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# Real-world results of first-line ABVD in patients with classic Hodgkin's lymphoma at a neoplastic disease institute in Lima, Peru

## Resultados del mundo real del ABVD de primera línea en pacientes con linfoma de Hodgkin clásico en un instituto de enfermedades neoplásicas en Lima, Perú

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## SUMMARY

***Objective:*** To evaluate the clinical characteristics and outcomes of first-line ABVD (doxorubicin, bleomycin, vinblastine, dacarbazine) in patients with classical Hodgkin lymphoma treated at a neoplastic disease institute in Lima, Peru. ***Methods:*** Retrospective study of previously untreated classical Hodgkin lymphoma diagnosed between 2014 and 2018. All received ABVD days 1 and 15 every 28 days. We described clinical features, objective response rate (ORR), overall survival (OS), and adverse events (AEs) per CTCAE v5.0, and explored associations between clinical variables and response using the chi-square test. ***Results:*** A total of 157 patients were included, with a median age of 31.5 years (interquartile range [IQR]: 22–49.25), of whom 56.7% were male. The most common histological type was nodular sclerosis (64.3%). Bulky disease was present in 17.8%, mediastinal mass in 45.2%, and B symptoms in 76.4%. Disease stages were distributed as follows: stage I (5.1%), stage II (36.9%), stage III (34.4%), and stage IV (22.9%). The complete response (CR) rate was 97.1%. Over the 36 months, overall survival (OS) was 83.1%. Regarding toxicity, grade 3–4 neutropenia occurred in 31.8%, while the most frequent non-hematological toxicity was nausea (24.8%). ***Conclusions:*** In this cohort, first-line ABVD showed effectiveness with a toxicity profile comparable to prior reports, supporting its use in resource-limited settings. Optimizing supportive care and incorporating PET/CT may help refine treatment selection and follow-up.

KEYWORDS: Hodgkin Disease, Antineoplastic Combined Chemotherapy Protocols, Drug Therapy Combination; Treatment Outcome, Retrospective Studies, Peru.


## RESUMEN

***Objetivo:*** Evaluar las características clínicas y los resultados del tratamiento de primera línea con ABVD (doxorrubicina, bleomicina, vinblastina y dacarbazina) en pacientes con linfoma de Hodgkin clásico atendidos en un instituto de enfermedades neoplásicas en Lima, Perú. ***Material y métodos:*** Estudio retrospectivo de pacientes con linfoma de Hodgkin clásico no tratados previamente, diagnosticados entre 2014 y 2018. Todos recibieron ABVD días 1 y 15 cada 28 días. Se describieron características clínicas, tasa de respuesta objetiva (TRO), supervivencia global (SG) y eventos adversos (EA) según CTCAE v5.0. Se exploraron asociaciones entre variables clínicas y respuesta mediante prueba de chi cuadrado. ***Resultados:*** Se incluyeron 157 pacientes con una mediana de edad de 31,5 años (rango intercuartílico [RIC]: 22–49,25), de los cuales el 56,7% eran varones. El tipo histológico más frecuente fue la esclerosis nodular (64,3%). El 17,8% presentaron enfermedad bulky, el 45,2% masa mediastinal y el 76,4% síntomas B. La distribución por estadios fue: estadio I (5,1%), estadio II (36,9%), estadio III (34,4%) y estadio IV (22,9%). La tasa de respuesta completa (RC) alcanzó el 97,1%. A los 36 meses, la supervivencia global (SG) fue del 83,1%. En cuanto a la toxicidad, la neutropenia de grado 3–4 se observó en el 31,8%, mientras que la toxicidad no hematológica más frecuente fueron las náuseas (24,8%). ***Conclusiones:*** En esta cohorte, el ABVD de primera línea mostró efectividad y un perfil de toxicidad seguro. La optimización del soporte y el empleo de PET/CT podrían contribuir a racionalizar mejor el tratamiento.


PALABRAS CLAVE: Enfermedad de Hodgkin, protocolos de quimioterapia combinada antineoplásica, terapia combinada, resultado del tratamiento, estudios retrospectivos, Perú.

## INTRODUCTION

Lymphomas are frequent malignant neoplasms in the world. According to GLOBOCAN 2020, worldwide, it has an incidence of 83,087 new cases and a mortality of 23,376 cases [1]. Peru is the fifth country in South America with the highest incidence, with 444 cases and 146 deaths [2]. According to the report of metropolitan Lima during the years 2013 -2015, it was 3683 cases, of which are 279 cases of Hodgkin's lymphoma and the number of deaths report 1924 (1801 of non-Hodgkin's and 123 of Hodgkin's); which places it in fifth place in frequency of cancer, only below prostate, breast, stomach, and cervical neoplasms. [3]

In the country, its presentation is similar in men and women; the age range of presentation is very wide, with an average of 50 years. Furthermore, diffuse large B-cell lymphoma accounts for 40% of non-Hodgkin lymphoma (NHL) and 60-65% of B-cell NHL, according to epidemiological data from Hospital Cayetano Heredia and Hospital Arzobispo Loayza, respectively. [4,5]

The diagnosis of Hodgkin's lymphoma in early stages can be non-specific; among the most common symptoms presented are because many of the signs and symptoms are non-specific because they simulate other pathologies, which is why it is extremely important to acquire knowledge of the variable characteristics of these lymphomas at the time of diagnosis to try to provide comprehensive management to the patient, offer a better quality of life and improve the expectation of survival.

In our institution, being a referral center, the flow of patients is very high. This makes the data obtained extremely valuable for our population. Clinical presentation, histological subtypes, treatment, and prognosis vary according to age. Young patients receive intense and curative treatments while elderly patients have less intense and palliative therapies.

Therefore, it is necessary to identify the characteristics of clinical presentation and histological variants to

help us guide the treatment and prognosis according to age groups and assess the intention of the therapies provided. In Peru, there is little data on this subject. The objective of this study was to describe, in patients with classical Hodgkin lymphoma, the clinical characteristics and the treatment responses achieved after first-line ABVD chemotherapy (doxorubicin 25 mg/m², bleomycin 10 units/m², vinblastine 6 mg/m², and dacarbazine 375 mg/m², administered intravenously on days 1 and 15 of each 28-day cycle, for up to six cycles).

## METHODS

*Study design and setting.* We conducted a retrospective observational cohort study at the Instituto Nacional de Enfermedades Neoplásicas (INEN), Lima, Peru, from January 2014 through December 2018.

*Eligibility criteria.* We included adults (≥18 years) with histologically confirmed classical Hodgkin lymphoma, clinical stages I–IV, who received at least two cycles of systemic treatment at INEN. This threshold of at least two cycles was established to ensure a minimum therapeutic exposure that would allow a reliable assessment of treatment response and toxicity. We excluded patients without INEN pathology confirmation and those with a second synchronous or metachronous malignancy.

*Treatment.* First-line chemotherapy consisted of ABVD (doxorubicin 25 mg/m², bleomycin 10 units/m², vinblastine 6 mg/m², and dacarbazine 375 mg/m²), administered intravenously on days 1 and 15 of each 28-day cycle. The number of cycles was determined according to clinical stage: 2 to 4 cycles for stages I–II and 6 cycles for stages III–IV.

*Outcomes and analysis.* We recorded baseline clinical and histologic characteristics, objective response rate (ORR), overall survival (OS), and adverse events (AEs). AEs were graded according to CTCAE v5.0. Associations between clinical variables and response were explored using the chi-square test with a two-sided significance level of 0.05.

*Endpoints.* The primary endpoint was overall survival (OS), defined as the time from initiation of first-line chemotherapy to death from any cause or last follow-up (censoring).The secondary endpoint was progression-free survival (PFS), defined as the time from initiation of first-line chemotherapy to disease progression or death, whichever occurred first; patients without an event were censored at last disease assessment. Objective response rate (ORR) (complete or partial response) was assessed according to standard clinical and radiologic criteria available during the study period (CT-based assessments aligned with contemporary recommendations). Treatment-related adverse events were graded per CTCAE v5.0.

*Statistical analysis*

Categorical variables were summarized as counts and percentages, and continuous variables as median (IQR) or mean (SD), as appropriate. Associations between baseline characteristics and treatment response (complete response vs non-complete response [partial response/progressive disease]) were assessed using the $\chi^2$ test with Yates' continuity correction when applicable. Overall survival (OS) was defined from initiation of first-line chemotherapy to death from any cause; progression-free survival (PFS) from initiation of first-line chemotherapy to documented progression or death. Patients without an event were censored at the date of the last disease assessment. Survival curves were estimated by the Kaplan–Meier method and compared with the log-rank test. Univariable and multivariable Cox proportional-hazards models were fitted to estimate hazard ratios (HRs) with 95% confidence intervals (CIs); the proportional-hazards assumption was evaluated. Two-sided $p<0.05$ was considered statistically significant. All analyses were performed in R (R Foundation for Statistical Computing, Vienna, Austria), open-source software distributed under the GNU General Public License; no commercial license was required.

*Ethical considerations.* The study protocol was reviewed and approved by the Institutional Research Ethics Committee of Instituto Nacional de Enfermedades Neoplásicas, INEN (approval No. 23-44). Given the retrospective design and the use of de-identified data from routine care, the requirement for informed consent was waived by the committee. All procedures complied with the Declaration of Helsinki and applicable local regulations on personal data protection. Direct identifiers (e.g., names, national IDs, addresses, medical record numbers) were removed prior to analysis; only coded study IDs were used. The database was stored on password-protected institutional servers with access restricted to the research team.

## RESULTS

Table 1 summarizes the clinicopathologic characteristics of 157 patients. The median age was 31.5 years (IQR

22–49.25); 118 (75.2%) were <50 years, 89 (56.7%) were male, and 75 (47.8%) were from Lima. Most presented B symptoms (76.4%) and had nodular sclerosis histology (64.3%), followed by mixed cellularity. Over 70% were stage II–III at diagnosis (stage IV 22.9%; stage I 5.1%). Disease burden was notable, with mediastinal involvement (45.2%) and bulky disease (17.8%). EBV and HTLV-1 positivity were infrequent.

According to treatment response, there were 81 (51.6%) patients with complete response, 63 (40.1%) patients with partial response, and 13 (8.3%) patients with disease progression. Table 2 shows the results of patient characteristics and response to treatment.

Deaths were documented in 29 (18.5%) patients. The median follow-up time for overall survival estimation was 39 months. Overall survival at 12, 36, and 60 months was estimated at 93.1%, 83.1%, and 75.3%, respectively (see Table 3 and Figure 2). Differences in overall survival were found according to age, sex, B symptoms, clinical stage, first-line treatment, and response to treatment (see Table 3). The life expectancy of patients who did not achieve a complete response was lower than that of patients who achieved a complete response (see Figure 3).

Table 4 shows that, after adjusting for characteristics that significantly differed in overall survival, B symptoms, clinical stage, and response to treatment were important in explaining the time to death in this group of patients with Hodgkin lymphoma; No effect of age or sex on time to death was detected. Compared with the absence of B symptoms, the presence of B symptoms was associated with a significantly higher risk of death (adjusted HR = 12.11; 95% CI = 1.61 to 91.28). Compared with clinical stage I-II-III, clinical stage IV was associated with a significantly higher risk of death (adjusted HR = 4.65; 95% CI = 2.10 to 10.32). Compared with having achieved a complete response and not having achieved one, it was associated with a significantly higher risk of death (adjusted HR = 3.42; 95% CI = 1.50 to 7.83).

Adverse events (Table 5). Hematologic toxicities predominate. Neutropenia was the most frequent event, with grade 3–4 neutropenia in 31.8% of patients. Leukopenia and thrombocytopenia occurred mainly as grade 1–2. Among non-hematologic events, nausea (24.8%) and vomiting (16.6%) were the most common, whereas diarrhea (5.7%) was infrequent and jaundice (0.6%) was rare (CTCAE v5.0).

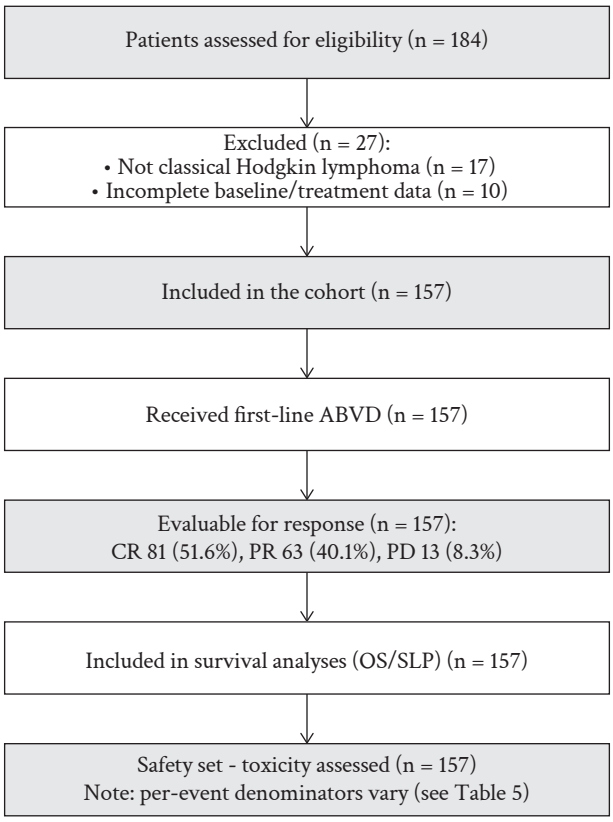


**Figure 1.** Flow diagram of patient selection and analysis. Flow of inclusion, exclusion, and analysis of patients with classical Hodgkin lymphoma treated with first-line ABVD at the Instituto Nacional de Enfermedades Neoplásicas (INEN), Peru.

**Table 1.** Clinical and pathological characteristics of patients who received treatment with ABVD.

| | n | % |
|---|---|---|
| **Age groups, years** | | |
| <=50 | 118 | 75.2 |
| >50 | 38 | 24.2 |
| No record | 1 | 0.5 |
| **Sex** | | |
| Female | 68 | 43.3 |
| Male | 89 | 56.7 |
| **Symptoms B** | | |
| Yes | 120 | 76.4 |
| No | 37 | 23.6 |
| **HTLV1** | | |
| Yes | 4 | 2.5 |
| No | 153 | 97.5 |
| **Clinical stage** | | |
| I | 8 | 5.1 |
| II | 58 | 36.9 |
| III | 54 | 34.4 |
| IV | 36 | 22.9 |
| No record | 1 | 0.6 |
| **Type** | | |
| Nodular sclerosis | 101 | 64.3 |
| Mixed cellularity | 53 | 33.8 |
| Lymphocyte depletion | 1 | 0.6 |
| No record | 2 | 1.3 |
| **Bulky tumor** | | |
| Yes | 28 | 17.8 |
| No | 129 | 82.2 |
| **Mediastinal tumor** | | |
| Yes | 71 | 45.2 |
| No | 86 | 54.8 |
| **Extranodal involvement** | | |
| Yes | 37 | 23.6 |
| No | 120 | 76.4 |
| **Complications** | | |
| Yes | 79 | 50.3 |
| No | 78 | 49.7 |

**Table 2.** Characteristics and response to treatment with ABVD.

| Characteristics | CR (n=81) n (%) | No CR (n=76) n (%) | p |
|---|---|---|---|
| **Age, years** | | | |
| Median [IQR] | 31 [22-55] | 32 [22-46.5] | 0.606 |
| **Age groups, years** | | | |
| ≤50 | 58 (71.6) | 60 (78.9) | |
| >50 | 23 (28.4) | 15 (19.7) | 0.222 |
| No record | - | 1 (1.3) | |
| **Sex** | | | |
| Female | 34 (42.0) | 34 (44.7) | |
| Male | 47 (58.0) | 42 (55.3) | 0.727 |
| **B symptoms** | | | |
| Yes | 57 (70.4) | 63 (82.9) | |
| No | 24 (29.6) | 13 (17.1) | 0.065 |
| **Epstein Barr virus Serology IGG** | | | |
| Yes | 12 (14.8) | 6 (7.9) | |
| No | 69 (85.2) | 70 (92.1) | 0.174 |
| **Clinical stage** | | | |
| I-II-III | 63 (78.8) | 57 (75.0) | |
| IV | 17 (21.3) | 19 (25.0) | 0.578 |
| No record | 1 | | |
| **Bulky tumor** | | | |
| Yes | 13 (16.0) | 15 (19.7) | |
| No | 68 (84.0) | 61 (80.3) | 0.546 |
| **Mediastinal tumor** | | | |
| Yes | 30 (37.0) | 41 (53.9) | |
| No | 51 (63.0) | 35 (46.1) | **0.033** |
| **Extra lymph node lesion** | | | |
| Yes | 15 (18.5) | 22 (28.9) | |
| No | 66 (81.5) | 54 (71.1) | 0.124 |

CR: complete response, PR: partial response, PE: disease progression.

**Table 3.** Characteristics and overall survival of patients treated with ABVD.

| Characteristics | Overall survival, % | | | p |
|---|---|---|---|---|
| | 12 months | 36 months | 60 months | |
| All patients | 93.1 | 83.1 | 75.3 | |
| **Age** | | | | |
| ≤50 | 92.6 | 84.0 | 75.6 | |
| >50 | 94.3 | 79.3 | 74.1 | 0.37 |
| **Sex** | | | | |
| Female | 93.9 | 89.9 | 84.3 | |
| Male | 92.4 | 77.2 | 67.6 | **0.023** |
| **Symptoms B** | | | | |
| Yes | 90.7 | 78.9 | 68.9 | |
| No | 100.0 | 96.0 | 96.0 | **0.005** |
| **Clinical stage** | | | | |
| I | 100.0 | 100.0 | 100.0 | |
| II | 96.2 | 87.5 | 80.9 | |
| III | 95.7 | 85.9 | 74.4 | |
| IV | 82.1 | 68.0 | 62.8 | **0.028** |
| **Type** | | | | |
| Nodular sclerosis | 93.7 | 83.0 | 74.9 | |
| Mixed cellularity | 91.4 | 82.2 | 74.4 | |
| Lymphocyte depletion | 100.0 | 100.0 | - | 0.90 |
| **Bulky tumor** | | | | |
| Yes | 96.2 | 89.3 | 73.7 | |
| No | 92.5 | 82.0 | 75.6 | 0.72 |
| **Mediastinal tumor** | | | | |
| Yes | 90.8 | 74.0 | 74.0 | |
| No | 95.0 | 90.4 | 77.1 | 0.25 |
| **Extra lymph node lesion** | | | | |
| Yes | 87.9 | 78.0 | 73.1 | |
| No | 94.6 | 84.8 | 76.2 | 0.47 |
| **Complications** | | | | |
| Yes | 93.0 | 79.6 | 68.0 | |
| No | 93.1 | 86.4 | 81.9 | 0.22 |
| **Response to treatment** | | | | |
| CR | 97.3 | 92.5 | 85.6 | |
| No CR | 88.5 | 72.8 | 64.9 | **0.009** |

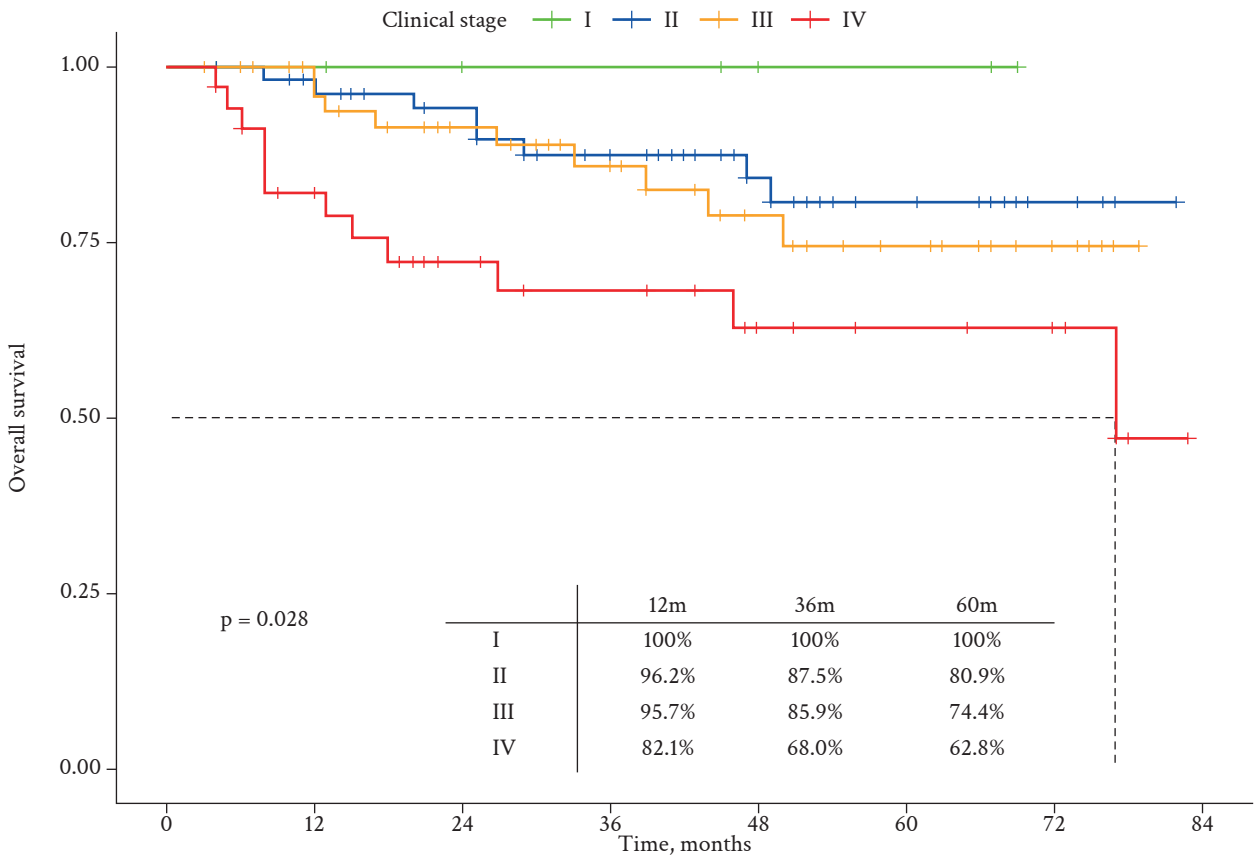


**Figure 2.** Estimated overall survival curves according to clinical stage.

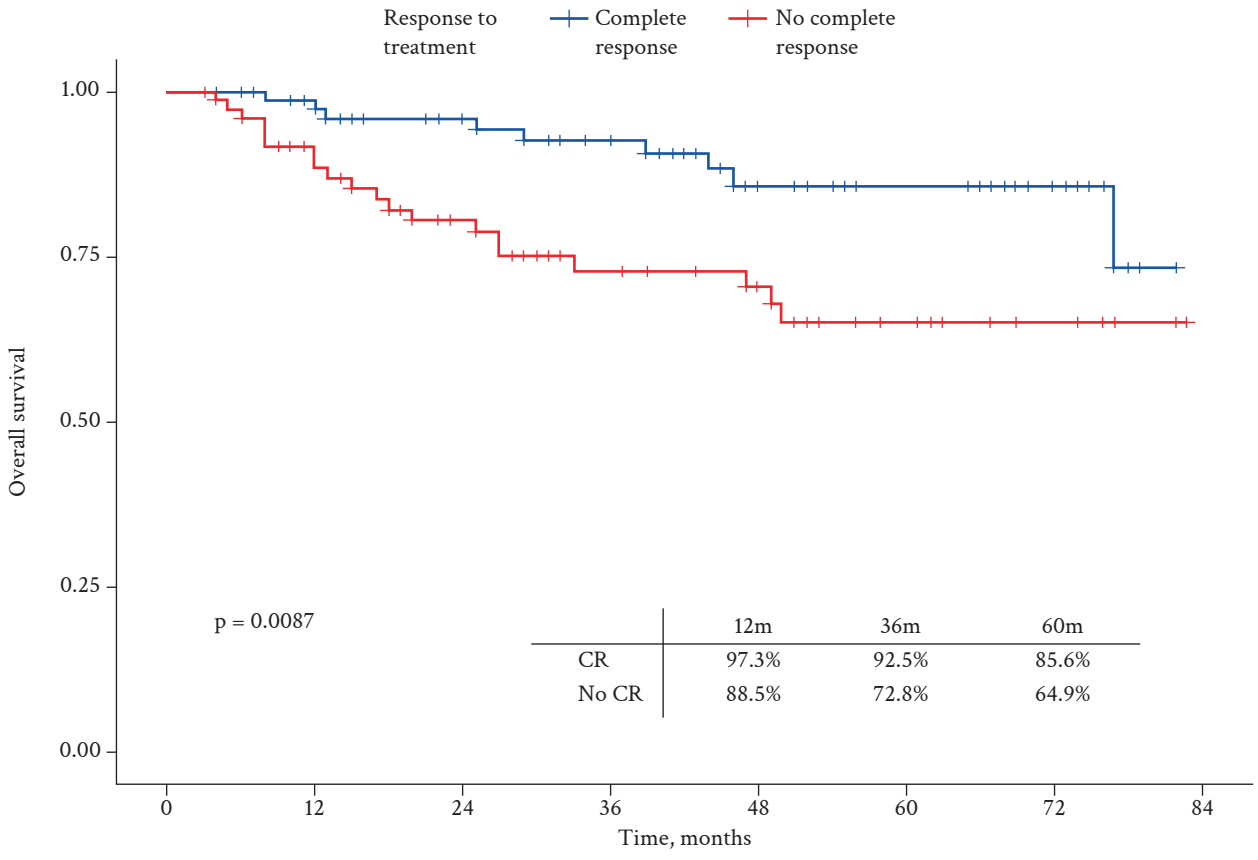


**Figure 3.** Estimated curves of overall survival according to response to ABVD treatment.

**Table 4.** Adjustment of univariate and multivariate Cox models for the analysis of deaths in patients with Hodgkin lymphoma.

| Characteristics | Unadjusted HR | 95% CI | p | Adjusted HR | 95% CI | p |
|---|---|---|---|---|---|---|
| **Sex** | | | | | | |
| Female | Ref. | | | Ref. | | |
| Male | 2.49 | 1.10-5.64 | **0.028** | 2.12 | 0.92-4.86 | 0.076 |
| **Symptoms B** | | | | | | |
| No | Ref. | | | Ref. | | |
| Yes | 10.12 | 1.38-74.42 | **0.023** | 12.11 | 1.61-91.28 | **0.016** |
| **Clinical stage** | | | | | | |
| I-II-III | Ref. | | | Ref. | | |
| IV | 2.82 | 1.34-5.93 | **0.006** | 4.65 | 2.10-10.32 | **<0.001** |
| **Response to treatment** | | | | | | |
| CR | Ref. | | | Ref. | | |
| No CR | 2.76 | 1.25-6.07 | **0.012** | 3.42 | 1.50-7.83 | **0.004** |

**Table 5.** Adverse effects secondary to treatment with ABVD (n=157).

| | n (%) |
|---|---|
| **Hematologic** | |
| **Neutropenia** | 138 |
| Grade 1 (>1500 /µL) | 56 (35.0) |
| Grade 2 (1500-1000/µL) | 32 (20.4) |
| Grade 3 (1000-500/µL) | 31 (19.7) |
| Grade 4 (<500/µL) | 19 (12.1) |
| **Anemia** | 84 |
| Grade 1 (>10 g/dL) | 30 (19.1) |
| Grade 2 (10-8 g/dL) | 17 (10.8) |
| Grade 3 (7.9-6.5 g/dL) | 31 (19.7) |
| Grade 4 (<6.5g/dL) | 6 (3.8) |
| **Thrombocytopenia** | 44 |
| Grade 1 (75,000 - 150,000/µL) | 15 (9.5) |
| Grade 2 (50,000 - 74,999/µL) | 29 (18.5) |
| Grade 3 (25,000 - 49,999/µL) | 0 (0.0) |
| Grade 4 (<25,000/µL) | 0 (0.0) |
| **No hematologic: any grade** | |
| Nausea | 39 (24.8) |
| Vomiting | 26 (16.6) |
| Diarrhea | 9 (5.7) |
| Jaundice | 1 (0.6) |

## DISCUSSION

The results of the present study show that more than half of the patients achieved a complete response with the first-line ABVD chemotherapy regimen. Likewise, the most relevant risk factor was EBV infection, and more frequent in patients from the interior of the country. During the course of this study, results were obtained that are very similar to those reported in the literature worldwide.

Compared with a previously reported cohort, our patients showed similar age at presentation, sex distribution, and frequency of B symptoms. Histology differed—nodular sclerosis predominated in our series (64.3%), whereas mixed cellularity was most common in the reference cohort (46.5%). Stage at diagnosis also varied (stage II–III 71.3% in our study vs stage III–IV 62.5% in the reference). Despite these differences, treatment outcomes were broadly comparable: the complete response rate was 85.6% in our cohort versus 84.5% in the reference, and overall survival estimates were in a similar range, acknowledging different follow-up horizons (5-year OS 77.1% vs 6-year OS 84.1%). [6]

An Indian cohort (n=939) reported age at presentation, male predominance, and frequency of B symptoms similar to our cohort. Histology differed: mixed cellularity predominated in the Indian series (60%), whereas nodular sclerosis predominated in ours (64.3%). Stage distribution was broadly comparable

(India: early stage I–II, 46.65%; advanced stage III–IV, 53.35%; ours: early 42.0%; advanced 57.31%). First-line therapy also differed: 21% of the Indian cohort received combined-modality treatment (chemotherapy plus radiotherapy), while all patients in our cohort received ABVD chemotherapy. Despite these differences, 5-year outcomes were similar—complete response 80.67% in the Indian cohort vs 85.6% in ours, and overall survival 83.63% vs 77.1%, respectively. [7]

A retrospective cohort from the United States of patients with advanced-stage (III–IV) Hodgkin lymphoma treated first line with ABVD provides a relevant comparator. Patients in the United States cohort were older at presentation (mean 45 years) than ours (31.5 years) and had more frequent extranodal involvement (49.1% vs 23.6%). Bulky disease was also more common in the United States cohort (33.5% vs 17.8% in ours). Regarding response in advanced stages, the United States cohort achieved a complete response (CR) rate of 44.9%, whereas our cohort achieved CR rates of 74.4% and 62.8% in stages III and IV, respectively. Overall survival was similar: the United States cohort reported 82% at a mean follow-up of 35.8 months, while our 36-month OS was 83.1%. Notably, response assessment methods differed (PET/CT in the United States cohort vs CT in our setting). [8]

In the clinicopathologic features and the presence of B symptoms at the debut of the disease was present up to 2/3 in 76.4% (n:120) of the patients. The most frequent histological form was the nodular sclerosis subtype with 64.3% (n:101), followed by the mixed cellularity type with 33.8% (n:53). While with other studies worldwide mixed cellularity was the most frequent, in our population nodular sclerosis was more frequent. In our study, 45.2% (n:71) of patients had a mediastinal tumor, which differs from the international literature, which only reports up to 20%, due to the fact that this type of presentation is not very frequent. [9-14]

In our population the frequency of EBV was not very high unlike other populations in which it can reach 20% to 40%, being considered a tumor initiating factor, due to its effect on the alteration of the tumor microenvironment in Hodgkin's lymphoma and this may be related to different levels of immunosuppression of the patient. The association with HTLV 1 was 2.5% (n:4) in our study, similar to that of other published studies, being the characteristic of this type of infection associated to lymphoma an affection to people over 50 years old and with a histopathology of mixed cellularity type. [15-23]

Regarding the efficacy of the results in patients with early clinical stages I or II, it was demonstrated that 4 cycles of ABVD showed durable responses, without Bulky disease and with negative interim PET/CT, after a follow-up of 3.8 years a PFS of 89% was achieved, with neutropenia being the most frequent toxicity reaching 70%. Another valid option is the continuation with 1 additional cycle of ABVD followed by radiotherapy, obtaining a PFS at 5 years of 99% and 87.1% respectively. With respect to the reduction of the number of cycles followed by radiotherapy, the treatment of 2 courses of ABVD followed by radiotherapy at 20 Gy is as effective and less toxic than 4 courses of ABVD followed by radiotherapy at 30 Gy, reaching an absence of treatment failure of 93% with 4 courses and 91.1% with 2 courses; as for toxicities, alopecia and hematologic toxicities were presented in greater quantity. [24-29]

In stages III or IV it was demonstrated that 2 cycles of ABVD, followed by a negative interim PET-CT can complete treatment with 4 cycles of AVD without bleomycin with less toxicity, after 3 years it was possible to achieve a PFS of 84.4%. Those who obtained a positive interim PET-CT showed that treatment with staged BEACOPP, 74% of these patients achieved a PFS of 67.5% and an OS of 87.8%. Demonstrating staging in PET-CT positive patients is effective in this group of patients, improving their prognosis. The addition of radiotherapy, after receiving treatment with staged BEACOPP to patients who obtained a positive interim PET-CT, after 5 years achieved a PFS at 5 years was 90.6% and an OS of 96%, but with a higher grade 3-4 hematologic toxicity. [25,30-36]

In patients with contraindication to receive Bleomycin and without neuropathy, a valid option in the Brentuximab - AVD scheme for 6 cycles, which after a follow-up of 2 years achieved a PFS 82.1% as opposed to the 77.2% achieved with standard treatment, but with more frequent toxicities such as neutropenia which reached 58% and peripheral neuropathy in 67%. In patients with Bulky tumor at diagnosis who failed to achieve complete response after 6 cycles of ABVD, consolidation radiotherapy at 30 Gy in the involved field was indicated. After 5 years the EFS was 86% and an OS of 93%, showing better results. [37-40]

In patients over 60 years of age in early stages with favorable risk, it was demonstrated that the use of ABVD or AVD for 2 cycles followed by consolidation radiotherapy achieved a complete remission rate of 96% and 99% respectively, in contrast to 4 cycles of

ABVD which only achieved a complete remission of 88%. As for pulmonary toxicity due to bleomycin, it occurred with 4 cycles of ABVD in 7 people and with 2 cycles of ABVD in 2 people. These results show that the use of bleomycin in patients over 60 years of age is not recommended for more than 2 cycles of chemotherapy. In case of patients with unfavorable risk it is recommended to perform an interim PET-CT after 2 cycles of ABVD, in case this is negative it was compared to give ABVD or AVD for 4 cycles, where it was evidenced that the PFS at 3 years with ABVD was 85.45% and with AVD 84.48%. In this scenario it was also demonstrated that the omission of bleomycin from the ABVD scheme after a negative interim PET-CT results in a lower incidence of pulmonary toxicity without loss of efficacy. [30,41,42]

In this study, we present the limitations of some clinical histories that were incomplete and therefore were excluded from the study. A small number of patients, for non-medical reasons, decided to continue treatment at other institutions. For the reasons stated of incomplete clinical histories and patient leakage, the study sample was affected.

In this study, it is concluded that the results obtained are similar to those reported in pivotal studies and in large case series, despite dealing with a population with a higher median age than that described in previous research. In this study, the objectives set were met, analyzing both disease-free survival and overall survival in patients with Hodgkin lymphoma. The adverse effects observed, such as thrombocytopenia, neutropenia, leukopenia, nausea, and vomiting, were transient and resolved without the need to interrupt treatment. Clinical and biological characteristics such as association with Epstein-Barr virus, leukocyte depletion, and nodular necrosis were also identified, which are related to a significant decrease in survival rate, in agreement with what has been described in the scientific literature. The increase in the incidence of Hodgkin lymphoma poses a growing challenge, highlighting the importance of developing more effective strategies for the early identification of high-risk patients.

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**Data availability:**

The data supporting the findings of this study are not publicly available due to ethical and legal restrictions but can be requested from the corresponding author (lsalinas@inen.sld.pe) with prior authorization from the INEN Ethics Committee. This work uses data from the study with INEN code (approval code: INEN 23-44).

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