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Utility of FNAC in Lymphadenopathy

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Abstract

Introduction: Lymphadenopathy is routinely encountered clinical presentation, affecting all age groups. It can be due to inflammatory process or malignancy. Fine needle aspiration cytology is an easy tool in the diagnosis of lymphadenopathy.

Aims & Objective: This study was aimed to see the spectrum of lesions in lymph nodes and the utility of aspiration cytology in their diagnosis.

Materials & Methods: This was a one year retrospective study carried out in a tertiary care hospital in south-west Maharashtra. Total 161 lesions were reported in this period. Cervical lymph nodes were most commonly affected. Reactive lymphoid hyperplasia was most common lesion followed by tuberculous lymphadenitis. Metastasis was common in elderly age group.

Conclusion: Fine needle aspiration cytology (FNAC) is a non-invasive, rapid and inexpensive, OPD based procedure to differentiate between reactive, inflammatory and malignant lesions.

Keywords: FNAC, lymph node, metastasis

1. Introduction

Enlarged lymph node is a commonly encountered clinical problem in the outpatient department. This may be a reaction to inflammatory process (acute/chronic) or due to primary malignant lymphoma and metastatic malignancies. Enlarged lymph nodes were the first organs to be sampled by fine needle aspiration (FNA).[1] Aspiration of lymph nodes for diagnostic purpose was first reported in 1904 by Grieg and Gray in the diagnosis of Trypanosomiasis.[2] FNAC is minimally invasive, safe, rapid and cost effective technique in establishing the diagnosis of lymphadenopathy. In cases of unknown primary, a positive diagnosis of metastatic disease in lymph nodes helps not to confirm malignancy but also gives an indication of the possible primary site. FNA has a high sensitivity and specificity in the distinction between a benign and malignant lesion. Sensitivity of FNAC for metastatic lesions to lymph nodes has varied from 97.9% to 100%, whereas the specificity has been found to be 100% [3]. Lymphoma diagnosis is a combination of pattern and cytomorphology in addition to immunophenotypic, genotypic, and clinical features. FNAC is not a substitute for conventional surgical histopathology. Instead, it should be regarded as being complimentary to it, part of the diagnostic processes in combination with clinical, radiological and other laboratory data.

Here, we report our experience of 161 cases of lymphadenopathy diagnosed by FNAC.

2. Materials and Methods

This study was carried out in a tertiary care hospital providing medical services to the rural population. This was a retrospective study between Jan 2016 and Dec 2016. All the patients presenting with enlarged lymph nodes were included in the study. Detailed clinical history and meticulous physical examination including the duration of swelling, size, number, matted/ discrete, consistency and mobility were taken into account. FNA was performed using 22-24G needles attached to 10cc syringes. One to two passes were given and the aspirated material was smeared onto glass slides. Smears were fixed in 95% ethyl alcohol and stained with Papanicolaou & Hematoxylin and Eosin stains. Giemsa stain was done on air dried smears. Ziehl-Neelson (ZN) staining was done whenever a cytological diagnosis of granulomatous disease was made and also in cases with abundant necrosis and suppuration. In cases where fluid was aspirated on FNA, the fluid was centrifuged and smears were prepared from the sediment followed by the above staining methods. The cytological diagnosis for each case was based on cytomorphology and available clinical information.

3. Results

Total 646 FNA were performed during the 1 year study period in our institute. Lymph node FNA was performed in 167 cases accounting 25.8% of total FNA. In 6 cases aspiration material were haemorrhagic where no opinion was possible, so these cases were excluded from the study. Hence, final study included 161 cases. All age groups were seen to be affected by enlarged lymph nodes (Table 1). Youngest was 2 years and oldest was 90 years old. Females (54.7%) showed slight predominance over males (45.3%) with male to female ratio of 1:1.2. Cervical lymph nodes were most commonly affected site, followed by submandibular and axillary (Table 2). Reactive hyperplasia was the most common lesion accounting for 71 cases (44.1%). This was followed by tuberculous lymphadenitis, acute suppurative lesions and metastasis. Non Hodgkin lymphoma was reported in one case. Reactive hyperplasia was reported predominantly in early age. 33 cases (46.5%) were reported in first two decades. Tuberculous lymphadenitis was observed predominantly in third and fourth decade (72.2%). The cytological smear revealing features of tuberculous lymphadenitis were group according to Heerde PV, *et al.* [4] into four categories:

1. Epithelioid granulomas with caseous necrosis

2. Epithelioid granulomas without necrosis
3. Necrosis without epithelioid granuloma
4. Polymorphs with necrosis with/without epithelioid granuloma

Epithelioid granuloma with caseous necrosis was the most common presentation (46.3%) (Table 3). Acid fast bacilli (AFB) positivity was seen in 22 cases (40.7%); however percentage of AFB positivity was higher in cases with necrosis without epithelioid granuloma (8 out of 12). History of HIV infection was seen in 27 cases (50%). Granulomatous lymphadenitis diagnosis was given in cases where epithelioid granulomas were seen without caseous necrosis, AFB smears were negative and patient had no history of tuberculosis or HIV infection. It was seen in 5% cases. Acute suppurative lymphadenitis was seen in 8.7% of cases. A single case of Non Hodgkin lymphoma was reported in a male patient in 4th decade. Metastasis to lymph nodes were reported in 13 cases (8.1%). Metastasis was seen predominantly in the 7th decade (38.5%). Most common metastasis was from squamous cell carcinoma.

Table 1: Age wise distribution of lesions

Age group (years)	RH	TL	GL	ASL	NHL	M	Total
1-10	17	0	1	1	0	0	19 (11.8%)
11-20	16	6	0	2	0	0	24 (14.9%)
21-30	11	18	3	0	0	1	33 (20.5%)
31-40	9	21	2	2	1	1	36 (22.4%)
41-50	8	4	1	3	0	3	19 (11.8%)
51-60	6	5	0	3	0	1	15 (9.3%)
61-70	3	0	0	2	0	5	10 (6.2%)
71-80	1	0	0	1	0	1	3 (1.9%)
81-90	0	0	1	0	0	1	2 (1.2%)
Total	71 (44.1%)	54 (33.5%)	8 (5%)	14 (8.7%)	1 (0.6%)	13 (8.1%)	161

RH: Reactive hyperplasia, TL: Tuberculous Lymphadenitis, GL: Granulomatous Lymphadenitis, ASL: Acute Suppurative Lymphadenitis, NHL: Non Hodgkin Lymphoma, M: Metastasis

Table 2: Site wise distribution of lesions

Site	No. of cases	Percentage
Cervical	111	69.0
Submandibular	13	8.1
Axillary	11	6.8
Inguinal	8	5.0
Supraclavicular	7	4.3
Post-auricular	5	3.1
Sub-mental	4	2.5
Occipital	2	1.2
Total	161	100

Table 3: Tuberculous lymphadenitis

Cytomorphological features	No. of cases	AFB positive
Epitheiloid granuloma with caseous necrosis	25	11 (44%)
Epithelioid granuloma without necrosis	7	0
Necrosis without epithelioid granuloma	12	8 (66.7%)
Polymorphs with necrosis with/without epithelioid granuloma	10	3 (30%)
Total	54	22 (40.7%)

4. Discussion

Lymphadenopathies are reactive processes of lymph nodes in response to a variety of exogenous and endogenous stimulants [5]. Possible causes of lymphadenopathies include microorganisms, autoimmune diseases, immune deficiency and dysregulation, foreign bodies, medical procedures, and tumours. Lymphadenitides are acute and chronic inflammatory processes of lymph nodes that occur in response to a variety of pathogenic agents which can be viruses, bacteria, fungi, and protozoa [5]. FNAC of lymph nodes is an extremely useful procedure. It is minimal invasive, safe, rapid and cost effective outpatient procedure. The major relative contraindication is a severe coagulation disorder. Complications of lymph node FNA are rare. The most common is a hematoma. The main purpose of cytological examination is to decide whether the lymphadenopathy is due to reactive hyperplasia, inflammatory pathology, metastasis or lymphoma and thus triaging of cases [6]. Most investigators report over 90% accuracy in the diagnosis of metastatic tumour to lymph node and a positive predictive value of 100% [7]. Similarly, accuracy of diagnosis of lymphoma is high with positive predictive value over 90% [7]. However, the role of FNAC in initial diagnosis and sub classification of primary lymphoid malignancy is still controversial and the cytological diagnosis of lymphoma on FNAC is still very often followed by tissue biopsy in most cases [8]. In the present study, out of 167 lymph node aspirates, 6 were unsatisfactory. This might be due to inexperience of the person performing the procedure as the study was conducted in a teaching institute. There was wide distribution of age group affected in present study, ranging from 2-90 years. 42.9% of lesions were seen in the 3rd and 4th decade. Most common age group affected was 4th decade (22.4%). Hafez *et al.* [8] and

Chawla *et al.* [9] also reported 3rd-4th decade predominance (36.9% & 41.4% respectively). Patel MM *et al.* [1] reported maximum cases in the 3rd decade (22.9%). This variation may be due to different population density or geographic variation. 69.6% of cases were seen in the first four decades. This was because of higher percentage of reactive and inflammatory lesions in the early age groups.Females were more commonly affected than males with male to female ratio of 1:1.2. Hafez *et al.* [8] reported similar findings (M: F=1:1.2). Patel MM *et al.* [1] and Chawla *et al.* [9] showed male predominance (1.3:1). This variation may be again due to different population density or geographic variation. Cervical lymph nodes were the most common site to be affected, accounting for 69% of all cases. This was similar to studies conducted by Patel MM *et al.* [1] (83.9%) and Hafez *et al.* [8] (56.7%). Reactive hyperplasia was the most common lesion (44.1%) (Fig 1). Chawla *et al.* [9] and Pandey *et al.* [10] also reported reactive hyperplasia as predominant lesion (41% & 30.6% respectively). Anila *et al*. [6] reported metastatic deposit as most common lesion followed by reactive hyperplasia. This difference was because of the Anila *et al.* [6] study was conducted in a cancer centre. Reactive hyperplasia in our study was more common in early age groups. 46.5% of cases were reported in the first two decades. Out of 19 cases of lymphadenopathy in first decade, 17 were reported to be reactive hyperplasia. Singh *et al.* [2] study in paediatric age group documented 71% cases as reactive hyperplasia. Thus, our finding correlated with Singh *et al.* [2]

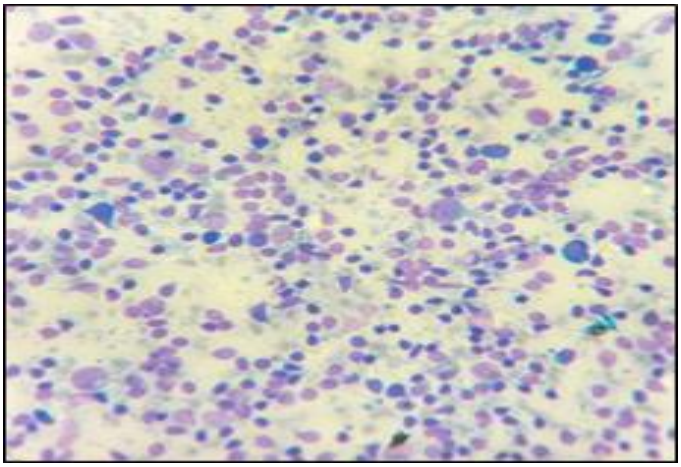

Fig 1: Reactive lymphoid hyperplasia. Polymorphous population of lymphoid cells (Giemsa stain, x40).

Tuberculous lymphadenitis was the second common lesion (33.5%) (Fig 2 & 3). Chawla *et al.* [9] (31.7%) and Pandey *et al.* [10] (28.6%) also reported tuberculous lymphadenitis as the second common lesion after reactive hyperplasia. However, Patel MM *et al.* [1] (50.5%) and Patel PK *et al.* [11] (38.6%) reported tuberculous lymphadenitis as most common lesion followed by reactive hyperplasia. This slight variation may be due to different study population and geographic distribution. Out of 54 cases of tuberculosis, 27 cases showed history of HIV infection. Thus, high prevalence of tuberculous lymphadenitis can be attributed to association with HIV infection. As compared to people without HIV, people living with HIV have a 20-fold higher risk of developing tuberculosis [12]. We classified cytomorphological features of tuberculous lymphadenitis according to Heerde PV, e*t al.* [4] Epitheliod granuloma with caseous necrosis was the most common presentation. AFB positivity was seen in 40.7% cases. However, the percentage of AFB positivity was more in necrosis without epithelioid granuloma. AFB positivity was close to Jagtap *et al.* [13] (32.7%) and Das *et al.* [14] (45.6%). Higher percentage of AFB positivity in necrosis without granuloma was reported by Khajuria *et al.* [15] (78%) and Laishram *et al.* [16] (100%). Tuberculosis has been declared as a global emergency. More than two billion people equal to one third of the world's population is infected with Mycobacterium Tubercle bacilli. One third of all new cases are in India and China [17].

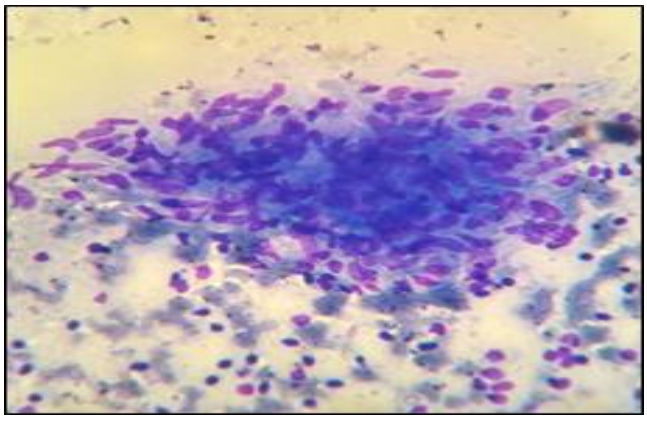

Fig 2: Tuberculous lymphadenitis. Cluster of epithelioid cell with surrounding lymphocytes (Giemsa stain, x40).

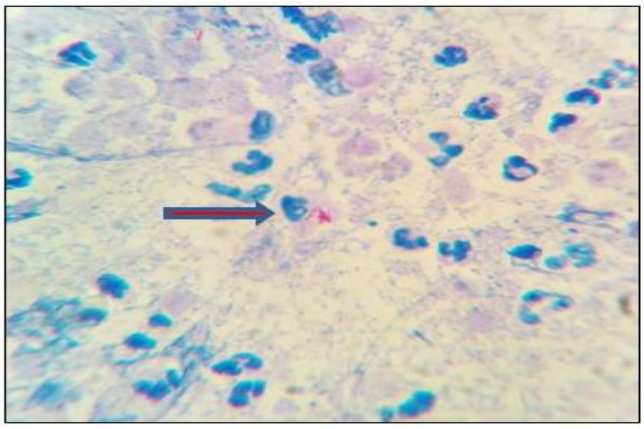

Fig 3: Tuberculous lymphadenitis. AFB positive bacilli (ZN stain).

Granulomatous lymphadenitis was reported in 5% of cases. It was more common in 3rd and 4th decade (5 out of 8). Granulomatous lymphadenitis is a manifestation of several disorders and is mainly caused by infections, sarcoidosis, foreign body reactions, lymphomas and lymph nodes draining carcinomas. Some authors believe in regions where tuberculosis is very common, morphologic findings of granulomatous inflammation are consistent with tuberculosis [17]. So, we advised culture and CBNAT in such cases to rule out tuberculosis. In the present study, suppurative lesion was seen in 8.7% cases. Suppurative lymphadenitis refers conventionally to acute, localized infections caused by pyogenic bacteria (eg, Staphylococcus aureus and Streptococcus pyogenes). However, several organisms (eg, Mycobacterium tuberculosis, Bartonella henselae, Francisella tularensis, Yersinia pestis) are not typically pyogenic, and yet may produce localized lymphadenitis that progresses to

necrosis and/or liquefaction, thereby resembling the clinical presentation of suppurative lymphadenitis [18]. Suppurative lymphadenitis is a common diagnosis, especially in the pediatric age group. We reported 3 cases in the paediatric age group. A single case of Non-Hodgkin lymphoma was reported in a male patient in 4th decade with history of HIV infection. Histopathological examination and immunohistochemistry was advised to confirm the diagnosis. Metastasis was seen in middle and elderly age group. Most common age group affected was 7th decade (38.5%). Squamous cell carcinoma was most common metastasis reported in 6 cases (Fig 4). Adenocarcinoma was reported in 2 cases, breast carcinoma in 1 case and renal cell carcinoma in 1 case. Remaining 3 cases were reported as undifferentiated. Other studies also reported squamous cell carcinoma as most common metastases [1, 6, 8]. Different studies have reported sensitivity and specificity of FNAC in metastatic lymphadenopathy over 97.9% and 100% respectively [19, 20].

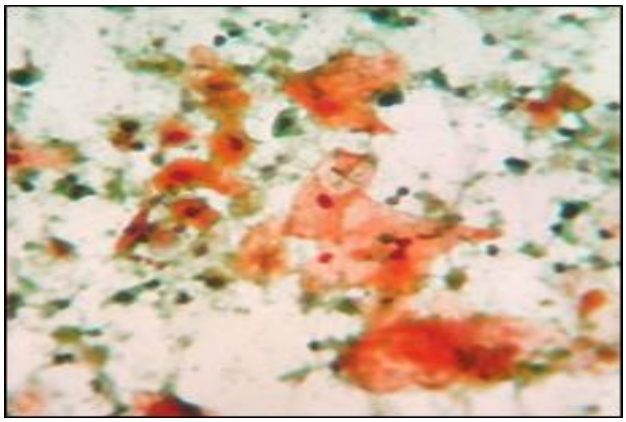

Fig 4: Metastatic keratinising squamous cell carcinoma (Pap smear, x40).

5. Conclusion

Lymphadenopathy is a common presenting complaint in all age group. Cervical lymph nodes are the most common sites to be affected. Reactive /inflammatory lymphadenopathy is more common in childhood and early adulthood. Lymphadenopathy in elderly patients is less common as compared to early age group. But, in such patients they are more due to metastasis than reactive/inflammatory conditions. Hence, these patients need close clinical follow up and further investigation to rule out malignancy. FNAC is a non-invasive, rapid and inexpensive, OPD based procedure to differentiate between these reactive, inflammatory and malignant lesions. It should be used as an adjunct to compliment the clinical diagnosis, radiology and other laboratory investigation.

6. References

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