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Assessment of bone marrow involvement in cases with lymphoma: A clinicopathological study

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Abstract

Introduction: Lymphomas are primary cancers of the lymphoreticular system. Lymphomas continue to represent a challenge to medical science due to their high death rate. The purpose of this study was to determine the incidence and patterns of bone marrow involvement in Hodgkin's and non-Hodgkin's lymphoma patients.

Materials and methods: We examined a total of 52 biopsy-confirmed lymphoma cases. Notable symptoms included significant weight loss (6-12% of body weight) over the previous six months, fever, pruritus, and night sweats. We performed all routine blood and urine tests, along with a bone marrow exam.

Results: Within the Hodgkin's group, the most common histological type was mixed cellular (61%), followed by nodular sclerosis (28%) and lymphocyte-depleted (11%). In the non-Hodgkin's group, we classify 80.83% of cases as well-differentiated diffuse lymphocytic, and 29.17% as diffuse histiocytic nodular. Approximately 17.85% of cases showed positive bone marrow infiltration, with two cases indicating diffuse bone marrow involvement.

Conclusion: The bone marrow involvement was equally common in both the Hodgkin's and non-Hodgkin's groups. The incidence of bone marrow involvement was similar to prior studies in the Hodgkin's group, but it was lower in the non-Hodgkin's group when compared to previous series.

Keywords: Lymphoma, bone marrow, Hodgkin's group nodular sclerosis

Introduction

Lymphoma denotes the primary malignancy affecting the lymphoreticular system within the body. Lymphomas consistently pose a challenge to medical science due to their elevated fatality rate^[1, 2]. The disease's annual loss of approximately 45 individuals per million in Great Britain demonstrates the magnitude of the problem. Hodgkin's lymphoma accounts for half of these cases, follicular lymphoma for seven percent, and lymphosarcoma for the remaining forty-three percent^[3].

Despite numerous advancements in medicine, the prognosis for the disease remained unfavourable until recent years. However, the landscape of previous years is rapidly evolving due to the collaborative efforts of surgeons, pathologists, and radiotherapists, leading to an emerging sense of assurance for these patients^[4, 5].

Numerous intriguing aspects of primary tumors in the lymphoreticular system have garnered the attention of researchers in recent years^[6]. The primary focus is on the rationale behind current methods for terminology, nomenclature, classification, accurate staging, and treatment. Efforts have consistently aimed to correlate histology, staging, and treatment. We strive to improve the final outcome for these patients. By analysing patient data and clinical outcomes, we sought to identify specific trends that could inform more effective therapeutic strategies. Additionally, understanding the relationship between lymphoma subtypes and their impact on bone marrow function may lead to enhanced prognostic tools and individualized treatment plans. This study aimed to determine the incidence and pattern of lymphoma with bone marrow involvement.

Materials and Methods

This study was carried out in the Department of Pathology at MR Medical College, Kalaburagi, from August 2018 to October 2018.

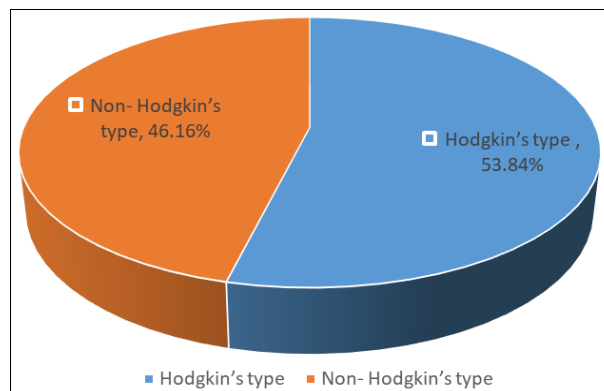
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In accordance with the World Health Organization's (WHO) classification of lymphoid neoplasms, each and every case of non-Hodgkin lymphoma (NHL) was identified through the use of morphology on haematoxylin and eosin sections, in addition to an immunohistochemistry (IHC) profile. A bone marrow test was performed on 52 biopsy-proven lymphoma patients admitted to Basaveswar Hospital to determine the prevalence and pattern of involvement and its relationship to clinical stage and histology. The protocol for the study was approved by the institutional ethics committee, and all of the participants gave their informed consent to participate in the research.

A thorough medical history was gathered, and critical symptoms were assessed in each and every case. These symptoms included a large loss of weight over the course of the previous six months (between 6 and 12 percent of the body weight), a noticeable history of fever, pruritus, and night sweats. Comprehensive blood and urine tests, routine blood smears, evaluations of liver function, X-rays, and both aspiration and open iliac biopsy of the bone marrow are all included in the diagnostic process. Through the use of the conventional method, bone marrow aspirate and trephine specimens were collected from the posterior iliac spine. In order to analyse the data that was collected, SPSS version 22.0 was utilized. The findings were provided in terms of the percentages and the frequency of occurrence.

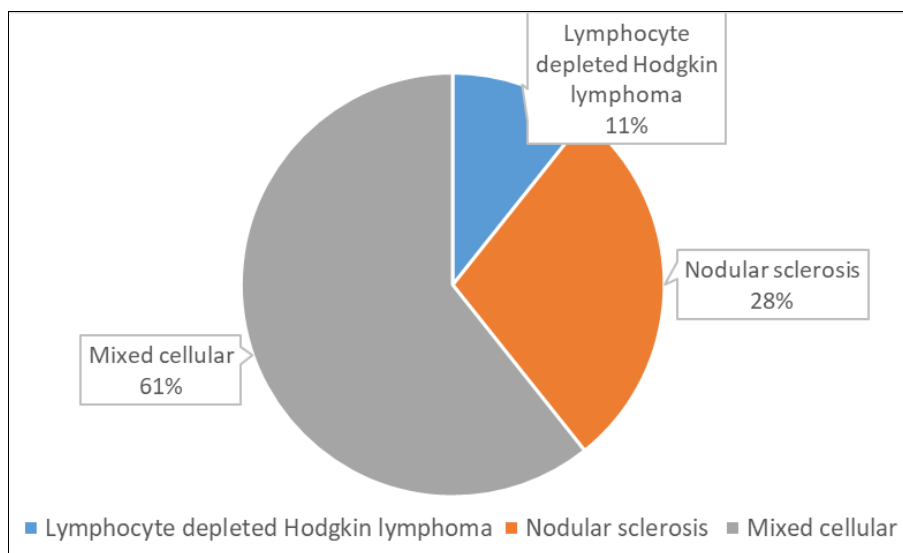
Results



Graph 1: Distribution of cases based on Hodgkin's and non-Hodgkin's type

Table 1: Demographic details of study participants

Age	Hodgkin's (n=28)		Non-Hodgkin's (n=24)	
	Male	Female	Male	Female
11-30	07	06	06	10
31-50	03	02	02	02
51-70	02	04	02	02
Above 70	02	02	-	-



Graph 2: Categorisation of Hodgkin's group cases (N=28) (Lukes and Butler classification)

Table 2: Categorisation of non-Hodgkin's group cases (N=24) (Rappaport classification).

Histologic Type	Frequency	Percentage
Well differentiated diffused lymphocytic	17	70.83%
Diffused histiocytic nodular	07	29.17%

Table 3: Showing the relationship of positive bone marrow with the clinical stage of the patient

Stage	Hodgkin's		Non - Hodgkin's	
	Total cases	No. of affected	Total number	No. of affected
Stage I	07 (25%)	-	06 (25%)	-
Stage II	08 (28.57%)	-	01 (4.16%)	-
Stage III	10 (35.71%)	03	08 (33.33%)	01
Stage IV	03 10.71%	02	09 (37.5%)	04

Discussion

In the cohort analyzed, 53.84% of the cases were identified as Hodgkin's type, while 46.16% were classified as non-Hodgkin's type (Graph 1). The majority of participants fell within the age range of 11 to 30 years, with equal representation of genders (Table 1). The histologic classification revealed that the majority of cases were mixed cellular (61%), followed by nodular sclerosis (28%), and lymphocyte-depleted (11%). These findings suggest a predominance of mixed cellularity in Hodgkin's lymphoma among the younger demographic, highlighting potential age-related factors that may influence disease presentation and progression. Further studies are warranted to explore the underlying mechanisms and treatment responses associated with these histologic subtypes.

Hodgkin lymphoma in 11% of cases within the Hodgkin's group (Graph 2). In the non-Hodgkin's group, 80.83% of cases are classified as well-differentiated diffuse lymphocytic, while 29.17% of cases are identified as diffuse histiocytic nodular type (Table 2).

A study conducted by Sultan S et al. examined 184 cases of non-Hodgkin's type, comprising 139 males and 45 females, resulting in a male-to-female ratio of 3:1. The average age was 48.5±16.0 years, while the median age stood at 50 years. B-symptoms were observed in 80.4% of the patients studied. Lymph node enlargement was observed in 71.1% of the cases. A total of one hundred and sixty-eight patients were diagnosed with B-cell lymphoma, accounting for 91.3% of the cases, while 16 patients were identified with T-cell lymphoma, representing 8.6% of the total. A total of 158 patients, representing 85.8%, were diagnosed with aggressive lymphoma. In our analysis, we determined that the incidence of bone marrow infiltration among patients with NHL was 31.5%. The infiltrate pattern observed was diffuse at 14.6%, primarily followed by interstitial at 6.5% and paratrabeular at 5.4% types of infiltration. A nodular infiltrate was the least common finding, observed in 9 patients, representing 4.8% of the total [7]. The characteristic feature of NHLs observed by Isikdogan A et al. was not aligned with the other findings [8].

The incidence rates of two lymphoma groups, as reported by M.M. Wintrobe and D.R. Bogg, indicate that approximately 33-50% belong to the Hodgkin's category, while 50-60% are classified as non-Hodgkin's [9]. Ketayun A. Dinshaw and colleagues carried out a retrospective study in Western India, revealing that thirty-three percent (33%) of all malignant lymphomas were classified as Hodgkin's disease, while the remaining 67% were identified as non-Hodgkin's type [10]. The current investigation, which involved 52 cases, classified 28 as Hodgkin's disease and the remaining 24 as non-Hodgkin's, yielding a relative incidence of 55-60%. Various authors report a significant variation in the incidence of bone marrow involvement. In Hodgkin's group, Thomas V. Colbay [11] reported 4%, Ketayun A. Dinshaw and colleagues reported 14%, and the current study shows 17.85%. In the non-Hodgkin group, the findings indicate that Maitreyun V. et al. reported 37.6%, Oman C.S. et al. noted 35.6%, and the current study observed 20.83%. In this study, the involvement of positive bone marrow cases was found to be 28% for the nodular sclerosis type. Drawing an effective conclusion from this study is somewhat challenging due to the limited number of cases.

However, these findings provide valuable insights into the prevalence of positive bone marrow involvement in different lymphoma subtypes. Future research with larger sample sizes will be essential to confirm these results and better understand the underlying mechanisms at play.

Conclusion

The ratio of Hodgkin's to Non-Hodgkin's was 1.2:1. Hodgkin's histology exhibited mostly mixed cellularity. We found no lymphocytic depletion. In non-Hodgkin's, lymphocytic histology predominated, followed by histiocytic. No alternative types were found. Hodgkin's and non-Hodgkin's groups had similar bone marrow involvement. In this series, 12% had bone marrow involvement. In the Hodgkin's group, bone marrow involvement was comparable to prior research, but it was

lower in the non-Hodgkin's group.

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