

Comparison of Fine Needle Aspiration Cytology Versus Open Biopsy for Chronic Cervical Lymphadenopathy

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ABSTRACT

Introduction: Open biopsy is considered ideal for diagnosis of cervical lymphadenopathy. Fine needle aspiration cytology (FNAC) is safe, less invasive and cost effective as compared to open biopsy. However, its diagnostic efficacy remains in debates. This study was conducted to know how accurately FNAC can detect the pathology as compared to open biopsy.

Objective: To compare the diagnostic efficacy of FNAC and open biopsy for chronic cervical lymphadenopathy.

Methodology: This comparative study was conducted at department of Surgery, Lahore General Hospital, Lahore. The study was completed in six months including 96 patients with diagnosis of cervical lymphadenopathy. All the patients had FNAC followed by open biopsy. The diagnostic efficacy of the two techniques was compared by calculating sensitivity, specificity and diagnostic accuracy of each technique.

Results: The diagnostic accuracy of FNAC for tuberculosis, metastatic carcinoma, Hodgkin's lymphoma, non Hodgkin's lymphoma, reactive hyperplasia and chronic nonspecific lymphadenopathy were 92.6%, 100%, 85.7%, 87.5%, 100% and 100%, respectively.

Conclusions: FNAC is reliable and safe technique with high diagnostic efficacy and should be preceded as first line investigation in management of cervical lymphadenopathy.

Keywords: Cervical lymphadenopathy; fine needle aspiration cytology; open biopsy

INTRODUCTION

Cervical lymphadenopathy is one of the most common head and neck manifestations of mycobacterial infections. It may be the manifestation of a systemic tuberculous disease or a unique clinical entity localized to neck. This disorder remains a diagnostic and therapeutic challenge because it mimics other pathologic processes and yields inconsistent physical and laboratory findings (1, 2). A high index of suspicion is needed for the diagnosis of tuberculous cervical lymphadenopathy. A thorough history and physical examination, tuberculin test, staining for acid-fast bacilli, radiological examination, fine-needle aspiration and biopsy are instrumental in arriving at an early diagnosis. It is important to differentiate tuberculous from nontuberculous mycobacterial cervical lymphadenopathy because their treatment protocols are different. Tuberculous adenitis is best treated as a systemic disease with antituberculosis medication (3, 4).

Fine Needle Aspiration Cytology is a procedure where small amount of tissue or cells is aspirated from a pathological lesion with the help of fine 10ml disposable syringe of 21 or 22 gauge needles (5). Fine-needle aspiration cytology (FNAC) is an easy, quick, inexpensive technique for diagnosing enlarged lymph nodes with a high degree of accuracy (5). The reported diagnostic accuracy of FNAC in malignant lymphadenopathy ranges from 79% to 94.5% (6, 7) but limitations of FNAC include a high rate of nondiagnostic sampling, high rate of false-negative diagnoses in Hodgkin disease, and incomplete classification of non-Hodgkin lymphoma (8, 9). When FNAC for unexplained cervical lymphadenopathy results in a non-diagnostic or an equivocal report, open biopsy is frequently performed as the second step in reaching the diagnosis.

The advantage of open biopsy is that it nearly always needs only a tissue sample for the diagnosis. However, there are several disadvantages like being highly invasive, increased

risk of infection, damage to nervous and vascular structures and unfavorable scarring. Open biopsy also adds costs (because the procedure requires use of an operation theatre), delays diagnosis and treatment (because the operation theatre must be scheduled in advance), and carries the risks inherent in sedation or general anesthesia. Moreover, open biopsy carries a known risk of seeding tumor and can violate a future surgical field, making definitive surgical treatment more difficult (10, 11).

Over the last decade though, FNAC has gained more important role than open biopsy in the diagnosis of cervical lymphadenopathy with higher sensitivity and specificity. This study was conducted in order to compare the diagnostic accuracy of both techniques, so that a better technique could be offered to the patients with cervical lymphadenopathy in future. Hence the objective of this study was to compare the diagnostic efficacy of FNAC and open biopsy for chronic cervical lymphadenopathy. We hypothesized that diagnostic efficacy of FNAC is as good as open biopsy for chronic cervical lymphadenopathy.

MATERIALS AND METHODS

Study Design: Diagnostic cross sectional study

Setting: Study was carried out at Department of Surgery, Lahore General Hospital, Lahore.

Sample Size: Ninety-six patients were included in this study

Duration with Dates: This study was completed in six months

Sampling Technique: We used non-probability purposive sampling

Sample Selection: All patients above 12 years of age and either gender presenting with undiagnosed chronic cervical lymphadenopathy were included in this study

DATA COLLECTION PROCEDURE

All patients were explained about the procedures (FNAC and open biopsy) and their written consent was taken. Detailed history of patients was taken pertaining to neck swelling. Detailed clinical examinations were done, noting the site, size, shape, consistency and matting of the affected cervical lymph nodes. Other systemic and general examination especially for extra cervical lymph nodes, hepatomegaly and/or splenomegaly, ascites, jaundice, bleeding tendency, skin rash, etc, were carried out in all patients. The patients

were randomly allocated to FNAC and open biopsy group.

DATA ANALYSIS PROCEDURE

The data was entered and analyzed using SPSS (Statistical Package for Social Sciences) version 20. Sensitivity and specificity, PPV and NPV of both open biopsy and FNAC techniques were calculated.

RESULTS

The mean age of the patients was 30.52 ± 8.69 years [range 13 - 66]. There were 59 (59%) male patients and 41 (41%) patients were female. The female to male ratio was 1:1.4. The histopathology reports resulted in diagnosis of tuberculosis in 54 (54%) patients, Non Hodgkin's Lymphoma (NHL) in 14 (14%) patients, Hodgkin's Lymphoma (HL) in 4 (4%) patients, metastatic carcinoma (MC) in 16 (16%) patients, reactive hyperplasia (RH) in 2 (2%) patients and chronic non-specific lymphadenitis (CNL) in 3 (3%) patients. The FNAC reports were also compared with that of histopathology reports. It was found that FNAC results were positive in 52 (96.2%) out of 54 patients, Non Hodgkin's lymphomas (NHL) were positive in 12 (85.7%) patients out of 14 patients. FNAC was also positive in 4 (100%) patients, metastatic carcinoma was positive in 12 (87.5%) patients, reactive hyperplasia in 2 (100%) and chronic non-specific lymphadenopathy (CNL) in 3 (100%) patients. The sensitivity, specificity, positive predictive value, negative predictive value and accuracy of FNAC of lymphadenopathies to diagnose tubercular lymphadenopathies were 96.2%, 0.0%, 100.0%, 0.0%, and 96.2 % respectively. The sensitivity, specificity, positive predictive value, negative predictive value and accuracy of FNAC of lymphadenopathies to diagnose NHL were 85.7%, 0.0%, 100.0%, 0.0%, and 85.7 % respectively. The sensitivity, specificity, positive predictive value, negative predictive value and accuracy of FNAC of lymphadenopathies to diagnose Hodgkin's lymphoma were 100.0%, 0.0%, 100.0%, 0.0%, and 100.0 % respectively. The sensitivity, specificity, positive predictive value, negative predictive value and accuracy of FNAC of lymphadenopathies to diagnose metastatic carcinoma were 87.5%, 0.0%, 100.0%, 0.0%, and 87.5 % respectively. The sensitivity, specificity, positive predictive value, negative predictive value and accuracy of FNAC of lymphadenopathies to diagnose reactive

hyperplasia were 87.5%, 0.0%, 100.0%, 0.0%, and 87.5 % respectively. The sensitivity, specificity, positive predictive value, negative predictive value and accuracy of FNAC of lymphadenopathies to diagnose chronic non-specific lymphadenopathies were 100.0%, 0.0%, 100.0%, 0.0%, and 100.0 % respectively. The sensitivity, specificity, positive predictive value, negative predictive value and accuracy of FNAC of lymphadenopathies to diagnose metastatic carcinoma were 87.5%, 0.0%, 100.0%, 0.0%, and 87.5 % respectively.

Table - 1: Distribution of patients by Diagnosis based on Histopathology (Gold Standard) after open biopsy (n=100)

Diagnosis	No.	%
Tuberculosis (TB)	54	54
Non Hodgkin's Lymphoma (NHL)	14	14
Hodgkin's Lymphoma (HL)	4	4
Metastatic Carcinoma (MC)	16	16
Reactive Hyperplasia (RH)	2	2
Chronic Non specific Lymphadenitis (CNL)	3	3

Table 2: FNAC results relative to Histopathological diagnosis (Gold Standard) after open biopsy

		Results of Culture			Sensitivity	Specificity	PPV	NPV	Accuracy
			+	-					
Tuberculous Lymphadenopathy n = 54	FNAC	+	52	0	96.2	0	100	0	96.2
		-	2	0					
Non Hodgkin's Lymphoma n = 14	FNAC	+	12	0	85.7	0	100	0	85.7
		-	2	0					
Hodgkin's Lymphoma n = 4	FNAC	+	4	0	100	0	100	0	100
		-	0	0					
Metastatic Carcinoma n = 16	FNAC	+	14	0	87.5	0	100	0	87.5
		-	2	0					
Reactive Hyperplasia n = 2	FNAC	+	2	0	100	0	100	0	100
		-	0	0					
Chronic Non-specific Lymphadenitis (n=3)	FNAC	+	3	0	100	0	0	0	100
		-	0	0					
Overall (n = 100)	FNAC	+	92	0					
		-	9	0					

PPV = Positive predictive value
 NPV = Negative predictive value

DISCUSSION

Our results showed that FNAC can be used as sole diagnostic modality in majority of cases of cervical lymphadenopathy because all diagnosis reached by cytology were confirmed on histology; i.e. the gold standard. Prasad (12) reported an analysis of FNAC on 2,418 cases of superficial lymphadenopathy over five years. The FNAC findings were correlated with subsequent histopathological diagnosis in 1,041 cases. The sensitivity rates of FNAC in tuberculosis, metastatic tumors, Hodgkin's disease, and non-Hodgkin's lymphoma were found to be 83.3, 97,

30, and 80.3% respectively, the specificity being 94.3, 98.9, 98.6, and 95.4% respectively.

Advani (13) evaluated the accuracy and efficacy of fine needle aspiration cytology (FNAC) in the cervical lymphadenopathy in 35 patients. Their study showed that overall sensitivity were 87.5%, specificity 90.0% and accuracy 91.4%. These all studies confirmed our findings that FNAC is reliable, safe and accurate test as a first line of evaluation in cervical lymphadenopathy, it could differentiate the infective process from malignant one and avoids unnecessary surgeries.

Shaikh SM, et al conducted a study on 200 patients with cervical lymphadenopathy. FNAC

was performed in all cases, while, incisional / excisional biopsy performed in cases where FNAC was inconclusive. This study was conducted at surgical unit-II Chandka Medical College Hospital Larkana. The most common cause of cervical lymphadenopathy was tuberculosis in 99 (49.5%) patients. Second most common cause was reactive change which accounts about 36 cases (18%). Chronic nonspecific inflammation 24 cases (12%), non hodgkins lymphoma 16 cases (8%), metastatic carcinoma 14 cases (7%), hodgkins lymphoma 10 cases (5%) & kikuchis lymphadenopathy in 1 case (0.5%) (14).

In Italy Pilotti et al in 1993 compared the efficacy of FNAB cytology of lymph nodes from suspicious or diagnosed cases of malignancy with excision biopsy. The diagnostic accuracy was 99.1%, while typing accuracy was 96.5%. It shows that FNAB cytology may be considered the first step in work up enlargement of superficial lymphadenopathy (15).

A study performed in Singapore on the use of FNAB-C in patients with multiple lymphadenopathy before open biopsy showed that in two cases of multiple lymphadenopathy open biopsies failed to reveal the true nature of the disease but subsequent fine needle aspiration biopsies did the job, showing that sometimes FNAB is more effective than open lymph node biopsy (16). In one study of lymphadenopathy and aspiration biopsy cytology, review of 376 superficial nodes was done and it was found that diagnostic accuracy in cases of metastatic carcinoma and melanoma is nearly 95% (8). The study done by Das has also reported accuracy of 76.78% for tuberculous lymphadenopathy to an histological correlation (17).

A similar study done by Bhargava P has reported accuracy of 98.50% for tuberculous lymphadenopathy to histological correlation (18). The study done by Sarda AK reported accuracy of 96.00% for tuberculous lymphadenopathy (19). In the present study accuracy for tuberculous lymphadenopathy is 96.2 % which is hence comparable with most of the studies.

In this study with the most common disease (54%) of cervical lymphadenopathy was tuberculosis. With such endemic background of TB in our region, one can rely entirely upon FNAC for screening for TB. Other studies from the region showed TB being one of the commonest disease which are becoming rare in the developed world (20). A recent study from India showed that

Tubercular cervical lymphadenitis can readily be diagnosed by fine needle aspiration cytology, a simple and cost-effective test. The disease can be cured completely by a short course of anti-tubercular chemotherapy, without surgical intervention (21).

In the present study, numbers of cases of Non-Hodgkin's lymphomas are too small as the selection of all the cases was done randomly. Hence accuracy of FNAC cannot be authentically arrived in our study for lymphoma of lymph nodes. The other studies have reported diagnostic accuracy in the range of 80 – 90% (22).

The study done by Das DK, reported accuracy of 90.00%, but this study had 175 cases of Non-Hodgkin's lymphoma and our study had only 4 cases (17).

The overall diagnostic accuracy in the present study is 92% with positive predictive value of 100% which is in accordance with other studies. The study conducted by Prasad R reported accuracy of 91.50% (23). Thus FNAC is safe, reliable, rapid and economic procedure. It is an excellent diagnostic tool. A negative result on FNAC does not rule out the diagnosis of tuberculous lymphadenitis, malignancies and if clinical suspicion is strong, lymph node biopsy for histopathological examination should be done in our setup.

FNAC is a very useful diagnostic tool in patients having significant lymphadenopathy. The metastatic carcinomas, and tuberculous lymphadenopathy can be diagnosed by FNAC with a high degree of accuracy. However the differentiating features are not well demarcated in reactive hyperplasia and Non-Hodgkin's lymphoma. In the present study, accuracy was of 96.2 % for tuberculous lymphadenitis which had improved because of Zeihl-Neelsen staining for acid fast bacilli. Therefore it must be stressed that when the fine needle aspirate appears purulent or when tuberculosis is clinically suspected, specimen should be stained for acid fast bacilli. It improves diagnostic capability of fine needle aspiration cytology. In the present study, overall diagnostic accuracy was 87.5 % for metastatic carcinoma. Although open biopsy for histological confirmation is gold standard, it has its limitations because it distorts the surgical plans and may increase risk of induction of tumor spread especially in metastatic upper and middle cervical lymph nodes which are potentially curable with radiotherapy or node dissection. FNAC is

preferable and if it is positive surgeon can proceed to treat the neck without excisional biopsy of the enlarged lymph nodes.

Although FNAC is useful in clinical management, there are number of pitfalls in its use. There is significant limitation in the assessment of Non-Hodgkin's lymphoma. There were only few patients who had lymphoma. So, it cannot be confidently stated how much effective it is. Again, the sensitivity of FNAC samples can be improved by subjecting them to dual parameter flow cytometry, T-cell, B-cell tumour markers and immunocytochemistry analysis.

CONCLUSION

Finally, it is concluded that, FNAC is simple, safe, reliable and cost effective diagnostic tool for lymphadenopathies but the limitation of the procedure should be kept in mind. If FNAC is negative it does not rule out the disease and should be followed by open biopsy for histopathological confirmation.

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