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To study the diagnostic role of fine needle aspiration biopsy cytopathology in lymph node lesions and to find out the pattern of lymphadenopathy among patients visiting Tertiary care hospital: A cross-sectional study

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ABSTRACT

Background: Fine needle aspiration cytology (FNAC) can be a valuable tool for the evaluation of lymphadenopathies. The purpose of this study was to study the diagnostic role of FNAC in lymph node lesions and to find out the pattern of lymphadenopathy among patients visiting Tertiary care hospital.
Material and Method: Fine needle aspiration biopsy cytopathology was carried out. Giemsa staining of all FNAC smears was done and Ziehl-Neelsen staining (ZN Stain) was done to confirm the diagnosis if required.
Result: Lymph nodes were evaluated for location, consistency, size, mobility. Commonest site involved was cervical region (91.38%), most frequently encountered size was 1 - 2 cm (35.64%), majority of lesions were firm (87.35%), and most of the lymph nodes (95.40%) were mobile. Out of 166 diagnosed cases by FNAC, 95.78% were diagnosed as benign lesions and 4.22% as malignant lesions. 30.72% benign lesions were of reactive hyperplasia and 27.11% were of granulomatous lymphadenitis. All malignant lesions were the secondary lesions.
Conclusion: We conclude that FNAC of lymph nodes is a very common, simple, safe, economical, and quick diagnostic technique that eliminates the need for an open biopsy, anesthetic, surgical complications, and hospital stays.

1. Introduction

A prevalent clinical manifestation among patients who visit the outdoor clinics in the majority of hospitals is lymphadenopathy, which can have a range of etiologies, from inflammation to malignancy. The term "lymphadenopathy" refers to aberrant lymph nodes in terms of size, consistency, or number.[1]

Fine Needle Aspiration Cytology (FNAC) is a widely used, simple, safe, economical, and quick diagnostic technique that can help identify a variety of disease disorders involving lymph nodes with accuracy and timeliness.[2] It is a vital task for the physician to determine which cases of lymphadenopathy are benign and which cases are due to malignancies or other dangerous illnesses. FNAC is a tool that can be used for both therapy and diagnosis. It functions as a supplement to histology and can eliminate the need for an incisional or trucut biopsy.[2] Additionally, it guides the therapeutic treatment by preventing needless surgeries and costs.[3]

When combined with clinical symptoms, radiographic, and laboratory tests, FNAC can be a cost-effective technique that significantly reduces the amount of time it takes for patients to see a clinician for the first time before a definitive diagnosis is made and an appropriate course of treatment is started.[4] When used in conjunction with

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auxiliary methods, lymph node FNAC can confirm to a physician that a lymphadenopathy is benign and highlight the need for clinical follow-up to identify any potential false negative results. If all goes well, it can give enough information to start treatment and avoid the need for more invasive procedures later on. It can be done in most situations, even when more invasive techniques are not practical, because of its speed, minimal invasiveness, and low cost.[5] The complications associated with FNAC are relatively rare and they all are minimized by the use of small size of the needle.[6] Even with issues affecting accuracy such as inadequate aspirate, error in sampling, and lack of histological information, FNAC has developed into a dependable cytological method.[7]

The purpose of the current study was to determine the pattern of lymphadenopathy in patients at the National Capital Region Institute of Medical Sciences, Meerut, as well as the diagnostic utility of FNAC in lymph node lesions.

2. Aims and Objectives

1. To find out the pattern of lymphadenopathy among patients visiting to tertiary care hospital
2. To study the diagnostic role of Fine Needle Aspiration Cytology in superficial and deep-seated lymph nodes.

3. Material and Methods

3.1. Study design

Hospital based cross - sectional study.

3.2. Place of study

Department of Pathology, National Capital Region Institute of Medical Sciences, Meerut.

3.3. Duration of study

1^{st} November 2022 to 31^{st} October 2023.

3.4. Study population

All patients undergoing Fine Needle Aspiration Cytology for lymphadenopathy were enrolled in the study.

3.5. Inclusion criteria

All patients having lymphadenopathy (OPD and IPD patients) and who were willing to give their consent were included in the study.

3.6. Exclusion criteria

Patients who were not willing to give their consent were excluded from the study.

4. Materials and Methods

The study was undertaken after obtaining approval from the Independent Ethics Committee (1396/22) for Human Research. An informed consent was taken from all patients. In all patients a detail clinical history i.e. age, sex, duration of complaints, past history, family history and history of tubercular contact and prior anti tubercular treatment was taken as per the case record form. Physical examination was carried out which included whether lymph node involvement was single or multiple, unilateral or bilateral, localized or generalized. Fine needle aspiration biopsy cytopathology was carried out. Giemsa staining of all FNAC smears was done and Ziehl-Neelsen staining (ZN Stain) was done to confirm the diagnosis if required. Appropriate measures were taken to exclude bias from the investigator. Adequate care was taken so that patients did not face any problem. All findings were tabulated, analyzed and recorded. Statistical evaluation was done and data was expressed in number and percentage.

5. Results

The present study was conducted among 174 patients visiting National Capital Region Institute of Medical Sciences, Meerut and presenting with localized or generalized lymphadenopathy (Table 1).

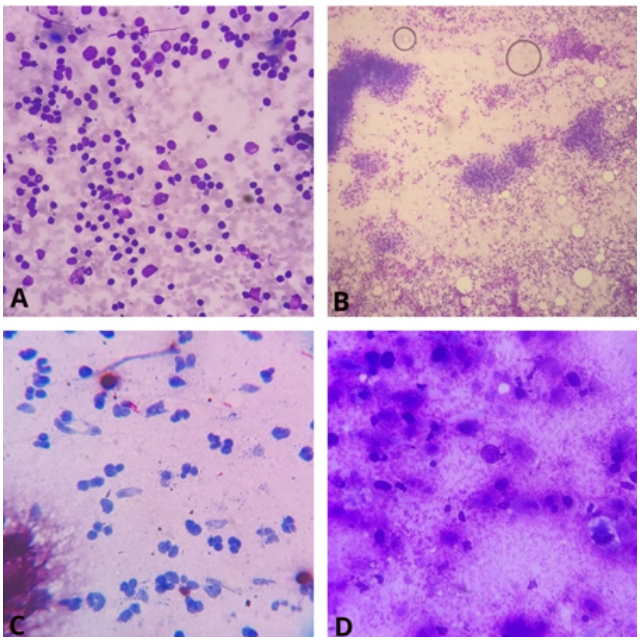

Figure 1: Benign lesions of Lymph Node; **A:** Reactive hyperplasia of lymph node; **B:** Granulomatous Lymphadenitis; **C:** Tubercular lymphadenitis; **D:** Lymph node necrosis

We observed that the commonest site involved was the cervical region in 159 (91.38%) patients, most frequently encountered size was 1–2 cm in 62 (35.64%) patients,

Table 1: Demographic data ofpatients

Age (years)	Number of patients				
	Male		Female		Male: Female
	No.	%	No.	%	
0-10	23	13.22	8	4.60	2.88
11-20	9	5.17	35	20.11	0.26
21-30	15	8.62	35	20.11	0.43
31-40	6	3.45	16	9.20	0.38
41-50	7	4.02	8	4.60	0.88
51-60	3	1.72	5	2.87	0.60
>60	1	0.57	3	1.72	0.33
Total	64	36.78	110	63.22	0.58:1

Table 2: Pattern of lymphadenopathy among patients

According to size of lymph nodes		
Size of the lymph node (cm)	**Number**	**Percentage (%)**
< 1 cm	18	10.34
1 – 2 cm	62	35.64
2 – 3 cm	57	32.76
3 – 4 cm	19	10.92
4 – 5 cm	5	2.87
5 – 6 cm	10	5.75
>6 cm	3	1.72
According to consistency of lymph nodes		
Consistency of lymph nodes	**Number**	**Percentage (%)**
Soft	18	10.35
Firm	152	87.35
Hard	4	2.30
According to mobility of lymph nodes		
Nature of Lymph Nodes	**Number**	**Percentage (%)**
Mobile	166	95.40
Immobile	8	4.60

Table 3: Distribution of benign and malignant lesions in different age groups

Age (in years)	Benign		Malignant	
	Number	Percentage	Number	Percentage
0-10	31	18.67	0	0.00
11–20	40	24.10	2	1.20
21-30	47	28.31	0	0.00
31-40	20	12.05	0	0.00
41-50	12	7.23	2	1.20
51-60	6	3.61	2	1.20
>60	3	1.81	1	0.60
Total	159	95.78	7	4.22

Table 4: Diagnostic pattern of lymphadenopathy on FNAC

Diagnosis	No. of cases	Percentage
Benign:	159	95.78
Reactive hyperplasia of lymph node	51	30.72
Granulomatous lymphadenitis	45	27.11
Tubercular lymphadenitis	25	15.06
Lymph Node Necrosis	22	13.25
Chronic lymphadenitis	3	1.81
Abscess	13	7.83
Malignant:	7	4.22
Primary	0	0.00
Secondary	7	4.22

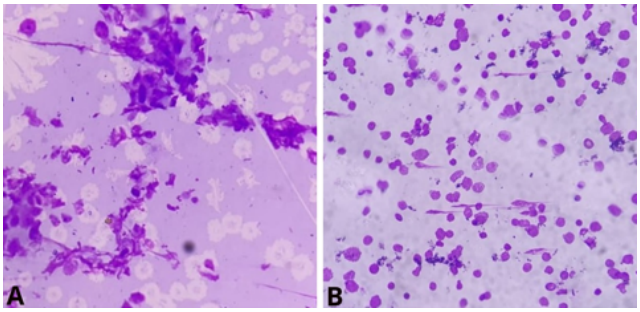

Figure 2: Malignant lesions of lymph node; **A:** Metastatic deposits; **B:** Non-Hodgkin's lymphoma

majority of lesions were the firm lymph nodes in 152 (87.35%) patients, and most of the lymph nodes 166 (95.40%) were mobile (Table 2).

Out of total 174 cases studied by fine needle aspiration cytology, diagnosis could not be made in 8 cases due to insufficient and unsatisfactory sample. Out of the remaining 166 cases, 159 (95.78%) were diagnosed as benign lesions and 7 (4.22%) as malignant lesions. Benign lesions of lymph node were most frequently encountered in the third decade of life followed by second decade of life. Malignant lesions of lymph node were equally encountered in 2^{nd}, 5^{th} and 6^{th} decade of life. The ratio of benign lesions in male and female was 1: 1.79 and in malignant lesions male and female ratio was 1 : 0.75, i.e. there was slight male preponderance (Table 3).

Out of 159 (95.78%) benign lesions the most significant lesions encountered were reactive hyperplasia 51 (29.31%) followed by granulomatous lymphadenitis 45 (25.86%). The malignant lesions were detected in 7 (4.22%) patients out of which 4 were males and 3 were females. All malignant lesions were the secondary lesions (Table 4,Figures 1 and 2).

6. Discussion

In the present study, 174 patients who presented with solitary or multiple lymphadenopathies were subjected to fine needle aspiration cytology. Needle aspiration was proved to be useful in 166 (95.40%) cases of present series as the definitive cytologic diagnosis could be offered in them. In 8 (4.60%) cases, smears were unsatisfactory. Lymph nodes in these cases were either too small or too deep. The age of patients ranged from 1 year to 89 years in our study. Similar fact had been reported by Hirachand et al[8] and Tilak et al.[9] The majority of patients 50 (28.74%) of lymphadenopathy in present series were of age group 21-30 years, similar to the fact reported by Chand P et al.[10] We observed the overall female: male ratio of 1.72 : 1 thereby showing female preponderance. Study conducted by R. Priya and V. Sarada[11] also showed female preponderance.

The commonest site of lymph node enlargement was the neck region in 159 (91.38%) patients followed by axilla in 12 (6.90%) patients and then inguinal region in 3 (1.72%) patients. Similar findings had been reported by A. Jandial.[12] The most frequently encountered size of lymph node was 1-2 cm (35.64%). The consistency of the involved lymph nodes was firm in 87.35% patients and the lymph nodes were mobile in 95.40% cases. In malignant lesions, male (4) and female (3) ratio was 1.33: 1. Bloch[13,14] reported the same incidence where males were the main contributors of the metastatic group. In current study, all malignant lesions were the secondary lesions and out of 159 benign lesions, reactive hyperplasia was the most frequently encountered lesion (30.72%) followed by granulomatous lymphadenitis (27.11%) and tubercular lymphadenitis (15.06%). However in the studies carried out by Patra et al (14) 37.8%, Sarda et al[15] 71.8%, Bandopadhyoy et al[16] 44% and Khan et al[17] 72.6% reported maximum incidence of tubercular lymphadenitis.

7. Conclusion

In present study, maximum patients belonged to third decade of life and there was significant female preponderance. The commonest site of involvement was cervical region followed by axilla and inguinal region. The most frequent encountered size was 1-2 cm followed by 2-3 cm. The overall benign lesions were 159 and 7 were malignant lesions. Benign lesions of lymph node were most frequently encountered in third decade of life while malignant lesions were equally encountered in 2^{nd}, 5^{th} and 6^{th} decade of life. All malignant lesions were the secondary lesions. In benign lesions, reactive hyperplasia of lymph node was the most frequently encountered lesion followed by granulomatous lymphadenitis and tubercular lymphadenitis.

We draw the conclusion that FNAC of lymph nodes is a very common, easy, safe, economical, and quick diagnostic technique that eliminates the need for an open biopsy, anesthetic, surgical complications, and hospital stays. While histopathology provides the definitive diagnosis in the majority of cases, it is hoped that by developing proficiency and experience in using the technique with careful clinical knowledge and judgment, the diagnostic error in FNAC can be reduced to a negligible degree.

8. Conflict of Interest

None.

9. Source of Funding

None.

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