

Original Research Article

Cytological Study of Lymph Nodes in Head and Neck Region - Pattern, Reliability and Limitations

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ABSTRACT

BACKGROUND- Fine needle aspiration cytology (FNAC) is of particular relevance in the head and neck area because of the easy accessibility of target sites and excellent patient compliance due to the minimally invasive nature of the technique. It is a valuable initial diagnostic procedure and efficient for follow up.

AIMS AND OBJECTIVES- To categorise all the lymph node swellings in the head and neck region and their statistical analysis. To study the various gross and cytomorphological features of lesions. To evaluate the diagnostic accuracy, sensitivity and specificity of fine needle aspiration technique by correlating cytological and histopathological diagnosis.

METHODS- We prospectively studied patients referred to the cytology department with clinical diagnosis of lymph nodes swelling in head and neck from July 2011 to June 2013. Detail clinical, cytological and histopathological findings were noted.

RESULT- The technical accuracy rate was 96.12% with 1390 adequate lymph node aspirates. The non neoplastic and benign lesions were 1268 (91.22%) while 122 (8.77%) were malignant. Granulomatous lymphadenitis was the most common cause for enlarged lymph nodes in younger while metastatic malignancies were common in elderly. Diagnosis of 67 cases was confirmed on histopathological examination with sensitivity of 100 % and specificity of 97.87 %.

CONCLUSION- FNAC is a gold standard for preoperative assessment of head and neck lymph nodes. Early and accurate diagnosis reduces surgical intervention, morbidity and mortality. It is safe, easy, fast, accurate, effective, easy to perform, minimally invasive and cost effective method.

Key Words- FNAC, Head and neck region lymph nodes, Histopathology

INTRODUCTION

Tuberculosis is commonest infectious disease of developing world and tuberculous lymphadenopathy is a most common manifestation of extrapulmonary tuberculosis. ^[1,2] In the evaluation of enlarged lymph nodes, fine needle aspiration cytology (FNAC) is widely accepted accurate, sensitive, specific and cost effective method and is especially proven valuable in the diagnosis of tuberculosis and in metastatic cervical

lymph node. This study was done to find out frequency of non neoplastic lesions at cervical lymph nodes with special reference to tuberculosis with variables like age and sex distribution, role of clinical assessment and history, aspiration and cytological findings and spectrum of cytomorphology with histopathological correlation.

MATERIALS AND METHODS

The present prospective study of head and neck lymph nodes by fine needle

aspiration cytology was undertaken in the Department of Pathology, tertiary care hospital, Mumbai from July 2010 to June 2012.

The procedure of FNAC was explained to the patient and informed consent was taken. Gross characteristics of lymph nodes along with detailed clinical history and relevant investigations were noted. After giving convenient position to patient, FNAC was done with Cameco syringe holder fit on 10 ml disposable plastic syringe and 23 gauge disposable needles. Aspirate was macroscopically inspected, spread and fixed. Wet fixed smears were stained with haematoxylin and eosin (H&E) and papanicolaou. Air dried smears were stained with May-Grunwald Giemsa (MGG) and Ziehl Neelsen (ZN) stain where ever essential.

For histopathological study, the specimens were processed as per criteria stated by Bancroft.^[3]

OBSERVATIONS AND RESULTS

A total 3856 FNAC's were performed at our institute in the duration of July 2010 to June 2012 of which 1445 (37.47%) were from lymph nodes in head and neck region. The technical accuracy rate was 96.12% with 1390 adequate lymph node aspirates. The non neoplastic and benign lesions were 1268 (91.22%) while 122 (8.77%) were malignant. The commonest site of aspiration was anterior cervical triangle lymph nodes and showed

female preponderance with M: F ratio of 1:1.2.

TABLE 1 - Distribution of Lymph Nodes In Head And Neck Region

Site	Lymph nodes aspirated [%]
Right anterior cervical	43.68
Left anterior cervical	29.78
Bilateral cervical	12.10
Right posterior cervical	6.64
Left posterior cervical	4.78
Submental	1.42
Bilateral preauricular	0.79
Bilateral postauricular	0.39

TABLE-2: Categorization of Lymph Node Lesions

Cytological Diagnosis	No. of Patients	Percentage
NON NEOPLASTIC(1268 CASES)		
Reactive Lymphadenitis	405	29.13
Granulomatous	241	17.33
Tuberculosis	511	36.76
Necrotizing	14	1.00
Suppurative	97	6.97

Most common lymph node lesion encountered was granulomatous suggestive of tuberculous lymphadenopathy (54.10%) [Table -2] with females being more affected (M: F ratio 1:1.27). Majority patients were in 11 to 40 year age group and 6.4% younger than 10 year. These patients clinically presented with fever, asymptomatic lymph node enlargement, and cough with expectoration, anorexia and weight loss. Interestingly, past history of tuberculosis was given by 11.30% patients and 5.31% patients were already taking AKT treatment and had a new lymph node enlargement.

The gross appearance of aspirate was correlated with microscopy as described in Table 3.

TABLE 3 - Correlation Between Gross And Salient Microscopic Features Of Aspirated Material In Tuberculous Lymph Nodes

Gross Appearance Of The Aspirate	All Cases		Cases With Granulomas		Cases With Caseous Necrosis		Cases With Afb Positivity	
	No. Of Cases	%	No. Of Cases	%	No. Of Cases	%	No. Of Cases	%
Whitish	333	44.28	306	91.89	274	82.28	55	16.51
Cheesy	151	20.08	112	74.17	132	87.41	31	20.52
Whitish + Hemorrhagic	123	16.35	115	93.49	121	98.37	16	13.00
Hemorrhagic	86	11.43	47	54.65	41	47.67	1	1.16
Purulent	60	7.97	41	68.33	56	93.33	20	33.33
Total	752	100	621	82.57	624	82.97	123	16.35

On cytology cytomorphological features were classified in to 7 groups as described in Table 4.

Epithelioid cells were evident in 81.25% smears, caseous necrosis in 72.07%, polymorphs in 26.32%, giant cells

in 20.07% and over all AFB positivity of 16.09%.

TABLE 4- Correlation Of Cytomorphological Features Of Tuberculosis With Afb Positivity

Sr. No	Features	No. Of Cases	Afb Positivity
1	Epithelioid cell only	75 (9.97 %)	3 (4.0%)
2	Epithelioid cell and giant cell	53(7.04%)	5 (9.43%)
3	Epithelioid cells and necrosis	236(31.38%)	26(11.01%)
4	Epithelioid cells, giant cells and necrosis	108(14.36%)	7(6.48%)
5	Necrosis, polymorphs and lymphocytes	49(6.51%)	21(42.85%)
6	Acellular necrotic material	92(12.23%)	24(26.08%)
7	Epithelioid cells, necrosis, polymorphs with or without lymphocytes	149(19.81%)	37(24.83%)
8	Total	752	123(16.35%)



Figure 1: Epithelioid cell granuloma with lymphocytic infiltration (Pap 40X)

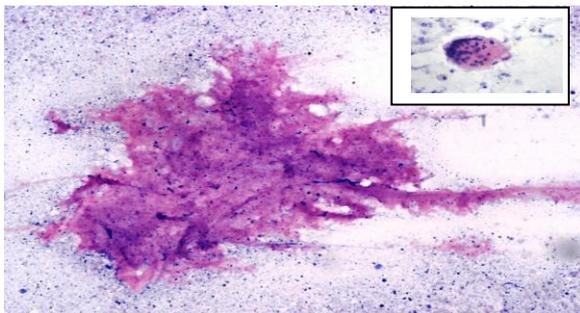


Figure 2: Caseation necrosis with Langhan giant cell in the inset (H & E 10 X)

Table 5 - Cytomorphologic Features in Tuberculous Lymph Nodes

Cytomorphological Features	Total Number	Percentage (%)
Epithelioid cells	611	81.25
Caseous necrosis	542	72.07
Polymorphonuclear leucocytes	198	26.32
Giant cells	151	20.07
AFB (Ziehl Neelsen)	121	16.09

Amongst the 1390 lymph node aspirates, 405 (29.13%) were reactive lymphadenopathies. It commonly presented with asymptomatic lymph node swelling, fever and cough. More than 70% patients were younger than 30 years and 12.34% of patients had past history of tuberculosis.

A necrotizing and suppurative inflammation was seen in 111 (7.9%) cases; however culture studies were not noted.

TABLE 6: Correlation Of Cytology And Histopathology

No	Cytology Diagnosis	No of cases	Histopathology diagnosis		
			Consistent	Inconsistent	Biopsy
LYMPH NODE (1390) 68					
A	Non neoplastic(1268) 48				
	Reactive	405	10	0	10
	Granulomatous	241	2	0	2
	Tuberculosis	511	35	0	35
	Necrotizing and suppurative	111	1	0	1
B	Neoplastic (122) 20				

DISCUSSION

Fine needle aspiration cytology is a simple and rapid diagnostic method especially in the evaluation of tuberculous lymphadenopathy. This study is emphasizing on accuracy of FNAC as a sole diagnostic method with comparison to biopsy. We studied an appreciable number of 1446 lymph node aspirates prospectively over the period of 2 years. The lesions encountered were extensive from infections

to malignancy. An inadequate aspirate reported in present study were 3.87% whereas in similar studies it ranged from 3% to 15%. [4-6]

TUBERCULOUS LYMPH NODES

India is one of the highest TB burden countries with 2.2 million cases of global 8.7 million cases of tuberculosis. [7] Tuberculous lymphadenitis is the most common site for extrapulmonary tuberculosis. FNA is a simple, rapid and

cost effective procedure to support the clinical diagnosis of tuberculous lymphadenitis so that the patient can be started with early anti-Koch's treatment (AKT). It can also be used to monitor treatment response for AKT. The incidence of tuberculous lymphadenitis was 54.10% in our study whereas it varied from 30% to 70% in comparative studies. [8-10]

The youngest patient was 5 month old and eldest was 81 years with slight female preponderance (M: F ratio of 1:1.27). Incidence of tuberculosis was higher in younger female. Poor nutrition and ignorance of female health could be the contributory factors. More than 70% patients were younger than 40 year hence tuberculosis is affecting economically productive age group. Arora and Arora [11] and Lau et al [12] also reported predominance of younger age group with female preponderance.

Clinically 20.77% patients presented with only lymph node enlargement without any other clinical symptom suggesting tuberculous lymphadenitis should be considered in patients with asymptomatic lymph node enlargement. Past history of tuberculous lymphadenitis was given by 85 (11.30%) patients while 40 patients (5.31%) were already taking AKT during the study. History of contact with tuberculosis patients was present in 29 patients (3.85%).

Macroscopically, whitish aspirate was reported in 333 (44.28%), cheesy in 143 (19.01%), aspirate admixed with blood in 123 (16.35%), extensively haemorrhagic in 86 (11.43%) and purulent in 67 (8.90%). Metre and Jayaram [13] reported classic cheesy aspirate in 25% of cases, Dasgupta et al [14] in 84.2 % while Samaila MO et al [15] reported in 14.6%.

All tuberculous lymph nodes were categorized in to 7 groups depending on microscopic features, as illustrated in table no.4. The common cytomorphological features reported in order were, combinations of epithelioid cells and necrosis (31.38%) followed by epithelioid cells, necrosis and polymorphs (19.81%),

epithelioid cells, giant cells and necrosis (14.36%), epithelioid cells, necrosis, polymorphs and lymphocytes (19.81%), acellular necrotic material (12.23%), epithelioid cell only (9.97%) and epithelioid cells with giant cells (7.04%). Overall AFB positivity was 16.35%. It is interesting to note that a significant number of tuberculous cases showed a polymorphonuclear infiltrate.

Arora and Arora [11] reported epithelioid cells, giant cells and necrosis in 45% smears, followed by epithelioid cells and necrosis in 15% and necrosis, polymorphs, lymphocytes in 15%. Lau et al [12] reported epithelioid granulomas in 68% of cases, multinucleated giant cells in 44%, caseous necrosis in 31% with overall AFB positivity of 37% while Dasgupta et al [14] reported caseation in 84.2 % cases, epithelioid cells in 73.6% with overall AFB positivity was 45.6%.

On correlating the nature of aspirate with microscopic features, it was noticed that, 89.18% of cheesy aspirates showed caseous necrosis. Granulomas were seen commonly with whitish aspirate (91.89%). Metre and Jayaram [13] reported granulomas in all the whitish aspirates.

When nature of aspirate was correlated with the AFB positivity, highest positivity of 32.25% reported in purulent aspirates, followed by 20.27% in caseous and lowest of 0% in hemorrhagic aspirates. Similarly, Mistry Y. et al [16] reported highest AFB positivity of 53.33% in purulent aspirates followed by 33.33 % in cheesy aspirates while lowest 5.88 % with blood mixed aspirates.

On cytology smears, highest AFB positivity of 42.85% was seen in smears with necrosis, polymorphs and lymphocytes group, followed by 26.08% in acellular necrotic material and lowest of 4% in smears with epithelioid group.

Arora and Arora [11] got maximum AFB positivity of 100% in smears showing acellular necrotic material, followed by 88.90% in epithelioid cells, giant cells and necrosis, 53.30% in epithelioid cells and

necrosis and lowest of 14.3% in smears with epithelioid cells only.

The AFB positivity was proportionally higher in comparative studies because of utilization of combination of Ziehl-Neelsen, Auramine-rhodamine and culture studies, while in present study only Ziehl-Neelsen technique was used. Thus the importance of meticulous screening for acid fast bacilli in smears using a combination of Ziehl-Neelsen and fluorescent microscopy and culture studies is highlighted by this comparison. [11]

REACTIVE LYMPH NODE LESION:

There were 405 cases (29.13%) diagnosed as reactive lymphadenitis, constituted for second largest group. Asymptomatic lymph node swelling was the commonest symptom followed by fever and cough. A past history of tuberculosis was given by 50 patients. It was commonest cause of lymphadenopathy in pediatric age group. Anterior triangle of neck was the commonest site of involvement.

Reactive lymph nodes reported by similar studies ranges from 16.1% to 53.6% [10,17,18]

On cytomorphological analysis, 144 (35.55%) smears reported tingible-body macrophages and 294 (69.90%) lymphohistiocytic clusters, this correlates well with the study done by O'Dowd et al who reported presence of lymphohistiocytic aggregate in 72% of cases. [19]

LYMPH NODE METASTASIS

Out of the total 1390 adequate lymph node aspirates, 101 (7.26%) showed metastatic malignancy. The incidence of metastatic malignancies in lymph node aspirates ranged from 10% to 56.81% in various studies. [4,8,20,22,23] Maximum patients with metastatic malignancies were elderly males with metastatic squamous cell carcinoma being the commonest.

LYMPHOMA

Of the 1390 adequate lymph-node aspirates, diagnosis of lymphomas was established in 19 (1.36%).

Incidence of lymphomas in various studies ranging from 1.50% to 5.21%. [4,6,8,21,24]

SUPPURATIVE LYMPH NODES-

There were 97 (6.97%) aspirates showing suppuration with no evidence of granuloma, caseous necrosis, or giant cells and negative for acid fast bacilli by Ziehl Neelsen stain. These were the cases Aspirates were not subjected to the cultures studies and hence etiology of these suppurative cases could not be determined. Patra et al [8] also reported 5.3% of suppurative lymphadenitis.

DIAGNOSTIC PITFALL

Amongst the 68 histopathologically confirmed cases from lymph node, 67 (98.52%) were accurate. Of these, 46 cases patients had benign lesion, 20 diagnosed as positive for malignancy. There was one case of reactive lymphadenopathy which was diagnosed as lymphoproliferative disorder on cytology. The sensitivity, specificity, positive and negative predictive values are 100%, 97.87%, 95.23%, 100%.

These are cases where diagnosis of malignancy was made on cytology but were non neoplastic on histopathological examination. In the present study, one false positive diagnosis was encountered. Cytologically one case was diagnosed as lymphoproliferative disorder (Non Hodgkin Lymphoma) but on histology it was proved to be reactive lymph node. In this case, smears were highly cellular and showing numerous lymphoid immature cells. Reactive lymphadenitis is known to cause false positive cases.

SUMMARY AND CONCLUSIONS

The distinction between reactive and malignant lymphoid proliferations is the most problematical area in lymph node but FNA helps to identify the patients who need a biopsy especially in cases with strong clinical suspicion and hence is a good screening tool. Thus, accurate pathological assessment of the malignant lesions and close collaboration between the clinician and the pathologist may maximize the

diagnostic potential in treatable malignancies as well as occult primaries.

In developing countries where facilities for biopsy are not readily available, FNAC reduce need of surgical biopsy. To conclude, FNAC is a gold standard for preoperative assessment of head and neck masses. Early and accurate diagnosis reduces surgical intervention, morbidity and mortality. It is safe, easy, fast accurate, effective, easy to perform, minimally invasive and cost effective.

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