

## Cytological and histopathological correlation of lymph node swellings

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### Abstract

**Background & Objectives:** Lymph node swellings are one of the commonest clinical presentation of patients and it encompasses a wide spectrum ranging from inflammation to a malignant lymphoma or a more obnoxious metastatic malignancy. The objective of the study was to study the role of FNAC in the evaluating lymph node swellings of various sites in the body and to understand the various cytological patterns of FNAC in correlation with histopathology of lymph node swelling.

**Methods:** Patients referred to the Department of Pathology, Deccan College of Medical Sciences and Hospital and its allied branches, Princess Esra Hospital for palpable lymph node swelling on whom FNAC procedure was performed were included in the study. FNAC diagnosis of patients was compared with histopathology in cases which underwent surgical excision and its diagnostic accuracy was studied.

**Results:** Out of 300 cases which included in the study, lymph node biopsy was carried out in 100 cases. Most were in 31 to 40 years. Gender wise, there was female preponderance. Cervical group of lymph node were most affected. Benign lymphadenopathies were diagnosed in 81% of cases. Metastatic deposits were diagnosed in 14% of cases. Lymphomas contributed to 5% cases. On correlation of FNAC findings with histopathology, overall correlation rate was 93%.

**Interpretation & Conclusion:** FNAC of lymph nodes is an excellent first line method to investigate the nature of lesions as it is economical and an easy alternative to open biopsy.

**Keywords:** FNAC, Histopathologicay, Biopsy

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### Introduction

Enlarged Lymph nodes were the first to be diagnosed by fine needle aspiration and are one of the most frequently sampled tissues.<sup>1</sup>

Lymphadenopathy is one of the commonest presentation in OPD with varied etiology ranging from inflammatory condition to malignant. The various modalities available for this are clinical evaluation, FNAC, open biopsy. Fine needle aspiration cytology (FNAC) was introduced to reduce the number of excisional biopsies of lymph nodes. FNAC is the study of cells obtained by a small gauge needle under vacuum provided by an airtight syringe.<sup>2</sup> It is a simple, inexpensive, rapid investigative procedure with minimal trauma and low complication.<sup>3</sup>

Subsequent Histopathological examination of excised biopsy is necessary to correlate cytodiagnosis obtained by FNAC procedure.<sup>4</sup>

Our study is to evaluate the diagnostic accuracy of FNAC in correlation with histopathology in cases of lymphadenopathies at Deccan College of medical

sciences and its allied Princess Esra Hospital from August 2011 to September 2013.

### Material and Methods

#### Source of data

A prospective study of 2 years and 2 months from August 2011 to September 2013 was done on patients who presented with lymph node swellings and were referred to the Department of Pathology, Deccan College of Medical Sciences and Hospital and its allied branch Princess Esra Hospital, Hyderabad for fine Needle Aspiration Cytology (FNAC).

#### Methods of collection of data

Patients referred to the Department of pathology, Deccan College of Medical sciences and Hospital and its allied branch Princess Esra Hospital, Hyderabad for FNAC of palpable lymph node swellings were included in the present study. The patients were clinically evaluated and the clinical details were obtained from medical records. FNAC procedure was explained to the patient including reliability. Limitations and complications and after that the consent of the patient was taken FNAC was done and the standard method for the procedure was adopted. All the slides were reviewed and their diagnosis was made. FNAC diagnosis was compared with the histopathology in cases which underwent surgical excision of lymph nodes and thus its diagnostic accuracy was determined.

**Place of study**

Department of Pathology, Deccan College of Medical Sciences and Hospital and its allied branch Princess Esra Hospital, Hyderabad.

**Duration of Study**

This was a 2 years and 2 months prospective study from August 2011 to September 2013.

**Inclusion criteria**

All patients referred to Department of Pathology, Deccan College of Medical Sciences and Hospital and its allied branch Princess Esra Hospital, Hyderabad for FNAC of lymph nodes were included in the study.

**Exclusion criteria**

Non lymph node sample on FNAC and inadequate material even after repeated aspiration attempts were excluded from the study.

A total of 300 patients were included in the present study, reporting to various clinical department with history of lymph node swellings. These patients were clinically evaluated. The limitations and complications of FNAC were explained to the patients. Lymph node to be aspirated was first examined thoroughly to determine the site of aspiration. Aseptic precautions were taken and aspiration of the selected lymph nodes was done. After the overlying skin was stretched, the lymph node was grasped between the index finger and thumb of the left hand; a sterile 22 or 23 gauge needle fitted to a 10 ml syringe was pierced obliquely into the lymph node. The plunger was then withdrawn to create negative pressure. With the negative pressure intact, the needle was moved to and fro within the node several times to aspirate adequate material. The negative pressure was released and the needle was removed from the mass. Pressure was applied to that area with a cotton swab after withdrawing the needle. The needle containing the aspirated material was detached and air was drawn into the syringe, needle was reattached and the material was dispensed onto clean dry, Grease free glass slides. Slides were marked beforehand for smearing side by diamond pencil. Smears were prepared by spreading using another glass slide exerting light pressure. Amount, nature of aspirated material was examined and several smears were prepared. Smears were immediately fixed in 95% ethyl alcohol in a coplin jar and these smears were stained by Haematoxylin and Eosin stain.

Ziehl Neelsen stain was done for all cases where necrotic material was aspirated or clinically suspected Tuberculosis and HIV. Smears were examined microscopically and cytological diagnosis was made.

Lymph node biopsy was done in 100 cases. Lymph nodes were fixed in 10% formalin and then were subjected to grossing procedure. Bits were taken from entire node for routine processing. After the processing and paraffin embedding, sections of 3 to 6 microns

were taken. Clearing of the slides was done, followed by H&E staining. Special stains like ziehl Neelsen and PAS were done wherever indicated.

Histopathological study was done separately and statistical analysis was done in 100 cases where results of cytological diagnosis was correlated with Histopathological diagnosis.

All cases of lymph node swelling where FNAC was done and those cases undergoing subsequent biopsy are included in the study. All cases where aspirate was inadequate even after repeated aspirations were excluded from the study.

**Results**

**Table 1: Showing related and associated clinical features in patients referred for FNAC of Lymph Nodes**

Clinical Features	No. of Cases
Fever	92
Cough	64
Loss of weight appetite	43
Features of Pulmonary T.B	31
Known cases of Tuberculosis	18
Known cases of Malignancy	10
Lump in Breast	6
Pain Abdomen	18
Difficulty in Swallowing	20
Change of voice	4
Congested tonsil	10
Dyspnea	10
Enlarged Thyroid	3
Others	5

All the patients presented with history of swelling (lymphadenopathy). Patients had ONE or MORE i.e., (a combination of clinical features) like – fever 92 cases, Cough 64 cases etc. 18 patients presented with previous history of pulmonary or extra pulmonary tuberculosis and 10 with malignancy. There were 3 cases of enlarged thyroid.

**Table 2: Distribution of Nodes in Different Regions**

Site	No. of Cases	Percentage
Cervical	192	64.0
Axillary	60	20.0
Inguinal	15	5.0
Supraclavicular	10	3.33
Submandibular	7	2.33
Submental	7	2.33
Other Groups	9	3.0
Total	300	100

The most commonly involved group of lymph nodes was cervical lymph nodes 192 cases (64%) followed by axillary nodes in 60 cases (20%). In 10 cases, lymph nodes were involved at more than one site.

**Table 3: Distribution of Consistency of nodes**

Consistency	No. of cases	Percentage
Firm	194	64.7
Hard	28	9.3
Soft	78	26.0
Total	300	100

Nodes were firm in consistence in 194 cases in yielding a 64.7%. Hard Nodes constituted 28 cases (9.3%) and Nodes of soft consistency were 78(26%).

**Table 4: Distribution of Different types of Aspirates**

Aspirate	No. of cases	Percentage
Sanguineous	168	56.0
Grey white	64	21.3
Caseous	44	14.7
Purulent	24	8.0
Total	300	100

Sanguineous fluid was aspirated in 168 cases (56%), 64 cases (21.3%) Yielded grayish white aspirate, 44 cases (14.7%), it was caseous in nature and in 24 cases (8%) the aspirate was purulent.

**Table 5: Distribution of cases by Etiology**

FNAC Diagnosis	No. of cases	Percentage
Benign	243	81.0
Metastasis	42	14.0
Lymphomas	15	5.0
Total	300	100

Among the 300 cases included in the study, 243 cases (81%) were of None Neoplastic Lesions and 57 cases were of neoplastic lesions. In the Neoplastic group, 42 cases (14%) were of Metastasis and 15 (5%) were of Lymphomas.

**Table 6: Distribution of Lymphomas**

Lymphomas	No. of cases	Percentage
Hodgkin's Lymphoma	3	20
Non-Hodgkin's Lymphoma	12	80
Total	15	100

15 cases of Lymphomas were diagnosed, out of which 12 were Non-Hodgkin's Lymphoma (NHL) and 3 cases were of Hodgkin's Lymphoma.

**Table 7: Distribution of Lymphadenopathy on Histopathology**

Histopathological Diagnosis	Cases	Percentage
Reactive Lymphadenitis	40	40
Granulomatous Lymphadenitis	24	24
Suppurative Lymphadenitis	8	8
Metastasis	20	20
Lymphomas	8	8
Total	100	100

In the category of benign lesions, reactive lymphadenitis comprised 40 cases (40%), whereas granulomatous lymphadenitis was diagnosed in 24 cases (24%) Suppurative Lymphadenitis accounted for 8 cases (8%).

In the Malignant lesions, metastasis constituted 20 cases (20%) and lymphomas were diagnosed in 8 cases (8%).

**Table 8: Distribution of Benign Lesions on Histopathology & Distribution of Malignant Lesions on Histopathology**

Histopathology Diagnosis	Cases
Reactive Lymphadenitis	40
Granulomatous Lymphadenitis	24
Suppurative Lymphadenitis	8
Metastasis	20
Lymphomas	8
Total;	72

In the category of benign lesions, reactive Lymphadenitis comprised 40 cases, whereas granulomatous lymphadenitis was diagnosed in 24 cases, Suppurative Lymphadenitis accounted for 8 cases.

28 cases out of 100 biopsis turned out to be Malignant nature. Of these Metastasis was diagnosed in 20 cases and 8 cases were Lymphomas. Of the 8 cases of Lymphomas, Hodgkin's Lymphoma was seen in 2 cases and Non-Hodgkin's Lymphoma in 6 cases.

**Table 9: Sensitivity and Specificity of FNAC**

Name of the Disease	Sensitivity (%)	Specificity (%)
Reactive Lymphadenitis	100	91.6
Suppurative Lymphadenitis	75	98.9
Granulomatous Lymphadenitis	83.3	98.6
Hodgkin's Lymphoma	100	100
Non-Hodgkin's Lymphoma	83.3	100
Metastasis	100	100

The sensitivity and specificity of FNAC in reactive lymphadenitis is 100% and 91.6% respectively.

## Discussion

In the present study, majority of patients referred for FNAC were 113 (37.7%) in the age group of 21- 40 years similar to the observation of Pandit AA et al.<sup>5</sup> 146(51.05%), whereas in the study of Gupta et al (1991)<sup>6</sup> most of the patients 532 (52.26%) were in the age group of 0-20 years.

Gender distribution in the present study was skewed in favor of females with 154 cases whereas males were 146 giving a ratio of 1.05:1. Other studies where females gender had a preponderance was Tariq et

al (2008)<sup>7</sup> which had 16 males and 34 females with male to female ratio of 1:2.1. Hirachand et al (2009)<sup>8</sup> (68 males and 62 females with 1:0.9 ratio), Sumit Giri et al (2012)<sup>9</sup> (221 males and 149 females with 1.48:1 ratio) and Adhikari et al (2011)<sup>10</sup> (30 males and 25 females with 1:0.8 ratio) had male preponderance.

Cervical region is the commonest site of enlarged lymph nodes in the present study with 192 cases (64%). Similar was the result in other studies where cervical nodes were the most commonly affected – Hirachand et al (2009)<sup>8</sup> 66 cases (50.76%), Guru et al (2009)<sup>11</sup> 230 cases (78.76%), Amit et al (2013)<sup>12</sup> 243 cases (81%). In the present study, Axillary group of lymph nodes were second most commonly affected with 60 cases (20%). Similar result was seen in Hirachand et al with 20 cases (15.38%).

In the present study, 81% of cases were diagnosed with Benign Lymphadenopathy whereas A H Khan et al (2011)<sup>13</sup> has 92% cases and the percentage of Benign Lymphadenopathy was lower in Anastasio Serrano et al (2001)<sup>14</sup> 58.7% and Sumit Giri et al (2012)<sup>9</sup> at 63.23%. Metastatic Deposits were 14% in present study and in other studies it was 6% in A H Khan et al, 21.89% in Sumit Giri et al, 22.6% in Anastasio Serrano et al. Lymphomas were 5% in the present study and other studies were 2% in A H Khan et al and 2.7% in Sumit Giri et al. Lymphomas were higher reported in Anastasio Serrano et al at 9%

In the present study 58.4% cases were diagnosed to be having reactive lymphadenitis. Guru et al (2009)<sup>11</sup> had incidence of 46.32% and remaining were lower than these two, A H Khan et al (2011)<sup>13</sup> at 28%, Hirachand et al (2009)<sup>8</sup> at 41.5% and Sumit Giri et al (2012)<sup>9</sup> at 34.6%.

In the present study 14% of cases were reported as Metastatic Deposits. This number was much lower than Sumyra et al (2012)<sup>15</sup> who reported 38.2% cases and Anastasio Serrano et al (2001)<sup>14</sup> who reported 22.6% and Sumit Giri et al (2012)<sup>9</sup> 21.89%. Adhikari et al (2011)<sup>10</sup> and Ah Khan et al (2011)<sup>13</sup> reported a lower percentage at 12.72% and 6% respectively. Nesreen et al (2011)<sup>16</sup> reported 19.7% cases of Metastatic Deposits.

In the present study 33.3% of the cases were reported to be Squamous cell carcinoma deposit which were highest in the study. Same finding were also reported by Nesreen et al (2011)<sup>16</sup> and Sumyra et al (2012)<sup>15</sup> who reported Squamous cell carcinoma deposit at 45.2% and 32.2% respectively. Second Highest Metastatic deposits were 28.6% in the present study and the same second highest was also reported for adenocarcinoma by both Nesreen et al (2011)<sup>16</sup> and Sumyra et al (2012)<sup>15</sup> at 25.8% and 22%. However Anjali Das Gupta et al (1994)<sup>17</sup> reported the highest incidence of adenocarcinoma deposits at 37.5% and Squamous cell carcinoma deposit at 25%

In the present study Hodgkin's Lymphoma was reported in 1% cases and Non-Hodgkin's Lymphoma in 4% cases. This correlates well with Sumit Giri et

al (2012)<sup>9</sup> who reported 1.08% cases of Hodgkin's Lymphoma. Nesreen et al (2011)<sup>16</sup> and Sumyra et al (2012)<sup>15</sup> reported 2.6% and 2% of cases of Hodgkin's Lymphoma which are slightly higher than the present study. In the case of NHL, Sumit Giri et al reported much lesser percentage of cases at 1.62% whereas Nesreen et al (2011)<sup>16</sup> and Sumyra et al (2012)<sup>15</sup> reported a higher percentage of NHL cases at 5.7% and 6.5% respectively.

In the present study there were 40 cases of Reactive lymphadenitis which were correlating with both FNAC and HPE out of 45 cases yielding a correlation rate of 89%. Adhikari et al (2011)<sup>10</sup> reported a 100% correlation rate where as other studies had a lower correlation rate than the present study i.e. Nesreen et al (2011)<sup>16</sup> and Sumyra et al (2012)<sup>15</sup> 58% and 76.78% respectively. Sumit Giri et al (2012)<sup>9</sup> correlated only 2 cases of reactive lymphadenitis out of 6 leading to 33.3% correlation rate.

In the present study 20 out of 21 cases of Granulomatous Lymphadenitis correlated well with both FNAC and HPE (95%) correlation rate. This was close to the finding of other studies i.e. Sumyra et al (2012)<sup>15</sup> and Sumit Giri et al (2012)<sup>9</sup> which had 91.1% and 94.11% correlation rate. Adhikari et al (2011)<sup>10</sup> correlated 34 out of 39 cases (87%) correlation rate. Nesreen et al (2011)<sup>16</sup> could correlate 7 out of 10 cases yielding 70% correlation rate.

In the present study 6 cases of Suppurative Lymphadenitis out of 7 could correlate well on both FNAC and HPE (86% correlation rate). Patra (1983)<sup>18</sup> could correlate all the cases of Suppurative Lymphadenitis (100% correlation rate).

In the present study all the cases correlated well yielding a 100% correlation rate.

Sumit Giri et al (2012)<sup>9</sup> and Nesreen et al (2011)<sup>16</sup> correlated 14 out of 18 Hodgkin Lymphoma cases.

In the present study all the cases correlated well yielding a 100% correlation rate.

Sumit Giri et al (2012)<sup>9</sup> and Nesreen et al (2011)<sup>16</sup> reported 100% and 74% Correlation rate. The former correlated 2 out of 2 cases and Nesreen et al (2011)<sup>16</sup> correlated 44 out of 60 Non-Hodgkin's Lymphoma cases.

In the present study all the 20 cases correlated well with both FNAC and HPE (100% correlation rate). This findings augurs well with the findings of other studies. Adhikari et al (2011)<sup>10</sup> and Nesreen et al (2011)<sup>16</sup> reported 100% correlation rate of Metastatic deposits. Sumyra et al (2012)<sup>15</sup> reported a slightly lower correlation rate at 99% and 96% respectively.

The present study had an overall correlation rate of 93% with 93 out of 100 cases correlating with FNAC and HPE. Sumyra et al (2012)<sup>15</sup> and Anuradha et al (1989)<sup>19</sup> had a similar correlation rates of 93% and 94% respectively. Adhikari et al (2011)<sup>10</sup> correlated 50 out of 55 cases having a slightly similar correlation rate of 91% as the present study. Bhaskaran et al (1990)<sup>20</sup> and

Sumit Giri et al (2012)<sup>9</sup> reported a correlation rate of 88% and 87% respectively. Nesreen et al (2011)<sup>16</sup> had the lowest correlation rates for the comparative study at 82% (128 out of 157 cases correlating).

In the present study the overall sensitivity and specificity was 96.4% and 100% respectively. Sumyra et al (2012)<sup>15</sup> reported 95% sensitivity whereas Sumit Giri et al (2012)<sup>9</sup> and Nesreen et al (2011)<sup>16</sup> reported similar sensitivity rate of 90.3% and 91% respectively. The specificity of the comparative studies i.e. Sumyra et al (2012)<sup>15</sup>, Sumit Giri et al (2012)<sup>9</sup> and Nesreen et al (2011)<sup>16</sup> were 91%, 91% and 67.2% respectively.

### Conclusion

Fine needle aspiration cytology is a primary diagnosis tool in the evaluation of lymph node lesions, with accuracy comparable to histopathology. At times when there is difficulty in diagnosis on cytology, excision biopsy should be done. Before the advent of FNAC the diagnosis of lymphadenopathies was done after surgical excision followed by histopathological examination. With the introduction of FNAC all the peripheral nodes that are easily accessible can be assessed through a needle to arrive at a probable diagnosis. The most frequent causes of lymphadenopathy are reactive lymphadenitis, tubercular lymphadenitis and metastatic malignancies. FNAC alone can help in establishing the diagnosis in large number of cases. In certain cases it can help in establishing the diagnosis in large number of cases. In certain situations it can be enough for diagnosis in proper clinical setting to avoid surgical procedure like biopsy. FNAC used in conjunction with clinical findings, radiological and laboratory investigations can be a cost effective method.

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