ORIGINAL RESEARCH PAPER
Volume - 13 | Issue - 10 | October - 2024 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

# ROLE OF IMMUNOHISTOCHEMISTRY IN LYMPH NODE BIOPSY

Pathology

**Dr. Kokila Parmar** 3rd year Pathology resident, Shri M. P. Shah Medical College, Jamnagar.
**Dr. Vijay C. Popat** Professor and Head, Shri M. P. Shah Medical College, Jamnagar.
**Dr. Babita** 3rd year Pathology resident, Shri M. P. Shah Medical College, Jamnagar.

## ABSTRACT

**Background:** Lymph node is one of the major anatomic components of the immune system. Lymphadenopathy is a common clinical problem and biopsies are usually undertaken to determine the cause of nodal enlargement, which may be neoplastic or non-neoplastic. Lymph node lesions form a wide range of spectrum from reactive changes to lymphoma and metastatic deposits. Generalized lymphadenopathy is seen in a large number of systemic illnesses while localized lymphadenopathy is more often seen with local infection or malignancy. Main aim is to exclude a malignant process and treatable causes. Immunohistochemistry helps in the sub typing of the lymphomas into different categories and thus help in prognosis. **Aims And Objectives:** To explore the histopathological diversity of lymphadenopathy through the examination of biopsy specimens and the relevant application of immunohistochemistry. **Material And Methods:** Formalin-fixed, paraffin embedded sections were prepared and histopathological examination was done. Immunohistochemistry was performed. **Results:** A comprehensive analysis of 66 cases of lymph node over 2 year period is done out of which total malignant cases are 37 out of which cases of Hodgkin's lymphoma (07) Non-Hodgkin's lymphoma (12). **Conclusion:** Lymph node biopsy with IHC plays an important role in establishing the cause for lymphadenopathy and thus aids in therapy.

## KEYWORDS

Lymphoma, hyperplasia

## INTRODUCTION:

Lymph node is one of the major anatomic components of the immune system. Because normal immune response leads to proliferation and expansion of one or more of the cellular components of lymph nodes, it leads to significant lymph node enlargement. Lymphadenopathy is a common clinical problem and biopsies are usually undertaken to determine the cause of nodal enlargement, which may be neoplastic or nonneoplastic.

Lymph node lesions form a wide range of spectrum from benign reactive changes to lymphoma and metastatic deposits. Lymphadenopathy is either generalized or localized, Generalized lymphadenopathy is seen in a large number of systemic illnesses while localized lymphadenopathy is more often seen with local infection or malignancy. 4 First step in developing better therapies is the recognition of distinct specific disease entities by pathologists. Since there is no specific treatment for most forms of reactive lymphadenopathy, even a non-specific diagnosis is helpful, because the main aim is to exclude a malignant process and treatable causes. 4 Immunohistochemistry helps in the sub typing of the lymphomas into different categories which have a therapeutic and prognostic importance. 5 We aim to study the incidence with respect to age and gender along with histopathological patterns of lymph nodes received in our department over a period of two and a half years.

A lymph node, also known as a lymph gland, is a bean-shaped organ within the lymphatic system and plays a crucial role in the adaptive immune system. Serving as a filtration system for foreign substances, including cancer cells, lymph nodes typically form clusters distributed throughout the body. In the average young adult, there are approximately 450 lymph nodes present throughout their body.

In a captivating perspective, envision a healthy lymph node as a petite ellipsoid entity, measuring roughly 1 to 2 centimetres in length. Delving deeper into its composition, this remarkable structure is ensconced within a fibrous capsule beneath the subcapsular sinus. Here, afferent lymphatic ducts converge, periodically depositing lymphatic fluid within this sinuous domain. The lymph nodes parenchyma is further distinguished by its dichotomy into an outer cortex and an inner medulla, creating a harmonious balance. Within this dynamic microcosm, lymphoid follicles or, in other words, lymphatic nodules take form, emerging through the collective congregation of lymphocytes and specialized follicular dendritic cells.

Within primary lymphoid follicles reside diminutive and quiescent lymphocytes, whereas secondary follicles house a central, luminous zone characterized by vibrant lymphoid proliferation, commonly referred to as germinal centres.

The realm of lymph node pathology is a captivating spectrum, where morphological diversity reigns supreme, spanning from non-neoplastic to neoplastic manifestations. Within this fascinating domain, we embark on the classification journey of non-neoplastic lymph node pathology.

1. Reactive Hyperplasia: This is a benign and reversible process leading to lymph node enlargement, driven by the hyperplasia of cellular components in response to antigenic stimulation.

2.Inflammation: This histologic pattern of tissue reaction emerges following cellular injury, resulting in diverse morphological alterations within the lymph node. These alterations may encompass a variable mix of acute and chronic inflammatory cells, along with features like necrosis and fibrosis. It encompasses suppurative and granulomatous inflammation.

3. Langerhans Cell Histiocytosis (LCH): This involves the clonal proliferation of cells that exhibit morphological and immunophenotypic similarities to Langerhans cells.

4. Castleman Disease: This is a rare non-neoplastic lymphoproliferative disorder characterized by polyclonal proliferation of B lymphocytes, either in a unicentric or multicentric form. This condition can manifest as hyaline vascular or plasma cell morphologic types.

Neoplastic lymph nodes can manifest a wide array of both benign and malignant neoplastic processes. Benign conditions, though relatively infrequent, may originate within the lymph node stroma or vessels. Conversely, cancer can originate within the lymph node itself or disseminate (metastasize) from elsewhere in the body to infiltrate the lymph node. These neoplastic lymph node conditions are often categorized as either Hodgkin's or non-Hodgkin's lymphoma.[9]

For a considerable duration, the aetiology of Hodgkin's lymphoma remained shrouded in mystery. It wasn't until the past decade that the B-cell lineage of the pathognomonic Hodgkin and Reed–Sternberg (HRS) cells and other recurrent genetic anomalies were finally unveiled.[10] Hodgkin's lymphoma constitutes approximately 10% of all lymphoma cases.[11] This lymphoma type is further classified into two categories: Classical Hodgkin's lymphoma (CHL) and Nodular lymphocyte-predominant Hodgkin lymphoma (NLPHL).[12,13]

Non-Hodgkin's lymphoma encompasses a wide range of lymphoproliferative malignancies, each exhibiting diverse clinical and pathological characteristics.[14] According to the 2016 classification by the World Health Organization for haematological and lymphoid tumours, these conditions have been categorized into B-lymphoblastic neoplasms, as well as T-cell and NK-cell neoplasms.[15]

**AIMS AND OBJECTIVES:**

1. To examine lymph node pathology within samples received at MP Shah Medical College, Jamnagar pathology department
2. To categorize neoplastic lymph node lesions.

**Material & Methods :**

A descriptive cross-sectional investigation was carried out at MP Shah Medical College, Jamnagar pathology department encompassing all cases received by the Histopathology section over a span of 2 years, from November 2021 to October 2023. Ethical clearance was obtained from both the institutional ethical committee. All gathered data was utilized for research purposes, maintaining strict confidentiality protocols.

Tissue specimens, having undergone initial processing and H&E staining, were subjected to a meticulous re-examination under the gentle gaze of a light microscope to validate the diagnoses. Immunohistochemistry was then performed on all neoplastic cases, whether they were primary lymphomas or metastatic tumours. The choice of antibody panels was guided by factors such as tumour morphology, patient age, and tumour location, tailoring our approach to each unique case.

For instance, in the case of Hodgkin lymphoma, we employed a panel featuring CD15, CD30, PAX5, EBV, MUM1, and OCT-2. T-cell non-Hodgkin lymphoma warranted the use of CD45, CD3, CD5, CD2, CD4, and CD8. B-cell non-Hodgkin lymphoma cases were evaluated with CD45, CD20, CD79a, PAX5, Bcl2, Bcl6, CD10, Cyclin D1, and Ki67. Meanwhile, for metastatic malignancies, the arsenal of antibodies included S100 protein, Vimentin, and Pankeratin, each tailored to unveil the mysteries hidden within the tissue samples.

The outcome data underwent analysis through Microsoft Excel software, specifically version 2016. The descriptive analysis primarily emphasized frequencies and percentages.

**RESULTS:**

Out of total of 66 patients were enrolled, table 1 shows age and sex distribution of the patients. Mean age of males was 36.25 + 20.91 years, and that of females 37.50 + 18.55 years. Nodal biopsy sites in male participants (n=40) were distributed as follows: cervical nodes were biopsied in 22(55%) of cases, axillary nodes in 6(15%), inguinal nodes in 5(12.5%), submandibular nodes in 1(2.5%), mesenteric nodes in 3(7.5%), and supraclavicular nodes in 1(2.5%) (refer to Table 2). For female participants (n=26), the nodal biopsy sites were as follows: cervical nodes were biopsied in 14(53%) of cases, axillary nodes in 5(19.1)%, inguinal nodes in 2(7%), supraclavicular nodes in3(11%) , mesenteric nodes in 1(3%), submandibular nodes in 1(3%), (see Table 3).

Table 4 illustrates the histopathological diagnosis of non neoplastic lesion and table 5 is histopathological diagnosis of neoplastic lesion.

An extensive examination was conducted on 66 cases of lymph node conditions over a two-year period . Among these cases, a total of 37 were found to be malignant (56.06%), with 7 cases diagnosed as Hodgkin's lymphoma (18 %), 12 cases as Non-Hodgkin's lymphoma (32 %), and 03 cases as metastatic lesions (8%).

**Table 1: Age And Sex Distribution Of The Patients**

| Age group | Male (40) | Female(26) | Total % |
|---|---|---|---|
| 0-10 | 2 | 1 | 3 |
| 11-20 | 2 | 2 | 4 (6%) |
| 21-30 | 5 | 3 | 8 (12%) |
| 31-40 | 6 | 4 | 10 (15%) |
| 41-50 | 6 | 4 | 10 (15%) |
| 51-60 | 10 | 7 | 17 (25%) |
| 60 year + | 9 | 5 | 14 (21%) |
| Total | 40 (61%) | 26 (39%) | 66 (100%) |

**Table 2: Age Wise Distribution Of Site Of Biopsy In Males**

| Age group | Site of biopsy | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|
| | Axilary | Cervical | Epi trochlear | inguinal | mesenteric | Sub-mendibular | supra clavicular | |
| 0-10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 (0%) |
| 11-20 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 (2.5%) |
| 21-30 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 (2.5%) |
| 31-40 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 (2.5%) |
| 41-50 | 1 | 3 | 0 | 1 | 0 | 0 | 0 | 5 (12.5%) |
| 51-60 | 2 | 6 | 0 | 2 | 1 | 1 | 0 | 12 (30%) |
| 61 + | 3 | 10 | 2 | 2 | 2 | 0 | 1 | 20 (50%) |
| Total | 6 (15%) | 22 (55%) | 2 (5%) | 5 (12.5 %) | 3 (7.5% ) | 1 (2.5) | 1 (2.5%) | 40 (100%) |

**Table 3: Age Wise Distribution Of Site Of Biopsy In Females**

| Age group | Site of biopsy | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|
| | Axilary | Cervical | Epi trochlear | inguinal | mesenteric | Sub-mendibular | supraclavicular | |
| 0-10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11-20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21-30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 31-40 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 3 (11%) |
| 41-50 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 3 (11%) |
| 51-60 | 1 | 4 | 0 | 1 | 1 | 0 | 2 | 9 (34%) |
| 61 + | 2 | 6 | 0 | 1 | 0 | 1 | 1 | 11 (42%) |
| Total | 5 (19%) | 14 (53%) | 0 | 2 (7%) | 1 (3%) | 1 (3%) | 3 (11%) | 26 (100% ) |

**Table 4: Histopathological Diagnosis Of Non Neoplastic Lesion**

| Serial no | Histopathological diagnosis | No of cases | Percentage |
|---|---|---|---|
| 1 | Reactive Follicular Hyperplasia | 12 | 41.37% |
| 2 | Non Specific Lymphadentis | 04 | 13.79% |
| 3 | Sinus Hyperplasia | 01 | 3.44% |
| 4 | Tuberculous Lymphadenitis | 07 | 24.13% |
| 5 | Lymphoepithelial Cyst | 01 | 3.44% |
| 6 | Kikuchi Necrotizing Lymphadenitis | 02 | 6.89% |
| 7 | Rosai Dorfman Disease | 01 | 3.44% |
| 8 | Kimura disease | 01 | 3.44% |
| | Total | 29 | 100% |

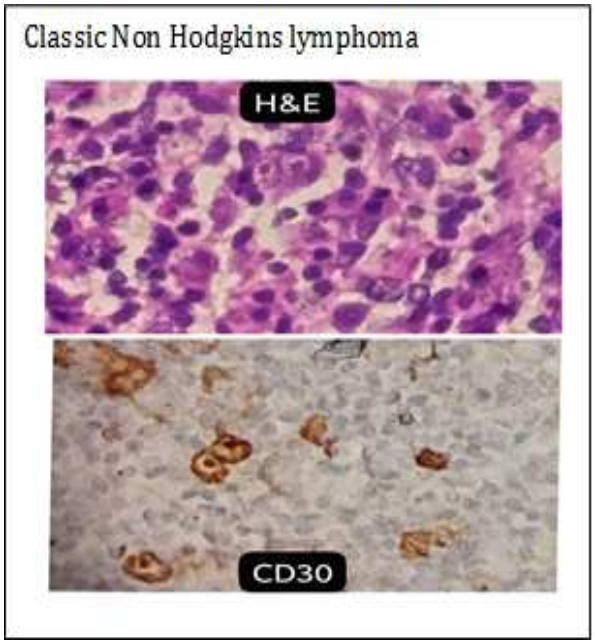
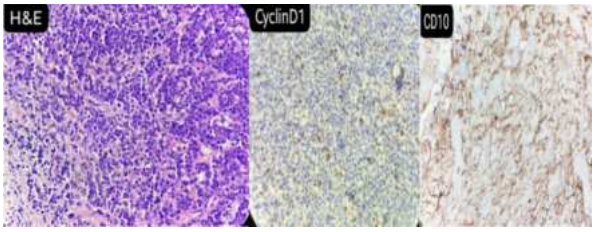
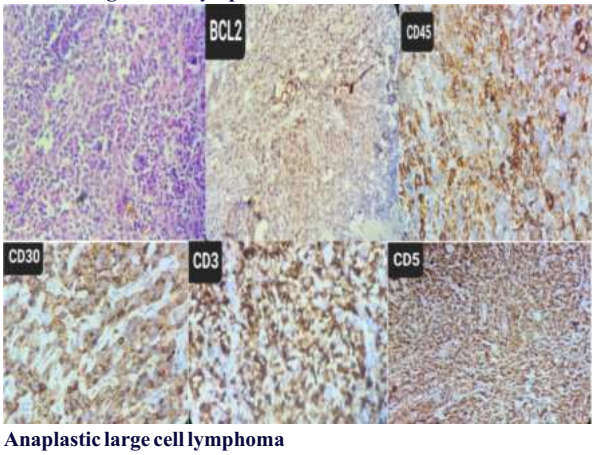


**Table 5: Histopathology Of Neoplastic Lesions**

| Microscopy | Male | Female | Total (n=37) |
|---|---|---|---|
| NHL (SLL) | 2 | 0 | 2 (5.4%) |
| NHL (DLBCL) | 6 | 4 | 10 (27 %) |
| Immunoblastic DLBCL | 1 | 1 | 2 (5.4%) |
| NHL (Burkitt's) | 2 | 1 | 3 (8%) |
| NHL(Follicular) | 3 | 1 | 4 (10 %) |
| Hodgkin's Disease (Mixed Cellularity) | 4 | 3 | 7 (18 %) |
| Hodgkin's Disease (Lymphocyte Rich) | 3 | 0 | 3 (8 %) |
| Hodgkin's Disease (Nodular Sclerosis) | 1 | 1 | 2 (5.4 %) |
| NLPHL | 0 | 1 | 1 (2.7%) |
| Metastasis | 1 | 2 | 3 (8%) |
| Total | 23 (62%) | 14 (38 %) | 37 (100 %) |




**Diffuse Large B Cell Lymphoma**




**Anaplastic large cell lymphoma**

## DISCUSSION:

Detectable lymph nodes represent a crucial diagnostic indicator for uncovering the root cause of the underlying condition. Excision biopsy of the lymph node continues to be considered the definitive "gold standard" for diagnosis, as endorsed by numerous studies [7-10].

Adeniji KA et al. [9], Adesuwa N et al. [11], and Roy A et al. [12] each noted in their respective studies a male-to-female ratio of 1.6:1, 1.3:1, and 1.7:1, suggesting a greater occurrence among males. However, Mbata GC et al. [13] reported a contrasting ratio of 1:1.3, indicating a higher prevalence among females. In our current investigation, we observed an almost equal male-to-female ratio (1.08:1), which diverges from the majority of the aforementioned studies.

In our current study, the age range of the participants spanned from 14 months to 80 years. The highest frequency of cases was observed within the 51-60 years age group, comprising 17 cases, accounting for 25 % of the total.

Roy A et al. [12] similarly documented an age range spanning from 1 to 87 years in their study, with the majority of cases concentrated in the 11-30 years age group, constituting 354 cases or 35%. In our study, the age group with the fewest cases (03 cases, 4.5%) was the 0-10 years age group, indicating a divergence in this aspect.

In our study, the cervical area emerged as the primary site for lymph node biopsy, constituting 22 cases(54.54%) of cases, with axillary nodes following closely behind. These trends align with findings reported in several other studies [11, 13, 14]. The prevalence of cervical lymphadenopathy could be attributed to its proximity to a frequently encountered source of infections and malignancies, as it serves as a crucial drainage point for this region [15].

In our current study, we observed that benign lesions accounted for a total of 29cases, comprising 43.3% of the cases. The most frequently encountered benign histopathological diagnosis was reactive lymphadenopathy (LAP), found in 12 patients (41.37%). On the other hand, malignancies made up 37 cases (56.06%), with diffuse large B cell lymphomas being the predominant category, constituting cases 10 (27.07%).

Lymphomas emerged as the predominant malignancy in our study, accounting for 51.51% of lymphadenopathy cases. This proportion appears to be higher compared to the findings in other studies, such as those by Ali K Ageep et al. [15] (16.6%), O Ochicha et al. [14] (24%), and Mbata GC et al. [13] (17.1%). In our investigation, non-Hodgkin's lymphoma exhibited a higher prevalence (32.2%) than Hodgkin's disease (11.2%). This trend aligns with the observations in most other studies, including those conducted by Roy A et al. [12], Ali K Ageep et al. [15], O Ochicha et al. [14], and Mbata GC et al. [13], which also reported a higher predominance of non-Hodgkin's lymphoma. Additionally, in Western countries, non-Hodgkin's lymphoma is documented as being three to four times more prevalent than Hodgkin's disease [16,17].

In our study total malignant lesion 37 cases out of which 3(8.10%) cases of metastasis from other primary which is quit lower from other study (12-15)

In a general sense, lymphadenopathy tends to manifest most frequently during the initial three decades of life. Reactive lymphadenopathy is more prevalent during childhood, tuberculosis is commonly encountered in young adulthood. But firstly we receive FNAC of the patient , on that basis AKT is started so we receive less number of lymphnode biopsy .regions. Nonspecific factors, such as reactive hyperplasia, and upper respiratory tract infections caused by bacterial and viral agents also play substantial roles in lymphadenopathy cases in developing countries. Conversely, in developed nations, malignancies and reactive hyperplasia are more commonly associated with lymphadenopathy cases. [13]

In our current study, among the 196 patients evaluated, we identified a non-specific cause, characterized as reactive hyperplasia, in 77 cases, constituting 39.3% of the cases. This made it the second most prevalent etiological factor following lymphomas (43.4%). Surprisingly, granulomatous lymphadenitis, typically the predominant etiology in many studies conducted within our region, ranked third in our study, comprising 12.2% of cases (24 cases). Our findings suggest a lower incidence of granulomatous lymphadenitis compared to some other studies, including those by Roy A et al. [12], Ali K Ageep et al. [15], O Ochicha et al. [14], and Mbata GC et al. [13]. Notably, higher prevalence rates have been reported in countries such as Nigeria, India, Pakistan, and Bangladesh [13].

**Conflict Of Interest:** None

**Funding:** None

## REFERENCES:

1. Goroll AH, May LA, Mulley AG Jr. Primary care medicine: Office evaluation and management of the adult patient. 2nd ed. Philadelphia: Lippincott; 1987.
2. Pangalis GA, Boussiotis VA, Fessas PH. Clinical approach to a patient with lymphadenopathy. In: Pangalis GA, Polliack A, editors. Benign and Malignant Lymphadenopathies: Clinical and Laboratory Diagnosis. London (United Kingdom): Harwood Academic Publishers; 1993; 19-29.
3. Allhiser JN, McKnight TA, Shank JC. Lymphadenopathy in a family practice. J Fam Pract 1981;12:27-32.
4. Abdullah A. Abba, Mohamed Z. Khalil. Clinical approach to lymphadenopathy. Ann Nigerian Med 2012;6(1);11-7.
5. Qadri SK, Hamdani NH, Shah P, Lone MI, Baba KM. Profile of Lymphadenopathy in Kashmir Valley: a Cytological Study. Asian Pacafic J Cancer Prev 2012;13:3621-5.
6. Nasuti JF, Yu G, Boudousquie A, Gupta P. Diagnostic value of lymph node fine needle aspiration cytology: an institutional experience of 387 cases observed over a 5-year period. Cytopathol 2000;11:18- 31.
7. Shahrzad Mohseni, Abolfazl Shojaiefard, Zhamak Khorgami, Shahriar Alinejad, Ali Ghorbani, Ali Ghafouri. Peripheral Lymphadenopathy: Approach and Diagnostic Tools. IJMS 2014;39(2):158-70.
8. Engert A, Eichenauer DA, Dreyling M, ESMO Guidelines Working Group. Hodgkin's lymphoma: ESMO Clinical Recommendations for diagnosis, treatment and follow-up. Ann Oncol 2010;21:168-71.
9. Adeniji KA, Anjorin AS. Peripheral lymphadenopathy in Nigeria. Afr J Med Med Sci 2000;29(3-4):233-7.
10. Moore SW, Schneider JW, Schaaf HS. Diagnostic aspects of cervical lymphadenopathy in children in the developing world: A study of 1877 surgical specimens. Pediatr Surg Int 2003;19:240-4.
11. Adesuwa N. Olu-Eddo, Chibundu E. Ohanaka. Peripheral Lymphadenopathy in

Nigerian adults. J Pak Med Assoc 2006;56:405.
12. Roy A, Kar R, Basu D, Badhe BA. Spectrum of histopathologic diagnosis of lymph node biopsies: A descriptive study from a tertiary care centre in south India over 5 1⁄2 years. Ind J Path and Microbiol 2013;56(2):103-8.
13. Mbata GC, Nweke IG, Egejuru RO, Omejua EG, Nwako OF, Chima EI and Oparaocha D. South Eastern Histologic Pattern of Lymph Node Biopsies in a Tertiary Hospital in Nigeria. J AIDS Clin Res 2015;6:6.
14. O. Ochicha, S.T. Edino, A. Z. Mohammed, A. B. Umar, A. T. Atanda. Pathology of Peripheral Lymph Node Biopsies in Kano, Northern Nigeria: Ann Afr Med 2007;6(2):104-8.
15. Ali K Ageep. Assessment of Adult Peripheral Lymphadenopathy in Red Sea State, Sudan. Int J Tropical Disease Health 2012; 2(1):24-32.