

## Original Article

### The Diagnostic Accuracy of Fine Needle Aspiration Cytology in Neck Lymphoid Masses

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#### ABSTRACT

**Background and Objective:** Fine needle aspiration cytology (FNAC) is a well-established method of diagnosis in palpable masses of various sites. This study was conducted to evaluate the usefulness of FNAC as a diagnostic tool in the management of patients with cervical lymphadenopathy.

**Patients and Methods:** Totally 178 patients admitted to Loghman-Hakim Hospital, Tehran, Iran, with cervical masses, were included in this study. They had undergone FNA and subsequently excisional biopsy of the same neck mass in which a lymphoid tissue lesion had been established.

**Results:** Reactive lymphadenitis, metastatic neoplasm, Hodgkin's lymphoma, and non-Hodgkin's lymphoma constituted 59.6%, 17.9%, 14.6% and 7.8% of total cases, respectively. In 27 cases (15.2%), the FNA findings were nondiagnostic. Diagnostic accuracy of FNAC was about 88%. Sensitivity, specificity, positive and negative predictive values were 75.8%, 96.6%, 94% and 85.1%, respectively.

**Conclusion:** FNAC has a high accuracy in the diagnosis of malignancies of cervical lymph nodes, but due to the existence of false negative cases, the benign results should be further evaluated if high clinical suspicion of malignancy exists.

**Keywords:** Fine Needle Aspiration, Cytology, Lymph Node, Neck

#### Introduction

Aspiration of lymph nodes for diagnostic purposes was first done by Griey and Gray in 1904, in patients with sleeping sickness (1). The experiment of fine needle aspiration (FNA) developed gradually, until 1921, when Guthrie tried to correlate FNA results with various disease processes (2). Today fine needle aspiration cytology (FNAC) is a part of initial management of patients presenting with neck masses using a 18 to 23 gauge needle. The main benefit of FNAC is to avoid the need for surgical biopsy, which requires local or general anesthesia,

increased hospital stay and costs (3).

Although the reliability of the method has been shown in several studies for neck masses (4-9) and for lymph nodes (10-13), but there are also some reports in contrary (14,15). This study aimed to show the accuracy of FNAC and the diagnostic utility of this method.

#### Material and Methods

The target population of this retrospective study was those patients admitted to Loghman-Hakim Hospital, Tehran, Iran with a complaint of neck mass

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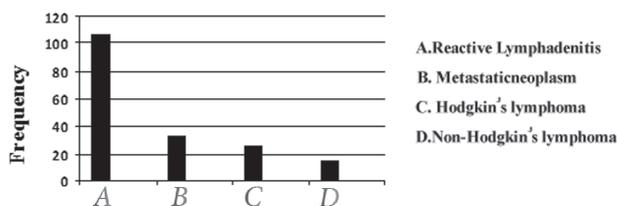
during 1997-2007, and had undergone both FNA and subsequently surgical excision of their neck masses. Then we limited the population to those patients who had a definitive histopathologic diagnosis of a lymph node lesion. Eventually the target population was formed by 178 qualified patients.

In all patients, the smears were stained by Pap method and the ultimate diagnoses were made by pathologists. We compared the FNAC results of 151 cases having satisfactory specimens, with histopathologic findings according to the state of malignancy. Sensitivity, specificity, positive and negative predictive values and the diagnostic accuracy of FNAC were calculated.

## Results

A total number of 178 patients were studied. 112 cases (63%) were male and 66 cases (37%) were female, with a sex ratio of about 1.7/1. The mean age of patients was 34 yr (ranging between 1 to 87 yr). The mean age of patients with benign lesion was about 28 yr and those of a malignant lesion were 42 yr.

The histopathologic results were divided into four categories of lymph node disorders (Fig. 1). According to the histopathologic diagnoses, in 106 cases (59.6%), the patients had benign lesions in lymph nodes and in 72 cases (40.4%), a lymph node malignancy was identified. The histopathology of malignant cases included metastatic neoplasm in 17.9% of patients, Hodgkin's lymphoma in 14.6% and non-Hodgkin's lymphoma in 7.8% of patients.



**Fig. 1:** Frequency of various cervical lymph node lesions according to histopathologic diagnosis

Cytopathology reports indicated that in 27 cases (15.2%), FNA findings were non-diagnostic [in 25 cases (14.1%) due to inadequate sampling and in 2 cases (1.1%) due to insufficient clinical information].

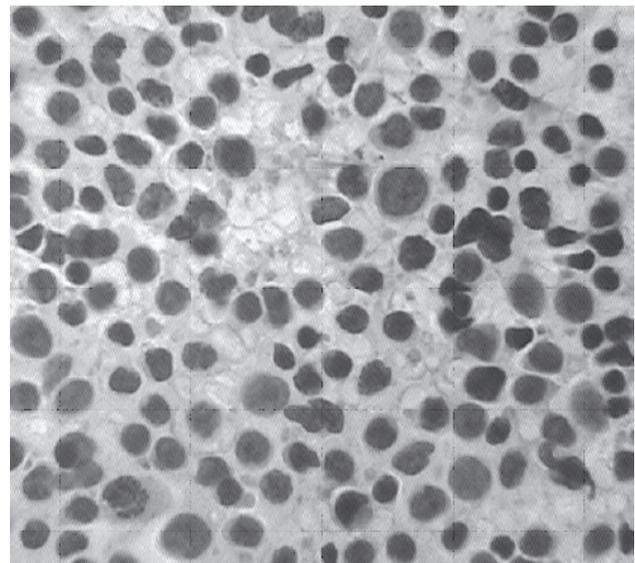
In the remaining 151 cases, histopathologic diagnosis was benign in 89 cases (58.9%) and malignant in 62 cases (41.1%). FNAC results supported a benign lesion in 101 cases (66.9%) and were compatible with a malignant lesion in 50 patients (33.1%) (Table 1).

**Table 1:** FNAC and histopathologic results according to the status of malignancy

Histology	Benign	Malignant	Total
FNAC			
Benign	86	15	101
Malignant	3	47	50
Total	89	62	151

FNAC: Fine Needle Aspiration Cytology

Comparing FNAC results with histopathologic diagnoses revealed that in 133 cases, the FNAC diagnoses were compatible with histopathology, a total accuracy of 88%. In 3 cases benign lesions were overdiagnosed as malignant and in 15 cases malignant neoplasms were underdiagnosed as benign lesions. FNAC had a sensitivity of 75.8% and a specificity of 96.6%. Positive and negative predictive values of this method were 94% and 85.1%, respectively. One of the false negative cases is shown in Fig. 2.



**Fig. 2:** Lymph node aspiration smear shows large lymphoid cells scattered among small lymphocytes. Histopathologic sections of excised lymph node revealed large cell lymphoma (Papanicolaou stain  $\times 400$ )

## Discussion

The total number of FNA samples with nondiagnostic smears was 15.2% in our study, which was in the upper limit of the acceptable range of less than 10-15% (16).

A major proportion of lymphadenopathies in this study were due to benign conditions (58.9%), which

was in accordance with an earlier study (12), in which 86.4% of the lesions were benign. AlAlwan *et al.* and Narang *et al.*, also showed benign lesions in 55.3% and 61.6% of the lymph nodes, respectively(11,13).

According to histopathologic diagnosis, the accuracy of FNAC in diagnosing lymph node lesions was 88%. In most studies an accuracy rate of 85% to 94.4% has been reported (3,10,11,13).

The diagnostic indices of our study are compared with five similar studies in Table 2. As shown, our results are comparable with other groups except in sensitivity, which is lower due to false negative results in malignant lesions. But considering the high specificity (96.6%) and positive predictive value (94%), it can be concluded that the positive results have a high validity. Since a positive cytologic diagnosis

can support an important management decision, an attempt should be made to minimize the false positive diagnoses, in this way false negative cases may increase (11). Furthermore, the inability to evaluate the lymph node architectural changes in FNAC, low sensitivity in differentiating reactive hyperplasia from low grade non-Hodgkin’s lymphoma or lymphocyte predominant form of Hodgkin’s lymphoma and partial involvement of lymph nodes in some cases of lymphoma have been proposed as the main reasons for false negative results (17). It could be useful to have additional smear for Giemsa staining, and get benefit of ancillary methods such as immunohistochemistry in aspiration smears to optimize the accuracy of the method.

**Table 2:** Comparison of the results of the present study with those of five similar studies

Study	Sens. (%)	Spec. (%)	PPV (%)	NPV (%)	Accu. (%)	n
Ahmad <i>et al</i>	94.6	98.5	N/A	N/A	97.6	115
AlAlwan <i>et al</i>	90.5	98.8	N/A	N/A	89.5	150
Eisele <i>et al</i>	94.2	96.9	98.9	84.6	N/A	782
Eisele <i>et al</i>	92.5	97.8	98.8	86.7	94.3	542
Narang <i>et al</i>	95.6	89.2	88.4	97.3	85	60
<b>Our study</b>	75.8	96.6	94	85.1	88	151

Sens: sensitivity; Spec: specificity; PPV: positive predictive value; NPV: negative predictive value; Accu: accuracy; n: number of diagnostic aspirates; N/A: not available

**Conclusion**

Despite the limitations, FNAC provides a reliable and convenient method for the initial management of cervical lymphadenopathy. Although, the benign results should be interpreted in the context of clinical findings and if clinical malignancy is highly suspected, further evaluation is justified.

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The authors declare that there is no conflict of interests.

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