

## Original Research Article

## Cytomorphological Study of Lymph Node Lesions: A Study of 130 Cases

Chaithra S<sup>1</sup>, Deoshree Solanki<sup>2</sup>, Prabhu H Mural<sup>3</sup>

<sup>1</sup>Post Graduate, IIIrd year, <sup>2</sup>Associate Professor, Department of Pathology, SNMC and HSK Hospital and Research Centre, Bagalkot, Karnataka, India.

**Corresponding Author:**

**Prabhu H Mural**, Associate Professor, Department of Pathology, SNMC and HSK Hospital and Research Centre, Bagalkot, Karnataka, India.

**E-mail:** docprabhumh@gmail.com

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**Abstract**

*Introduction:* Lymph node enlargement is frequent presentation in all age groups with a wide spectrum of diseases, ranging from infections to malignancy. Therefore, management of cases depends on lymph node pathology, which can be studied by collecting material through fine needle aspiration method that can be used as an outpatient procedure.

*Objectives:* To assess the cytomorphological features and incidence of various lymph node lesions on fine-needle aspiration cytology (FNAC) and to analyse the utility and importance of FNAC in diagnosing lymph node lesions.

*Material and Methods:* A prospective study undertaken on 130 patients who had presented with lymphnode enlargement at the Department of Pathology for a period of 20 months.

*Results:* Most common lesion observed in our study was reactive lymphadenitis, followed by tubercular lymphadenitis, metastatic malignancies, acute suppurative lymphadenitis, lymphomas and necrotizing lymphadenitis, respectively.

*Conclusion:* Lymphadenopathy is most commonly superficial and palpable, and therefore easily accessible to sampling by palpation or ultrasound guided FNA, which usually results in a fast, reliable, and relatively in expensive diagnosis. In the current study, reactive lymphadenitis was recorded as the most common presentation of lymphadenopathy in the cervical region. It not only confirms the presence of metastatic diseases but also, in most cases, gives the clue regarding the origin of the primary tumor.

**Keywords:** Fine-needle aspiration cytology; Lymph node; Lymphadenitis.

**Introduction**

Lymphadenopathy refers to enlarged lymph nodes. It is the most common clinical presentation of patients attending the outpatient department. Fine-needle aspiration cytology (FNAC) is the first line of investigation in evaluating lymphadenopathy due to frequent involvement of lymph nodes in regional and systemic diseases and easy accessibility. The technique is minimally invasive and gives speedy result.<sup>1</sup> The present study is 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.

**Materials and Methods**

This study was undertaken in the Department of Pathology. This is a prospective study conducted over a period of 20 months which included a total

of 130 patients with lymphnode enlargement at various sites. All the patients presented with lymphnode enlargement were included in the study.

After taking prior consent from the patient, FNAC procedure was performed under strict aseptic conditions using a Franzen's aspiration handle with 23-25 gauge needle attached to a 10 ml syringe. Multiple sites were aspirated. The aspirated material was smeared onto four slides in each case. Two slides were immediately immersed in 95% ethanol and remaining air-dried. The air-dried smears were routinely stained by May-Grunwald-Giemsa stain and alcohol fixed smears were stained by Haematoxylin & Eosin stain and Papanicolaou stain. Ziehl-Neelsen (ZN) stain for acid-fast bacilli (AFB) was done when needed. The aspiration smears were then studied to arrive at a probable diagnosis.

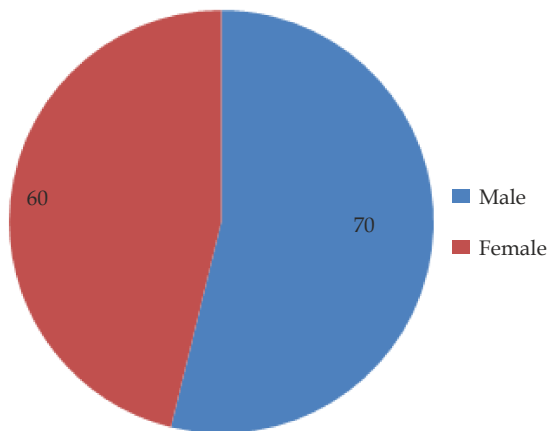
**Results**

The age of the patients varied from 8 months to 85 years. Maximum patients were seen in the age range of 21-30 years.

**Table 1:** Age distribution of cases.

Age Range	Number of Patients	Percentage (%)
8 months - 10 years	10	7.7%
11-20 years	15	11.5%
21-30 years	35	27.0%
31-40 years	25	19.2%
41-50 years	18	13.8%
51-60 years	16	12.3%
61-70 years	06	4.6%
71-85 years	05	3.9%

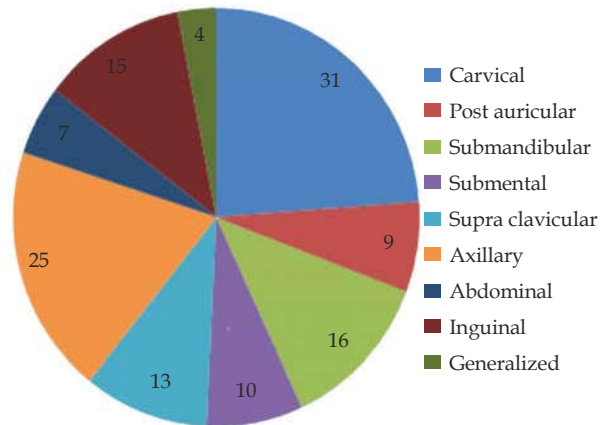
**Graph 1:** Sex Distribution



Out of 130 patients, 70 were males (53.9%) and 60 were females (46.1%). A slight male predominance was observed with a male to female ratio of 1.15:1.

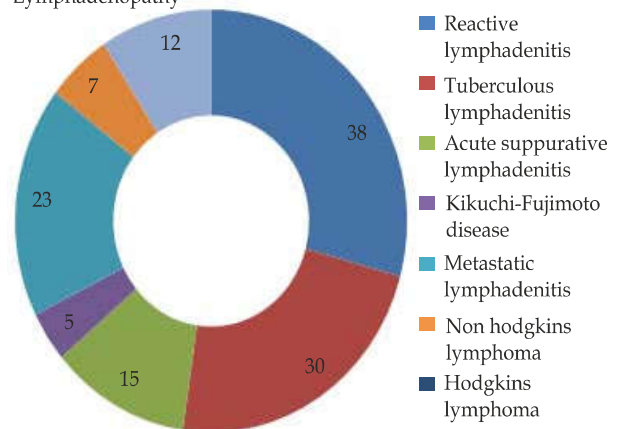
In our study, the most common group of lymph nodes involved was cervical with 31 cases (23.8%) followed by 25 cases (19.2%) involving axillary group, 16 cases (12.3%) of submandibular group, 15 cases (11.5%) of inguinal group, 13 cases (10%) of supraclavicular group, 10 cases (7.7%) of submental group, 9 cases (7%) of post auricular group, 7 cases (5.4%) of abdominal group. 4 cases (3.1%) were generalized.

**Graph 2:** Lymph Node Group Involved



In our study, majority of cases (38) were those of reactive lymphadenitis (29.2%) followed by 30 cases (23%) of tuberculous lymphadenitis, 23 cases (17.7%) of metastatic lymphadenitis, 15 cases (11.5%) of acute suppurative lymphadenitis, 12 cases (9.3%) of Hodgkin's lymphoma, 7 cases (5.4%) of Non-Hodgkin lymphoma and 5 cases (3.9%) of Kikuchi-Fujimoto disease.

**Graph 3:** Cytomorphological Diagnosis of 130 Cases of Lymphadenopathy



A total of 23 cases (17.7%) were diagnosed as metastatic deposits in the study. Maximum cases (12) of metastatic deposits were those of squamous cell carcinoma (52.1%), followed by 5 cases (21.7%) of carcinoma deposits of breast, 4 cases (17.3%) of adeno carcinomas and 1 case (4.3%) each of small cell carcinoma of lungs and undifferentiated metastatic deposits.

Out of 130 cases, 30 cases (23%) were of tuberculosis. Out of these, 22 cases (73.3%) were positive for acid-fast bacilli (AFB) in ZN stain. Caseous necrosis was seen in 23 cases (76.6%) and granulomas were seen in 15 cases (50%).

**Table 2:** Cytomorphological findings of tuberculous lymphadenitis.

Features	Number of Patients	AFB Positivity
Epithelioid granulomas with necrosis	08	07
Epithelioid granulomas without necrosis	07	02
Necrosis without epithelioid granulomas.	15	13
<b>Total</b>	<b>30</b>	<b>22</b>

## Discussion

Lymphadenopathy is a commonly encountered clinical condition requiring prompt and accurate diagnosis to provide treatment as early as possible. FNAC is the first line of investigation in the diagnosis of lymph node lesions. It is safe, inexpensive and highly acceptable to the patient.<sup>2</sup> FNAC can be used as a safe alternative to excision biopsy.<sup>3</sup>

In the current study, maximum number of patients were in the age group of 21–30 years which was similar to the study done by Patel AS et al<sup>11</sup> and Vimal Set al.<sup>4</sup>

A slight male predominance was noted in the current study. This is comparable with studies conducted by Gupta et al<sup>18</sup> and Khajuria et al.<sup>7</sup> Study done by Vimal Set al<sup>4</sup> observed slight female predominance.

In the present study, cervical lymph nodes were the most common group of lymph nodes involved (23.8%). Similar findings were observed by other authors.<sup>14,18</sup>

In our study, the most common lesion observed was reactive lymphadenitis which was seen in 38 cases (29.2%). This was similar to the study done by Vimal s et al.<sup>4</sup> Contrasting results were observed by the studies done by Malakar et al<sup>8</sup>, Patel S et al<sup>11</sup>, Shilpa et al<sup>6</sup> and Kochher et al<sup>5</sup>.

**Table 3:** Comparison with various studies.

Study Group	Most Common Cytological Diagnosis
Annam et al <sup>17</sup>	Metastasis> Reactive lymphadenitis
Malakar et a <sup>18</sup>	Tuberculosis> Metastasis
Patel S et al <sup>11</sup>	Tuberculosis>Reactive lymphadenitis
Shilpa et al <sup>12</sup>	Tuberculosis>Reactive lymphadenitis
Kochher et al <sup>10</sup>	Tuberculosis>Reactive lymphadenitis
Vimal S et al <sup>4</sup>	Reactive lymphadenitis > Tuberculosis
In our study	Reactive lymphadenitis > Tuberculosis

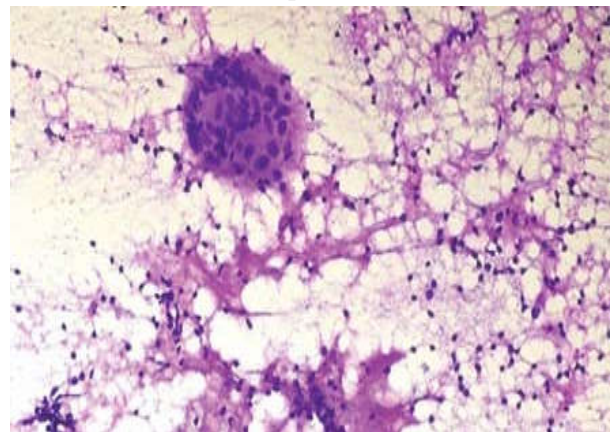
Reactive hyperplasia is a common form of lymphadenitis due to a variety of causes ranging from bacterial, viral, fungal or non-specific etiology.

A study done by Annam et al<sup>17</sup> found metastatic lymphadenitis as the most common cytological diagnosis. It may have been due to different study population, genetic factors, environmental factors and habitual factors.

Second most common lesion in our study was tuberculous lymphadenitis which was observed in 30 cases (23%). Similar results was observed by Vimal S et al<sup>4</sup>. However some study groups observed tuberculous lymphadenitis as the most common cytological diagnosis.<sup>8,10,11,12</sup>

Tuberculous lymphadenitis usually is the most common form of extra pulmonary tuberculosis. Most often it involves the cervical group of lymph nodes attributed to the rich lymphatic supply of the region.

In India, Mycobacterium tuberculosis infection is most common compared to other granulomatous diseases. Hence the presence of granulomas is highly suggestive of tuberculosis. A total of 07 cases (23.3%) had presented without necrosis but amongst these, 2 (6.6%) of them were AFB positive. In epithelioid granuloma without necrosis, AFB positivity is usually very low and in cases negative for AFB, other possibilities like sarcoidosis can be considered in the differential diagnosis. However, in under developed and developing countries where tuberculosis is very common, cases of epithelioid granuloma without necrosis should be considered as tuberculous lesions based on clinical history and clinical features, unless proven otherwise.



**Fig. 1:** Epithelioid granulomas with necrosis, H & E, 40X

Among the 30 cases, 8 cases (26.7%) had presented as granulomatous lymphadenitis with necrosis. AFB positivity rate is particularly high in the presence of necrotic material in the background. This is in accordance with the other studies.<sup>13,14,15,16</sup> In this study, a total of 22 cases (73.3%) showed AFB positivity in this category.

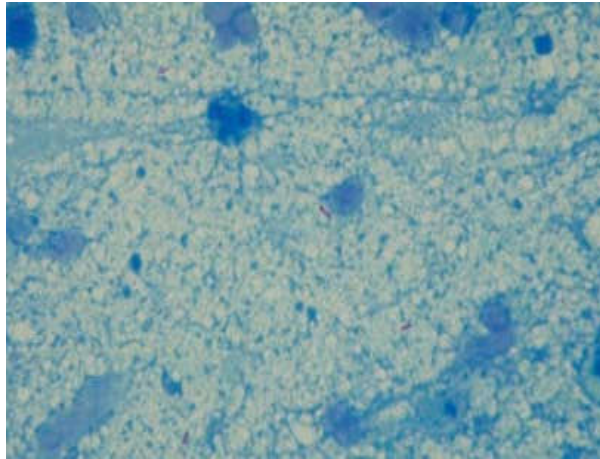


Fig. 2: Acid fast bacilli positive in Ziehl-Neelsen stain, 100X.

A total of 23 cases (17.7%) were diagnosed as metastatic deposits in the current study. A marked male preponderance was noted with a maximum number of cases recorded in the cervical group of lymph nodes followed by axillary lymph nodes.

Maximum cases of metastatic deposits were those of squamous cell carcinoma which showed cluster of polygonal cells with hyperchromatic nuclei and showing pleomorphism against background of lymphoid cells followed by infiltrating ductal carcinoma of breast and adenocarcinoma. This pattern of high number of metastatic deposits of squamous cell carcinoma followed by adenocarcinomas deposits were also observed in other studies.<sup>13,14,16,18</sup>

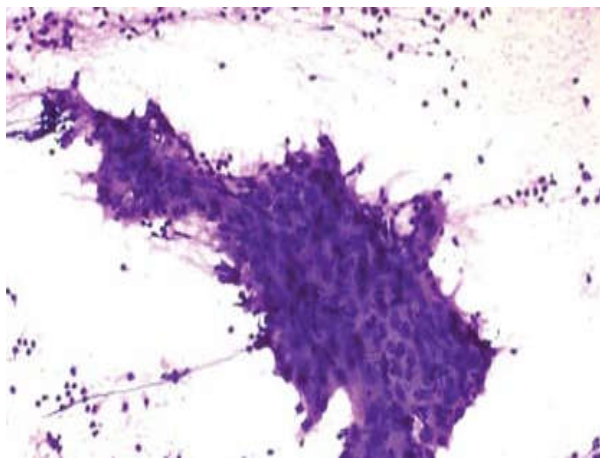


Fig. 3: Metastatic deposits of squamous cell carcinoma, Giemsa, 40X.

A single case of small cell carcinoma of lung showing secondaries in the supraclavicular lymph node was recorded. The smears showed closely packed cells with scant cytoplasm, indistinct small nucleoli and prominent nuclear moulding.

The reason for higher cases of metastasis is regional variation and different study population.

Prevalence of carcinoma of oral cavity, pharynx, oesophagus and larynx are highest in India, probably due to the habit of using multiple tobacco products.

In this study, a total of 19 cases (14.6%) of lymphoma were diagnosed out of which 7 cases (36.8%) were Non-Hodgkinlymphoma (NHL) and 12 cases (63.2%) were those of Hodgkin lymphoma. The cytodiagnosis of NHL depends mainly on finding a relatively monomorphic population of lymphoid cells. FNAC plays a greater role in the management of Hodgkin's disease as compared to NHL as it helps in the primary diagnosis, staging of the patient and monitoring the recurrence of the disease.

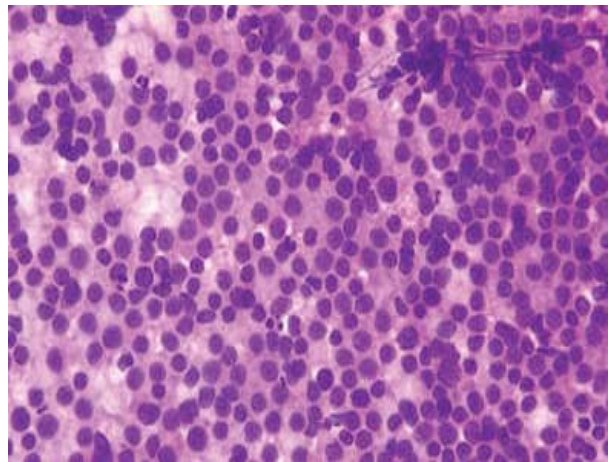


Fig. 4: Non-Hodgkin lymphoma, H & E, 40X.

In FNAC procedure, aspirates can only be taken from a certain focal area of the lymph node. This is one of the shortcomings which make the diagnosis of NHL difficult. With the help of flow cytometry and immuno histochemistry in adjunct to FNAC, the diagnosis of NHL can be made much easier.

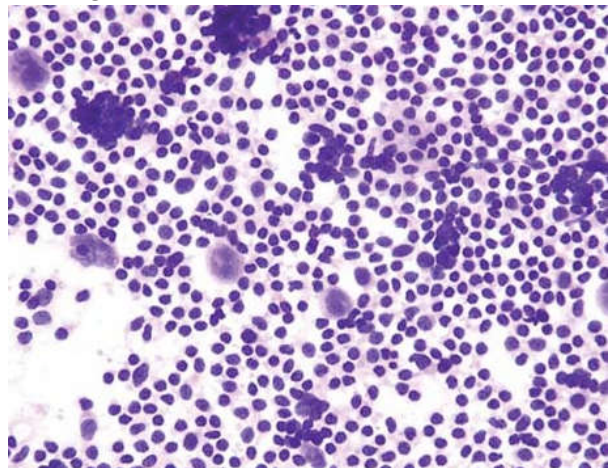


Fig 5: Hodgkin lymphoma, Giemsa, 40X.

Cytological diagnosis of Hodgkin lymphoma is confirmed by the presence of Reed-Sternberg

cells and Hodgkin cells against a background of reactive components such as eosinophils, plasma cells and benign histiocytes. The cases were further confirmed on histopathological examination.

Acute suppurative lymphadenitis was observed in 15 cases (8.8%), which is comparable with the studies done by others which ranged from 1% to 11.26% of all cases.

In this study, 5 cases (3.9%) were diagnosed as Kikuchi Fujimoto's disease. The smears here were cellular and showed plenty of degenerating lymphoid cells and histiocytes with necrotic material in the background.

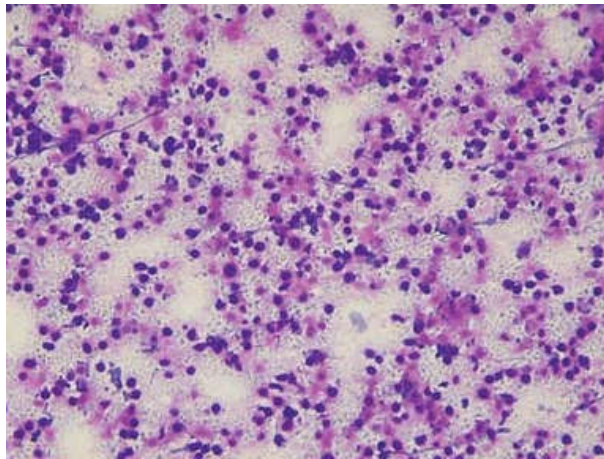


Fig 6: Kikuchi-Fujimoto disease, H & E, 40X.

## Conclusion

FNAC is a simple, inexpensive, relatively painless, rapid, repeatable and reliable method of investigation for lymphadenopathy. Lymphadenopathy is most commonly superficial and palpable, and therefore easily accessible to sampling by palpation or ultrasound guided FNA. In the current study, reactive hyperplasia was recorded as the most common presentation of lymphadenopathy in the cervical region. Granulomatous lesions were next in which demonstration of AFB is a must for the definite diagnosis of tuberculosis. But in our setup, the presence of epithelioid granulomas and the associated clinical symptoms together should be considered as conclusive of tuberculosis. FNAC helps in diagnosing neoplastic and metastatic lesions. It not only confirms the presence of metastatic diseases but also, in most cases, gives the clue regarding the origin of the primary tumor.

*Conflict of Interest:* The authors declare that they have no conflict of interest.

*Funding:* Nil

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