



ROLE OF FNAC IN THE DIAGNOSIS OF TUMORS AND TUMOR LIKE LESIONS OF LYMPH NODES IN CORRELATION WITH HISTOPATHOLOGY

Dr. Chintapalli Pavani*

Postgraduate, Rangaraya medical college, Kakinada, AndhraPradesh, India.
*Corresponding Author

Dr. R. Rajyalakshmi

Professor & HOD, Rangaraya medical college, Kakinada, AndhraPradesh, India.

Dr. P.R.D Ganesh Basina

MD, Assistant Professor, Rangaraya medical college, Kakinada, AndhraPradesh, India.

ABSTRACT

Background & Objectives: Lymph node swellings are one of the commonest clinical presentations of patients attending OPD and it has various aetiologies and sometimes reactive lesions may mimic malignancy on clinical examination and on FNAC. The aim of the study was evaluation of the utility and limitations of FNAC in morphological diagnosis of tumours and tumour like lesions of lymph nodes. **Methods:** Patients attending OPD are referred to Department of pathology, Rangaraya Medical College, Kakinada. FNAC procedure was done and diagnosis was correlated with Histopathology for confirmation. **Results:** A total number of 50 patients were subjected to FNAC followed by excision biopsy. The patient age ranged from 41 to 60 years with male preponderance. Most common group of lymph nodes affected were cervical group. Of these 50 cases subjected to FNAC, 74% were diagnosed as tumors and 26% were tumor like lesions. The histopathology correlation rate was 90% with tumors. **Interpretation & Conclusion:** FNAC of lymph nodes is primary diagnostic tool for evaluating tumors and tumor like lesions as it is simple, cost effective and an easy alternative for biopsy.

KEYWORDS : FNAC, Histopathology, Lymph node

Introduction

Lymphadenopathy is one of the most common clinical presentations of patients attending medical, surgical, and paediatric OPD, and its aetiology confounds physicians. Various aetiologies are seen as causes for lymph nodal swellings, i.e., infectious, inflammatory, and malignant tumours. Some reactive lesions may mimic malignancy on clinical examination. For those types of lesions, FNAC followed by histopathology is of great help.

Various modalities for evaluation of lymph nodal swellings includes clinical examination, imaging, FNAC and surgical biopsy.

FNAC is the preferred first-line investigation for morphological evaluation of lymph node swellings, as it is simple, quick, safe, cost-effective, easily accessible, and done as an OP procedure. Cytological examination is a valuable aid in the majority of cases in the basic assessment and identification of the diagnostic entity, as well as in distinguishing tumours from tumour-like lesions.

However, there are certain limitations to FNAC, including inherent sampling errors and pitfalls in differentiating mimics of malignancy based on cytological study alone. In such a scenario, FNAC should be followed by a histopathological evaluation for confirmation.

Aims And Objectives

AIM Of the Study

Evaluation of the utility and limitations of FNAC in morphological diagnosis of tumours and tumour like lesions of lymph nodes.

Objectives Of The Study

1. To study the incidence of tumours and tumour like lesions of lymph nodes.
2. To study the cytological features of tumours and tumour like lesion of lymph nodes.
3. To correlate the cytodagnosis of these lesions with histopathology.
4. To differentiate cytological mimics of malignancy in correlation with histopathology.

Materials and Methods

This study was conducted in the Department of Pathology at Government General Hospital, Rangaraya Medical College, Kakinada after obtaining ethical committee approval.

The present study was cross sectional and the study material includes cytologically diagnosed Lymph node specimens received at the department of pathology over a period of 3 years that is from November 2019 to October 2022.

Inclusion criteria: Lymph node size more than 0.5cm and cytologically diagnosed tumours and tumour like conditions.

Exclusion criteria:

1. Inadequate material
2. Infectious conditions
3. Metastatic deposits

After obtaining the clinical data and examination of patient, the patient is subjected to FNAC after taking his/her consent.

FNAC is performed using 22 G needle and the smears were fixed in isopropyl alcohol and stained with Hematoxylin and Eosin.

Excised Lymph Node specimens were fixed in 10% buffered formalin for 10-15 hours and was submitted for processing and sectioning followed by staining with Hematoxylin and Eosin.

Results

The present study was a cross-sectional study conducted over a period of three years, from 2019 to 2022, in the Department of Pathology at Rangaraya Medical College, Kakinada.

A total of 70 patients with lymph nodal swellings were subjected to FNAC and were diagnosed as tumours or tumour-like lesions. Of these, 50 cases were followed by histopathology.

In the present study, the majority of the cases were between the age group of 41-60 years (38%) followed by 21-40 years (34%). The age of the patients ranged from 10-71 yrs with a median age of 41.78 yrs +/- 16.9 years.

Out of 50 cases, 26 were males (52%) and 24 were females (48%). The male to female ratio was 1.09:1.

All patients were presented with lymph nodal swellings, with associated complaints like pain, fever, loss of weight and appetite.

The most common group of lymph nodes were cervical lymph nodes 31 cases (62%) followed by axillary and inguinal nodes with 5 cases each (10%). In 6 cases, multiple lymph node groups were involved.

On cytology, out of 50 cases, 17 cases were diagnosed as lymphoproliferative disorder (34%), 11 cases were Non - Hodgkin lymphoma (22%), 8 cases were Hodgkin lymphoma (16%), 2 cases were reactive lymphadenitis with eosinophilia/ Kimura (4%), 7 cases

were necrotizing lymphadenitis (10%), 4 cases were granulomatous lymphadenitis(8%), and remaining one case was Rosai Dorfman Disease. Cytologically diagnosed 50 cases were subjected to excisional biopsy for histopathological correlation.

Table: 1 Cytological and Histopathological correlation of various lymph node lesions.

S. no	Cytological diagnosis	No. of	Histopathological Diagnosis												
			Non Hodgkin Lymphoma	Hodgkin Lymphoma	Metastatic Deposit	Kikuchi Fujimoto	Castl eman	Kimura Disease	Rosai Dorfman Disease	Dermatopathic Lymphadenitis	Lymphoproliferative Disorder	Caseating Granulomatous Lymphadenitis	Necrotizing Lymphadenitis	Reactive lymphadenitis	
1	Lymphoproliferative disorder	17	7	5	2						1	1	1		
2	Non Hodgkin Lymphoma	11	11												
3	Hodgkin Lymphoma	8		7				1							
4	Reactive Lymphadenitis with eosinophilia/ Kimura	2							1						1
5	Chronic Granulomatous Lymphadenitis	4	2	2											
7	Necrotizing Lymphadenitis	7					4							3	
8	Rosai Dorfman Disease	1								1					
Total no of cases		50	20	14	2	4	1	1	1	1	1	1	1	3	1

Statistical Analysis

	HPE		
FNAC	MALIGNANT	BENIGN	Total
MALIGNANT	34	2	36
BENIGN	7	7	14
Total	41	9	50

Sensitivity= 82.93% (95% CI- 67.94% to 92.85%)
 Specificity= 77.78% (95% CI- 39.99% to 97.19%)
 Disease prevalence= 82.00% (95% CI- 68.56% to 91.42%)
 Positive Predictive Value= 94.44% (95% CI- 83.24% to 98.31%)
 Negative Predictive Value= 50.00% (95% CI- 31.87% to 68.13%)
 Accuracy= 82.00% (95% CI- 68.56% to 91.42%)
 Chi square value= 13.48
 p value=<0.001

Photomicrographs

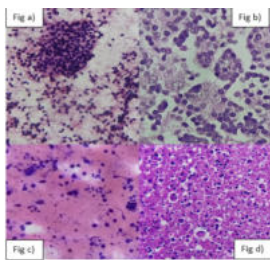


Fig a & b shows Emperipolesis in Rosai Dorfman disease. Fig c & d shows Karyorectic debris in Necrotizing Lymphadenitis

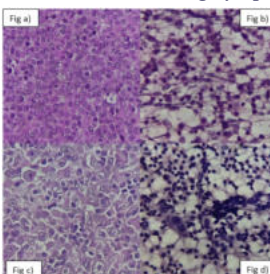


Fig a & b shows monomorphic population of cells in Non-Hodgkin Lymphoma. Fig c & d showing binucleated and multinucleated RS cells in Hodgkin Lymphoma cells

Discussion

A total number of 70 patients with lymph nodal swellings were cytologically diagnosed as tumors and tumor like lesions were taken of which 50 cases got histopathological confirmation and were included in the present study.

Enlarged lymph nodes were the most common presentation with cervical lymph nodes being the most common group. Similar results were observed in other studies like Guru et al.,⁽¹¹⁾ Hirachand et al.,⁽⁴⁾ Fatima R et al.,⁽⁷⁾ and Amit et al.,⁽¹¹⁾. The next common site was axillary group followed by inguinal group of lymph nodes.

Out of 50 cases, 36 cases were tumors, 14 cases were tumor like lesions on histopathology. Two studies have similar results as present study i.e., in N.H. Hafez et al.⁽⁸⁾ and Steel et al.⁽¹⁰⁾ studies. However, the present study showed variable findings compared to other studies as the present study excluded infectious etiology and metastatic which are the most common cause for lymphadenopathies.

In the present study, 17 cases were diagnosed on cytology as lymphoproliferative disorders had further histological evaluation for accurate diagnosis. Of the 17 cases, 13 cases were diagnosed as lymphomas of which 7 were Non – Hodgkin and 6 were Hodgkin Lymphoma on histopathology. Of the remaining four cases of lymphoproliferative disorder, two cases were diagnosed as metastatic deposits of which one was deposits from nasopharyngeal carcinoma Non keratinizing type, other was poorly differentiated carcinoma. Of the remaining 2 cases, one case was diagnosed as caseating granulomatous lymphadenitis and the other as Dermatopathic Lymphadenitis on biopsy.

In Hashmi et al.,⁽¹³⁾ study in which 19 cases were diagnosed on cytology

as lymphoproliferative disorders and all the 19 cases were diagnosed as Non –Hodgkin and Hodgkin Lymphoma on HPE.

In the present study, 8 cases were diagnosed as Hodgkin lymphoma on cytology, of which 7 cases had correlated on histopathology, the remaining one case turned out to be as Castleman disease. Similar results were observed in the studies conducted by Sumit Giri et al.,⁽⁵⁾ and Nesreen et al.,⁽⁸⁾ in which out of 18 cases, 14 cases had correlated on HPE. On cytology, 2 cases were diagnosed as chronic granulomatous lymphadenitis but on biopsy they turned out to be Hodgkin lymphoma. This is due to the granulomatous response in association with Hodgkin Lymphoma, may distract the observer from the underlying pathology⁽¹⁶⁾. In Kumari and Rajalakshmi⁽¹⁴⁾ study also, 5 cases had well formed granulomas. These lesions are further subjected to surgical biopsy due to persistence of symptoms⁽¹⁵⁾. The above discussed 2 cases can be considered as false negatives.

In the present study, the diagnostic accuracy for Hodgkin Lymphoma was 82% which was correlating with N.H. Hafez, N.S. Tahoum et al., (77.8%)⁽⁸⁾, Al- Mulhim et al., (92%)⁽³¹⁾ studies respectively.

In the present study, 11 cases were diagnosed on cytology as Non Hodgkin Lymphoma and all these cases were later confirmed on histopathology with 100 percent sensitivity. Similar findings were observed in Sumit Giri et al.,⁽⁵⁾, Mohammed Abdul Nasar et al.,⁽¹⁾ studies. 17 cases on cytology diagnosed as lymphoproliferative disorders, out of 17 cases, 7 cases were diagnosed as Non Hodgkin Lymphoma on histopathology. Two cases on cytology were granulomatous lymphadenitis later they were diagnosed as Non Hodgkin Lymphoma on HPE.

In the present study, the overall diagnostic accuracy of Non –Hodgkin Lymphoma was 82.0% which was correlating with Keith et al (82%)⁽³³⁾, Al- Mulhim et al., (86%)⁽³¹⁾ and Al - Alwan et al., (88.5%)⁽³²⁾ studies.

In the present study, 7 cases were diagnosed as Necrotizing Lymphadenitis on cytology and for confirmation of Kikuchi – Fujimoto Disease, these 7 cases were subjected to excisional biopsy. There was female preponderance in the present study which was similar to other studies like Das et al.,⁽¹⁸⁾ and Vani et al.,⁽¹⁹⁾.

Kikuchi – Fujimoto disease have characteristic cytological findings i.e., crescentic histiocytes, plasmacytoid monocytes, neutrophils paucity and extracellular karyorrhectic debris⁽¹⁷⁾. On histopathology, there will be patchy necrosis with architecture effacement but the diagnosis of KFD poses a diagnostic dilemma due to its rarity, non specific symptoms and other disease mimickers⁽¹⁹⁾. The necrosis may distract the observer for tuberculosis but absence of neutrophils, epitheloid cells and langhans type giant cells may exclude the tuberculosis diagnosis. Sometimes, it may mimic malignancy, so the cytopathologist should be aware of the characteristic features of Kikuchi Fujimoto, since they can be cured by supportive therapy which includes analgesics, corticosteroids and anti inflammatory medications.

In the present study, there is discordance in diagnosing Castleman's disease. Out of 50 cases, one case was diagnosed as Castleman disease – Hyaline Vascular type on histopathology which was diagnosed as Hodgkin Lymphoma on cytology because of the presence of atypical mononucleated R-S cells. Similar observation was seen in Mallik et al.,⁽²⁴⁾ study in which 10 cases were considered. Out of 10 cases, 3 cases were diagnosed as Hodgkin lymphoma, 4 cases as reactive lymphoid hyperplasia and 3 cases as mixed. Later on histopathology they diagnosed these cases as Castleman disease. Muktha R et al study,⁽²⁵⁾ conducted study on 3 cases. On cytology, these 3 cases were diagnosed as reactive hyperplasia, Hodgkin lymphoma with a differential of NHL of T cell type and extranodal plasmacytoma. On histopathology, they were diagnosed as Castleman disease.

FNAC, being well established diagnostic modality for lymphadenopathies, lack a clearly defined role in Castleman disease⁽²²⁾. The cytological features of hyaline vascular type of Castleman disease may overlap with certain other reactive and neoplastic conditions like reactive lymphoid hyperplasia (RLH), granulomatous lymphadenitis, Hodgkin lymphoma, Kimura disease, Mantle cell lymphoma and Thymoma^(23,24).

In the present study one case was diagnosed as reactive lymphadenitis with eosinophilia / Kimura disease on cytology which was later

diagnosed as Kimura disease on Histopathology. Mingma Sherpa et al studied,⁽²⁶⁾ one case which was diagnosed as reactive hyperplasia with increased eosinophilia on cytology later on they reviewed the slides and possibility of Kimura's disease was suggested⁽²⁶⁾.

Other studies which showed discordance were Chow et al.,⁽²⁷⁾ Deshpande et al.,⁽²⁸⁾ and Jayaram and Peh et al.,⁽²⁹⁾ studies.

Definitive diagnosis of Kimura disease is obtained by histological examination of the excised lesion. On HPE, the lesion is characterized by hyperplasia of lymphoid tissue with well developed lymphoid follicles, marked infiltration of eosinophils, proliferation of thin – walled capillary venules and varying degrees of fibrosis.⁽²⁶⁾

In current study, one case was diagnosed as Rosai – Dorfman disease on both cytology and histopathology. In Garza – Guajardo et al.,⁽³⁴⁾ study, there was discordance in diagnosing Rosai – Dorfman disease and they mistaken for lymphoma as the patient presented with painless bilateral cervical lymphadenopathy.

Cytology has an important role in the diagnosis of Rosai – Dorfman disease, as it has characteristic features which ensure an accurate diagnosis. The cellularity is usually high with plenty of large histiocytes both with and without emperipolesis and also lymphocytes.⁽³⁰⁾

Histologically, there is an infiltration of tissue by lymphocytes, histiocytes and plasma cells. Presence of emperipolesis is usually characteristic for disease along with dilated sinusoids.

In the present study, out of 17 cases of lymphoproliferative disorders on cytology, one case was later diagnosed as Dermatopathic lymphadenitis on HPE. Neeti Nagar et al.,⁽³⁵⁾ studied one case which had first clinical diagnosis as Hodgkin lymphoma on the basis of age and multiple enlarged lymph nodes. On cytology, they were no R-S cells and later diagnosed it as Dermatopathic lymphadenitis.

By doing IHC, the diagnosis can be confirmed. For histiocytic cells, S-100 and CD1a positive whereas for Langerhans cells, CD1a positive.

Statistical Parameters

The overall sensitivity and specificity of FNAC of the present study was 82.93%, 77.78% respectively, sensitivity was correlated with Rakshan et al.,⁽³⁶⁾ study and specificity was correlated with Nesreen et al.,⁽⁸⁾ study. Because of the higher number of false positives, the current study had a lower specificity than other studies. The higher number of false positive cases was due to the overlapping cytological features of tumours and tumour-like lesions. Similar results were observed in Nesreen et al., study.⁽⁸⁾ The current study has p value of <0.001 which was highly significant.

Conclusion

FNAC was preferred as it is simple, quick, safe, cost-effective, and easily accessible for lymph node swellings. It is the primary diagnostic tool for evaluating the lymph node lesions of tumours and tumour-like lesions.

However, there were certain limitations and pitfalls in diagnosing tumour-like conditions, as they may overlap and lead to misdiagnosis. The current study discussed those mimics, and a cytopathologist should be aware of these lesions and know about their specific cytomorphology.

As histopathology is the gold standard, FNAC should be followed by HPE.

REFERENCES

- Mohammed Abdul Nasar et al, Indian journal of pathology and oncology, July-September 2016;3(3):427-431.
- Pandit A A, Candes FP, Khub Chandini SR. Fine needle Aspiration cytology of lymph nodes. Journal of post graduate medicine: 1987;33(3): 134-136.
- R.K. Gupta, S. Naran, S. Lallu and R. Fauck. The diagnostic value of fine needle aspiration cytology in the assessment of palpable supraclavicular lymph nodes: a study of 218 cases. Cytopathology; 2003;14:201-207.
- Hirachand s, Lakhey M, Akhter j, Thapa B. evaluation of fine needle aspiration cytology of lymph nodes in Kathmandu Medical College, Teaching hospital, Kathmandu University Medical Journal 2009;7(26):139-142.
- Sumit Giri Karandeep Singh. Role of FNAC in evaluation of patients with superficial lymphadenopathy. International Journal of Biological and Medical Research 2012;3(4):2475-2479.
- Adhikari P, Sinha BK, Baskota DK. Comparison of fine needle aspiration cytology and histopathology in the diagnosing cervical lymphadenopathies. Australasian Medical

- Journal AMJ 2011;44,2,97-99.
7. Fatima R et al. *Int J Res Med Sci.* 2017 Apr;5(4):1607-1611.
 8. Nesreen H. Hafez, N.S. Tahoun *Journal of the Egyptian National Cancer Institute*(2011) 23, 105-114.
 9. Steel BL, Schwartz MR, Ibrahim R. Fine needle aspiration biopsy in the diagnosis of lymphadenopathy in 1,103 patients. *Acta Cytol* 1995;39:76-81.
 10. Kumuguru, M.H. Kulkarni, N.S> Kamakeri. FNAC of peripheral lymph nodes in HIV positive patients. *Scientific medicine* 2009;1(2):1-7.
 11. Amit A, Hardik S, Gauravi D. Fine needle aspiration study of lymph node in HIV positive patients and CD 4 count. *Int J Res Med.* 2013;2(2):16-19.
 12. Samer A Kadam, Arun T. Miskin, Vijay D. Dombale. Role of FNAC in study of cytomorphological patterns in cervical lymph node, July – December 2020, Volume 9, Issue 2.
 13. Atif A. Hashmi, Samreen Naz, Omer Ahmed et al. Utility of Fine Needle Aspiration Cytology in the evaluation of Lymphadenopathy. *Cureus* 12(12): e11990. DOI 10.7759/cureus.11990.
 14. Kumari and Rajalakshmi: Cytology of Hodgkin Lymphoma. *Journal of Cytology*; January 2008/ Volume 25/ Issue 1.
 15. David C. Chhieng, Joan F. Cangiarella et al. Fine – Needle Aspiration Cytology of Hodgkin Disease. *Cancer cytopathology*, February 25,2001/Volume 93/ Number 1.
 16. Khurana KK, Stanley MW, Powers CN, Pitman MB. Aspiration cytology of malignant neoplasms associated with granulomas and granuloma like features: diagnostic dilemmas. *Cancer* 1998;84:84-91.
 17. Tsang WY, Chan JK. Fine – needle aspiration cytologic diagnosis of Kikuchi's lymphadenitis. A report of 27 cases. *A/m J Clin Pathol.* 1994;102(4):454-458.
 18. Das, et al.: FNA cytology of pediatric Kikuchi- Fujimoto disease. *Indian Journal of Pathology and Microbiology* – 55(3), July – September 2012.
 19. Vani, et al.: Kikuchi Fujimoto's disease. *International journal of Health & Allied Sciences.* Volume 3. Issue 2. April – June 2014.
 20. Veer V, Lim A, Issing W. Kikuchi – Fujimoto disease: A case report and literature review. *Case Rep Ptolaryngol* 2012;2012:497604.
 21. Tong TR, Chan OW, Lee KC. Diagnosing Kikuchi disease on fine needle aspiration biopsy: A retrospective study of 44 cases diagnosed by cytology and 8 by histopathology. *Acta Cytol* 2001;45:953-7.
 22. Ghosh A, Pradhan SV, Talwar OP: Castleman's disease - hyaline vascular type- clinical, cytological and histological features with review of literature. *Indian J Pathol Microbiol.* 2010;53:244-7.
 23. Sudha A, Vivekanand N: Cytologic picture of Castleman's disease: a report of 2 cases. *J Cytol.* 2010, 27:152-4.
 24. Mallik MK, Kapila K, Das DK, Haji BE, Anim JT: Cytomorphology of hyaline-vascular Castleman's disease: a diagnostic challenge. *Cytopathology.* 2007, 18:168-74.
 25. Pai MR, Hosamane S, Marla NJ. Cytodiagnosis of Castleman's disease: A diagnostic challenge. *Muller J Med Sci Res* 2016;7:66-9.
 26. Mingma Sherpa, Rachna Lamichaney and Asitava Deb Roy. Kimura's disease: A diagnostic challenge experienced with cytology of postauricular swelling with histopathological relevance. *J Cytol.* 2016 October-December; 33(4): 232-235.
 27. Chow LT, Yuen RW, Tsui WM, Chan SK. Cytological features of Kimura's disease in fine needle aspirates. A study of eight cases. *Am J Clin Pathol.* 1994;102:316-21.
 28. Deshpande AH, Nayak S, Munshi MM, Bobhate SK. Kimura's disease. Diagnosis by aspiration cytology. *Acta cytol.* 2002;46:357-63.
 29. Jayaram G, Peh KB. Fine – needle aspiration cytology in Kimura's disease. *Diagn Cytopathol.* 1995;13:295-9.
 30. R. Rajyalakshmi, Mohammad Akhtar, Yarlagadda Swathi, Ranjani Chakravarthi, Jeeru Bhaskara Reddy, and Maddirala Beulah Priscilla. Cytological diagnosis of Rosai – Dorfman: A study of twelve cases with emphasis on diagnostic challenges. *J Cytol.* 2020 Jan – Mar; 37(1): 46-52.
 31. Al – Muhim AS, Al – Ghamdi AM, Al – Marzooq HM, Mohammad HA, Gharib IA. The role of fine needle aspiration cytology and imprint cytology in cervical lymphadenopathy. *Saudi Med J* 2004;28:862-5.
 32. AlAIWan NA, Al Hashimi AS, Salman MM, AlAttar EA. Fine needle aspiration cytology versus histopathology in diagnosing lymph node lesions. *East Mediterr Health J* 1996;2(2):320-5.
 33. Kieth VE, Harsharan SK, Jerald GZ. Fine needle aspiration biopsy of lymph nodes in the modern era: reactive lymphadenopathies. *Pathol Case Rev* 2007;12(1):27-35.
 34. Garza – Guajardo et al: Cytological diagnosis of Rosai – Dorfman disease; *Biomedical reports* 6: 27-31, 2017.
 35. Nagar N, Arora S, ranga S. Dermatopathic Lymphadenitis: Cytological Diagnosis. *Arch Med Health Sci* 2022 November; 9: 117-9.
 36. Rakhshan M, Rakhshan A. The diagnostic accuracy of fine needle aspiration cytology in Neck lymphoid masses. *Iranian J Pathol* 2009;4(4):147-50.