

# Survival Pattern of Hodgkin Lymphoma Patients in the Last 25 Years in Lebanon

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## Abstract

**We retrospectively compared the overall survival in HL over 3 different decades in Lebanon. Patients were divided into 3 groups according to period of analysis: group A (1990-1999), group B (2000-2009), and group C (2010-2015). The survival rate at 5 years in group A was 91%, 94% in group B, and 100% in group C. The survival of patients with HL has dramatically improved over the past 25 years in Lebanon.**

**Context:** After the emergence of combination chemotherapy in 1960s, survival of patients with Hodgkin lymphoma (HL) has dramatically improved worldwide. We lack studies that document the favorable evolution of survival regarding this disease in Lebanon. **Objective:** To compare the overall survival in HL over 3 different decades in Lebanon.

**Methods:** We retrospectively reviewed the charts of 196 patients diagnosed with HL, treated and followed from 1990 to 2015 in our center. Patients were divided into 3 groups according to period of analysis: group A (1990-1999), group B (2000-2009), and group C (2010-2015). We studied the characteristics and survival patterns of patients in each group. **Results:** The male-to-female sex ratio was 1.06. The median age at diagnosis was 33 years in group A, 30.4 in group B, and 33.12 in group C ( $P = .6$ ). Results showed variations in the subtypes of the disease according to the following: nodular-sclerosis HL 59.5% in group A, 76.2% in group B, and 85.4% in group C. Mixed cellularity HL 21.6% in group A, 2.4% in group B, and 73.7% in group C ( $P = .0001$ ). Patients presented with localized disease in 58.6%, 73.7%, and 56.4% in groups A, B, and C, respectively ( $P = .173$ ). Complete remission was achieved in 76.5% in group A, 85.3% in group B, and 69.5% in group C ( $P = .007$ ). The survival rate at 5 years in group A was 91%, 94% in group B, and 100% in group C. **Conclusion:** The survival of patients with HL has dramatically improved over the past 25 years in Lebanon. These results resemble those achieved in Western countries due to the fast adoption of new molecular imaging technologies at diagnosis and follow-up and the rapid approval of new drugs for relapse in the Lebanese market.

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## Introduction

The management of Hodgkin lymphoma (HL) has been consistently improving over the past few decades.<sup>1,2</sup> Historically, treatment of localized disease consisted of extended field radiation therapy alone leading to low cure rates and several side effects, including secondary neoplasms.<sup>3-5</sup> In the 1960s, Vincent DeVita at

the National Cancer Institute, introduced the first combination chemotherapy and it consisted of mustargen, Oncovin (vincristine), procarbazine, and prednisone, which is the MOPP regimen for advanced HL.<sup>4,6</sup>

MOPP rapidly became the “gold standard” therapy for patients with advanced HL. This regimen was associated with multiple acute side effects but other serious long-term toxicities were only seen years after treatment, such as infertility and secondary acute leukemia (sAML).<sup>7-9</sup>

The ABVD regimen (Adriamycin [doxorubicin], bleomycin, vinblastine, and dacarbazine) was introduced in the 1970s by Bonadonna as a non-cross-resistant salvage regimen for patients failing on MOPP.<sup>10</sup> The regimen was shown to yield good activity in patients with MOPP-resistant disease, causing less acute myelotoxicity, sterility, and, particularly, less sAML.<sup>11,12</sup> In 1992,

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the pivotal Cancer and Leukemia Group B (CALG B) trial in advanced HL, which compared MOPP with ABVD and with MOPP/ABVD, showed equivalent therapeutic results for ABVD and MOPP/ABVD (complete remission rates were 81% and 82%, respectively). Both regimens were superior to MOPP, which made the ABVD regimen as the treatment of choice for patients with HL.

Thirty percent of patients with advanced HL who are not cured with the ABVD regimen would benefit from escalated therapy with bleomycin, etoposide, doxorubicin, vincristine, procarbazine, prednisone and cyclophosphamide (BEACOPP) with a higher cure rate but a more significant side-effect profile, including cardiovascular and arterial disease, secondary neoplasms, and negative impact on the quality of life.<sup>12,13</sup>

The improvement in staging techniques, treatment modalities, and the associated reduction in side effects has led to a significant improvement in survival of patients with HL.<sup>2</sup> The aim of our study was to highlight the progression and the improvement of survival among Lebanese patients with HL during the past 25 years.

## Methods

We retrospectively reviewed the charts of 196 patients diagnosed with HL, treated and followed in our center in Lebanon between 1990 and 2015. Only classic HL histology was included in our study.

Patients were divided into 3 groups according to period of analysis. Group A consisted of the patients with HL who were diagnosed, treated, and followed between 1990 and 1999, group B between 2000 and 2009, and group C from 2010 to 2015.

The time cutoff was based on the milestone changes made in the treatment strategies and the emergence of new techniques or management.

We studied the characteristics and survival patterns of patients in each group.

With a confidence interval of 95% and a 5% margin of error, the data were analyzed using SPSS (Statistical Package for the Social Sciences) Version 20. Quantitative variables are expressed as mean  $\pm$  SD type and qualitative variables as percentages. A  $P < .05$  was considered significant.

Descriptive statistics were calculated using the  $\chi^2$  and Student  $t$  tests to analyze the basic characteristics and parameters of clinical study participants and the comparison among the 3 study groups.

Survival analysis was used to establish the survival curve of patients with HL. Relapse rate was calculated using the Kaplan-Meier. For the comparison of curves depending on the year, the log-rank test was used to see the association between the dependent variable (RC) and the independent variables.

**Table 1** Characteristics Comparison Among the 3 Different Groups

Characteristics	1990-1999	2000-2009	2010-2016	P
Gender				.607
Male	51.4	45.2	54.4	
Female	48.6	54.8	45.6	
Median age at diagnosis	32.7 $\pm$ 16.4	30.4 $\pm$ 16.41	33.12 $\pm$ 16.42	.662
Subtypes				.0001
NSHL	59.5	76.2	85.4	
MCHL	21.6	2.4	8.7	
LRHL	5.4	14.3	5.8	
LDHL	2.7	0	0	
Stage				.075
I	17.2	18.4	27.7	
II	41.4	55.3	28.7	
III	27.6	13.2	18.8	
IV	13.8	13.2	24.8	
Stage in group				.173
I and II	58.6	73.7	56.4	
III and IV	41.4	26.3	43.6	
Chemotherapy				.0001
ABVD	29.7	88.1	87.4	
First response				.007
Complete remission	76.5	85.3	69.5	
Relapse	17.6	8.8	8.5	
Partial remission	0	2.9	22	
Stability	5.9	2.9	0	

Abbreviations: ABVD = Adriamycin, bleomycin, vinblastine, and dacarbazine; LDHL = lymphocyte depleted Hodgkin lymphoma; LRHL = lymphocyte rich Hodgkin lymphoma; MCHL = mixed cellularity Hodgkin lymphoma; NSHL = nodular-sclerosis Hodgkin lymphoma.

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