

Original article

To evaluate the role of fine needle aspiration cytology lymph node in histopathological diagnosis in a tertiary care center of Himachal Pradesh

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Abstract

Introduction: Lymphadenopathy occurs frequently as a common presenting symptom. Fine needle aspiration cytology (FNAC) is used to assess the nature of the lesion. Etiology of lymphadenopathy in the head and neck region varies from benign reactive hyperplasia to tubercular granulomatous lesion to malignancy. The study was planned to evaluate the sensitivity, specificity and predictive value of FNAC in tuberculosis and metastatic carcinoma.

Methods: A total of 50 patients out of 160 patients at Indira Gandhi Medical College, Shimla, who underwent FNAC were evaluated by histopathological examination for correlation. The results were calculated for sensitivity, specificity and predictive value of FNAC after evaluation of the aspiration smears and histopathological slides.

Observations and Results: Reactive lymphadenitis was seen in 24 patients followed by tuberculargranulomatous lymphadenitis in 13 patients and malignant lesions in 13 patients. Histology revealed 11 patients of tubercular lymphadenitis, 27 of reactive changes, 08 of metastasis in lymph nodes and 04 of lymphomas. On correlating the findings, a 100% sensitivity, and 96.7% specificity was achieved for tubercular lymphadenopathy and 98.5% sensitivity and 100% specificity, respectively for metastatic carcinoma.

Conclusions:Our results showed FNAC as a satisfactory tool in the diagnosis of tubercular and malignant lymphadenopathy. FNAC used in association with clinical findings, radiological and laboratory investigations can be an economic method for the diagnosis of lymphadenopathy.

Keywords: FNAC, Lymphadenopathy, Metastatic, Tubercular lymphadenitis

Introduction

Fine Needle Aspiration technique was elaborated for the first time by Greig and Gray in 1904.¹Since the mid-1960's, it has been progressively used and a high degree of precision has been achieved. Lymphadenopathy is one of the commonest presenting symptoms of all age groups attending out door facilities. The etiology can differ from simple inflammatory reactive lesion to a malignant condition. Thus, lymphadenopathy requires further

assessment. Fine Needle Aspiration Cytology(FNAC) has been an appropriate investigation to diagnose malignancies and to confirm reactive or infective pathology of the lesion.² Currently, the use of FNAC in the investigation of lymphadenopathy is a suitable and widely practiced minimally invasive technique, and is safe, simple, rapid, and relatively painless.³ FNAC is highly economical and precise as a first line investigativetechnique. Focal lesions can be aspirated using ultrasound and computer tomography scan

technologies owing to the recent advancement in these procedures. FNAC has come to light as an advanced diagnostic tool to differentiate reactive hyperplasia/inflammatory conditions, granulomatous disorders and lymphomas.⁴ This diagnostic modality has attained substantial importance in the management of patients with lymphadenopathy over a period of time. The histopathological correlation of 160 cases of lymphadenopathy with FNAC has been reported in the study.

Aims & Objectives: To assess accuracy of FNAC in the diagnosis of lymph node lesions.

Methods:

This prospective study was conducted at Indira Gandhi Medical College, Shimla-1, Himachal Pradesh which is a tertiary health care centre of the state. It was conducted between August, 2015 to July, 2016. In this study, a total of 160 patients were screened, out of which 50 patients were enrolled in the study.

Aspiration of lymph nodes was carried out under aseptic precautions with 22-23-gauge needle and 10 ml syringe. Lymph node biopsies were done in 50 patients and the specimens were put through histopathological examination after fixing in 10% formalin. The results were correlated with the cytological reports to ascertain efficacy of the procedure.

The reactive hyperplasia of lymph node was deduced by observing mixed lymphoid tissue and macrophages with tangible bodies along with absence of Reed Sternberg cells. Granulomatous lesions were identified cytologically by the observation of aggregates of epithelioid cells with or without associated multinucleated giant cells. An amorphous necrotic backdrop suggestive of caseative necrosis leads to conclude the diagnosis of tuberculosis. The slides were stained with Ziehl-Neelsen method to detect acid fast bacilli (AFB) directly. The subsequent diagnosis of granulomatous inflammation by FNAC was confirmed either by surgery and/or by clinical investigations. The cytological diagnosis was confirmed with histopathological examination of specimen submitted. Metastatic carcinoma was determined cytologically by presence of dual population composed of malignant epithelial cells and mixed lymphoid tissue.

Observations and Results:

A total of 160 patients were included in the present study who visited IGMC & H, clinical laboratory for FNAC lymph node during the period from August, 2015 to July, 2016. Out of the 160 patients whose FNAC was done, 50 patients underwent excisional biopsy.

Table I: Age and sex distribution of patients for lymph node FNAC.

Age Groups (years)	Number of patients	Male	Female	Percentage
0-10	8	5	3	5.0%
11-20	18	13	5	11.3%
21-30	21	16	5	13.1%
31-40	40	27	13	25.0%
41-50	33	24	9	20.6%
51-60	22	17	5	13.8%
61-70	8	6	2	5.0%
>70	10	7	3	6.3%
Total	160	115	45	
Percentage		72%	28%	

Table II: FNAC & Histopathological correlation for lymphadenopathy.

Cytological diagnosis						
Histopathologic al Diagnosis	Reactive Hyperplasia	Tubercular Lymphadenitis	Metastatic Carcinoma	Non-Hodgkin's Lymphoma	Hodgkin's Lymphoma	Total
Reactive Hyperplasia	24	0	0	0	0	24
Tubercular Lymphadenitis	2	11	0	0	0	13
Metastatic Carcinoma	1	0	8	0	0	09
Non-Hodgkin's Lymphoma	0	0	0	3	0	03
Hodgkin's Lymphoma	0	0	0	0	1	01
Total	27	11	8	3	1	50

Out of 50 patients, 32 patients (64.0%) presented with cervical lymph node enlargement, 7 patients (14.0%) presented with submandibular swelling, 4 patients (8%) with inguinal lymph node enlargement, 4 patients (8%) with axillary and 3 patients (6%) with

Infra auricular lymph node enlargement. The age group of 50 patients ranged from 7 years to 78 years with a mean of 38 years, of which 37 were males and 13 were females (Table1).

Table 3 : Statistical analysis for tubercular lymphadenitis by FNAC.

FNAC diagnosis	Histopathological diagnosis		Total	Predictive value
	Positive	Negative		
Positive	12	1	13	(Positive) 90.0%
Negative	0	37	37	(Negative) 100.0%
Total	12	38	50	
Sensitivity/Specificity	100%(sensitivity) 96.7% (specificity)			

Benign lymphadenopathy was the most common presentation of lymphadenopathy of the head and neck region amounting to 77.0% of all. Among benign lesions, non-specific reactive lymphadenitis was the most common findings of enlarged lymph nodes of the neck region amounting to 52.0%, followed by tubercular granulomatous lymphadenitis amounting to 26%. Of the 26.0% malignant lesions,

17.0% were metastatic carcinoma and 9.0% patients were suspected of lymphoma. Among 5 lymphoma cases, 4 were Non-Hodgkin's Lymphoma and 1 case was diagnosed as Hodgkin's lymphoma. Of the 50 cases subjected to FNAC and histological diagnosis revealed 11 patients of tubercular lymphadenitis, 27 of reactive changes, 8 of metastasis in lymph nodes and 4 of lymphomas (Table 2).

Table 4 : Statistical analysis for metastasis in lymph node by FNAC.

FNAC diagnosis	Histopathological diagnosis		Total	Predictive value
	Positive	Negative		
Positive	07	1	08	(Positive) 92.3%
Negative	0	42	42	(Negative) 100.0%
Total	07	43	50	
Sensitivity/Specificity	100% (sensitivity) 96.7% (specificity)			

Table 3 shows the sensitivity, specificity, positive and negative predictive value of FNAC for tubercular granulomatous diagnosis. A definitive diagnosis of tuberculosis was confirmed by AFB positivity in FNAC material and clinical features. Table 4 shows the sensitivity, specificity, positive and negative predictive value of FNAC for metastasis of malignant cells in lymph node.

Discussion:

Lymphadenopathy is a disease of the lymph nodes, in which they may be abnormal in size, number, or consistency. It is a clinical manifestation of regional or systemic disease and aids as an outstanding clue to the underlying disease. Cervical lymphadenopathy may be the preliminary finding or may arise later on with other symptoms. The use of FNAC with other ancillary tests (microbiological, radiological, immune-histochemical, biochemical and special staining techniques) is worthwhile for obtaining a definitive diagnosis in the setting of granulomatous disorders. Lymphadenopathy often denotes the spectrum of other serious illnesses like lymphoma, metastatic cancer or acquired immunodeficiency syndrome. FNAC, as a first line screening method has been suggested in suspected malignancy.^{5,6}

Granuloma may be come across in both Hodgkin's disease and non-Hodgkin's lymphoma, particularly T-cell lymphoma. Lymph nodes containing metastatic carcinoma may also sometimes show features of granuloma. It has been suggested to be due to necrotic material or surface antigen. Previous studies have been described in metastatic nasopharyngeal carcinoma, seminoma and malignant melanoma.^{7,8}

A series by Khurana et al.⁹ portrayed the difficulties encountered in making a definitive diagnosis of

malignant neoplasm that imitates, or occurs, in association with granuloma. Granulomatous inflammation found in lymph nodes draining carcinomas is a recognized scenario. The background cell population needs to be investigated if a malignant lymphoma is suspected. FNAC is the study of cellular samples obtained through a fine needle under negative pressure. The technique is quick, relatively painless and cost effective. It can provide distinct diagnosis in most of the situations. The lesion arising in lymph nodes can be found in patients ranging from an early to advanced age.^{10,11}

The significance of performing an FNAC in patients with cervical lymphadenopathy prior to an excisional biopsy helps to assess the diagnosis of metastatic tumors of the head and neck. Consequently, direct open biopsy prior to cytology may result in a significantly higher local treatment failure rate, which in turn may be associated with an adverse effect on survival.¹³ The precision of FNAC in the diagnosis of lymphoma has previously been questioned. The factors that impact the diagnostic specificity and sensitivity of FNAC in the diagnosis of lymphoma include necrosis in involved nodes, the presence of dual pathology, and sclerosis/fibrosis in involved nodes leading to insufficient diagnostic material. Despite its drawbacks, FNAC appears to be a good first line method for investigating the cervical lymphadenopathy. The well-defined role of FNAC in the investigation of lymphadenopathy has been studied previously.¹²⁻¹⁴

In the present study, sensitivity of FNAC in the various pathologies of lymph nodes ranged from 90% to 100%. Reactive hyperplasia constituted the largest number followed by tubercular lymphadenitis among benign lesions. Cytological features of the aspirate are important for the diagnosis of tubercular lymph

nodes. A 100% sensitivity and 96.7% specificity for tubercular lymphadenopathy could be achieved.

Rajwanshi et al.¹⁵ observed that FNAC does pose problems in diagnosing lymphomas, but in our study the sensitivity and specificity with regard to lymphomas was 100%, while that for metastatic it was 98.5% and 100% respectively. These findings are coherent with the results of a few other studies.¹⁶⁻

¹⁸A diagnostic test is considered satisfactory if its sensitivity and specificity is around 90%.

Conclusion:

FNAC has been found to be a satisfactory tool in the diagnosis of tubercular and malignant lymphadenopathy in our study. The lucidity and rapidity of the procedure makes it most appropriate for use on outpatient basis even in peripheral hospitals and dispensaries. FNAC used in conjunction with clinical findings, radiological and laboratory investigations can be an economical method for the diagnosis of lymphadenopathy.

Limitations: Sample size was small; the findings of this study need to be corroborated in larger sample studies.

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