

**CLINICOPATHOLOGIC STUDY OF LYMPHOMA: a relook**Malathi B. G<sup>1</sup>, Manjunath M. R<sup>2</sup>**HOW TO CITE THIS ARTICLE:**

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**ABSTRACT: INTRODUCTION:** Lymphomas are heterogeneous group of malignant lymphoproliferative disorders. Broadly categorized into Non-Hodgkin's lymphoma [NHLs] and Hodgkin's lymphoma [HL]. Decades back one of the challenging topics in morphologic pathology was accurate diagnosis and classification of lymphoma. Studies on lymphoma with clinicopathologic correlation were found to be much significant. **STUDY OBJECTIVES:** This was a retrospective study aimed to describe lymphomas on histo morphology and thus classify NHLs using working formulation for clinical usage (1982) and HL using Rye (1966) classification respectively. To attempt clinicopathologic correlation. **METHODS:** The study was done in the department of pathology, Mahadevappa Rampure Medical College, Gulbarga during the period 1989-1999. Formalin fixed paraffin wax embedded tissue blocks previously diagnosed as lymphomas in the department were used. Morphologic details by light microscopy on haematoxylin and eosin (H&E) stained sections were noted. Clinical history of each case were analysed from hospital records. Clinical and pathologic correlation was done. Special stains Reticulin (Gomori) and Periodic acid Schiff's stain [PAS] was done in relevant cases. **RESULTS:** Study of total 102 cases of lymphoma it was observed NHLs formed 70 cases with an incidence of 68.3%. HL accounted for 32 cases with incidence of 37.2%. NHLs commonly presented in fifth decade 24.2%, followed by fourth and sixth decade. Sex distribution showed Male: Female ratio as 2.5:1. Majority of cases presented with cervical and axillary lymphadenopathy at 41% and 20% respectively. The most frequent grade was clinically aggressive intermediate grade NHLs seen in 80% of all cases. 20 cases of NHLs were of extranodal in origin. The most common site was gastrointestinal tract (60%) and head and neck region with (30%). The major histologic type in both nodal and extranodal NHLs was diffuse small cleaved cell type (DSCC). HL showed sex ratio of 1.8:1. The common age group was in third and second decade. Mixed cellularity was most frequent type. No extranodal HL was noted. **CONCLUSION:** This study confirmed the usefulness of histomorphology in diagnosis of lymphomas and its basis used in the classification systems. Clinicopathologic correlation was significant. The Result was comparable with various author study series. A relook into the still clinical usefulness of the above classification system in this era of immunophenotyping for lymphomas.

**KEYWORDS:** Lymphoma, Classification, Clinicopathology.

**INTRODUCTION:** The lymphomas are a heterogeneous group of non-leukemic malignant conditions arising from the lymphoreticular tissue. These have as a common central abnormality, the uninhibited proliferation of one or more of the cell population of lymphoid tissue. It is divided into two broad categories; Non-Hodgkin's lymphoma [NHLs] and Hodgkin's lymphoma [HL].<sup>[1]</sup> Genetic alternations, viruses, environmental agents, as well as radiotherapy and chemotherapy are implicated as etiologic factors.<sup>[1]</sup> It can arise from nodal or extra nodal locations and spread in unpredictable fashion. Two thirds of NHLs and virtually all cases of HL present with non-tender nodal enlargement (often greater than 2 cm).

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The lymphadenopathy can be localized or generalized. The remaining one third of NHLs arises at extra nodal sites such as skin, stomach and brain.<sup>[1,2]</sup> Historically, few areas of pathology evoked as much controversy as the classification of lymphoid neoplasms. Decades back the accurate diagnosis and classification of histologic patterns and cell type of lymphomas constituted one of the most difficult and challenging topics in morphologic pathology. At ends of the spectrum lymphomas needed to be distinguished from benign, hyperplastic lesions and anaplastic carcinomas.

Decades back world wide a steady increase of 3 to 4% per year for NHLs was seen.<sup>[3]</sup> In the United States in 1990's more than 50,000 new cases per year were diagnosed and reported with an incidence rate of 19/1 lakh in males and 11.6/1 lakh in female.<sup>[3]</sup> Now NHLs is the 6<sup>th</sup> most common cancer in males and 7<sup>th</sup> among females in the United States (US)<sup>[4]</sup> The age adjusted rates between 20-24 years is 2.5 cases, 66-64 years is 44.6 cases and 80-84 years is 119.7 cases/1 lakh population.<sup>[4]</sup> This incidence increased with age. Diverse incidence patterns and trends were observed in lymphoma subtype and population.

Follicular lymphoma is the most common form of indolent NHLs in the US affecting 15,000 to 20,000 individuals per year at the rate of 1.8%.<sup>[1,4]</sup> It usually presents in middle age.<sup>[1]</sup> Diffuse large B-cell lymphoma (DLBCL) is the most common histologic type. DLBCL in US accounts for 25,000 new cases with a rate of 1.4% per year.<sup>[1,2]</sup> A slight male predominance. The median patient age is about 60 years, but DLBCL also occurs in young adults and children.<sup>[1]</sup> Small lymphocytic lymphoma constitutes only 4% of NHLs.<sup>[1]</sup> A histological study of adult lymphoma was conducted in Lagos aimed to document the histologic types, age and sex distribution.

The male and female accounted for 64% and 36% giving M:F ratio 1.8:1. The most frequent site was cervical lymph node. The age group (46-55) accounted about 65% of patient of NHLs. Intermediate grade, high grade and low grade variants of NHLs accounted for 39%, 34%, and 27%.<sup>[2]</sup> In India NHLs is the eleventh most common cancer in terms of incidence.<sup>[5]</sup> Desai and authors, 1965 studied 800 cases with an incidence of 2.34% of all cancers and sex ratio of 4:5:1.<sup>[6]</sup> Mehrotra in 1977 studied a total of 1046 cases of lymphomas and found 71.4% of NHL's and 28.6% of HL.<sup>[7]</sup>

In a Indian study of fifty three cases of NHLs of detailed morphological assessment and classified using the international working formulation reported diffuse large cell lymphoma and small lymphocytic lymphoma commonest types.<sup>[2]</sup> In children NHLs accounts for 10% of childhood cancer in developed countries, the commonest subtype being high grade diffuse pattern blastic or transformed appearance with high mitotic rate.<sup>[3]</sup> In India study by Advani in 1987 of 108 cases showed undifferentiated lymphoma (Burkitt's and non Burkitt's) to be the commonest sub type (40.9%).<sup>[8]</sup>

HL has distinctive pathologic features and is treated in a unique fashion. It accounts for 0.7% of all new cancers in the US with about 8000 new cases each year. The average age at diagnosis is 32 years. It is one of the most common cancers of young adults and adolescents.<sup>[2]</sup> Histologically nodular sclerosis is the most common form constituting 65% to 70% of cases. Equal frequency in males and females. It has a propensity to involve the lower cervical, supraclavicular, and mediastinal lymph nodes in adolescents or young adults.<sup>[2]</sup>

Mixed cellularity constitutes about 20% to 25% of cases. Involved lymph nodes are diffusely effaced. Is more common in males.<sup>[2]</sup> Lymphocyte predominance is uncommon variant of HL and accounts for about 5% of cases. A majority of patients are males, usually younger than 35 years of age.

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Typically present with cervical or axillary lymphadenopathy.<sup>[2]</sup> Lymphocyte depletion type is the least common form of HL with 5% of cases, predominantly seen in the elderly, in HIV+ individuals of any age, and in non-industrialized countries.<sup>[2]</sup> A review study of 1082 cases of HL in India, showed a peak age in second decade and a male predominance.<sup>[3]</sup> Common histologic types were mixed cellularity and lymphocyte depletion.<sup>[9]</sup>

The incidence of extranodal lymphomas varied. Highest incidence in Europe and Far East at 40-50% was reported.<sup>[3]</sup> In United States an incidence of 15-25% in adult patients was reported.<sup>[3]</sup> Andrew G Glass in 1997 studied 91306 NHLs which showed an incidence of 28%. Common organs involved were stomach, followed by skin, bone marrow, small intestine, lungs skull/orbit and thyroid.<sup>[10]</sup> From India lower incidence of 23% by authors Desai and 17.5% by Vashisht and Aikat was reported.<sup>[6, 11]</sup> Advani reported an incidence of 13.8% in 108 cases of NHLs studied in children.<sup>[8]</sup>

The etiologic factors of NHLs included genetic alterations,<sup>[1]</sup> immunodeficient individuals, long term use of immunosuppressive drugs after an organ transplant, and certain infectious agents such as *Helicobacter pylori*, HIV, Human T-cell leukemia/lymphoma virus type 1, Hepatitis C virus<sup>83</sup> and Epstein-Barr virus (EBV).<sup>[1, 2, 3]</sup> Two to threefold increased incidence of NHLs has been reported among agricultural workers in association with exposure to pesticides.<sup>[12]</sup>

Radiation for benign diseases of head and neck implicated as an etiologic factor for thyroid associated lymphoma.<sup>[2]</sup> Inflammatory conditions as cystitis and in inflammatory bowel diseases lymphomas are reported.<sup>[3, 13]</sup>

**MATERIALS AND METHODS:** This was a retrospective study of one hundred and two (102) reported cases of lymphoma over a period of ten years from 1989 to 1999 in the department of pathology, Mahadevappa Rampure Medical College, Gulbarga.

Formalin fixed, paraffin wax embedded tissue blocks from lymph node and extra nodal locations were used for the study. 5 micron thick sections were cut. Stained with Haematoxylin and eosin (H&E). Histomorphology of all cases studied under light microscope. The lymphomas were classified under NHLs and HL accordingly using the "working formulation for clinical Usage" (1982) and the "Rye Classification" (1966).

The clinical history of all cases was reviewed from hospital records. Relevant information on distribution of age, sex and site of involvement were noted. A clinicopathologic correlation was attempted. In the study special stains reticulin (Gomori method) and periodic acid schiff stain (PAS) was done for relevant cases.

**RESULTS:** This was a retrospective study of 102 cases of lymphoma in the department of pathology M.R. Medical College, Gulbarga over ten years from 1989 to 1999. In the total 3222 of all malignancies reported in the department, lymphomas constituted 102 cases with an incidence of 3.2%. NHLs formed a total of 70 cases giving an incidence of 68.3%. Preponderance of diffuse type in 67 cases (95.7%) with 3 cases (4.2%) presented as follicular lymphoma.

Analysis of histologic types using working formulation for clinical usage showed 56 cases belonged to clinically aggressive intermediate grade with incidence (80%), 9 cases (12.8%) in low grade and 5 cases (7.4%) in high grade subtypes. Analysis on histologic types showed DSCC to be commonest in 36 cases (35.2%), followed by diffuse mixed in 12 cases (11.7%) and diffuse large cell in 8 (7.8%). SLL was seen 6 cases (5.8%). 2 cases of FSCC and one case of follicular mixed also noted.

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In high grade lymphoblastic lymphoma in 3 cases and SNCC in 2 cases were seen. [Table (1) shows the histologic types and number of cases]. In age distribution maximum cases of NHLs were seen in fifth decade 17 cases (24.2%), followed by fourth decade 15 cases (21.4%), sixth decade 14 cases, (20.0%), and in third decade 11 cases (15.7%). Five cases (7.1%) each was seen in the first and second decade. The youngest case was 8 years child and the oldest patient was 74 years old. Study on histologic types showed 4 cases (66.6%) of SLL were seen in in fourth decade with one case each in first and fifth decade. Two cases of FSCC were seen in fifth decade.

F- Mixed case was seen at 36 years of age. Among DSCC, maximum 11 cases each were seen in fifth and sixth decade. D- Mixed type was commonly seen in third and fourth decade with 4 cases in each age group. DLC cases were seen in decreasing order from third to seventh decade. Oldest patient was a 64 year male. Lymphoblastic lymphoma presented with 2 cases in second and one case in third decade. SNCC (Burkitt's) was seen at 8 and 16 years. [Table 2(a) shows the above age distribution pattern]. In Sex distribution male: female ratio was found to be 2.5:1.

This high male predominance was seen in all histologic types of NHLs. [Table 3(a) shows analysis of sex distribution]. Analysis of clinical presentation showed of total 102 lymphoma cases 82 (82%) were nodal in origin. Cervical nodes involved in maximum cases 25 (41%), followed by axillary node in 10 cases (20%), mesenteric in 4 cases and 2 cases of inguinal nodes. Generalized lymphadenopathy was noted in 6 cases (11.7%). [Table 4 shows the nodal distribution of cases].

In the study 32 cases (37.2%) of HL were analysed according to Rye classification. Mixed cellularity was predominant with 16 cases (15.6%) followed by lymphocytic depletion 7 cases (6.8%), 1 lymphocytic predominance 5 cases (4.9%) and nodular sclerosis 4 cases (3.9%). [Table (1) shows the distribution of cases]. Age distribution showed maximum cases in third decade 11 cases (34.3%), 8 cases (25%) in second decade and 5 cases (15.6%) each in fourth and fifth decade. Three cases were seen in first decade. [Table 2 (b) of age distribution in HL] [In sex distribution there were 22 males and 12 females giving male: female ratio of 1.8:1.

In lymphocytic predominance, mixed cellularity and lymphocytic depletion male predominance was seen, while in nodular sclerosis the ratio was equal. [Table 3 (b) show sex distribution in HL]. Analysis of clinical presentation of total 32 cases, cervical node maximum in 18 cases (58.0%), followed by axillary node in 5 cases (15.6%), mesenteric 3 cases and one each in mediastinal, retroperitoneal and inguinal nodes. Generalized lymphadenopathy was seen in 3 cases. [Table (4) is the distribution of HL in different nodes.]

Among 70 cases of NHLs, 20 cases (19.6%) were of extranodal in origin. Gastro intestinal tract (GI) constituted most with 12 cases (60%). Distribution of 6 in small intestine, 4 in stomach and one case each in colon and caecum. Head and neck region 6 cases (30%) was noted, distributed as 2 in tonsil, one each in floor of mouth, nasopharynx and maxilla. One case (5%) each presented as testicular mass and as a mass in upper third right thigh.

Age distribution for GI lymphomas varied from 29 upto 60 years and in head and neck region from 8 to 62 years. Testicular lymphoma was seen in 64 years patient and thigh 52 years male patient. Common histologic type was DSCC formed 14, cases (70%), diffuse mixed type 4 cases (20%) and SNCC 2 cases (10%).

A Sex distribution of 15 in males and 5 in females with ratio 3: noted. Clinically GI lymphomas presented as multiple node involvement in 7 cases, abdominal pain in 6 cases, as obstruction in 3 cases. In two cases hepatosplenomegaly was also present.

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Head and neck region presented as progressively enlarging growth, difficulty in swallowing in 3 cases. Fever and weight loss in 4 cases. Superficial lymphadenopathy noted in 3 cases. One case was seen as painless testicular mass with fever, sweat and weight loss. One other case was seen in a male patient as non-tender soft tissue mass over upper third of anterior aspect of right thigh. [Table (5) shows the number and site of extranodal lymphomas.]

Reticulin stain in both cases of FSCC lymphoma clearly outlined relatively uniform sized follicles. In SCC reticulin showed delicate network in relation to thin walled blood vessels. In Hodgkin lymphoma of lymphocytic depletion type reticulin showed diffuse, disorderly fine reticulin network. PAS stain showed positivity in all three cases of lymphoblastic lymphoma.

**DISCUSSION:** In the present study there were 102 cases of lymphomas giving an incidence of 3.2% of all malignancies studied between 1989 and 1999. The incidence of lymphomas in various Indian studies reported higher figures. Vashisht and Aikat in 1973 report 7.4%, Mehrotra and authors in 1977, 6.2%.<sup>[11,7]</sup> However Desai in 1965 and Bhasin noted low incidence of 2.2%.<sup>[6, 14]</sup> NHLs constituted 70 cases (68.3%). Comparative studies by Mehrotra and co-authors of 1046 cases, found incidence of NHLs at 71.4%.<sup>[7]</sup> Vashisht and Aikat reported 67.3%.<sup>[11]</sup>

Analysis of distribution of NHLs according to the working formulation for clinical usage revealed clinically aggressive intermediate grade to be the commonest group with 80% incidence, low grade at 12.8% and high grade at 7.1%. Similar comparable results were noted by Liberman & co-authors in 1986, and the National Cancer Institute (NCI), study series by Andrew G Glass in 1997.<sup>[15, 10]</sup> However Stephen & co-authors 1973, reported equal incidence in intermediate and high grade subtypes.<sup>[16]</sup> Here 95.7% were of diffuse type and 4.2% of follicular lymphomas.

Gravin & co-authors in 1983 reported 70% diffuse and 29% of follicular type.<sup>[17]</sup> Lukes in 1966, studied 58% diffuse and 41% follicular types.<sup>[18]</sup> The frequency of histologic type among low grade were SLL with 6 cases (5.8%), followed by FSCC of 2 cases (1.9%) and 1 case each of follicular mixed. A similar results were noted by Stephen and others in 1973, and NCI series by Andrew G Glass in 1997.<sup>[16,10]</sup> Liberman in 1986 observed FSCC twice more common than SLL.<sup>[15]</sup> DSCC was commonest with 64.2%. Authors Liberman, Stephen and Andrew G Glass in their study showed DLCC to be most frequent.<sup>[15, 16, 10]</sup>

Least cases were in high grade with 5 cases (7.1%), comparable by Liberman and co-authors study.<sup>[15]</sup> Among high grade NHLs in this study incidence of lymphoblastic lymphoma was 92.9%. High incidence of immunoblastic lymphoma have been reported in NCI series by Andrew G Glass and Liberman and co-authors.<sup>[10, 15]</sup> Compare table 6[a] of observed frequency of histologic types of NHLs in various studies. In Sex distribution male preponderance with male: female ratio of 2.5:1 was noted. Male preponderance in comparable series of Vakil and Purandare,<sup>[19]</sup> Soman and Abraham,<sup>[20]</sup> Liberman<sup>[15]</sup> and Andrew G Glass were reported.<sup>[10]</sup>

In age distribution the maximum incidence was seen in fifth decade 24.2%, followed by fourth 21.4% and sixth decade 20%. Talerman & authors reported maximum incidence in fourth, fifth and sixth decades.<sup>[21]</sup> Andrew G Glass also noted maximum cases in older adults with median age of onset in sixth decade. Table 6[b] is sex distribution in NHLs in various series. The commonest histologic type was DSCC seen after fourth decade, oldest patient being 74 years old.

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Andrew G Glass in their NCI 1997 series reported similar trends of DSCC in elderly population.<sup>[10]</sup> According to Rappaport the commonest early manifestation of lymphoma is a progressive enlargement of lymph nodes in an otherwise asymptomatic patient.

Observed in present study of total 102 cases, 82(80.6%) patients presented with lymphadenopathy. Desai and authors observed 72.6% incidence of lymphadenopathy.<sup>[6]</sup> Andrew G Glass in a total 91306 cases, initially noted lymphadenopathy with incidence of 71.9%.<sup>[10]</sup> Cervical node enlargement was commonest in 25 cases (49%).

Similarly Desai and co- authors and David J Strauss reported early cervical node involvement giving incidence of 72.6% and 72%.<sup>[6, 22]</sup> In NCI series by Andrew G Glass, head and neck nodes was commonly involved in 20.4%.<sup>[10]</sup> Generalized lymphadenopathy in 6 cases (11.7%) was seen in this study. Andrew G Glass reported generalized lymphadenopathy incidence of 22.0%.<sup>[10]</sup>

HL was clinicopathologically studied and classified as per Rye classification. HL was seen in 32 cases giving incidence of 37.2%. This incidence correlated well with studies from Vashist and Aikat,<sup>[11]</sup> and Vakil and Purandare.<sup>[19]</sup> comparable data were also reported by Talerman,<sup>[21]</sup> Rajkumari & Reddy<sup>[23]</sup> and Mehrotra.<sup>[7]</sup> However Wright and Roberts reported low incidence of 14.1%.<sup>[24]</sup> Table 7[a] of incidence of HL amongst lymphomas observed in various studies. Analysis of histologic types show mixed cellularity with 50% incidence.

This incidence was found comparable with reports from authors Mehrotra and Mani.<sup>[17, 25]</sup> Table 7[b] of reference of comparison of histologic types of HL in various studies. Sex distribution show male: female ratio 1.8:1. Studies from authors Selzer,<sup>[26]</sup> Patchefsky,<sup>[27]</sup> Vashist and Aikat<sup>[11]</sup> and Keller<sup>[28]</sup> showed HL 1.2 to 2 times more common in males. Analysis of age distribution revealed maximum cases in first three decades giving incidence of 65.6%. Similar incidence was noted by Mehrotra at 71.7% and by Rajkumari & Reddy 1973, 64%.<sup>[7, 23]</sup>

The finding of higher incidence in younger age groups correlates well with other series. Table 7[c] shows age distribution in other series. In our study clinically all 32 cases presented with lymphadenopathy. Cervical nodes were involved in 18 cases (58%) and Comparable maximum cervical nodes involvement of 46.6% by authors Mehrotra at 62% by Keller was reported.<sup>[7, 28]</sup> Generalized lymphadenopathy incidence of 11.7% was comparable with 17.3% incidence reported by Mehrotra.<sup>7</sup> Table 7[d] shows comparable results.

Extranodal lymphomas formed 20 cases of NHLs with incidence of 19.6%. Indian studies by Vashisht and Aikat 1973, observed 17.5% and Desai 23% incidence<sup>[11, 6]</sup>. NCI series by Andrew G Glass & co-authors reported 28.1%.<sup>[10]</sup> However Freeman 1972, reported high incidence of 48% in Italy and 47% in East Germany.<sup>[29]</sup> Present study showed GI involvement in 60% with head and neck in 30%. Freeman 1972 reported GI incidence of 63.3% and head and neck 12.2% respectively.<sup>[29]</sup>

David J Strauss in 1983, and Deodhar and Purandare found GI as most frequent site of involvement.<sup>[22, 30]</sup> In Andrew G Glass series head and neck region formed second larger group of extranodal involvement.<sup>[10]</sup> One case (5%) of testicular lymphoma was noted. Authors Freeman and David J Strauss reported 1.04% and 1.7% testicular involvement respectively.<sup>[29 30]</sup> Majority of histologic types were of DSCC type with 80% incidence.

Similar result was found by Andrew G Glass and co-authors in 1997.<sup>[10]</sup> In the study a 52 year male patient was diagnosed with diffuse mixed lymphoma in the right thigh. Travis and co-authors in 1987 had reported 8 cases of primary soft tissue lymphoma of the extremities.<sup>[31]</sup> No case of extranodal lymphoma was observed in HL in the present study.

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**CONCLUSION:** The study concluded the importance of histo morphologic diagnosis of lymphomas and the classification using working formulation for clinical usage for NHLs and Rye classification for HL. Clinicopathologic correlation was significant. The Result was comparable with other authors study series. In this retrospective study of 102 cases NHLs was found more common than HL. Majority cases of NHLs were seen in age range fourth to sixth decade.

Most common morphologic type noted was clinically aggressive intermediate grade diffuse small cleaved cell type. Extra nodal involvement observed in NHLs. GI tract being commonest affected site. HL was common in first three decades. Mixed cellularity and lymphocytic depletion types were frequent. In both NHLs and HL males were affected twice more common than females. Cervical lymphadenopathy was commonest initial presentation in both.

World over for more than two decades in 1980's and 1990's the major diagnosis and classification of lymphomas was based on histomorphological basis incorporated in working formulation for clinical usage (1982) and Rye (1966) with significant contribution towards study of NHLs and HL. A relook into still clinical usefulness of the above classification systems in an era of 'lymphoma and Immunohistochemistry'. A tribute in lymphoma study.

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<b>NON-HODGKIN'S LYMPHOMA Histologic types</b>	<b>Total cases</b>	<b>Percentage of all cases</b>
Low Grade		
Small lymphocytic lymphoma (SLL)	06	5.8%
Follicular, predominantly small cleaved cell (FSCC)	02	1.9%
Follicular, mixed small cleaved and large cell (Follicular mixed)	01	0.91%
Intermediate Grade		
Follicular, predominantly large cell (Follicular large cell)	NIL	
Diffuse, small cleaved cell (DSCC)	36	35.2%
Diffuse mixed small cleaved and large cell (Diffuse mixed)	12	11.7%
Diffuse, large cell cleaved/ non-cleaved (DLC)	08	7.8%
High Grade		
Large cell, immunoblastic	NIL	
Lymphoblastic	03	2.9%
Small non-cleaved cell(SNCC)	02	1.9%
HODGKIN'S LYMPHOMA		
Lymphocytic predominance (LP)	05	4.9%
Nodular sclerosis (NS)	04	3.9%
Mixed cellularity (MC)	16	15.6%
Lymphocytic depletion (LD)	07	6.8%

**Table 1: Showing the distribution of histologic types of NHLs and HL in the present study**

<b>Histologic types</b>	<b>0-10 (years)</b>	<b>11-20</b>	<b>21-30</b>	<b>31-40</b>	<b>41-50</b>	<b>51-60</b>	<b>61-70</b>	<b>&gt;70</b>
SLL	1	-	-	4	1	-	-	-
FSCC	-	-	-	-	2	-	-	-
F-mixed	-	-	-	1	-	-	-	-
DSCC	3	2	2	5	11	11	1	1
D-mixed	-	-	4	4	2	2	-	-
DLC	-	-	3	2	1	1	1	-
lympho blastic	-	2	1	-	-	-	-	-
SNCC	1	1	-	-	-	-	-	-
Total cases	<b>5</b>	<b>5</b>	<b>11</b>	<b>15</b>	<b>17</b>	<b>14</b>	<b>2</b>	<b>1</b>

**Table 2 (a): Showing the age distribution in histologic types of NHLs**

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Histologic types	0-10 (years)	11-20	21-30	31-40	41-50	51-60	61-70	>70
Lymphocytic predominance	2	0	2	1	-	-	-	-
Nodular sclerosis	-	1	2	1	-	-	-	-
Mixed cellularity	1	5	4	1	5	-	-	-
Lymphocytic depletion	0	2	3	2	-	-	-	-
<b>Total cases</b>	<b>3</b>	<b>8</b>	<b>11</b>	<b>5</b>	<b>5</b>	<b>-</b>	<b>-</b>	<b>-</b>

Table 2 (b): Showing the age distribution in histologic types of HL

Histologic types	Males (M)	Females (F)	Total	M:F ratio
SLL	4	2	6	2:1
FSCC	2	0	2	2:0
F- mixed	1	-	1	1:0
DSCC	26	10	36	2.6:1
D- mixed	8	4	12	2:1
DLC	5	3	8	1.6:1
Lymphoblastic	2	1	3	2:1
SNCC	2	-	2	2:0
<b>Total 50</b>	<b>50</b>	<b>20</b>	<b>70</b>	<b>2.5:1</b>

Table 3(a): showing sex distribution in different histologic types of NHLs

Histologic types	Males	Females	Total	M:F ratio
Lymphocyte predominance	4	3	5	1.3:1
Nodular sclerosis	2	2	4	1:1
Mixed cellularity	11	5	16	2.2:1
Lymphocyte depletion	5	2	7	2.5:1
<b>Total</b>	<b>22</b>	<b>12</b>	<b>32</b>	<b>1.8:1</b>

Table 3(b): showing sex distribution in different histologic types of HL

Histologic type	Cervical	Axillary	Mediastinal	Mesenteric	Retro peritoneal	Abdominal	Inguinal	Generalized
<b>NHLs</b>								
SLL	1	1	0	1	-	-	-	3
FSCC	2	-	-	-	-	-	-	-
F-mixed	1	-	-	-	-	-	-	-
DSCC	11	6	0	1	-	-	2	2
D-mixed	4	3	-	1	-	-	-	-
DLC	5	-	-	1	1	1	-	-
Lymphoblastic	1	-	1	-	-	-	-	1
<b>Total cases 50</b>	<b>25</b>	<b>10</b>	<b>1</b>	<b>4</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>6</b>
<b>HL</b>								
<b>Total cases 32</b>	<b>18</b>	<b>5</b>	<b>1</b>	<b>3</b>	<b>1</b>	<b>-</b>	<b>1</b>	<b>3</b>

Table 4: Showing sites of involvement in NHLs and HL

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Sites of involvement	Male	Female	Total
Gastrointestinal tract	08	04	12(60%)
Head and neck area	04	02	06(30%)
Testis	01	-	01(5%)
Thigh	01	-	01(5%)
<b>Total</b>	<b>14</b>	<b>06</b>	<b>20(19.6%)</b>

**Table 5: Shows the number and sites of extranodal lymphomas**

Histologic types	Liberman 1986	Stephen1973	Andrew 1977	Present study
<b>Low grade</b>				
SLL	42(8.7%)	9(6.1%)	31.9%	06(5.8%)
FSCC	78(16.2%)	4(2.7%)	32.0%	2(1.9%)
Follicular mixed	22(4.6%)	nil	34.2%	1(0.91%)
<b>Intermediate grade</b>				
FLC	15(3.1%)	1(0.7%)	6.11%	nil
DSCC	67(13.9%)	10(6.8%)	26.8%	36(35.2%)
Diffuse mixed	10(2.10%)	5(3.3%)	0.25%	12(11.7%)
DLCC	165(34.2%)	44(29.7%)	66.6%	08(7.8%)
<b>High grade</b>				
Immunoblastic	28(5.8%)	19(12.9%)	46.6%	nil
Lymphoblastic	18(3.7%)	37(25%)	10.9%	03(2.9%)
SNCC	11(2.3%)	4(2.7%)	33.0%	02(1.95)
Others	26(5.4%)	5(10.1%)	9.25%	--

**Table 6 (a): Incidence of NHLs in various series**

Authors	Male: Female	Total cases
Vakil & Purandare	6.9:1	57
Soman & Purandare	2.2:1	163
Liberman 1986	1.5:1	482
Andrew G Glass 1997	1.14:1	91306
Present study	2.5:1	70

**Table 6(b): Sex ratio of NHLs in various authors study**

Authors	Total cases studied	Incidence of Hodgkin lymphoma
Vakil & Purandare 1962	84	27(32.2%)
Wright & Roberts 1966	749	106 (14.1)
Talerman 1970	260	132(50.9%)
Vashist & Aikat	365	119(33.0%)
Rajkumari7 Reddy 1973	200	112(56.0%)
Mehrotra 1977	1046	300(28.6%)
Present study	102	32(37.2%)

**Table 7 [a]: Incidence of HL in different studies**

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Author	Lymphocytic predominance	Nodular Sclerosis	Mixed cellularity	Lymphocyte depletion	Total cases
Dorfmon RF 1999	7%	74 cases	17% cases	2 cases	--
Keller 1968	9	92cases	65 cases	10 cases	176 cases
Stephen 1973	2%	6.5%	26%	6%	--
Golda Selzer1972	14	26 cases	35 cases	25 cases	122
Mehrotra 1977	24	08 cases	242 cases	26 cases	300
Mani 1982	19	18 cases	65 cases	14 cases	106
Present study1999	05(4.9%)	4(3.9%)	16(50%)	07	32

Table 7[b]: Distribution of types of HL seen in other studies

Authors	Lymphocytic predominance	Nodular sclerosis	Mixed cellularity	Lymphocytic depletion	Total cases
Selzer 1972	4.3:1	1.1:1	1.6:1	2.7:1	122
Patchefsky 1973	1.1:1	1.1:2	3.6:1	1.1:1	235
Vashist & Aikat	4:0	3.6:1	4.8:1	5.2:1	96
Keller 1968	9:0	1.1:1	3.06:1	2.3:1	176
Present series	1.3:1	1:1	2.2:1	2.5:1	32

Table7[c]: Sex ratio in types of HL in study series

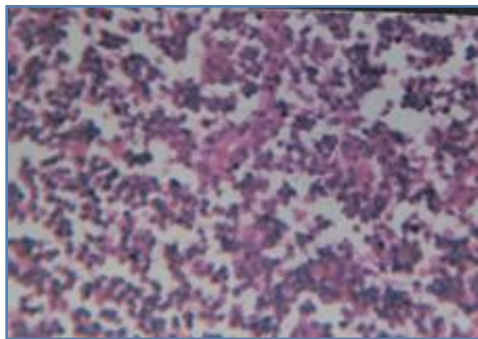
Age (years)	Mehrotra 1977	Selzer 1972	Rajkumari & Reddy 1973	Present Study 1999
0-10	85	15	15	03
11-20	16	17	20	08
21-30	64	35	33	11
31-40	51	08	14	05
41-50	21	04	19	05
over 50	13	22	05	--
<b>Total</b>	<b>300</b>	<b>100</b>	<b>106</b>	<b>32</b>

Table 7[d]:Age distribution of HL in other studies

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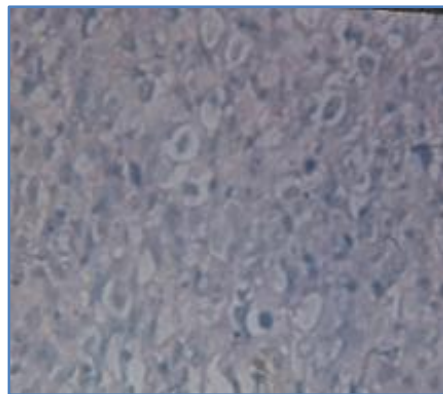
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Fig. 1: Photomicrograph of small lymphocytic lymphoma. Diffuse monotonous cells resembling small lymphocytes with uniform round nuclei and clumped chromatin. (H &E x400).



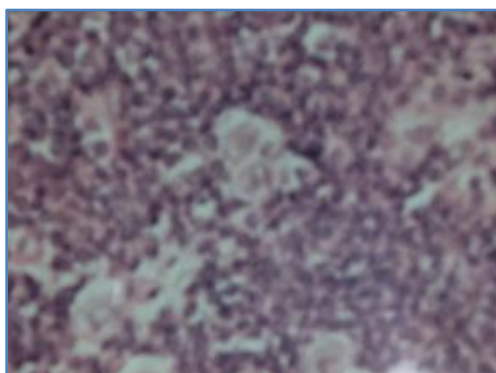
**Fig. 1**

Fig. 2: Photomicrograph of diffuse large cell lymphoma. Large cells with abundant cytoplasm showing cleaved and non-cleaved nuclei. (H&E x 400).



**Fig. 2**

Fig. 3: Photomicrograph of nodular sclerosis. Lacunar cells with single large lobated nucleus lying in a clear space seen. (H&E x400).

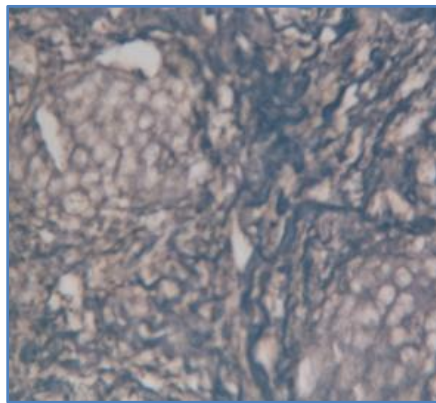


**Fig. 3**

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Fig. 4: Photomicrograph of nodular sclerosis reticulin stain. Well defined nodules separated by bands of fibrocollagenous septa. (H&Ex400).



**Fig. 4**

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