

Clinicopathological Evaluation of Lymph Node Lesions by Fine Needle Aspiration Cytology

Sharma Upender¹, Bajaj Akanksha², Bamra Navtej Singh³

ABSTRACT

Introduction: Fine Needle Aspiration Cytology (FNAC) is a simple, quick and inexpensive method that is used to sample enlarged lymph nodes and is usually performed as an outdoor procedure. It causes minimal trauma to the patient and carries virtually no risk of complications. The objective of this descriptive study was to analyse the various cytomorphological patterns on FNAC in peripheral lymphadenopathy patients along with their clinical presentation.

Materials and Methods: The present study included 200 patients of peripheral lymphadenopathy in a tertiary care hospital. FNAC was done under all aseptic conditions and various cytomorphological patterns were analysed.

Results: On stratification of lymph node lesions, 110/200 cases (55.0%) were reported as neoplastic and 90/200 cases (45.0%) as non-neoplastic lesions. Metastatic involvement of lymph node was the commonest pathological finding diagnosed in 96/110 of malignant neoplastic cases (87.3%). Among the non-neoplastic lesions, reactive lymphoid hyperplasia was the commonest lesion encountered in 47 cases (52.2%), followed by granulomatous pathology and suppurative lymphadenitis. Overall, the cervical lymph nodes were most commonly involved in 59.5% patients, followed by other lymph nodes.

Conclusion: FNAC as a first line investigative procedure in lymphadenopathy patients obviates the need for surgical excision and guides subsequent patient therapy and management. The cervical group of lymph nodes are most commonly involved in both non neoplastic as well as neoplastic lymph node lesions. In younger age group (<20 years) non neoplastic causes of lymphadenopathy are more common whereas in elderly the malignant neoplastic causes are more common. The secondary metastatic carcinoma is more common than primary lymphoma of the lymph nodes.

Keywords: Fine needle aspiration cytology, lymphadenopathy, metastasis, granuloma.

INTRODUCTION

Lymphadenopathy is one of the commonest clinical presentations of all age group patients coming to the outpatient departments. Lymph nodes react to a variety of microorganisms and non-specific stimuli by expansion of the follicle centres and/or interfollicular tissue. This results in enlargement of the nodes which may be considerable. The etiological factors of lymphadenopathy in adults are likely to be different from that in children. Children can present with massive local lymphadenopathy even after mild infections. In contrast, adults or elderly patients often react to infections with only slight to modest lymph node enlargement. Therefore, distinct lymphadenopathy in an elderly patient will

raise suspicion of malignancy.¹ On the other hand, in second and third decade of life, granulomatous lymphadenitis is a common cause of lymphadenopathy. Thus, etiology can vary from a reactive process to a granulomatous etiology to a malignant condition.²

FNAC is a sensitive, safe, speedy, reliable, cost-effective OPD procedure that has a lower risk of complications as compared to a surgical biopsy. Surgical excision is considerably expensive, time consuming and delays appropriate early management.³ With FNAC results are obtained within few hours and if required the procedure can be repeated with wide patient acceptance as it is relatively atraumatic and does not leave a scar.⁴⁻⁷

The cytomorphological features obtained in needle aspiration, usually correlate very well with the histological features. Using cytomorphology alone, it is often possible to decide whether lymphadenopathy has resulted from reactive lymphadenitis, granulomatous pathology, acute suppurative etiology, metastatic malignancy or lymphoma. Patients with reactive lymphadenopathy and metastasis from a known malignancy can thus be spared lymph node excision. In cases with indeterminate cytology or diagnosis of lymphoma, surgical excision has usually been regarded as mandatory. However, several recent studies have shown conclusively that a combined cytological and immunological evaluation of aspirated lymphoid cells results in distinctly improved diagnostic accuracy in cases of lymphoma. Aspirated cells perform excellently in immunohistochemistry, flowcytometry and gene rearrangement analysis.^{1,8}

In cases of reactive lymphadenopathy, FNAC has made the diagnosis easier and the number of surgical biopsies has been reduced. The causative organisms can be identified with FNAC in infectious etiology cases. In cases of malignancies, it not only confirms the presence of metastatic disease but also gives clue regarding the nature and site of the primary tumour.⁹ It also helps in staging, diagnosing recurrences and progression of low grade lymphomas.¹⁰ Thus, FNAC is helpful in preparing and monitoring treatment plans for the patients with lymph node lesions.¹¹

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According to various preliminary reports, the Malwa belt of Punjab has an increasing incidence of cancer so this study was planned to evaluate the cytomorphological patterns in lymphadenopathy by fine needle aspiration.

MATERIALS AND METHODS

The present study included 200 patients of peripheral lymphadenopathy in a tertiary care hospital of Malwa region of Punjab. All the patients were clinically examined and the procedure of FNAC was explained to them including reliability, limitations and complications of the procedure. Informed consent of the patients was taken. FNA procedure, smear preparation and staining were done as per the standard procedure. The smears were stained with May Grunwald Giemsa, Haematoxylin and Eosin and Papanicolaou stain. Special staining like Ziehl Neelsen stain was performed for the detection of acid fast bacilli, wherever required. Smears were examined microscopically for evaluating the cytological findings in all the cases.

RESULTS

The age range of the patients was from 1 to 90 years with a mean age of 43.71 years. The male:female ratio was 1:1.1. The non neoplastic lymph node lesions were more in females as compared to males with the male:female ratio of 1:1.9, whereas the neoplastic lymph node lesions were more in males as compared to females with the male:female ratio of 1.4:1.

In the present study, 191 patients (95.5%) had localised lymphadenopathy whereas 9 cases (4.5%) had involvement of multiple groups of lymph nodes. The cervical group of lymph node was the commonest site in 119 cases (59.5%), followed by supraclavicular in 25 cases (12.5%), axillary in 19 cases (9.5%) and inguinal group in 15 cases (7.5%). Submandibular group was involved in 6 cases (3.0%), submental in 4 cases (2.0%), preauricular in 2 cases (1.0%) and postauricular group in 1 case (0.5%) respectively.

The patients in the study presented with a broad range of signs and symptoms with a history of fever in 37 cases (18.5%), loss of appetite in 36 cases (18.0%), cough in 25 cases (12.5%) and 40 cases (20.0%) were already known case of malignancy. Hoarseness of voice was present in 13 cases (6.5%), breathlessness in 10 cases (5.0%), sore throat in 6 cases (3.0%) and history of dysphagia in 5 cases (2.5%). 12 patients (6.0%) had associated lump breast, 8 patients (4.0%) had hepatomegaly, 4 patients (2.0%) had splenomegaly and 1 patient (0.5%) presented with prostatomegaly.

It was observed that 110/200 cases (55.0%) were of malignant neoplastic lymph node lesions and 90/200 cases (45.0%) were of non neoplastic lesions. In the malignant neoplastic lesions secondary malignancy (metastatic involvement) of lymph node was more common pathological finding in 96/110 cases (87.3%) whereas primary malignancy (lymphoma) was diagnosed in 14/110 cases (12.7%).

Reactive lymphadenitis was the commonest lesions encountered among non neoplastic lesions with 47/90 cases (52.2%)

followed by granulomatous lymphadenitis (Fig 1) in 34/90 cases (37.8%) and suppurative lymphadenitis in 9/90 cases (10.0%). The study revealed highest incidence of reactive lymphoid hyperplasia in first and second decade of life. Patients reported as reactive lymphoid hyperplasia presented with a wide spectrum of clinical symptoms; most common complaints were fever, cough and pain.

It was observed that the cases of suppurative pathology were evenly distributed in all the age groups and all these patients had localised lymphadenopathy. Most of the cases reported as granulomatous pathology were in the second and third decade of life. The mean age of involvement was 26.58 years. It was noticed that majority i.e. 26/34 cases (76.5%) of granulomatous pathology involved cervical group of lymph nodes whereas submental group of lymph nodes were involved in 3/34 cases (8.8%) and axillary in 2/34 cases (5.8%). Out of 34 cases of granulomatous disease, in 10 cases (29.5%) multinucleate giant cells were also seen and 10 cases (29.5%) had necrosis in the background. On Ziehl Neelsen staining, acid fast bacilli (AFB) were seen in 18 (52.9%) cases.

The majority of the cases of Non-Hodgkin Lymphoma (61.5%) were seen in >50 years of age group and males were affected more commonly with male:female ratio of 1.6:1. Cervical group of lymph nodes were involved in majority i.e. 9 cases (69.2%) and multiple groups of lymph nodes were involved in 4 cases (30.8%). The loss of appetite, fever and hepatosplenomegaly were the common clinical signs and symptoms of patients with Non-Hodgkin Lymphoma. A single case of Hodgkin Lymphoma was observed. This patient of Hodgkin lymphoma was a 12 year female child with enlarged rubbery lymph nodes in the cervical region.

It was noticed that most of the patients with metastatic lymph node lesions were above 40 years of age with male:female ratio of 1.4:1. Cervical group of lymph node involvement was seen in 43/96 cases (44.8%), followed by 20 cases (20.8%) of supraclavicular, 15 cases (15.6%) of axillary and 11 cases (11.5%) of inguinal group of lymph node involvement. The patients presented with a wide range of symptoms depending on the site of primary malignancy. 16 patients (16.7%) presented with a chief complaint of loss of appetite, 12 cases

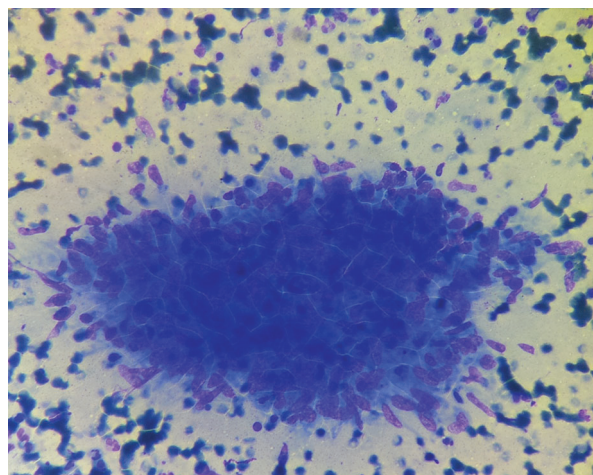


Figure-1: Photomicrograph showing epithelioid cell granuloma in case of granulomatous lymphadenitis (MGG, 400X).

(12.5%) with hoarseness of voice and 12 cases (12.5%) with a lump breast. 11 cases (11.5%) had a complaint of cough, 9 cases (9.4%) had breathlessness, 5 cases (5.1%) had fever, 4 cases (4.2%) had SOL lung and 3 cases (3.1%) had dysphagia. The study revealed that out of 96 cases of metastasis, 46 cases (47.9%) were of squamous cell carcinoma (Fig 2), 22 cases (22.9%) of infiltrating ductal carcinoma breast, 10 cases (10.4%) of adenocarcinoma, NOS, 2 cases (2.1%) each of small cell carcinoma and nasopharyngeal carcinoma, 1 case (1.04%) each of carcinoma ex pleomorphic adenoma, papillary adenocarcinoma ovary and transitional cell carcinoma. However, 11 cases (11.46%) cases could not be subtyped based on cytomorphology.

DISCUSSION

Lymphadenopathy is a common clinical finding; it may be a sign of inflammation, metastatic malignancy or malignant lymphoma. Fine needle aspiration in the investigation of lymphadenopathy has become a standard and frequently practiced invasive technique.^{12,13} Because of early availability or results, simplicity, minimal trauma and complication, the aspiration cytology is now considered as a valuable diagnostic aid and it provides ease in following patients with known malignancy and ready identification of metastasis or recurrence.¹⁴

In the present study age range of the patients was quite wide from 1 to 90 years indicating that lymphadenopathy is a common clinical presentation in all age groups. The mean age of the patients was 43.71 years with male: female ratio of 1:1.1. The cervical region is usually the commonest

site of enlarged lymph nodes.^{15,16} In this study also maximum (59.5%) patients presented with cervical lymphadenopathy followed by supraclavicular, axillary and inguinal. On stratification of lymphadenopathy cases it was observed that neoplastic malignant cases (55%) were more common than the non neoplastic cases (45%). The ratio of non-neoplastic:neoplastic lesions was 1:1.22. As compared to the other studies (Table 1) this ratio was altered and was in favour of malignant neoplastic lesions indicating the high incidence of malignant cases in this region.^{15,17-19} However, it may be because of more number of malignant referral cases coming to our tertiary care hospital for treatment.

In the present study, among non neoplastic lesions, maximum number of cases (23.5%) were of reactive lymphoid hyperplasia, followed by 17.0% cases of granulomatous pathology and 4.5% cases of suppurative lymphadenitis. A comparative evaluation of these results has been done and shown in table 2.^{15,16,20,21}

The granulomatous pathology occurs because of a number of infectious and non infectious causes. The common infectious causes include tuberculosis, atypical mycobacteriosis, fungal infections, toxoplasmosis, cat scratch disease, tularaemia and leprosy. The common non infectious causes include chronic granulomatous disease, sarcoidosis and foreign body granuloma. 34/200 (17%) cases in the present study had granulomatous pathology and 52.9% (18/34) of these patients revealed presence of acid fast bacilli on Ziehl Neelsen staining confirming the diagnosis of tubercular lymphadenitis. Most of the patients of granulomatous pathology were in the second and third decade of life. Patients of suppurative lymphadenitis presented with pain, tenderness and fever and responded well with antibiotic treatment.

The lymphoma patients usually present with severe anorexia, loss of weight and fever along with the presence of hepatos-

| Sr No | Study | Non-neoplastic lesions | Neoplastic lesions | Ratio |
|-------|--|------------------------|--------------------|--------|
| 1 | Dash et al ¹⁷ (1996) n- 472 | 410(86.14%) | 66(13.86%) | 6.21:1 |
| 2 | Nada A et al ¹⁸ (1996) n-150 | 83(55.30%) | 67(44.70%) | 1.24:1 |
| 3 | Shamshad et al ¹⁹ (2005) n-1000 | 864(86.40%) | 136(13.60%) | 6.35:1 |
| 4 | Hirachand et al ¹⁵ (2009) n-130 | 106(81.70%) | 24(18.30%) | 4.42:1 |
| 5 | Present study n-200 | 90(45.00%) | 110(55.00%) | 1:1.22 |

Table-1: Showing comparative evaluation of non-neoplastic and neoplastic lesions in different studies

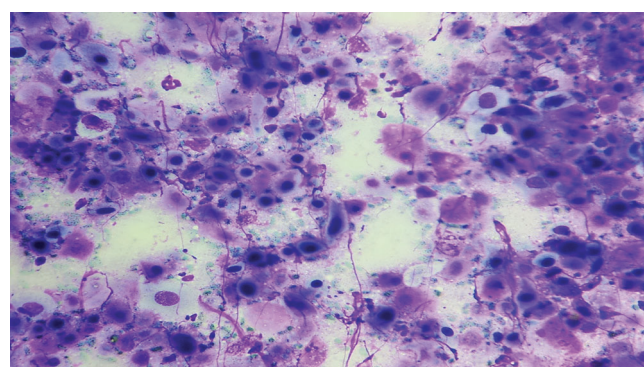


Figure-2: Photomicrograph showing metastatic squamous cell carcinoma (MGG, 400X).

| Sr No | Lymph node lesions | Bottle et al ²⁰ (1988) | Hirachand et al ¹⁵ (2009) | Ruchi et al ²¹ (2006) | Guru et al ¹⁶ (2009) | Present study |
|-------|-------------------------------|-----------------------------------|--------------------------------------|----------------------------------|---------------------------------|---------------|
| 1 | Reactive lymphoid hyperplasia | 50.00% | 41.50% | 37.20% | 46.32% | 23.50% |
| 2 | Granulomatous pathology | 17.00% | 37.20% | 52.30% | 48.85% | 17.00% |
| 3 | Suppurative lymphadenitis | - | 03.00% | 01.00% | 01.29% | 04.50% |
| 4 | Metastatic carcinoma | 12.30% | 12.30% | 03.80% | 01.29% | 48.00% |
| 5 | Lymphoma | 06.00% | 06.00% | 02.00% | 01.73% | 07.00% |

Table-2: Showing comparative evaluation of cytological diagnosis of lymphadenopathy in different studies

plénomegaly in some of these. 13/14 lymphoma cases in this study were having Non Hodgkin's lymphoma and a single case of Hodgkin Lymphoma was observed. Hypocellular aspirates from clinically significant/large lymph nodes should alert the pathologist to the possibility of fibrosis obscuring the primary pathology. The biopsy is mandatory in such cases. The presence of atypical mononuclear cells, large number of eosinophils and granulomas together should raise a high index of suspicion for further evaluation.

The most common cause of malignant neoplastic lesions in the present study was metastatic carcinomatous deposits in 48% of total cases followed by lymphoma in 7% cases. It was observed that 22 patients (22.9%) had primary lesion in the breast, 13 patients (13.5%) in larynx and pharynx, 8 patients (8.3%) in lung, 4 patients (4.2%) in cervix, 3 patients (3.1%) in anal canal, 2 patients (2.1%) each in esophagus and lip and 1 patient (1.04%) in tongue, ovary, gall bladder, pancreas, testes, penis, prostate, salivary gland and urinary bladder. FNAC helped to find out the site of primary tumor in 45 (46.88%) cases with the help of clinicoradiological findings. This is the most valuable contribution of FNAC in timely management of malignant cases.

The incidence of malignancy increases steadily with the age of the patients and in this study 55.2% of reported cases were >50 years of age. No case of metastatic lymph node lesion was reported below 20 years of age. Hence, there is a pressing need for FNAC of enlarged lymph nodes in the elderly because of high chances of it to be malignant. Conversely, in younger age group (<20 years) non neoplastic causes of lymphadenopathy are more common and 53.2% of reactive lymphoid hyperplasia patients in this study were <20 years of age.²²

CONCLUSION

FNAC is simple, safe and cost effective investigative procedure that can be used as a first line investigation in diagnosis of lymphadenopathies. It helps in establishing the diagnosis in a large number of cases when used in conjunction with clinicoradiological findings, obviates the need for surgical excision and guides subsequent patient therapy and management. In first two decades of life reactive lymphoid hyperplasia is most common cause of lymphadenopathy whereas both NHL and metastatic carcinoma are seen mostly in patients over 40 years of age. Secondary metastatic carcinoma is more common malignant etiology of lymphadenopathy than primary lymphoma.

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