

Original Research Article

Efficacy of fine needle aspiration cytology in the diagnosis of lymphadenopathies

Rasheed Fatima^{1*}, Sandhya M.²

¹Assistant Professor, Department of Pathology, SVS Medical College, Mahabubnagar, Telangana, India

²Tutor, Department of Pathology, Hassan Institute of Medical Sciences, Hassan, Karnataka, India

Received: 11 February 2017

Revised: 20 February 2017

Accepted: 09 March 2017

***Correspondence:**

Dr. Rasheed Fatima,

E-mail: dr Rasheedfatima786@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Enlarged lymph nodes were the first organs to be diagnosed by fine needle aspiration. Objectives were to study the role of FNAC in the evaluation of lymphadenopathies, to study the various cyto-morphological patterns in correlation with histopathology of various lymph node lesions and to document the diagnostic accuracy of FNAC in correlation with histopathology.

Methods: All patients referred to the department of pathology K.V.G. Medical College and Hospital, Sullia, Karnataka, India for FNAC of palpable lymph nodes were included in present study. FNAC was done and the standard method for the procedure adopted. All the slides were reviewed and their diagnosis was made. FNAC diagnosis was compared with histopathology in cases which underwent surgical excision and thus its diagnostic accuracy determined. This was two years and two months' prospective study from July 2008 to August 2010.

Results: A total of 150 patients were included in the present study, reported to various clinical departments with history of swelling. Lymph node biopsy was done in 50 cases. Statistical analysis was done in 50 cases, where FNAC diagnosis was correlated well with histopathological diagnosis. Maximum number of cases was in the age group of 31-40 years. Present study showed female preponderance of cases. Cervical group of nodes were most commonly involved. Benign lymphadenopathies were diagnosed in 69.8% of cases. Maximum number of cases being reactive lymphadenitis (65.4%). Metastatic deposit was diagnosed in 23.5% of cases. Most common subtype being adenocarcinoma. Lymphomas were diagnosed in 09 cases. 1 case of Hodgkin's lymphoma and 8 cases of NHL were diagnosed. The overall correlation between FNAC and histopathology was 98% (49 out of 50).

Conclusions: FNAC is an accurate, sensitive, specific and cost effective procedure in the diagnosis of lymphadenopathies.

Keywords: FNAC, Lymphadenopathies, Procedure

INTRODUCTION

Enlarged lymph nodes were the first organs to be diagnosed by fine needle aspiration; they are one of the most frequently sampled tissues.¹ The study of cells which are obtained by a small gauge needle is known as fine needle aspiration cytology (FNAC).² FNAC is a simple, inexpensive, rapid investigative procedure with

minimal trauma and low complication rate.³ The material obtained from FNA can be used for diverse group of special techniques like cyto-chemistry, bacteriological culture, immune cyto-chemistry, ultra-structural studies and molecular hybridization.⁴ For determining the diagnostic accuracy of FNAC, it is a usual practice to correlate cyto-diagnosis with subsequent histopathological examination of excised biopsy

specimens.⁵ The present prospective study was undertaken to document the diagnostic accuracy of FNAC in correlation with histopathology in the evaluation of lymphadenopathies at K.V.G. Medical College and hospital, Sullia, Karnataka, India from June 2008 to August 2010.

Lymph nodes are the most common target organs where FNAC is performed. The simple procedure of needle aspiration of lymph nodes dates back to 1904, when Greig and Gray were investigating cases of trypanosomiasis. Nearly two decades later, in 1921, Guthrie systematically performed lymph node aspiration for diagnostic purposes. In 1930, Martin and Ellis published their experience with the technique. As a result of the pioneering work of Franzen et al and the widespread acceptance of the technique, aspiration of lymph nodes has become a standard laboratory procedure.⁸ In 1925, several physicians at Memorial hospital in New York investigated the use of aspiration smears on a large scale.¹

METHODS

Source of data

All patients referred to the department of pathology K.V.G. Medical College and Hospital, Sullia, Karnataka, India for FNAC of lymph nodes were included in the present study.

Methods of collection of data

All patients referred to the department of pathology K.V.G. Medical College and Hospital, Sullia, Karnataka, India for FNAC of palpable lymph nodes were included in the present study. Medical records were used to obtain the data and at the same time, clinical evaluation of patients was used. FNAC was carried out with standard protocol and procedure. All the slides were reviewed and their diagnosis was made. FNAC diagnosis was compared with histopathology in cases which underwent surgical excision and thus its diagnostic accuracy determined.

Place of study

Department of Pathology, K.V.G. Medical College and Hospital, Sullia, Karnataka, India.

Duration of study

This was a two year and two months' prospective study from July 2008 to August 2010.

Inclusion criteria

All patients referred to the department of pathology K.V.G. Medical College and Hospital, Sullia, Karnataka,

India for FNAC of lymph nodes were included in the study.

Exclusion criteria

Non-lymph node samples on FNAC were excluded from the study.

A total of 150 patients were included in the present study, reported to various clinical departments with history of swelling. These patients were clinically evaluated and informed consent was obtained for the procedure. The limitations and complications of FNAC were explained to the patient. Lymph node to be aspirated was first examined thoroughly to determine the site of aspiration. Taking all aseptic precautions, aspiration was done with standard procedure. The needle with syringe was introduced into the node; the plunger of the syringe was pulled to create a negative pressure. With the negative pressure intact, the needle was moved to and fro within the node at least two to three times, to aspirate adequate material. The negative pressure was released and the needle along with the syringe was withdrawn from the node. Pressure was applied to the area with a cotton swab after the needle was withdrawn. The needle was detached from the syringe, air was drawn into the syringe, needle was reattached and the material was dispensed on to glass slides. Four smears were made; two of them were fixed in a fixative containing ethyl alcohol, later to be stained with PAP and/or H and E. Two smears were air-dried followed by staining with Romanowsky stains.

Lymph node biopsy was done in 50 cases. Lymph nodes were fixed in formalin; bits were given from entire node for routine processing.

RESULTS

A total of 150 cases were enrolled in the Department of Pathology K.V.G. Medical College and Hospital, Sullia, Karnataka, India during the study period. Age of the patient varied from 5 years to 80 years. Maximum numbers of patients were seen between the age group of 31 to 40 years. The above table gives age distribution in the study group.

Table 1: Distribution of cases in different age groups.

Age in years	Number	Percentage
1-10	08	5.3
11-20	22	14.7
21-30	23	15.3
31-40	33	22
41-50	25	16.7
51-60	22	14.7
61-70	11	7.3
71-80	06	4
Total	150	100

Table 2: Distribution of cases in both sexes.

Sex	Number	Percentage
Female	80	53.3
Male	70	46.7
Total	150	100

Table 2 shows distribution of cases in both sexes. Out of 150 patients 70 were males and 80 were females. There was female preponderance of cases.

Table 3: Distribution of symptoms in all cases.

Symptoms	Number	Percentage
Fever	07	4.6
Fever, swelling, weight loss	19	12.6
Fever, swelling	24	15.9
Swelling	85	56.3
Swelling, weight loss	15	9.9
Weight loss	01	0.7
Total	150	100

The presenting complaints in all 150 patients are tabulated in Table 3. The presenting complaint in 56.3% of patients was swelling (localized). Fever was the presenting complaint in 4.6% of the patients, 1% of patients presented with undiagnosed weight loss, 12.6% of patients presented with fever, swelling and weight loss, 15.9% of patients presented with fever and swelling and 9.9% of patients presented with swelling and weight loss.

Aspiration was done in 150 cases, 1 aspirate yielded inadequate sample for cytologic interpretation.

Table 4: Distribution of nodes in different regions.

Site	Number	Percentage
Cervical	105	69
Axillary	32	22
Inguinal	10	7
Other	03	2
Total	150	100

Cervical lymph nodes (105 cases) were the most commonly involved group of lymph nodes in the study group of 150 patients. Axillary nodes (32cases), inguinal nodes (10 cases) and other nodes (03 cases) were involved. Other nodes included the pre-auricular, post-auricular nodes. In 6 cases, lymph nodes were involved at more than one site.

Table 5: Size wise distribution of lymph nodes.

Size of nodes (cm)	Number	Percentage
<2x2	140	93.3
>2x2	10	6.7
Total	150	100

Table 5 shows size wise distribution of lymph nodes. Majority of the nodes (140) were less than 2x2 centimeters. Smallest node was 0.5x0.5centimeters while the largest node was 4x3 centimeters.

Table 6: Distribution of consistency of nodes.

Consistency	Number	Percentage
Firm	91	60.7
Soft	50	33.3
Hard	09	6
Total	150	100

In 60.7% of the cases nodes were firm in consistency, seen in all types of lymphadenopathies. Hard nodes were present in 6% of cases. Most of the hard nodes were seen in malignant deposits. Most of the soft nodes (33.3%) were seen in suppurative lymphadenitis, granulomatous lymphadenitis and in reactive lymphadenitis.

Table 7: Distribution of number of nodes at each site.

Number of nodes	Number	Percentage
01	78	52
02	41	27.3
03	18	12
> 3	13	8.7
Total	150	100

Table 7 shows distribution of number of nodes at each site. In 52 % of cases only a single node was involved and in 8.7% of cases more than 3 nodes were involved.

Table 8: Distribution of different types of aspirates.

Color of aspirate	Number	Percentage
Sanguineous	91	60.7
Purulent	08	5.3
Caseous	17	11.3
Grey white	32	21.3
Grey black	01	0.7
Failed/scanty	01	0.7
Total	150	100

In 91 cases sanguineous fluid was aspirated, in 32 cases the aspirate was grey white in color, in 17 cases it was caseous material and in 8 cases purulent fluid. The details of distribution of type of aspirate are as shown in Table 8. In all but 1 case, the aspirate was satisfactory.

Table 9: Distribution of cases by etiology.

FNAC diagnosis	Number	Percentage
Benign	104	69.8
Metastasis	35	23.5
Lymphomas	10	6.7
Total	149	100

The total numbers of 150 cases constituted 104 cases of non-neoplastic lesions, and 45 cases of neoplastic lesions. Among neoplastic lesions, 35 cases were of metastasis & 10 were of lymphoma. In 1 case the aspirate was inadequate and hence inconclusive.

DISCUSSION

FNAC of lymph nodes is one of the routinely used diagnostic procedures in patients presenting with lymphadenopathy. In the present study extending over two years and two months’ duration, 150 patients

underwent FNAC of the nodes. Age of the patient varied from 5 years to 80 years. Maximum number of patients was seen between the age group of 31 to 40 years. The ratio of number-of males to females was 0.8:1. Swelling was the presenting complaint in 56.3% of patients. The other important modes of presentations were fever 4.6% of cases, and weight loss in 1% of cases. Aspiration was done in 150 cases, 1 aspirate yielded inadequate sample for cytologic interpretation. This was due to small size of the node and scanty cellularity. The comparison of inadequate aspirate in different studies is shown below.

Table 10: Comparison of inadequate aspirate in different studies.

Studies	Total cases studied	Inadequate aspirate	Percentage
Kumar A et al ⁶	1471	175	11.8
Egae AS et al ⁷	667	55	8.2
Barroca H et al ⁸	113	08	07
Present study	150	01	0.7

Cervical group of lymph nodes were the most common involved nodes (69%). This was followed by axillary and inguinal nodes. The involvement of nodes correlated well with studies done by Egae AS et al 77 in which cervical lymph nodes were the most commonly involved nodes (67.48%) followed by axillary and inguinal nodes.⁷ Majority of the nodes (140) were less than 2x2 centimeters. Smallest node was 0.5x0.5 centimeters while the largest node was 4x3 centimeters. In 60.7% of the cases nodes were firm in consistency. Hard nodes were present in 6% of cases. Most of the hard nodes were seen in malignant deposits. Most of the soft nodes (33.3%)

were seen in suppurative lymphadenitis, granulomatous lymphadenitis and in reactive lymphadenitis. In 52% of cases only a single node was involved and in 8.7% of cases more than 3 nodes were involved. In 91 cases sanguineous fluid was aspirated, in 32 cases the aspirate was grey white in color, in 17 cases it was caseous material and in 8 cases purulent fluid. In all but 1 case, the aspirate was satisfactory. Aspirates were benign in 69.8% of cases, metastasis deposits were found in 23.5% of the cases and lymphomas in 6.7% of the cases. The comparison of present findings which correlated with other studies is as follows:

Table 11: Comparison of different types of lymphadenopathies.

Lesions	Kumar A et al ⁶	Katz RL et al ¹⁰	Egae AS et al ⁷	Present study
Benign lymphadenopathy	67.2%	45%	58.7%	69.8%
Metastatic deposit	10%	28%	22.6%	23.5%
Lymphomas	1.8%	6%	9%	6.7%

We diagnosed 68 cases of reactive lymphadenopathy in 45.33% of total 150 cases. This study correlated with studies by Egae AS et al where 51.12% of aspirated nodes were reactive.⁷ Suppurative lymphadenitis was diagnosed in 4.66% of total of 150 cases. The distribution of cases correlated with other studies. Granulomatous lymphadenitis was diagnosed in 19.33% of total 150 cases. This finding correlated with studies by S. Anuradha et al where 22% of aspirated nodes were diagnosed as granulomatous lymphadenitis.⁹ Lymph node aspirates in 35 cases (23.5%) showed metastatic deposits.

The finding of metastatic deposit correlated well with other studies mentioned below:

Table 12: Correlation of findings of metastatic deposits with other studies.

Metastatic deposit	Percentage of cases
Kumar A et al ⁶	10
Katz RL et al ¹⁰	28
Egae AS et al ⁷	22.6
Present study	23.5

Diagnosis of adenocarcinoma was made in 51.5% of metastatic deposits. The primary sites of origin are from malignancies of breast and stomach. This was the most common form of metastasis in present study.

Squamous cell carcinoma was diagnosed in 37.1% of metastatic deposits in lymph nodes. The primary sites of origin are malignancies of head and neck region and lung. Diagnosis of poorly differentiated carcinoma was made in 5.7% of metastatic deposits. The comparison of metastasis of various types is as follows:

Lymphomas constituted 6.7% of cases in present study. This was in accordance with other studies. A single case of Hodgkin's lymphoma was diagnosed in a 33-year-old male who presented with multiple swellings in the neck, fever and weight loss. Histopathological correlation was done and it was diagnosed as Hodgkin's lymphoma-nodular sclerosis variant.

Fine needle aspiration of lymph nodes revealed 8 cases of non-Hodgkin's lymphoma. Four cases diagnosed as NHL on cytology correlated with histopathology. Katz RL emphasized that an attempt to diagnose and sub classifies NHL on cytology must be made.¹¹ However a definitive diagnosis is possible only through multi-parametric approach through the use of immunochemistry and flow cytometry. 4 cases were sub classified into following types. Three were diagnosed as NHL- predominantly centrocytic type and one case as small cell type.

There was good correlation between FNAC and histopathology in 50 cases. The overall correlation between FNAC and histopathology was 98% (49 out of 50). The specificity of FNAC is 98%. In this study, the sensitivity and specificity of FNA in reactive lymphadenitis is 94.73% and 96.77% respectively and that of non-Hodgkin's lymphoma is 80% and 97.77% respectively. In suppurative lymphadenitis, tuberculosis and metastasis, the sensitivity and specificity is 100%. This shows that FNAC is a good tool for diagnosis considering all the advantages.

CONCLUSION

FNAC is useful either to confirm or to exclude certain conditions for the physician. It is also useful to further plan the management of the patient. For diagnosis of etiology, FNAC is the perfect tool. It is easy to carry out, cost effective and the reports are available quickly. With FNAC, probable diagnosis can be arrived at quickly.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Shoog L, Hagen TL, Taani E. Lymph Nodes. In: Grey W: Diagnostic Cytopathology. Hong Kong. Churchill Livingstone; 1995;479-526.
2. Sheik MM, Ansari Z, Ahmed P, Tyagi SP. Tuberculosis lymphadenopathy in children. Indian Paediatr. 1981;18:293-7.
3. Nayak S, Mani R, Anita N, Kavatker, Puranik SC, Holka VV. Fine needle aspiration cytology in lymphadenopathy of HIV positive patients. Diagn Cytopathol. 2003;29(3):146-8.
4. Patra DK, Nath S, Biswas K, Sarkar R, Jayanta DE. Diagnostic evaluation of childhood cervical lymphadenopathy by fine needle aspiration cytology. J Indian Med Assoc. 2007;105:694-9.
5. Saboorian MH, Ashfaq R. The use of fine needle aspiration biopsy in the evaluation of lymphadenopathy. Semin Diagn Pathol. 2001;18(2):110-23.
6. Gupta AK, Nayar M, Chandra M. Clinical appraisal of fine needle aspiration cytology in tuberculous lymphadenitis. Acta Cytol. 1992;36:391-4.
7. Egae AS, González MMA, Barrios PA, Masgrau AN, de Agustín P. Usefulness of light microscopy in lymph node fine needle aspiration biopsy. Fine needle aspiration cytology; Acta Cytol. 46(2):364-8.
8. Barraco H, Marques C, Candeias J. Fine needle aspiration cytology Diagnosis, Flow cytometry, Immunophenotyping and histology in clinically suspected lympho-proliferative disorders. Acta Cytol. 2008;52(2):124-32.
9. Raghuvver CV, Pai MR, Manohar C. Role of fine needle aspiration cytology in disorders of lymph nodes. J of Cytol. 1996;13:45-9.
10. Katz RL. Cytologic diagnosis of leukemias lymphoma, values and limitations. Clinics in Lab Med. 1991;11(2):469-98.
11. Dasgupta A, Ghosh RN, Poddar AK. Fine needle aspiration cytology of cervical lymphadenopathy with special reference to tuberculosis. J Indian Med Assoc. 1994;92(2):44-6.

Cite this article as: Fatima R, Sandhya M. Efficacy of fine needle aspiration cytology in the diagnosis of lymphadenopathies. Int J Res Med Sci 2017;5:1607-11.