10]</sup> For the above mentioned purposes, FNAB is an easily applicable, oncologically safe and an inexpensive method. In this diagnostic tool, the technique of aspiration, the sufficiency of the material and the cytological evaluation are important.<sup>[2,3]</sup> However, small lesions may offer a difficulty for reaching the lesion by means of palpation and gather material from the center.<sup>[2,3,11,12]</sup> Therefore, USG is a good diagnostic tool for local-

TABLE I  
CORRELATION OF USG GUIDED FNAB AND HISTOPATHOLOGICAL DIAGNOSIS OF  
PAROTID GLAND MASSES

Histopathology	No	Cytology	
		Benign	Malignant
Benign (n=67)			
Pleomorphic adenoma	38	37	1 (Mucoepidermoid ca)
Warthin's tumor	18	18	0
Lymphoid hyperplasia	5	5	0
Lipoma	2	2	0
Tuberculosis	2	2	0
Malignant (n=17)			
Mucoepidermoid carcinoma	6	1 (Warthin's tumor)	5
Adeno carcinoma	4	0	4
Acinic cell carcinoma	3	0	3
Lymphoma	2	0	2
Metastatic tumor	2	0	2

ization, invasion and extension of the lesion, because of the superficial location of the parotid gland. It is also non-invasive, easy to perform and carries no risk of ionizing radiation.<sup>[13,14]</sup>

USG could detect characteristics of parotid lesions in regard to size, echogenity and presence of halo sign, but can not indicate the nature of the lesion. USG guided FNAB has the advantage to reach the nonpalpabl, deep localized lesions to have sufficient material. USG guided FNAB offers the ability to aspirate lesion under direct vision and to sample different regions of a lesion as central or peripheral (Fig. 1). The aspiration material from the center of the lesions provides a higher cellularity compared to peripheral aspiration and is necessary for the exact histopathological diagnosis with USG guided FNAB of parotid masses.<sup>[14]</sup> Also USG determines the solid part of the mixt cystic-solid lesion to perform the biopsy from the solid component.<sup>[2,3,11,14]</sup>

Histological appearance of pleomorphic adenoma ranges widely, and can be recognised cytologically. We correctly diagnosed 37 of 38 (97.5%) cases of pleomorphic adenoma. Correct diagnosis of pleomorphic adenomas has been reported in a range of 82% to 94% in the literature.<sup>[15,16]</sup> Only one case of pleomorphic adenoma was incorrectly diagnosed as mucoepidermoid carcinoma in our series. Eighteen Warthin's tumors, five lymphoid hyperplasias, two

tuberculosis and two lipomas were correctly diagnosed and classified. The correct diagnosis of benign parotid lesions was 98.5% in our series. In the literature, it was ranged between 70-100%.<sup>[17,18]</sup>

In our series, five of six mucoepidermoid carcinomas were accurately diagnosed and classified. One case of mucoepidermoid carcinoma was incorrectly diagnosed as Warthin's tumor. In the literature, mucoepidermoid carcinoma was reported as

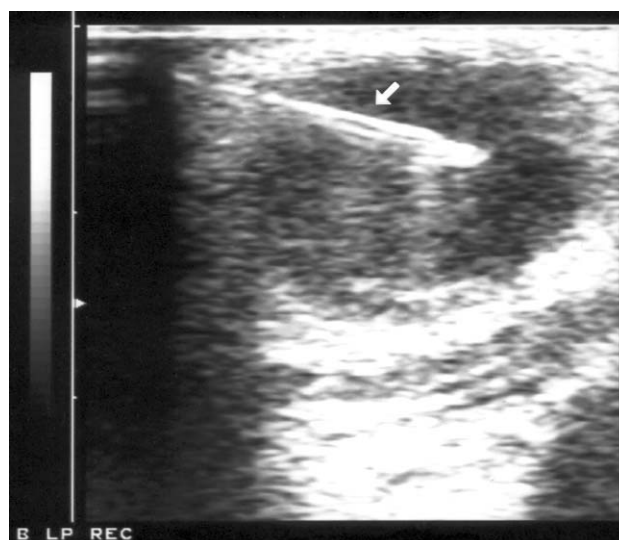


Fig. 1 - Ultrasonographic view of the needle in the center of the parotid mass.

one of the most problematic lesion to diagnose and type cytologically. Low grade mucoepidermoid carcinomas may be confused with non-neoplastic cystic lesions. Aspirates from low grade tumors contain much debris and background mucoid material mixed with groups producing cells with abundant vacuolated cytoplasm. Some intermediate cells with small dark nuclei and scanty cytoplasm are also present, but squamous cells are usually sparse and display no appearance of stigmata of malignancy.<sup>[19]</sup> Four adenocarcinomas and three acinic cell carcinomas were correctly diagnosed. In the literature, the accuracy in detecting malignant tumors ranged from 84% to 97%, sensitivity from 54% to 95%, and the specificity from 86% to 100%.<sup>[5,12,13,18,20-22]</sup> In our series, the sensitivity, specificity and accuracy rates were 94.1%, 98.4% and 97.6% for parotid lesions, respectively.

The diagnosis of metastatic parotid gland tumors usually are not difficult, because of the known presence of primary tumor. In our study, two metastatic tumors were correctly diagnosed including a scalp malign melanoma and a previously treated squamous cell carcinoma of the larynx.

Two lymphomas were histologically correctly diagnosed and superficial parotidectomy was performed for typing. Al-Khafaji et al. reported that all 10 lymphomas were accurately diagnosed, where as Zurrida et al. reported five negative findings in seven lymphomas and Zbaren et al. reported that none of seven lymphomas were diagnosed correctly.<sup>[15]</sup> All of these authors performed FNAB without USG.

Our study shows that USG guided FNAB performed by an experienced clinician and cytopathologist is accurate, cost-effective, and a valuable diagnostic technique in parotid gland lesions.

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