

# Pattern of Bone Marrow Infiltration in Hogkin's Lymphoma

Bone Marrow  
Infiltration in  
Hogkin's  
Lymphoma

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## ABSTRACT

**Objective:** To determine the pattern of bone marrow infiltration in Hogkin's Lymphoma.

**Study Design:** Cross-sectional study

**Place and Duration of Study:** This study was conducted at the Department of Hematology, Nishtar hospital, Multan from October 2021 to September 2022.

**Materials and Methods:** A total of 145 patients were recruited from hematology department of hospital. Main variables of study were histopathology pattern, duration of diagnosis, gender and age. Bone marrow trephine biopsy was done from posterior superior iliac spine to assess the pattern of bone marrow infiltration. Pattern of bone marrow infiltration was assessed in terms of diffuse, interstitial and focal.

**Results:** The mean age of the patients was  $36.02 \pm 6.33$  years. The mean duration of diagnosis was  $6.55 \pm 2.42$  months. There were 64.4% patients between 3-6 months of duration of diagnosis and 35.6% between 7-9 months. Major included variables were histopathological pattern, in our study. Out of the 100%, diffuse was noted in 29% patients, interstitial was noted in 62% and focal was noted in 9% patients.

**Conclusion:** Bone marrow infiltration is a frequent event in Hodgkin's lymphoma and interstitial pattern is more common, and should be taken into consideration when determining the prognosis and treatment plan.

**Key Words:** Hodgkin's Lymphoma, Diffuse, Interstitial, Focal, Pattern

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## INTRODUCTION

Hodgkin lymphoma, also known as Hodgkin's disease, is a type of lymphoma that affects the lymphatic system — the system that helps the body fight infection and disease<sup>1</sup>. It is named after Thomas Hodgkin, who was the first to identify the disease in 1832<sup>2</sup>. Hodgkin lymphoma typically begins in the lymph nodes, but it can also start in other parts of the body. The most common form of the disease is classified as classical Hodgkin lymphoma, and it's usually marked by the presence of a certain type of lymphocyte, known as a Reed-Sternberg cell<sup>3</sup>.

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Other types of Hodgkin lymphoma, such as nodular lymphocyte-predominant Hodgkin lymphoma, are less common. Symptoms of Hodgkin lymphoma may include fever, night sweats, fatigue, and swelling of the lymph nodes, itching, and weight loss<sup>4</sup>. Diagnosis may involve blood tests, X-rays, CT scans, and biopsies. Treatment of Hodgkin lymphoma may include radiation therapy, chemotherapy, or a combination of both<sup>5</sup>. That consists predominantly of lymphocytes, with rare Hodgkin lymphoma (HL) is characterized by a nodular growth pattern in an inflammatory background or no eosinophils<sup>6</sup>. It usually starts in the lymph nodes, but can spread to other organs. The histopathologic variants of nodular lymphocyte-predominant Hodgkin lymphoma are associated with advanced stage and increased relapse rate<sup>7,8</sup>.

Most common type of non-Hodgkin's lymphoma is diffused B cell lymphoma which accounts for 30% of all Hodgkin's lymphoma in United States<sup>9</sup>. Among total cancer types Hodgkin's lymphoma accounts 4% all over the world. Epstein-Barr virus is the leading cause that contributes half of the cases and represents the classic form; other factors include HIV and family history<sup>10</sup>. Survival rate is also different worldwide as 88% of population with Hodgkin lymphoma survives for 5 years and in patients less than 20 years of age patients survival rate is 97%<sup>11</sup>.

This study will help us to get local magnitudes and in future we can plan management options for patients of

Hodgkin's lymphoma according to presence of pattern of bone marrow infiltration.

## MATERIALS AND METHODS

Study was started after ethical approval from hospital ethical board. Informed written consent was taken from patients after detailed information about study purpose and confidentiality of their data. Pattern of Hodgkin lymphoma was defined as diffuse if majority (>80%) of observed area (<2mm in diameter) in bone marrow showing dense infiltration of neoplastic lymphocytes. Interstitial lymphoma is cells infiltrating between fat cells but no distortion of normal architecture of hemopoietic cells and fat. Focal is irregular aggregates of lymphoma cells but showing a lower volume percentage (<80%) then those characterized as diffuse pattern.

Sample size of 145 cases was calculated using openepi-tools online with 95% confidence, 5% margin error and taking expected percentage of random type i.e. 10.5% in patients with Hodgkin's lymphoma. Non-probability, consecutive sampling technique was used.

**Inclusion Criteria:** Patients of age 16-60 years of either gender presented with Hodgkin's Lymphoma (as per operational definition).

**Exclusion Criteria:** Patients who had already received chemotherapy for lymphoma and improper Biopsy sample. Patients were selected from hematology department of Nishtar hospital, Multan for bone marrow examination as the staging requirement of Hodgkin's Lymphoma. Bone marrow trephine biopsy was done from posterior superior iliac spine to assess the pattern of bone marrow infiltration. Pattern of bone marrow infiltration was assessed in terms of diffuse, interstitial and focal.

The collected information was analyzed with SPSS version 23. Descriptive statistics were used to calculate the mean and standard deviation for continuous variables like age and duration of diagnosis. Frequency and percentage were calculated for categorical variable i.e. gender and pattern of bone marrow infiltration. Chi-square test was applied to calculate association among variables. P-value  $\leq 0.05$  was taken as significant difference.

## RESULTS

Among total 90 patients male gender is greater in number as compare to female i.e. n=66 (73.3%) and n=24 (26.7%), respectively. Mean age was  $36.02 \pm 6.33$  years. The mean duration of diagnosis was  $6.55 \pm 2.42$  months (Table. 1). There were n=58 (64.4%) patients between 3-6 months of duration of diagnosis and n=32 (35.6%) between 7-9 months. The main outcome variable of this study was histopathological pattern, in our study. Out of the 100% (n=90), diffuse was noted in n=25 (27.8%) patients, interstitial was noted in n=55

(61.1%) and focal was noted in n=10 (11.1%) patients (Table-1).

**Table No.1: Demographic and histopathologic pattern**

Characteristics	Frequency (%)
<b>Gender</b>	
Male	66 (73.3%)
Female	24 (26.7%)
Mean age	$36.02 \pm 6.33$
Duration of diagnosis	$6.55 \pm 2.42$
<b>Histopathologic Pattern</b>	
Diffuse	25 (27.8%)
Interstitial	55 (61.1%)
Focal	10 (11.1%)

**Table No.2: Association of histopathological pattern with gender**

Gender	Histopathological pattern			Total	P-value
	Diffuse	Interstitial	Focal		
Male	16	43	7	66	0.400
Female	9	12	3	24	

**Table No.3: Association of histopathological pattern with duration of diagnosis**

Stratified duration of diagnosis	Histopathological pattern			Total	P-value
	Diffuse	Interstitial	Focal		
3-6 months	25	33	0	58	0.000
7-9 months	0	22	10	32	

## DISCUSSION

In our study it was noted that there were more males than females i.e. n=66 (73.3%) and n=24 (26.7%), respectively. according to a study by Butt F et al<sup>12</sup> the frequency of bone marrow infiltration at the time of diagnosis was seen to be higher in females than in males, at 57% and 21.9% respectively and most common type was mixed cellularity. Sharma et al<sup>13</sup> conducted a study which revealed that bone marrow infiltration is a much more common occurrence than previously thought. 36.2% of the cases studied displayed bone marrow involvement, and the highest incidence was found in Stage III and Hodgkin's disease of the mixed cellularity type. Bone marrow infiltration is typically seen in advanced stages of the disease and affects multiple organs, including the bone marrow. Lone et al<sup>14</sup> reported in his study 10.5% hodgkin's lymphoma of nodular sclerosis and 89.4% of mixed cellularity, infiltrate pattern was interstitial and 2<sup>nd</sup> one is of diffused infiltration. Lei K et al<sup>15</sup> in 2020 studied the incidence of malignancy stages in a specific population, and found that only 16.6% of the patients had Stage IV malignancy. The remaining 83.4% were in earlier stages. This suggests that early detection and treatment may be effective in reducing the risk of cancer progression.

In the local study conducted by Armitage et al<sup>16</sup>, bone marrow infiltration was seen in 21.3% of cases. This is

higher than the global average and could be attributed to the unique characteristics of the area, such as higher rates of certain types of cancers or certain inherited conditions. In a study conducted by Ananthamurthy et al<sup>17</sup> it was found that 20% of the cases at the time of diagnosis exhibited infiltration of the marrow. Moreover, marrow suppression, fibrosis and lymphocyte aggregates were also observed. This phenomenon is known as bone marrow infiltration, and it has been linked to various diseases and conditions.

In our study diffuse type was noted in 27.8% patients, interstitial was noted in 61.1% and focal was noted in 11.1% patients. A study conducted by Nadeem et al<sup>18</sup> at King Edward Medical University in Lahore, Pakistan reported that 30% of cases of Hodgkin's lymphoma had bone marrow infiltration. In another study by Sultan S et al<sup>19</sup> reported 27.4% pattern of bone marrow infiltration in Hodgkin's lymphoma which is followed by focal pattern and diffuse.

A study was conducted by Hamid et al<sup>20</sup> in 2010 and reported 30% cases of Hodgkin's lymphoma and diffused disease was most common among this. Biopsy should be performed at early stage of disease. Siddiqui et al<sup>21</sup> conducted a study on pattern of Hodgkin's lymphoma and reported majority of patients presented with cervical lymphadenopathy and mixed cellularity is the most common histological finding.

## CONCLUSION

The findings of our study concluded that bone marrow infiltration is a frequent event in Hodgkin's lymphoma and interstitial pattern is more common, and should be taken into consideration when determining the prognosis and treatment plan. Furthermore, this study provides further evidence that Hodgkin's lymphoma is an aggressive form of cancer, and should not be taken lightly.

### Author's Contribution:

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**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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