

Evaluation of Diagnostic Fine Needle Aspiration Cytology in Parotid Gland Masses

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Abstract

Background and Objectives: It is important to detect benign and malignant parotid gland masses preoperatively due to plan the treatment and to prepare the patient and the surgeon in order to have a better surgery of malignant tumors. The aim of this research was to evaluate the fine needle aspiration cytology's sensitivity, specificity, positive and negative predictive value and also its diagnostic role in parotid gland masses.

Material and Methods: During August 2005 to August 2007, Fine needle aspiration was performed on 124 participants with parotid gland masses and they had superficial or total parotidectomy for the final treatment in Tabriz university of Medical Sciences, Department of Otolaryngology Head and Neck Surgery. It was a descriptive study. Their preoperative FNAC and the cytology results with definite histopathology were compared. Furthermore, the sensitivity, specificity and the predictive value of the results were calculated by statistical formulas.

Results: The results of the FNAC in detecting malignant parotid masses were as follow:

- Sensitivity: (64.8%) - specificity: (98.8%) - Positive predictive value: (96%)
- negative predictive value: (86.6%)

Conclusion: FNAC is a simple, safe and economical diagnostic method and it is valid for detecting malignant and benign parotid gland masses without any contraindication.

INTRODUCTION

Fine needle aspiration cytology (FNAC) was used in United States and Europe in 1920 and it was more acceptable in 1970.

Batsakis believes since most of the parotid masses require surgical operations so the preoperative FNAC has a little influence on selecting the treatment plans (1). Some other authors believe that FNAC, as a diagnostic procedure, is superior to combination of physical examinations and imaging in parotid lesions (2).

There was an anxiety of the risk of tumor seeding to be implanted on the needle route by FNAC. But after several studies on 157 patients with pleomorphic adenoma, there wasn't any report about spreading of tumor by needle route

(6).

In 1986, Cohn studied and compared the accuracy of the FNAC results with histological frozen sections of parotid masses. The results of both the FNAC in 16 out of 21 patients and the histological frozen section in 15 out of 21 patients were correct(3).

The information obtained from FNAC could be beneficial for planning the surgical procedure and informing the patients (5). Therefore, the aim of this research was to evaluate the fine needle aspiration cytology's sensitivity, specificity, positive and negative predictive value and also its diagnostic role in parotid gland masses.

METHOD

During August 2005 to August 2007, Fine needle aspiration

was performed on 124 participants with parotid gland masses and they had superficial or total parotidectomy for the final treatment in Tabriz university of Medical Sciences, Department of Otolaryngology Head and Neck Surgery. The aspiration was performed by 23 gauge needle with a 10 ml syringe. At least 6 specimens of each mass were prepared .Then, the specimens were sent for the pathologist in order to perform cytological examinations.

After the surgical operation the parotid masses were sent to the pathology for definite histopathology diagnosis. Then, the results of both the FNAC and the definite histopathology were compared.

The FNAC results were as follow:

- (Non-diagnostic): Cytological diagnosis was impossible by the specimens.
- (True negative): Absence of malignancy was correctly diagnosed by FNAC specimens and according to definite pathology results.
- (True positive): Presence of malignancy was correctly diagnosed by FNAC specimens and according to definite pathology results.
- (False negative): Cytological considerations were failed to diagnose - malignancy.
- (False positive): Based upon malignancy the cytological considerations were not correct, because it was rejected by definite pathology.

Furthermore, the sensitivity, specificity and the predictive value of the FNAC results were calculated by statistical formulas.

RESULTS

There were 124 participants, 68 male and 56 female. The age range was from 1.5 to 80 years old. Table 1 illustrates the FNAC results that in 2 cases were non-diagnostic (1.6%), true positive in 24 cases (19.4%) and true negative in 84 cases (67.7%).

Considering the histological results 7 out of 24 cases were true positive (29%) and 60 out of 84 cases were true negative (71.4%). 1 case was false positive (0.8%) and 13 cases were false negative (10.5%).

Figure 1

Table 1: Results of FNAC and histopathological examination in detecting malignancy.

Definite histopathology			
-	+		
1	24	+	FNAC
84	13	-	

Table 2 illustrates the definite histopathology examination reports that 38 cases were malignant (30.6%) and 86 cases were benign tumors (69.4%).

The sensitivity and specificity of FNAC in detecting malignancy were sequentially 64.8% and 98.8%. Also the positive and negative predictive values were 96% and 86.6%. Furthermore, there weren't any complications such as hematome, infection, facial nerve damage and implantation of tumor cells.

Figure 2

Table 2: Definite histopathologic diagnosis of parotid masses

Benign tumors	NO.
Pleomorphic adenoma	62
Cysts	10
Warthin's tumor	7
Monomorphic adenoma	2
Lymphoepithelial lesions	2
Basal cell adenoma	1
Myoepithelioma	1
Lipoma	1
Malignant tumors	NO.
Mucoepidermoid carcinoma	10
Squamous cell carcinoma	6
Lymphoma	6
Malignant mixed tumor	3
Adenocarcinoma	2
Acinic cell carcinoma	2
Adenoid cystic carcinoma	2
Myoepithelial carcinoma	2
Malignant pleomorphic adenoma	2
Rhabdomyosarcoma	1
Ductal carcinoma	1
Metastatic malignant melanoma	1
Chondrosarcoma	1

DISCUSSION

As a general rule approximately 20% of parotid, 50% of submandibular and 80% of sublingual and minor salivary gland tumors are malignant (6).

Incisional biopsy is completely contraindicated in major salivary gland tumors in order to cause neoplastic cell implantation that would be inevitable and also results in local recurrence. So, it is only used for minor salivary gland tumors in palate (7).

FNAC is a safe and easy diagnostic method with the minimum annoyance and complications for the patients. The main aim of parotid gland masses cytology diagnosis is to

detect benign lesions from malignant tumors. Usually, definite histological examinations determine the histological tumor types but it is not that much important in FNAC (5).

FNAC accuracy depends on two factors, the physician's skill in aspiration and the pathologist experience in specimen examinations. Different papers reported 2% to 10% non-diagnostic results that were because of insufficient specimens (4). About 2 cases (1.6%) were non-diagnostic in this study. Failures to obtain sufficient specimens could be as the result of hemorrhage, cystic areas and needle position, for example, outside the lesions or in the necrosis areas.

Recent papers reported the sensitivity range from 54% to 95% and the specificity range from 86% to 100% (4). In this research the sensitivity was 64.8% and the specificity was 98.8% that both were comparable with reference papers and texts.

The high rate of false negative in FNAC results is a problem of both this study and the other researches. Therefore, while the FNAC results are non-diagnostic or negative in the case of malignancy and the parotid gland masses are clinically suspected for malignancy, it is suggested to perform parotidectomy with frozen sections or aspirate again. But the false positive results are rare. In this study it was 0.8% and the other papers reported the rate of 0% to 7% (4).

Between malignant parotid tumors, mucoepidermoid carcinoma is one of the most problematic tumors for cytological diagnosis. And between benign tumors, pleomorphic adenoma could be diagnosed easily through cytological examinations due to their wide range of histological appearance (4).

Also, it is not difficult to diagnose and classify metastatic intraparotid tumors by FNAC because the primary location of the tumor is obvious in most cases.

CONCLUSION

This study illustrates that the FNAC of parotid gland masses is a useful and accurate evaluating method for therapeutic planning before the surgery. Moreover, it could detect malignant tumors preoperatively that will help both the surgeon and the patient for an appropriate surgical procedure. Furthermore, FNAC is considered as a simple, safe and economical diagnostic procedure without any contraindication. Also, until now there was not any report of FNAC complications such as infection, facial nerve damage or spread of tumors.

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