
ORIGINAL ARTICLE**Cytomorphological Study of Spectrum of Lymph Node Lesions in Tertiary Care Hospital in India.***Gayathri B N¹, Mallikarjun A. Pattanashetti² and Priyadarshini M M³**Associate Professor of Pathology, Kodagu Institute of Medical Sciences, Madikeri, Karnataka, India^{1,3},
Assistant Professor of Pathology, Gadag Institute of Medical Sciences, Gadag, Karnataka, India².***Abstract:****Introduction and Background:**

Lymphadenopathy is an abnormal increase in size and/or altered consistency of lymph nodes. The use of fine needle aspiration cytology (FNAC) in the investigation of lymphadenopathy has become an acceptable and widely practiced minimally invasive technique, which is safe, simple and rapid. The main objective of present study was categorizing various lesions of lymphadenopathy by cytology.

Materials and Methods:

This was a 2 years and 3 months study done in Department of Pathology, Kodagu Institute of Medical Sciences, Madikeri, Karnataka, India. It included 309 patients with lymphadenopathies at various sites. Acellular aspirates were excluded from the study. FNAC was conducted with the help of a 22 gauge disposable needle attached to a 5cc syringe. Haematoxylin, Eosin stain & Papanicolaou stains were done on alcohol fixed smears. May-Grunwald Giemsa Stain was done on air-dried smears. Ziehl-Neelsen stain was done when tuberculosis was suspected for the demonstration of acid-fast bacilli. The results were expressed as percentage and were tabulated.

Results and Discussion:

Maximum number of patients were diagnosed with Reactive Lymphadenitis followed by Granulomatous lymphadenitis. The other lesions were acute suppurative lymphadenitis, Metastatic Lymphadenopathy, Tuberculous Lymphadenitis, Lymphomas and Non -Specific Lymphadenitis.

The most common site of lymph node aspiration was cervical group of lymph nodes. The most common malignancy with lymph node metastasis was Squamous cell carcinoma.

Conclusion:

FNA is a convenient, quick and accurate procedure that can be performed in patients attending outpatient department. Reactive lymphadenitis was the most common lesion detected in FNA of lymph nodes in our study with cervical group of lymph nodes being the most commonly affected group.

Keywords: lymphadenopathy, FNAC, malignancy

Introduction:

Lymphadenopathy is defined as an abnormal increase in size of lymph node and or variation in consistency of lymph nodes. It is a clinical manifestation of regional or systemic disease and serves as an excellent clue to the underlying disease.¹ Fine needle aspiration cytology (FNAC) in the investigation of lymphadenopathy is most widely used minimally invasive technique. It is a simple procedure, which is rapid, accurate first line investigative test and safe for practice. FNAC is highly cost effective and stratifies cases requiring further investigations like biopsy, surgical treatment¹. Lymphadenopathy is a commonly encountered clinical condition requiring prompt and accurate diagnosis, so that a proper treatment protocol can be started as early as possible. FNA is a completely safe, rapid and inexpensive method for the diagnosis of lymphadenopathy, reducing the need of surgical biopsy.²

Lymph node aspiration can be important in our country where facilities and cost of treatment is not affordable to poor patients. FNAC is particularly useful in rural and semi urban areas where facilities for diagnosis are not adequate. The present study was undertaken to evaluate the usefulness of FNAC as a diagnostic tool in cases of lymphadenopathy and study the different cytomorphological patterns associated with various lymphadenopathies at various sites. Routine use of FNAC can help us to diagnose the types of lymphadenopathies pre-operatively and we can proceed ahead accordingly. It can be done in places where facilities of histopathology are not available.

Enlargement of lymph nodes can be caused due to infections, reactive processes, metastatic tumours and lymphomas. Hence this study was undertaken to evaluate the cytomorphological lesions in our tertiary care hospital which is the only tertiary hospital catering to the hilly region of Karnataka, India.

Materials and Methods:

This was a 2 years and 3 months cross-sectional study done from January 2016 to March 2018 in Department of Pathology, Kodagu Institute of Medical Sciences, Madikeri, Karnataka, India. Institutional ethics committee approval was taken for conducting the study. Hospital record based universal sampling was used as sampling technique. Thorough general physical examination was carried out. Palpable peripheral lymph nodes were examined noting their size, location, consistency, number, mobility, and presence of matting and presence of any local changes like redness, discharge or sinus formation. All the patients presenting with enlarged lymph nodes ≥ 0.5 cm in diameter and patients presenting with superficial or deep lymph node enlargement were included. Patients in whom FNAC of the node could not be carried out were excluded: lymph nodes < 0.5 cm, deep seated lymph nodes which needs to be aspirated under ultrasound or CT guidance. The lymph nodes

were grasped between the index finger and thumb of left hand; a sterile 22 or 23 gauge needle is fitted to a 5-10 ml syringe and pierced obliquely into the lymph node. The aspirate was examined for the amount and nature of the aspirated material, and then several smears were prepared. Smears were immediately fixed in 80% isopropyl alcohol and stained by PAP stain. Air-dried smears were also prepared and stained with May-Grunwald Giemsa Stain. Ziehl-Neelsen stain was done for the cases where necrotic material is aspirated or tuberculosis suspected, for the demonstration of acid-fast bacilli. Smears were examined under microscope for the cytology report. The smears, which were inadequate for reporting, were excluded from study. The data was recorded and analyzed using SPSS software version 20. The results were tabulated as frequency and percentage.

Results:

The total numbers of patients included in our study were 309. There were 164 female patients and 145 male patients with Female to Male ratio of 1.13:1. Right side lymph node aspiration was done more commonly as compared to left side. The incidence of lymphadenopathy was higher on right side (53.07%) as compared to left side (43.7%). There were 10 patients (3.23%) who presented with bilateral lymphadenopathy. In our study, there were 279 (90.29 %) benign lesions and 30 (9.71%) malignant lesions. Maximum numbers of patients were diagnosed with Reactive Lymphadenitis (49.83 %), followed by Granulomatous lymphadenitis (22.33 %). The other lesions were Acute suppurative lymphadenitis (9.06%), Metastatic Lymphadenopathy (8.41%), Tuberculous Lymphadenitis (8.10%), Lymphomas (1.30%) and Non-Specific Lymphadenitis (0.97 %) as shown in Table 1. Following were the various sites of aspiration in our study: Cervical (59.22 %), Submandibular (8.41 %), Supraclavicular (6.79 %) followed by Posterior cervical (5.50%) and Axillary lymph nodes (5.50%) as

shown in Table 2. The most common malignancy with lymph node metastasis was Squamous cell carcinoma (65.38 %) followed by Breast Carcinoma (13.33%) as shown in Table 3.

Table No. 1: Spectrum of Lymph node lesions on cytology with age distribution of patients

Sr. No.	Cytological Diagnosis	Gender	Age (in years)									Total	Total	Percentage (%)
			0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90			
1	Reactive Lymphadenitis	Male	18	23	13	13	6	2	2	1	0	78	154	49.83
		Female	7	24	17	17	3	4	3	1	0	76		
2	Granulomatous Lymphadenitis	Male	0	5	11	9	0	1	0	0	0	26	69	22.33
		Female	0	6	15	9	5	5	1	2	0	43		
3	Acute Suppurative lymphadenitis	Male	3	0	2	2	2	0	0	0	0	9	28	9.06
		Female	3	2	4	3	3	2	2	0	0	19		
4	Metastatic lymph node	Male	0	0	0	0	4	4	3	3	1	15	26	8.41
		Female	0	0	1	1	2	4	2	0	1	11		
5	Tubercular lymphadenitis	Male	2	2	3	3	2	0	0	0	0	12	25	8.10
		Female	2	4	3	2	2	0	0	0	0	13		
6	Lymphoma	Male	0	0	1	1	0	0	0	0	0	2	4	1.30
		Female	0	0	0	0	0	1	0	0	1	2		
7	Non Specific lymphadenitis	Male	0	2	1	0	0	0	0	0	0	3	3	0.97
		Female	0	0	0	0	0	0	0	0	0	0		
	Total		35	68	71	60	29	23	13	7	3	309	309	100

Table No. 2: Sites of Lymph node aspiration

Site of Lymph node Aspiration	Total number	Percentage
Cervical	183	59.22
Submandibular	26	8.41
Supraclavicular	21	6.79
Posterior cervical	17	5.50
Axillary	17	5.50
Submental	15	4.85
Inguinal	9	2.91
Posterior triangle	8	2.58
Jugulodigastric	6	1.94
Post Auricular	3	0.97
Suprasternal	2	0.64
Parajugular	1	0.32
Infaclavicular	1	0.32
Total	309	100

Table No.3: Distribution of Malignant lymph node lesions at various sites

Diagnosis	Site of FNAC Lymph node					Total
	Cervical	Supraclavicular	Axillary	Submandibular	Jugulo-digastric	
Squamous cell carcinoma	12	2	0	2	1	17
Breast carcinoma	0	0	4	0	0	4
Adenocarcinoma	2	1	0	0	0	3
NHL	2	0	0	0	0	2
HL	1	0	0	0	1	2
Poorly differentiated carcinoma	1	1	0	0	0	2
Total	18	4	4	2	2	30

Discussion:

Lymphadenopathy is a commonly encountered clinical condition requiring early and appropriate diagnosis, so that a proper treatment protocol can be started at the earliest. Enlarged lymph nodes were first organ to be biopsied by fine needle aspiration; today they are most frequently sampled tissues³. Aspirates from lymph nodes are usually very cellular and their interpretation varies from clear diagnosis to a firm request for histopathology. FNA is a completely safe, rapid and inexpensive method for the diagnosis of lymphadenopathy, reducing the need of surgical biopsy⁴.

In our study male to female ratio was 1: 1.13 which is similar to study by Swapnil et al³ which had ratio of 1:1.7. In our study the most common site of neck lymphadenopathy was cervical group 59.22% which is similar to study done by Swapnil et al³, Sravani et al⁵, Alam K et al⁶ and Sheik S et al⁷. The second most common site was Submandibular group of lymph nodes (8.41%) followed by Supraclavicular lymph nodes (6.79%).

In study done by Sravani et al⁵, out of 400 patients of lymphadenopathy, 308 cases (77%) were non-neoplastic lesions and 64 cases (16%) were malignant lesions. This correlates with our study where number of benign lesions was higher 279 cases (90.29 %) as compared to 30 cases (9.71%) of malignancy. Few other studies have found the incidence of neoplastic involvement to vary from 10.1% to 47.8%².

In our study, Reactive lymphadenitis (Figure 1) was observed to be the most frequent diagnosis with 49.83% cases. It was also the most frequent diagnosis in other studies and its incidence has been seen to range from 18.9% to 42%^{8,9,10,11}. Smears studied show high cellularity with polymorphous cell population and a good number of tingible body macrophages. Reactive lymphadenitis was the most common diagnosis even in other studies. These other studies showed the incidence ranging from 18.9% to 86.4%¹².

The second most frequent diagnosis in this study was observed to be granulomatous lymphadenitis (Figure 2) with 22.33 % cases. The incidence of granulomatous lymphadenitis varies from 9.2% to 25.45% in various studies^{10,11}. Acute suppurative lymphadenitis shows both well-preserved and degenerated neutrophils and cell debris. In the initial phase if the lymph node is aspirated then a mixture of lymphocytes and neutrophils can be seen. With the treatment the aspirates show a mixed population of cells comprising of polymorphs, lymphocytes, plasma cells and histiocytes along with cell debris.

FNAC has been highly accurate in the diagnosis of metastatic carcinoma of the lymph node. Lymphadenopathy may be the first sign of malignancy in a patient. Metastatic disease can be diagnosed on FNAC which also provides hints about the characteristics and origin of the primary tumour. There were 30 cases of neoplastic lesions in the lymph nodes by FNAC, of which 26 cases (8.41%) were positive for metastasis. Lymphoma was seen in 4 patients (1.29%). Non Hodgkin Lymphoma was seen in 2 cases and Hodgkin lymphomas was reported in 2 cases and were advised biopsy. In our study, the most common node to be involved by metastasis was the cervical group (60%) with squamous cell carcinoma (Figure 3) being the most common type which is similar to study done by Vimal et al.¹³ Among the secondaries to lymph nodes squamous cell carcinoma deposits were commonly seen in 17 cases (65.38 %) which is similar to study done by Hirachand et al¹⁰ and Pramod Pathy et al¹⁴. Next common diagnosis being metastatic breast carcinoma in 4 cases (15.38%) followed by adenocarcinoma (11.54%) and poorly differentiated carcinoma (7.70%). A Brazilian FNAC study by Martin MR et al¹⁵ on lymph nodes diagnosed 79.4% metastasis and 14.2% lymphomas. A study conducted in Egypt by Hafez NH et al¹⁶ has reported more involvement by lymphomas (80.3 %) rather than

metastatic diseases (19.7%) which is contrary to our study. Cytomorphology of NHL reveals monomorphic population of lymphoid cells, whereas its differentiation or grading is predicted by cell size and shape, presence of nucleoli and mitotic activity. FNAC plays a greater role in the management of Hodgkin's lymphoma as compared to NHL as it helps in the primary diagnosis, staging of the patient and monitoring the recurrence of the disease.

Tuberculosis is the commonest cause of lymphadenopathy in developing countries like India and should be considered in every case of granulomatous lymphadenopathy unless proved otherwise. Tuberculous lymphadenitis usually is the most common form of extra pulmonary tuberculosis and arises as a result of lymphatic spread from a primary focus. Most often it involves the cervical group of lymph nodes attributed to the rich lymphatic supply of the region and most commonly seen in second and third decades.⁸ Tuberculous lymphadenitis diagnosed by cytology alone occurred in 8.10% of our cases which is higher as compared to Sharma H et al¹⁷ which reported 4% cases. Other previous studies showed this condition varying from 28% to 52%.² In our study epithelioid granuloma with necrosis was the predominant cytological pattern. The other common cytological pattern observed was epithelioid granuloma without necrosis. AFB positivity in aspiration smears of tuberculous lymphadenitis is variable between 40.6% and 56.4%.¹⁸ The presence of caseous necrosis helps in diagnosing tuberculosis as it is more sensitive and specific to tuberculosis. In 25 cases, demonstration of AFB was done by ZN stain. The background mainly comprised of a mixed population of lymphocytes, polymorphs, eosinophils and plasma cells. The neutrophils in the background may be due to the immune response of the host to the tubercle bacilli antigen.

In our study we had 3 cases (0.97%) which were diagnosed as Non-specific lymphadenitis which

correlated with study done by Haque et al which reported 0.88 % cases.¹⁹

FNAC is convenient alternative to open biopsy of lymph nodes, the diagnostic accuracy of which can be further improved when used in collaboration with other special techniques such as cytochemistry, bacteriologic culture, immunocytochemistry, ultrastructural studies and molecular hybridization. However, limitations and pitfalls of the procedure should be recognized. Limitation of the present study is lack of Cytological and histopathological correlation which was difficult in present centre due to minimal number of biopsies received for follow up after FNAC for histopathological study of lymph node. Understanding the pattern of lymphadenopathy in a specific geographical region is vital for specific diagnosis or suspicion of a disease. The use of FNAC for the diagnosis of metastatic malignancies in the lymph nodes is a well-established method.

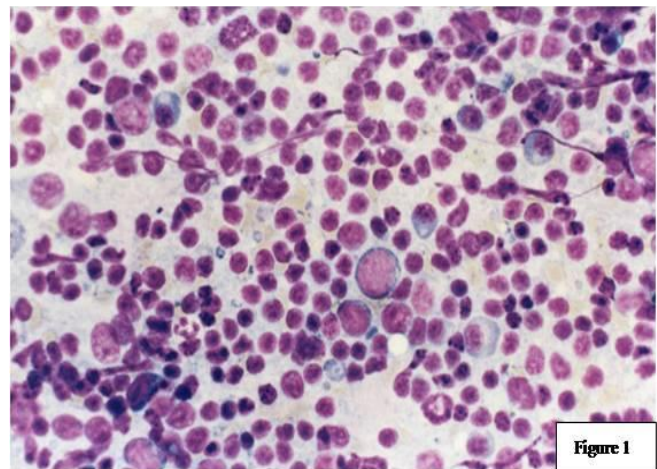


Figure 1: Smears shows polymorphous population of lymphocytes seen in Reactive lymphadenitis. (May-Grunwald Giemsa stain, 40 X)

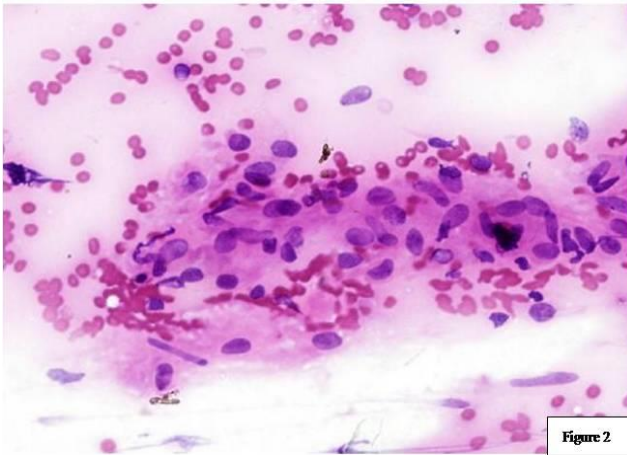


Figure 2: Smears shows aggregates of epithelioid histiocytes seen in Granulomatous lymphadenitis (May-Grunwald Giemsa stain, 40 X)

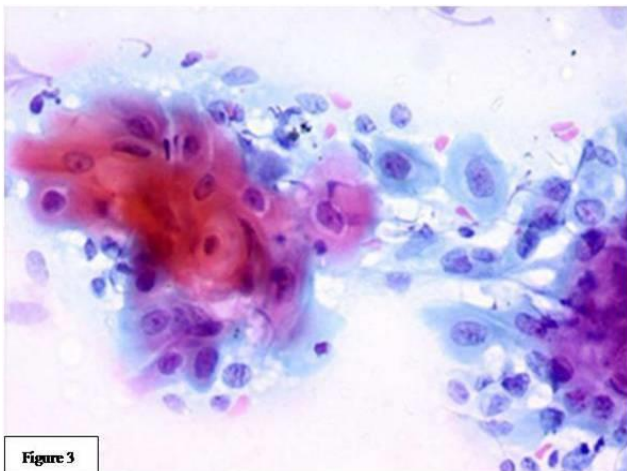


Figure 3: Smears shows malignant squamous cells seen in Metastatic Squamous cell carcinoma. (PAP stain, 40X)

Conclusion:

FNA is a quick, easy and accurate outpatient daycare procedure which is important for diagnosis of lymphadenopathies. Reactive lymphadenitis was the most common lesion detected in FNA of lymph nodes in our study with cervical group of lymph nodes being the most commonly affected group. FNAC is an important diagnostic tool for diagnosing benign as

well as malignant lesions. It is inexpensive definite diagnostic procedure to render a prompt diagnosis, especially in lymph node aspirates, where biopsies are not done commonly. Although, the benign results should be interpreted in the context of clinical findings and if clinical malignancy is highly suspected, further evaluation is justified.

Conflict of Interest - Nil

Sources of Support - Nil

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