https://doi.org/10.59459/1859-1655/JMM.888

CHARACTERISTICS OF PATIENTS WITH B-CELL NON-HODGKIN LYMPHOMA AND HEPATITIS B VIRUS INFECTION AT THE HEMATOLOGY AND BLOOD TRANSFUSION CENTER, BACH MAI HOSPITAL

Nguyen Thi Hang[1]*, Hoang Thi Hong[1], Nguyen Tuan Tung[2]

ABSTRACT

Objectives: *To describe the clinical and laboratory characteristics of B-cell non-Hodgkin lymphoma patients with hepatitis B virus infection at the Hematology and Blood Transfusion Center, Bach Mai Hospital.*

Subjects and methods: *A descriptive study was conducted on 32 B-cell non-Hodgkin lymphoma patients with hepatitis B virus infection, treated at the Hematology and Blood Transfusion Center, Bach Mai Hospital, from January 2022 to January 2025.*

Results: *The average age of patients was 58.5 years, with a male/female ratio of ≈ 1.3/1. The most common clinical manifestations were lymphadenopathy (84.4%) and B symptoms (46.9%). The rate of bone marrow infiltration was 34.4%, and extranodal involvement was 59.4%. Laboratory characteristics: the rate of patients with positive HBsAg was 78.1%; HBsAg negative, anti-HBc total and anti-HBs positive was 21.9%. 20% of HBsAg positive patients had high HBV DNA levels (> 2,000 IU/ml). The rates of elevated liver enzymes and LDH were 21.9% and 56.2%, respectively. The rates of anemia, leukopenia, and thrombocytopenia were 53.1%, 9.4%, and 21.9%, respectively. The predominant histopathological subtype was diffuse large B-cell lymphoma, accounting for 68.7% of cases, stage IV disease was also observed in 68.7% of patients.*

Conclusions: *Further research is warranted to better characterize the clinical and laboratory features of patients with B-cell non-Hodgkin lymphoma and hepatitis B virus infection, thereby providing evidence to guide the development of appropriate therapeutic strategies.*

Keywords: *B-cell non-Hodgkin lymphoma, hepatitis B virus.*

Corresponding author: Nguyen Thi Hang, Email: hangnguyen2814@gmail.com

Received: 22/9/2025; scientific review: 10/2025; accepted: 28/5/2026

[1]*Hanoi Medical University.*

[2]*Bach Mai Hospital.*

1. INTRODUCTION

Non-Hodgkin lymphoma (NHL) represents a heterogeneous group of malignant neoplasms originating from the lymphoid system and accounts for approximately 4-5% of all cancer cases worldwide, with increasing incidence and mortality rates. Among NHL cases, 85-90% are derived from B lymphocytes [1]. Although various therapeutic approaches are currently available for B-cell non-Hodgkin lymphoma (B-NHL), chemotherapy regimens combined with rituximab remain a cornerstone of treatment.

Rituximab, together with myelosuppressive chemotherapeutic agents, may predispose patients to severe infectious complications. One of the well-recognized adverse events associated with rituximab therapy is hepatitis B virus (HBV) reactivation. Recent studies have suggested an association between HBV infection and the development of extrahepatic lymphoid malignancies, including B-NHL. HBV has been regarded as a potential risk factor contributing to lymphomagenesis through several mechanisms, including integration of viral DNA into the host-cell genome, induction of genetic alterations, and immune dysregulation. In countries with a high prevalence of HBV infection, such as Vietnam, characterization of NHL patients with HBV infection is essential to provide real-world evidence for diagnosis, prognostic assessment, and treatment decision-making.

In Vietnam, comprehensive studies on the clinical and laboratory characteristics of B-NHL patients with HBV infection remain limited. Therefore, we conducted this study to describe selected clinical

and laboratory features of patients with B-cell non-Hodgkin lymphoma and concomitant HBV infection treated at the Hematology and Blood Transfusion Center, Bach Mai Hospital. These findings may serve as a basis for patient monitoring, clinical assessment, and the development of appropriate treatment strategies for this specific patient population.

2. SUBJECTS AND METHODS

2.1. Subjects

This study included 32 patients diagnosed with B-NHL according to the 2016 WHO classification [8] with concomitant HBV infection, who were treated at the Hematology and Blood Transfusion Center, Bach Mai Hospital, between January 2022 and January 2025.

- Inclusion criteria: Patients aged >16 years; patients who were either HBsAg-positive or HBsAg-negative but positive for total anti-HBc and anti-HBs.

- Exclusion criteria: Patients with non-HBV hepatitis, hepatitis B co-infection with other hepatotropic viruses, autoimmune hepatitis, or hepatocellular carcinoma; pregnant women; and patients who declined to participate in the study.

2.2. Methods

- Study design: Descriptive case-series study.

- Sample size: Total population sampling was applied.

- Study variables and indicators:

+ General characteristics: age and sex.

+ Clinical characteristics at diagnosis: lymphadenopathy; B symptoms, including fever, weight loss of >10% within 6 months, and night sweats; other symptoms, including abdominal pain, bone and joint pain, sore throat with dysphagia, chest pain with dyspnea, dizziness, pallor, jaundice, scleral icterus, and hepatomegaly; and Eastern Cooperative Oncology Group performance status (ECOG).

+ Laboratory characteristics at diagnosis: hematological parameters, including hemoglobin (Hb), white blood cell count (WBC), and platelet count (PLT); blood biochemical parameters, including LDH, AST/ALT, creatinine, and total bilirubin (TBil); HBV infection markers (HBsAg, anti-HBs, HBV DNA); histopathological findings; and imaging findings (PET/CT, CT).

- Study ethics: Patients' personal information was kept confidential and used solely for research purposes. Patients and/or their family members were informed about the study objectives and provided consent to participate. The study did not affect the patients' treatment process.

- Data analysis: using SPSS software, version 22.0.

3. RESULTS

3.1. General characteristics

Table 1. Age distribution of patients

Age group	Number of patients (n = 32)	Percentage (%)
≤ 40	3	9.4
41-50	5	15.6
51-60	7	21.9
> 60	17	53.1
$\bar{X}$ ± SD (years)	58.5 ± 13	

The mean age was 58.5 ± 13 years, and the majority of patients were older than 60 years, accounting for 53.1%.

- Sex distribution of patients:

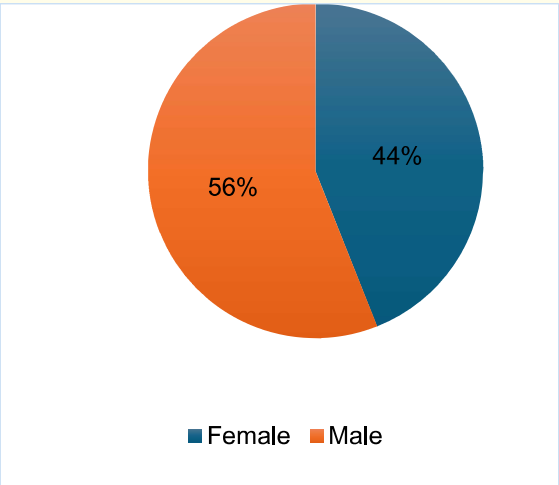

Figure 1. Sex distribution of patients.

Of the 32 patients, 18 were male and 14 were female, yielding a male-to-female ratio of 1.3:1.

3.2. Clinical characteristics at diagnosis

Table 2. Clinical characteristics at diagnosis

Clinical symptoms	Patients (n = 32)	Percentage (%)
B symptoms	15	46.9
Palpable lymphadenopathy/ mass	27	84.4
Other symptoms	11	34.4
ECOG > 2	7	21.9

The most frequent finding was palpable lymphadenopathy or mass, observed in 84.4% of patients. B symptoms were present in 46.9%, while other symptoms, including abdominal pain, bone and joint pain, sore throat with dysphagia, and chest pain with dysphea, occurred in 34.4% of patients. Overall, 21.9% of patients had an ECOG greater than 2.

3.3. Laboratory characteristics at diagnosis

Table 3. Hematological findings at diagnosis

Characteristics		Patients (n = 32)	Percentage (%)
Hb (g/L)	< 120	17	53.1
	120-140	13	40.6
	> 140	2	6.3
	$\bar{X}$ ± SD	113.2 ± 25.6	
WBC (G/L)	< 4	3	9.4
	4-10	27	84.4
	> 10	2	6.2
	$\bar{X}$ ± SD	6.5 ± 2.4	
PLT (G/L)	< 150	7	21.9
	150-450	22	68.9
	> 450	3	9.2
	$\bar{X}$ ± SD	230.5 ± 161.6	

The mean WBC was 6.5 ± 2.4 G/L, Hb level was 113.2 ± 25.6 g/L, and PLT was 230.5 ± 161.6 G/L. Anemia (Hb < 120 g/L) was present in 53.1% of patients, leukopenia (WBC < 4 G/L) in 9.4%, and thrombocytopenia (PLT < 150 G/L) in 21.9%.

Table 4. Blood biochemical findings at diagnosis

Parameter	Value	Patients (n = 32)	Percentage (%)
LDH (U/L)	Normal	14	43.8
	> 250	18	56.2
AST (U/L)	Normal	25	78.1
	> 40	7	21.9
ALT (U/L)	Normal	26	81.2
	> 40	6	18.8
Creatinine (µmol/L)	Normal	24	75.0
	> 90	8	25.0
TBil (µmol/L)	Normal	26	81.2
	> 17	6	18.8

Elevated LDH was observed in 56.2% of patients, while increases in ALT, AST, and total bilirubin occurred in 18.8%, 21.9%, and 18.8%, respectively.

- Assessment of hepatitis B virus infection status:

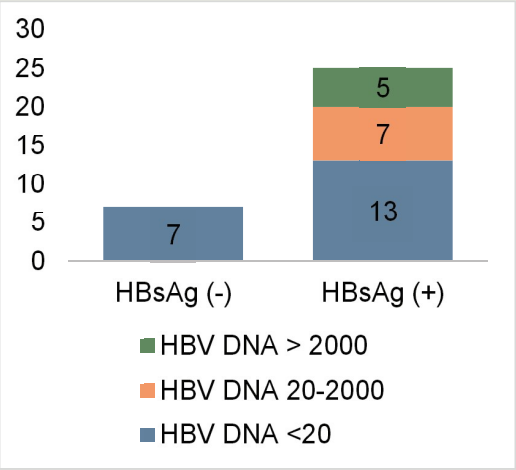

Figure 2. Assessment of hepatitis B virus infection status in the study patients.

Among the 32 patients, 25 (78.1%) were HBsAg-positive, indicating chronic or acute hepatitis B virus infection, while 7 patients (21.9%) were HBsAg-negative but positive for total anti-HBc and anti-HBs, indicating resolved past HBV infection. Among HBsAg-positive patients, 20.0% had a high HBV DNA viral load (> 2,000 IU/mL).

Table 5. Lesion sites on PET/CT and CT imaging

Lesion sites detected on PET/CT and CT		Patients (n = 32)	Percentage (%)
Lymph node lesions	Cervical lymph nodes	21	65.6
	Axillary lymph nodes	15	46.9
	Inguinal lymph nodes	10	31.3
	Mediastinal lymph nodes	11	34.4
	Abdominal lymph nodes	14	43.8
Extra-nodal lesions	Amydal	3	9.4
	Gastrointestinal tract	4	12.5
	Musculoskeletal system	1	3.1
	Bone marrow	11	34.4

CT and PET/CT demonstrated that cervical lymphadenopathy was the most common, observed in 65.6% of patients. Extranodal involvement was present in 59.4%, and bone marrow infiltration was detected in 34.4% of cases.

- Distribution of patients by disease subtype:

As shown in Figure 3, the most frequent subtypes were diffuse large B-cell lymphoma (DLBCL,

68.7%), marginal zone lymphoma (MZL, 15.6%), mantle cell lymphoma (MCL, 9.4%), and follicular lymphoma (FL, 6.3%).

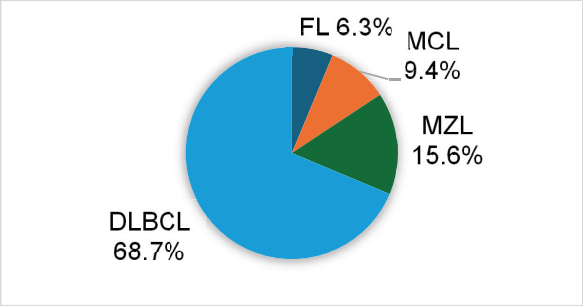

Figure 3. Distribution of patients by histopathological subtype.

- Distribution of patients by disease stage (based on the Ann Arbor staging system [6]):

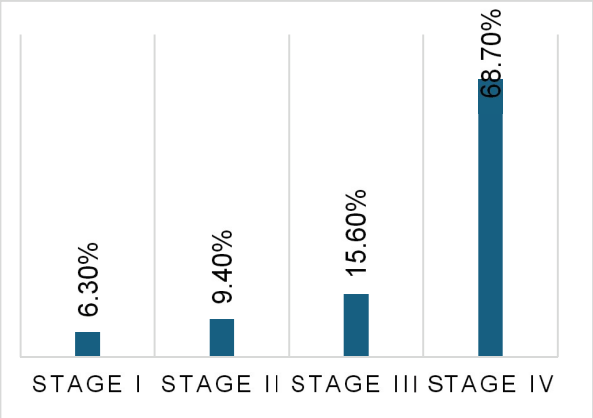

Figure 4. Distribution of patients by disease stage.

The most frequent disease stage was stage IV, observed in 68.7% of patients, followed by stage III (15.6%), stage II (9.4%), and stage I (6.3%).

4. DISCUSSION

- Age and sex characteristics: The mean age of the patients was 58.5 ± 13 years. The male-to-female ratio was 1.3:1, with males accounting for 56.2% of the cohort. These findings indicate that the majority of patients were middle-aged or elderly, consistent with the typical age distribution of malignant lymphomas. The sex distribution in this study was not markedly skewed and lacked statistical significance, likely due to the small sample size. Similar observations have been reported in studies from China and other Asian countries; for example, Nuersulitan et al. (2022) [7] reported that patients with DLBCL and HBV infection were generally over 50 years old, with a slight male predominance. Although our findings are consistent with international trends regarding age and sex, this study is limited to a descriptive analysis of patients at the Hematology and Blood Transfusion Center, Bach Mai Hospital.

- Clinical characteristics: In this study, 46.9% of patients presented with B symptoms (fever, weight loss > 10% within 6 months, and night sweats), and 84.4% had palpable peripheral lymphadenopathy. These rates are higher than those reported by Becker N (2012) [2] in Germany, where 34.1% of patients exhibited B symptoms, hepatomegaly was observed in 25%, and splenomegaly in 21.6%. Similarly, Deng L (2012) [4] in China reported a lower prevalence of B symptoms (41.3%), with hepatomegaly in 30.8% and splenomegaly in 26.9% of patients. Overall, the clinical manifestations in our cohort are largely consistent with previously published data, although the frequency of palpable peripheral lymphadenopathy was notably higher.

- Laboratory findings: Biochemical testing revealed elevated AST and ALT in 21.9% and 18.8% of patients, respectively. Assessment of hepatitis B virus infection showed that 78.1% of patients were HBsAg-positive, while 21.9% were HBsAg-negative but positive for total anti-HBc and anti-HBs, indicating resolved past infection. Chen et al. (2008) [3] reported an HBsAg-positive rate of 24.3% and anti-HBs positivity of 44.8% among patients with B-NHL. This difference likely reflects the higher prevalence of HBV infection in Vietnam compared with other populations. A larger study by Tian et al. (2020) [9] demonstrated that HBsAg positivity increased the risk of NHL by 2.67-fold, whereas anti-HBs positivity was associated with a 2.09-fold increased risk.

- Histopathological findings: In this study, DLBCL was the most common subtype, accounting for 68.7% of cases, followed by MZL (15.6%). These results are consistent with several international studies, including Wang et al. (2007) [10], who reported DLBCL in 68.2% of patients with HBV infection, and Chen et al. (2008) [3], who observed a rate of 70.5%. These data support the hypothesis that hepatitis B virus infection may be associated with the development of DLBCL.

Additionally, 56.2% of patients had elevated LDH levels, suggesting a higher disease burden and poorer prognosis. This rate is higher than that reported by Deng L (2012) [4], in which 39.4% of patients exhibited elevated LDH. The difference may be attributable to delayed presentation or variations in disease stage distribution. In the present study, 68.7% of patients were diagnosed at Ann Arbor stage IV, which is comparable to the findings of Huang et al. (2021) [5], where 70% of patients were identified at advanced stages.

This study described the clinical and laboratory characteristics of patients with B-NHL and HBV infection at the Hematology and Blood Transfusion Center, Bach Mai Hospital. Overall, the findings are consistent with reports from other Asian populations, particularly studies from China, where HBV prevalence is high. It should be emphasized that this is a descriptive case series rather than an epidemiological study; therefore, the observed proportions reflect the characteristics of the selected cohort and cannot be generalized to the entire population of patients with malignant lymphomas. The high prevalence of HBsAg positivity in this cohort underscores the importance of routine HBV screening, prophylaxis against HBV reactivation, and close collaboration between hematology and hepatology specialists during diagnosis and treatment to minimize complications and optimize therapeutic outcomes.

5. CONCLUSION

This study characterized the clinical and laboratory characteristics of patients with B-NHL and concurrent HBV infection. The mean age was 58.5 ± 13 years, with most patients being middle-aged or elderly. The most common clinical manifestations were palpable lymphadenopathy (84.4%) and B symptoms, with a relatively high frequency of extranodal involvement and bone marrow infiltration. Laboratory findings showed that most patients were HBsAg-positive, with some exhibiting high HBV DNA levels, as well as elevated liver enzymes and LDH, reflecting tumor burden. Hematological abnormalities commonly observed included anemia, leukopenia, and thrombocytopenia. Histopathologically, DLBCL was the predominant subtype (68.7%), and the majority of cases were diagnosed at advanced stages. The study findings provide initial practical evidence to support the monitoring, evaluation, and development of appropriate treatment strategies for patients with B-NHL and HBV infection.

REFERENCES

1. Alaggio R, Amador C, Anagnostopoulos I *et al*, "The 5th edition of the World Health Organization Classification of Haematolymphoid Tumours: Lymphoid Neoplasms", *Leukemia*, 36 (7): pp. 1720-1748, *doi:10.1038/s41375-022-01620-2,* Jul 2022.
2. Becker N, Schnitzler P, Boffetta P, *et al*, "Hepatitis B virus infection and risk of lymphoma: results of a serological analysis within the European case-control study Epilymph", *J Cancer Res Clin Oncol*, 138 (12): pp. 1993-2001, *doi:10.1007/s00432-012-1279-y,* Dec 2012
3. Chen M.H, Hsiao L.T, Chiou T.J *et al*, "High prevalence of occult hepatitis B virus infection in patients with B cell non-Hodgkin's lymphoma", *Ann Hematol*; 87 (6): pp. 475-80, doi:10.1007/s00277-008-0469-9, Jun 2008
4. Deng L, Song Y, Young KH, *et al*, "Hepatitis B virus associated diffuse large B-cell lymphoma: unique clinical features, poor outcome, and hepatitis B surface antigen-driven origin", *Oncotarget*; 6 (28): 25061-73, *doi:10.18632/oncotarget.4677,* Sep 22, 2015
5. Huang H.H, Hsiao F.Y, Chen H.M, Wang C.Y, Ko B.S, "Antiviral prophylaxis for hepatitis B carriers improves the prognosis of diffuse large B-cell lymphoma in Taiwan-a population-based study" *British journal of haematology*, 2021; 192(1): pp. 110-118, 2021
6. Momotow J, Borchmann S, Eichenauer DA, Engert A, Sasse S, "Hodgkin Lymphoma-Review on Pathogenesis, Diagnosis, Current and Future Treatment Approaches for Adult Patients, *J Clin Med*; 10 (5). *doi:10.3390/jcm10051125,* Mar 8, 2021.
7. Nuersulitan R, Li M, Mi L, *et al*, "Effect of infection with hepatitis B virus on the survival outcome of diffuse large B-cell lymphoma in the prophylactic antiviral era", *Front Oncol*; 12:989258, *doi:10.3389/fonc.2022.989258*, 2022
8. Swerdlow S.H, Campo E, Pileri S.A *et al*, "The 2016 revision of the World Health Organization classification of lymphoid neoplasms", *Blood*; 127 (20): 2375-90, *doi:10.1182/blood-2016-01-643569,* May 19, 2016
9. Tian T, Song C, Jiang L *et al*, "Hepatitis B virus infection and the risk of cancer among the Chinese population", *Int J Cancer*; 147 (11): pp. 3075-3084, *doi:10.1002/ijc.33130,* Dec 1 2020.
10. Wang F, Xu R.H, Han B, *et al*, "High incidence of hepatitis B virus infection in B-cell subtype non-Hodgkin lymphoma compared with other cancers", *Cancer*; 109 (7): 1360-4, *doi:10.1002/cncr.22549*, Apr 1, 2007. ❑