Content available at: iponlinejournal.com

Indian Journal of Microbiology Research

Journal homepage: www.innovativepublication.com

Original Research Article

Etiological evaluation of purulant aspirates on lymph node FNAC

Pushpendra Singh Bhagor[1], Rajeev Saxena[1,*]

[1] *Dept. of Pathology, Government Medical College, Kota, Rajasthan, India*

ARTICLE INFO

Article history:
Received 02-01-2020
Accepted 21-02-2020
Available online 08-04-2020

Keywords:
Lymphadenopathy
FNAC
ZN stain
Granulomas

ABSTRACT

Fine needle aspiration is the mainstay in the diagnosis of Lymphadenopathies. In present study the purulent aspirates from lymph nodes were evaluated for etiological agents to know the distribution pattern of various disease agents.

Materials and Methods: This study was a prospective one covering 100 cases taken from patients attending MBS and NMCH Hospitals under Govt. medical college, Kota. Our study spanned from January to December, 2017.

Results and Conclusion: Out of a total of 100 cases incidence of different types of lymphadenopathies were, Tubercular, 55%, Acute suppurative, 27%, Granulomatous Inflammatory, 12% and Metastatic Carcinoma, 6%. Cases of lymphadenopathy showed a wide age range from 1 to 73 years. Male to female ratio was 1:1.04. AFB positivity was seen in 61.8% cases of Tubercular lymphnoditis. Among the 55 cases of tubercular lymphnoditis, 46 (83.6%) cases showed Auramine Rhodamine positivity while only 34 (61.8%) corresponding cases were positive by Ziehl Neelsen stain, demonstrating higher sensitivity of Auramine Rhodamine stain.

In present study, commonest cause of Metastasis in lymph nodes was Squamous Cell Carcinoma (33.3%). Other diagnosis were Metastatic Adenocarcinoma, Duct carcinoma breast, Mucoepidermoid carcinoma and poorly differentiated carcinoma. On gram's staining out of 27 cases of Acute suppurative lymphnoditis, 3 showed positivity for gram positive cocci. Out of 3 cases, 1 case showed gram positive cocci in clusters and 2 cases showed gram positive diplococci. Diplococci were more common in younger population.

FNAC is a safe, convenient, rapid and inexpensive first approach procedure, without any complications in evaluation of cases of lymphadenopathy and can be practiced even in peripheral hospitals where histopathological techniques are not available.

1. Introduction

Fine needle aspiration cytology (FNAC) is a simple and rapid diagnostic technique. Because of early availability of results, simplicity, minimal trauma and complications, aspiration cytology is now considered as a valuable diagnostic tool and is extremely popular.

Lymphadenopathy or adenopathy is disease of the lymph nodes, in which they are abnormal in size, number, or consistency. Lymphadenopathy of an inflammatory type (the most common type) is lymphnoditis, producing swollen or enlarged lymph nodes. In clinical practice, the distinction between lymphadenopathy and lymphnoditis is rarely made and the words are usually treated as synonymous. Causes of lymphadenopathy are reactive lymphnoditis, infections, malignant lymphoma and leukemias, metastatic malignancies and autoimmune disorder. It is important to differentiate between benign and malignant conditions to decide the further line of management. A group of nodes that feels connected and seems to move as a unit is said to be "matted." Nodes that are matted can be either benign (e.g., tuberculosis, sarcoidosis or lymphogranuloma venereum) or malignant (e.g., metastatic carcinoma or lymphomas).

* *Corresponding author*.
E-mail address: rajprasax58@gmail.com (R. Saxena).

https://doi.org/10.18231/j.ijmr.2020.003

The main causes of purulent aspirates from lymph nodes are extra-pulmonary tuberculosis, diabetes, malignancies, in HIV infected persons, T.B. with HIV, fungal infections, cat scratch disease and many bacteriological conditions etc.

Tuberculous Lymphadenopathy is the commonest form of extra pulmonary tuberculosis in regions where mycobacterial infection is highly prevalent and presents commonly in lymph nodes draining the head and neck.

Bacterial lymphnoditis is most common in the pediatric population and affects regional lymph nodes draining areas of bacterial infections

Purulent aspirates can also be found in some of the malignancies and creates difficulty in diagnosis. For diagnosis of etiological agent various stains were used.

2. Aims and Objectives

1. The aim of present study is to evaluate cause of infectious purulent lymphadenopathies.
2. To find out less common and rare causes of such lesions like infection by fungal agents in cases of immune-suppression /AIDS patients.
3. Such a study will give us an idea about the incidence of these etiological agents in causing purulent lymphadenopathy.
4. It will also tell us about a possible coexistence of more than one etiological agent in causing such lesions.

3. Materials and Methods

3.1. Source of data

Patients of all age groups at New medical college hospital and MBS hospital associated with Government Medical College, Kota, in whom FNAC of lymph nodes has been advised, based on clinical and radiological findings, and produced purulent aspirates, were included in this study. Total 100 cases were studied for the same. Cases included in this study were taken from January to December, 2017.

Each case was subjected to a detailed history, thorough clinical examination, routine haemogram, HIV status and imaging (USG/CT) studies wherever needed as per the proforma. Patients for FNAC needed no anaesthesia or sedation.

For staining of the smear ZN Stain, PAS, GIEMSA, GRAM'S Stain, AURAMINE RHODAMINE Stains were used.

3.2. Inclusion criteria

Patients of all age groups with superficial and deep lymphadenopathies producing purulent aspirates.

3.3. Exclusion criteria

Non cooperative patients.

Patient with insufficient and blood mixed aspirates.

4. Discussion

Etiological profile in present study showed Tubercular Lymphnoditis (55%) and Acute Suppurative Lymphadenopathy (27%) as being the commonest causes of lymphadenopathy followed by Granulomatous (12%) and Metastatic causes (6%). Our results indicated that tuberculosis and other benign conditions constituted a major cause of purulent aspirates from enlarged lymph nodes.

4.1. Tubercular lymphnoditis

Our findings were comparable to findings of Dev prasoon[1] who found maximum AFB positivity in purulent aspirates from Lymph nodes. Dev prasoon[2] observed that the relation between granulomas and AFB was inverse.

Swellings at various anatomical sites were the most common presenting complaint of which cervical swelling dominated with 66% of cases. Unilateral lymph node enlargement was a common presentation (76%) as compared to bilateral (24%).

The maximum number of aspirations were done from cervical lymph nodes (66%) followed by submandibular (13%), axillary (9%), supraclavicular (6%), inguinal (5%) and postauricular (1%) lymph node. This may be due to the easy accessibility of cervical lymph nodes for examination and evaluation, a finding similar to Alam K et al.[3] However, Ojo et al[4] found axillary nodes to be most common site of involvement followed by cervical lymph nodes.

In the present study, tubercular lymphnoditis most commonly showed presence of epithelioid cell clusters with necrosis (with or without Langhan's giant cells) (60%), followed by necrosis alone (18.2%). (confirmed by positive AFB stain), only epithelioid cell clusters without necrosis (with or without Langhan's giant cells) (12.7%), and occasional epithelioid cells without necrosis or Langhan's giant cells (9.1%).

These findings correspond well with findings of study done by Arun K Gupta et al.[5] Epithelioid cell clusters with or without Langhans giant cells and necrosis was seen in 50.35% cases, epithelioid cell clusters with or without langhans giant cells without necrosis in 32.14%, only necrosis in 14.64% cases and occasional epithelioid cells only in 2.85% of cases. S. Bhattachrya et al[6] also found similar results in their study.

Out of 55 cases of tubercular lymphnoditis 46 (83.6%) cases showed Auramine Rhodamine positivity while only 34 (61.8%) corresponding cases were positive by Ziehl Neelsen stain. This shows higher positivity by Fluorescent microscopy on auramine rhodamine stain. Brijesh et al[7] published an article in a study – "The correlation of cytomorphological features in fine needle aspiration smears from patients suspected of having tuberculous lymphadenitis with Ziehl-Neelsen staining (ZN), Auramine-Rhodamine staining (ARS), and autofluorescence (AF) methods".

Ninety aspirates were reported on cytomorphology as suggestive of tuberculous lymphnoditis, out of a total of 150 cases. Smear positivity for Mycobacteria by conventional ZN method was 26.7% (24/90), while positivity increased to 34.4% (31/90) by ARS and to 42.2% (38/90) on AF.

4.2. Pyogenic abscess

Most common lymph node groups to be affected by Acute suppurative lymphnoditis were: cervical (62.9%), followed by submandibular, axillary, inguinal and supraclavicular region.

Gram's staining was employed in all cases of Acute suppurative lymphnoditis where 3 out of 27 cases showed gram positive cocci. Out of 3 cases 1 case showed gram positive cocci in groups and 2 cases showed gram positive diplococci.

Table 1: Distribution of cases according to FNA cyto-diagnosis

Cytological diagnosis	No. of cases	Percentage (%)
Tubercular lymphnoditis	55	55%
Acute suppurative lymphnoditis	27	27%
Granulomatous inflammatory lesion	12	12%
Metastatic carcinomas	6	6%
Total	100	100%

Table 2: Positive results with various stains used (ZN/Gram and PAS)

Cytological diagnosis	Ziehl neelsen stain	Gram's stain	PAS stain
Tubercular lymphnoditis	32	-	-
Acute suppurative lymphnoditis	-	3	-
Granulomatous inflammatory lesion	-	-	-
Metastatic carcinomas	-	-	-
Total	32	3	-

Diplococci were more common in younger population. Pneumococcal infections are thought to spread from person to person via droplets/aerosols and nasopharyngeal colonization is a prerequisite for pneumococcal disease. The carriage rate peaks around 2–3 years of age and diminishes thereafter to less than 10% in the adult population. This age group is particularly susceptible to infections partly as a result of immature immune response and frequent exposures to and colonizations by S. pneumoniae. While the prevalence and duration of pneumococcal colonization also decline over the course of childhood. No comparative studies were available for correlation with our findings.

4.3. Granulomatous lymphnoditis

12 cases of Granulomatous lymphnoditis were identified, out of 100 purulent aspirates of lymph nodes. No comparartive study for granulomatous lymphnoditis was found.

4.4. Malignant Lesions

In our study Metastatic Carcinoma was common, (83%) noted in 41-70 years of age. U. Engzell et al[8] and William L Betsill et al[9] also found that in 80-90% cases, metastatic lymph node involvement was among 41-80 years of age. So FNAC of enlarged lymph nodes in the elderly is of utmost importance, as it can provide an early clue to the diagnosis.

In our study, all cervical lymph node groups were equally affected, including supraclavicular and submandibular. These lymph nodes are most commonly involved by metastatic deposits. While result by William L Betsill et al[9] and Alam K et al[3] found cervical lymph nodes to be most commonly involved. Most lymph nodes involved by metastatic carcinoma were hard, fixed and non tender.

Out of 6 cases of metastasis, 2 cases (33.3%) were by Squamous Cell Carcinoma, one by Adenocarcinoma, one metastasis from Duct carcinoma breast, one by poorly differentiated Carcinoma and one metastasis from mucoepidermoid carcinoma. Our findings were similar to studies conducted by Chhotray and Acharya,[10] Frable WJ[11] and Pilotti et al,[12] where squamous cell carcinoma predominated over adenocarcinoma.

4.5. AIDS cases

In this study 4 HIV positive patients were seen. All of them were females. Out of these 4 cases, 2 patients (50%) showed lymphadenopathy in inguinal region followed by 1 case each of cervical (25%) and supraclavicular (25%) region. Granulomatous lymphnoditis (50%), Tubercular and Metastatic Adeno carcinoma were the diagnosis made on FNAC.

PAS staining was done in all cases of Granulomatous, Tubercular lymphnoditis and also in HIV positive cases with lymphadenopathy to find out any fungal etiological agent. But no fungal hyphae or spores were identified on PAS stain in these cases worked out.

5. Summary

1. Incidence of different types of lymphadenopathy were: Tubercular Lymphnoditis 55%, Acute suppurative lymphnoditis 27%, Granulomatous Inflammatory lesion 12% and Metastatic Carcinoma 6%.

Table 3: AFB positivity in various cytological groups in tuberculosis

Cytological Features	AFB Positivity on ZN stain	AFB Positivity on Auramine Rhodamine stain
Epithelioid cell clusters with or without langhans giant cells without necrosis	5/7 (71.4%)	6/7 (85.7%)
Epithelioid cell clusters with or without langhans giant cells with necrosis	16/33 (48.5%)	25/33 (75.5%)
Occasional epithelioid cells without characteristic necrosis or giant cells and with polymorphs	4/5 (80%)	5/5 (100%)
Necrosis without epithelioid cell clusters or langhans giant cells	9/10(90%)	10/10 (100%)

2. Unilateral lymph node enlargement was a more common presentation (76%) than bilateral (24%)
3. Cases of lymphadenopathy showed a wide age range, from 1 to 73 years. Mean age was 32.67 years.
4. 28% cases were in 1-20 year age group, 43% cases were between 21-40 yrs age group and 29% cases were in 41-70 years age group.
5. Most of the patients (77%) had duration of symptoms between one to six months. 5% of cases had presented with symptoms of less than one month duration, while 18% of cases had been symptomatic for more than 6 months at the time of presentation.
6. After lymphadenopathy, the most common presentation was fever, seen in 62% in cases, pallor in 58% of cases and splenomegaly in 2% of cases.
7. Cervical lymph nodes were involved in 66% of cases, followed by submandibular (13%), axillary (9%), supraclavicular (6%), inguinal (5%) and postauricular lymph nodes (1%).
8. Most tubercular lymph nodes were firm, non matted and non adherent (60%). Matting was found only in 20% of cases of tuberculosis. Most lymph nodes involved by metastatic carcinoma were hard, fixed and non tender while in cases of lymphoma, lymph nodes were rubbery and tender.
9. In 1-10 yrs. age group, Acute suppurative lymphnoditis was most common. In 11-40 yrs. age group commonest were Tuberculosis, Acute suppurative lymphnoditis and Granulomatous inflammatory lesion. In 41-70 year age group tuberculosis was the commonest cause.
10. 49% cases were seen in males and 51% in females. Male to female ratio was – 1:1.04.
11. Male preponderance was seen in Acute suppurative and metastatic lesions while Tuberculosis and Granulomatous inflammatory lesions were female preponderant.
12. Correlation between cytological and clinical diagnosis was noted in 80% cases of lymphadenopathy. Out of 55 cases of Tubercular lymphnoditis, 44 cases were diagnosed clinically as tubercular lymphadenopathy. In case of Metastatic carcinoma, 5 out of 6 cases were clinically diagnosed as Metastatic carcinoma.
13. Among the cytological findings of Tubercular Lymphadenopathy most smears (50.35%) had combination of presence of epithelioid granulomas with necrosis followed by epithelioid granuloma without necrosis (32.14%).
14. AFB positivity was seen in 61.8% cases of Tubercular lymphnoditis. It was maximum in cases where necrosis was found without epithelioid clusters or giant cells (90%). This shows that tuberculosis can still be diagnosed even in absence of epithelioid granulomas with the help of AFB.
15. Among the 55 cases of tubercular lymphnoditis 46 (83.6%) cases showed Auramine Rhodamine positivity, while only 34 (61.8%) corresponding cases were positive by Ziehl Neelsen stain, demonstrating higher sensitivity of Auramine Rhodamine stain.
16. On gram's staining out of 27 cases of Acute suppurative lymphnoditis, 3 showed positivity for gram positive cocci. Out of 3 cases, 1 showed gram positive cocci in groups and 2 cases showed gram positive diplococci. Diplococci were more common in younger population.
17. Diagnosis of Granulomatous lesion were made in 12 cases out of 100.
18. In present study, commonest cause of Metastasis in lymph nodes was Squamous Cell Carcinoma (33.3%) followed by metastasis from Adenocarcinoma, Duct carcinoma breast, Mucoepidermoid carcinoma and poorly differentiated carcinoma.
19. When arriving at a diagnosis, clinical profile of patient is helpful in assessing cases of lymph node enlargement, diagnostic accuracy can be significantly improved by FNAC. Staining of aspirate by Z N Stain, auramine rhodamine and grams stain can further authenticate the final diagnosis.

6. Conclusion

1. Cases presenting with lymphadenopathy showed a wide age variation from 1 to 73 years. Mean age was 32.67 years.

2. Tubercular Lymphnoditis and Acute suppurative lymphnoditis were the commonest causes of lymphadenopathy in our study.
3. Cervical group of lymph nodes were most commonly involved.
4. Commonest cause of lymphadenopathy in children was Acute suppurative lymphnoditis. In adults Tubercular Lymphnoditis and Acute suppurative lymphnooditis was common, while in older age group it was Tuberculosis and Metastatic Carcinoma.
5. Most of the patients had prolonged duration of symptoms at the time of presentation.
6. Male preponderance was seen in Acute suppurative lymphnoditis and metastatic lesions while Tuberculosis and Granulomatous lesions showed female preponderance.
7. Most patients of Tubercular Lymphnoditis showed a combination of Epithelioid cell granulomas with necrosis. AFB positivity was found in 61.8% cases while Auramine Rhodamine positivity was seen in 83.6% cases.
8. Maximum positivity of AFB in tubercular lymphnoditis were found in cases where only Necrosis without epithelioid cell clusters or langhans giant cells were present.
9. In Acute suppurative lymphnoditis 3 cases showed gram positive cocci on gram's staining, 2 out of 3 cases shows diplococci. Low positivity rate for purulent aspirates indicate low positive predictive value of Gram's staining in such cases.
10. Commonest cause of metastasis in lymph nodes was by Squamous Cell Carcinoma from head and neck malignancies, followed equally by Adenocarcinoma, Duct carcinoma breast, Mucoepidermoid carcinoma and Poorly differentiated carcinoma.
11. In the present study 4 cases showed HIV positivity. However in none of the cases any fungal etiology could be detected.
12. FNAC is a simple and accurate technique for the diagnosis of lymphadenopathy. FNAC should be used as a first line of investigation for screening lymphadenopathy in outpatient clinic.

7. Abbreviations

AF: Auro Fluorescence; AFB: Acid Fast Bacilli; AIDS: Acquired Immuno Deficiency Syndrome; ARS: Auramine Rhodamine Stain; FNAC: Fine Needle Aspiration Cytology; HIV: Human Immunodeficiency Virus; PAS: Periodic Acid Schiff; PCR: Polymerase Chain Reaction; SCC: Squamous Cell Carcinoma; TB: Tuberculosis; ZN Stain: Ziehl Neelsen Stain

8. Source of Funding

None.

9. Conflict of Interest

None.

References

1. Prasoon D. Acid Fast Bacilli in Fine Needle Aspiration Smears from Tuberculous Lymph nodes-Where to look for them. Acta Cytol. 2000;44:297–300.
2. Yaris N, Cakir M, Sözen E, Cobanoglu U. Analysis of Children with Peripheral Lymphadenopathy. Clin Pediatr. 2006;45(6):544–9.
3. Alam K, Maheshwari V, Haider N, Siddiqui F, Jain A, Khan A. Fine needle aspiration cytology (FNAC), a handy tool for metastatic lymphadenopathy. Int J Pathol. 2010;10(2).
4. Ojo BA, Buhari MO, Malami SA, Rahaman MBA. Surgical lymph node biopsies in University of Ilorin Teaching Hospital. Niger Postgrad Med J. 2005;12(4):299–304.
5. Gupta AK, Nayar M, Chandra M. Critical appraisal of Fine needle aspiration cytology in tuberculosis. Acta Cytol. 1992;36:391–4.
6. Bhattacharya S, Raghuveer CV, Adhikari MP. FNAC diagnosis of tuberculosis- An eight year study at Mangalore. Indian J Med Sci. 1998;52(11):498–506.
7. Thakur B, Mehrotra R, Nigam JS. Correlation of Various Techniques in Diagnosis of Tuberculous Lymphadenitis on Fine Needle Aspiration Cytology. Patholog Res Int. 2013;2013:824620. doi:10.1155/2013/82462.
8. Engzell U, Jakobsson PÅ, Sigurdson Å, Zajicek J. Aspiration Biopsy of Metastatic Carcinoma in Lymph Nodes of the Neck: A Review of 1 101 Consecutive Cases. Acta Oto-Laryngol. 1971;72(1):138–47.
9. William LB, Steven IH. Percutaneous aspiration biopsy of lymph nodes. Am J Clin Pathol. 1980;73(4):471–9.
10. Chhotray GP, Acharya GS. Fine needle aspiration cytology in diagnosis of metastatic lymphadenopathies. Indian J Med Res. 1987;85:685–8.
11. Frable WJ. Thin-needle Aspiration Biopsy: A Personal Experience with 469 Cases. Am J Clin Pathol. 1976;65(2):168–81.
12. Pilloti S, Palma SD, S, Bartoli CAL, Rilke F. Diagnostic assessment of enlarged superficial lymph nodes by aspiration biopsy. Acta Cytol. 1993;93:853–66.

Author biography

Pushpendra Singh Bhagor Tutor

Rajeev Saxena Senior Professor

Cite this article: Singh Bhagor P, Saxena R. **Etiological evaluation of purulant aspirates on lymph node FNAC**. *Indian J Microbiol Res* 2020;7(1):10-14.