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Retrospective Analysis of Patients Diagnosed with Primary Gastric NonHodgkin's Lymphoma and Potential Prognostic Markers

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Objective: In this study, we aimed to present the treatments administered to patients with primary gastric lymphoma who were treated in the hematology and oncology clinics of our center, as well as the survival rates and the differences between the subgroups.

Materials and Methods: The data of patients diagnosed with primary gastric lymphoma and those treated between January 2000 and January 2022 were retrospectively reviewed. Certain biochemical parameters of the patients, the chemotherapy regimens they received, whether they received surgical treatment, radiotherapy or both, their overall survival (OS) and progression-free survival (PFS) rates, and intergroup differences were investigated.

Results: The study included 27 patients. Of these, 10 (41.2%) were diagnosed with mucosa-associated lymphoid tissue (MALT) lymphoma and 17 (58.8%) were diagnosed with diffuse large B-cell lymphoma (DLBCL). At the time of diagnosis, 10, 3, 2, and 12 patients were in stages I, II, IIE, and IV, respectively, according to the Lugano staging. According to the Ann–Arbor staging, 9, 5, 1, and 12 patients were in stages I, II, III, and IV, respectively. Of the 21 patients receiving systemic chemotherapy, 19 received R-CHOP (rituximab, cyclophosphamide, doxorubicin, vincristine, and prednisone), 1 received CHOP, and 1 received rituximab, cyclophosphamide, vincristine, and prednisone treatments. There was a significant difference between the two groups in terms of neutrophil levels and Ki-67 percentages (p=0.027, p=0.0144, respectively). The median OS was 162.3 (1–233) months in patients diagnosed with MALT lymphoma, whereas the median OS for patients diagnosed with DLBCL could not be reached (2–80 months; p=0.57).

Conclusion: The present study showed that patients with primary gastric non-hodgkin lymphoma (NHL), regardless of the subtype being MALT or DLBCL, may have longer OS and PFS. At the time of diagnosis, *Helicobacter pylori* positivity and eradication should not be overlooked, especially in MALT lymphomas, keeping in mind that the neutrophil count may be associated with OS in the DLBCL type.

Key Words: *Non-hodgkin lymphoma, gastric, h.pylori, neutrophil*

Primer Gastrik Non-Hodgkin Lenfoma Tanılı Hastaların Retrospektif İncelenmesi ve Potansiyel Prognostik Belirteçler

Amaç: Bu çalışma ile merkezimiz hematoloji ve onkoloji kliniklerinde tedavi görmüş, primer gastrik lenfoma tanılı hastalarımıza uygulanan tedavileri, hastaların sağ kalımlarını ve alt gruplar arasındaki farklılıkları sunmayı amaçladık.

Gereç ve Yöntem: Ocak 2000 ve Ocak 2022 tarihleri arasında primer gastrik lenfoma tanısıyla tedavi edilen hastaların verileri retrospektif olarak incelendi. Hastaların bazı biyokimyasal parametreleri, aldıkları kemoterapi rejimleri, cerrahi tedavi veya radyoterapi alıp almadıkları toplam sağkalım (OS) ve progresyonsuz sağkalım (PFS) düzeyleri ve gruplar arasındaki farklılık araştırıldı.

Bulgular: Çalışmaya 27 hasta dahil edildi. Bunların 10 (%41.2) tanesi MALT lenfoma, 17 (%58.8) tanesi difüz büyük B hücreli lenfoma (DBBHL) tanılı idi. Tanı anı Lugano evrelemesine göre 10 hasta evre I, 3 hasta evre II, 2 hasta evre IIE, 12 hasta evre IV; Ann-Arbor evrelemesine göre ise 9 hasta evre I, 5 hasta evre II, 1 hasta evre III, 12 hasta ise evre IV'tü. Sistemik kemoterapi alan 21 hastanın 19'u R-CHOP (ritüksimab, siklofosfamid, doksorubisin, vinkristin, prednizon), 1 hasta CHOP, 1 hasta ise R-CVP (ritüksimab, siklofosfamid, vinkristin, prednizon) tedavileri almışlardı. Nötrofil düzeyleri ve Ki-67 yüzdelerine göre iki grup arasında DBBHL lehine anlamlılık saptandı (sırasıyla p=0.027, p=0.0144). Sağkalım analizlerinde MALT Lenfoma tanılı hastalarda medyan OS 162.3 (1-233) ay, DBBHL tanılı hastalarda ise medyan OS'ye (2-80 ay) ulaşılamadı (p=0.57).

Sonuç: Çalışmamız ister MALT ister DBBHL tipinde olsun, primer gastrik non-Hodgkin lenfoma tanılı hastaların toplam ve progresyonsuz sağkalımlarının uzun olabileceğini göstermiştir. Tanı anında özellikle MALT lenfomalarda H.pylori pozitifliği ve eradikasyonu unutulmamalı, DBBHL tipinde ise tanı anı nötrofil değerinin OS ile ilişkili olabileceği akılda tutulmalıdır.

Anahtar Kelimeler*: Hodgkin dışı lenfoma, gastrik, h.pylori, nötrofil*

Introduction

Primary gastrointestinal nonHodgkin's lymphoma (NHL) is the most common subgroup of extranodal lymphomas, accounting for 30%–40% of cases (1). Among extranodal NHLs, the stomach is the most common site of involvement. Gastric NHL is

observed in 55%–65% of all gastrointestinal NHL cases (2). Primary gastric NHLs are the most common gastric malignancies after gastric adenocarcinoma (3). Patients are usually over 50 years of age, and the condition is observed 2–3 times more frequently in males compared to females. Histopathologically, 90% of cases originate from B cells. Marginal zone lymphoma of mucosa-associated lymphoid tissue (MALT) accounts for 38% of cases, the diffuse large B-cell lymphoma (DLBCL) subtype accounts for 59% of cases, and other types (mantle cells, follicular cells, and peripheral T-cells) are less common (2).

After diagnosing primary gastric NHL, determining the stage of the patient is essential to establishing a treatment plan and determining prognosis. Staging is also necessary to distinguish secondary stomach involvement in systemic lymphoma. Although there is no consensus in the literature, the most commonly used staging systems are Ann–Arbor and modified Ann–Arbor (Lugano) staging (4, 5). For staging, especially in the case of the DLBCL subtype, positron emission tomography/computed tomography (PET/CT) is primarily preferred. However, contrast-enhanced thoracic and abdominopelvic CT scans may also be suitable. In the MALT subtype, the sensitivity of PET/CT decreases. In some cases, bone marrow examination can be beneficial in demonstrating tumor spread (2). There are marked differences in treatment between MALT lymphoma and DLBCL. Gastric MALT lymphoma typically follows an indolent course, since the bacterium Helicobacter pylori plays a role in its etiology, the primary treatment option in localized MALT lymphomas Helicobacter pylori eradication treatment (6, 7). Surgery can be performed if the gastric lesion has caused bleeding, gastric perforation, or obstruction (8). In advanced-stage MALT lymphoma and in the DLBCL subtype, treatment should consist of systemic chemotherapy. The most commonly used chemotherapy regimens are those based on rituximab (9).

Today, some prognostic markers have been identified for primary gastric lymphomas. Previous studies have shown that factors such as gender, histological subtype, performance score, and whether or not surgery was performed may affect the prognosis (2, 9, 10). The International Prognostic Index (IPI) used for DLBCL lymphomas (IPI; age >60 years, advanced stage, poor performance score, elevated lactate dehydrogenase [LDH] levels) is also used for gastric DLBCL (2, 9). The recently defined MALT-IPI (age >70 years, Ann–Arbor stages 3–4, high LDH levels) categorizes patients into low, intermediate, and high-risk groups, showing their 5-year PFS rates as 70%, 56%, and 29%, respectively (10).

Herein, we aimed to present the treatments administered to patients diagnosed with primary gastric lymphoma who received treatment at our hematology and oncology clinics, as well as their survival rates, potential prognostic markers and differences among subgroups.

Materials and Methods

Research and Publication Ethics: Our study was conducted following the ethical standards of the institutional research committee and in accordance with the 1964 Helsinki Declaration. This study was approved by the Clinical Research Ethics Committee of the Bursa Uludag University Faculty of Medicine (Decision No: 2022-6/40).

The data of patients treated for primary gastric lymphoma in the Hematology and Medical Oncology Departments of Bursa Uludag University Hospital between January 2000 and January 2022 were retrospectively analyzed. Age, gender, gastric lymphoma subtypes, white blood cell (WBC), neutrophil, lymphocyte, and monocyte counts, hemoglobin (Hgb) levels, lactate dehydrogenase (LDH) levels at the time of diagnosis, beta2-microglobulin (β2-microglobulin) counts, Ki-67 (%) levels, Lugano and Ann–Arbor staging, international prognostic indices (MALT-IPI and IPI), and whether patients diagnosed with MALT lymphoma received *H. pylori* treatment or not were evaluated. The study included individuals with these parameters, along with CT or PET/CT results obtained at the time of diagnosis. The chemotherapy regimens administered to the patients and whether they underwent surgical treatment or radiotherapy were investigated. The overall survival (OS) and progression-free survival (PFS) rates of the patients and the differences among groups were analyzed. OS was measured from the date of diagnosis to death from any cause or to the last follow-up. PFS was defined as the time from the date of treatment to the first of either disease progression, relapse or death from any cause.

Statistical Analysis: SPSS v23.0 was used for statistical analysis. The continuous variables were presented with mean, standard error, median, minimum, and maximum values, while the categorical variables were presented with numbers and percentages. The Shapiro–Wilk test was used to determine a normal distribution. An independent sample t-test was used for normally distributed variables, while the Mann–Whitney U test was used for non-normally distributed variables. Survival analysis was conducted using the Kaplan–Meier method. $p<0.05$ was accepted statistically significant in all analyses.

Results

The demographic and clinical characteristics of the patients are given in Table 1. The study included 27 patients. Of the patients, 19 were females and 8 were males. Ten (41.2%) patients were diagnosed with MALT lymphoma, and 17 (58.8%) were diagnosed with DLBCL. The median age was 55 (27–85) years. At the time of diagnosis, 10, 3, 2, and 12 patients were in stages I, II, IIE, and IV, respectively, according to the Lugano staging. According to the Ann–Arbor staging, 9, 5, 1, and 12 patients were in stages I, II, III, and IV, respectively. Among the patients diagnosed with DLBCL, 12 (70%) belonged to stages IIE and IV. The Eastern Cooperative Oncology Group (ECOG) performance status of patients

was found to have a median of 0 (range: 0–3) for MALT lymphoma and a median of 1 (range: 0–4) for DLBCL. The median MALT-IPI score was 1 (0–2) for MALT lymphoma and 3 (0–4) for DLBCL. Four patients were operated on at the time of diagnosis (3 due to excessive bleeding, 1 for perforation), and five patients underwent radiotherapy. Out of 21 patients receiving systemic chemotherapy, 19 patients received R-CHOP (rituximab, cyclophosphamide, doxorubicin, vincristine, and prednisone), 1 received CHOP, and 1 received R-CVP (rituximab, cyclophosphamide, vincristine, and prednisone) treatment. Median number of chemotherapy cycles was 8 (4-8). Four patients diagnosed with MALT lymphoma received chemotherapy (R-CVP, one patient; R-CHOP, three patients) at the time of diagnosis, while all patients diagnosed with DLBCL received chemotherapy (R-CHOP) at the time of diagnosis. *H. pylori* was identified in seven patients with MALT lymphoma, and all of them received eradication treatment.

When patients with MALT lymphoma and DLBCL were compared based on laboratory parameters and Ki-67 levels, no significant difference was found between the two groups with respect to WBC, lymphocyte, monocyte, and platelet counts and Hgb, LDH, and β2-microglobulin levels. According to neutrophil levels and Ki-67 percentages, there was a significant difference between the two groups in favor of DLBCL (p= 0.027, p=0.0144, respectively) (Table 2). In patients diagnosed with DLBCL, both the median neutrophil levels (4.86 $\times 10^9$/L vs. 5.91 $\times 10^9$/L) and Ki-67 percentages (27% vs. 62.3%) were found to be higher. When the groups were compared according to Lugano and Ann–Arbor stages at the time of diagnosis, it was found that patients with DLBCL were diagnosed at a more advanced stage for both staging systems and there was a statistical difference between the groups in terms of staging (Lugano p= 0.0125, Ann–Arbor p= 0.0057) (Figure 1). Although no statistical difference was found between the two groups in terms of survival analysis, the median OS for patients diagnosed with MALT lymphoma was 162.3 (range: 1–233) months, whereas the median OS for patients diagnosed with DLBCL could not be reached (range: 2–80 months; p= 0.57). The median PFS could not be reached in both groups (p= 0.30). The median OS for all patients was 162.3 months, and the median PFS could not be reached (Figure 2).

Table 1. Demographic and clinical characteristics of the patients

Items	**N (median, min–max) (percentage)**
Age	55 (27-85)
Gender	
Female	19 (%70.3)
Male	8 (%29.7)
Diagnosis	
MALT lymphoma	10 (%41.2)
DLBCL	17 (%58.8)
Stage (Lugano)	
I	10 (%37)
II	3 (%11.1)
IIE	2 (%7.4)
IV	12 (%44.5)
Stage (Ann–Arbor)	
I	9 (%33.3)
II	5 (%18.5)
III	1 (%3.7)
IV	12 (%44.5)
ECOG	
MALT lymphoma	0 (0-3)
DLBCL	1 (0-4)
IPI (DLBCL)	3 (0-4)
MALT-IPI (MALT lymphoma)	1 (0-2)
Surgery	4 (%14.8)
RT	5 (%18.5)
CT	
CHOP	1
R-CHOP	19
R-CVP	1
Helicobacter pylori (MALT lymphoma)	7 (%63)

N: number; MALT: mucosa-associated lymphoid tissue; IPI: International Prognostic Index; ECOG: Eastern Cooperative Oncology Group; RT: radiotherapy; CT: chemotherapy; CHOP: cyclophosphamide, doxorubicin, vincristine, prednisone; R: rituximab; CVP: cyclophosphamide, vincristine, prednisone; DLBCL: diffuse large B-cell lymphoma

Table 2. Comparison of laboratory parameters of the patients according to groups at diagnosis

Items	MALT Lymphoma (mean ± SD)	DLBCL (mean ± SD)	*p* value
WBC (10^9/L)	7.74±4.15	8.30±2.64	0.292**
Neutrophil (10^9/L)	4.86±3.89	5.91±2.41	***0.027*****
Lymphocyte (10^9/L)	2.09±0.8	1.56±0.76	0.120**
Monocyte (10^9/L)	1.08±0.16	0.59±0.36	0.874**
Hgb (g/dL)	12.1±2.3	11.5±2.1	0.598**
Platelet (10^9/L)	292±97	399±154	0.090**
LDH (U/L)	203.4±85.3	385.4±603.1	0.355*
β2 microglobulin (mg/L)	2.2±0.9	3.4±3.9	0.435*
Ki-67 (%)	27±33.4	62.3±21.3	***0.014******

Hgb: hemoglobin; DLBCL: diffuse large B-cell lymphoma; LDH: lactate dehydrogenase; MALT: mucosa-associated lymphoid tissue; WBC: white blood cell count; SD: standard deviation

* Independent samples t-test

** Mann–Whitney U test
p<0.05 was considered significant

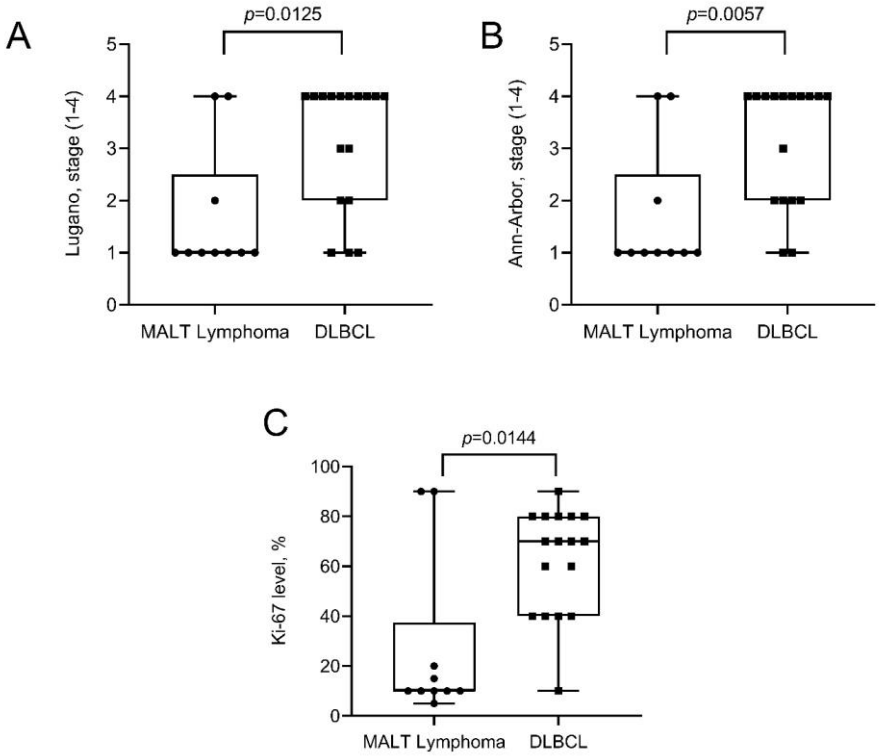

Figure 1. Comparison of patients diagnosed with MALT Lymphoma and DLBCL according to stages and Ki-67 levels; Whisker–Plot diagrams. A) Lugano staging; B) Ann–Arbor staging; C) Ki-67 level

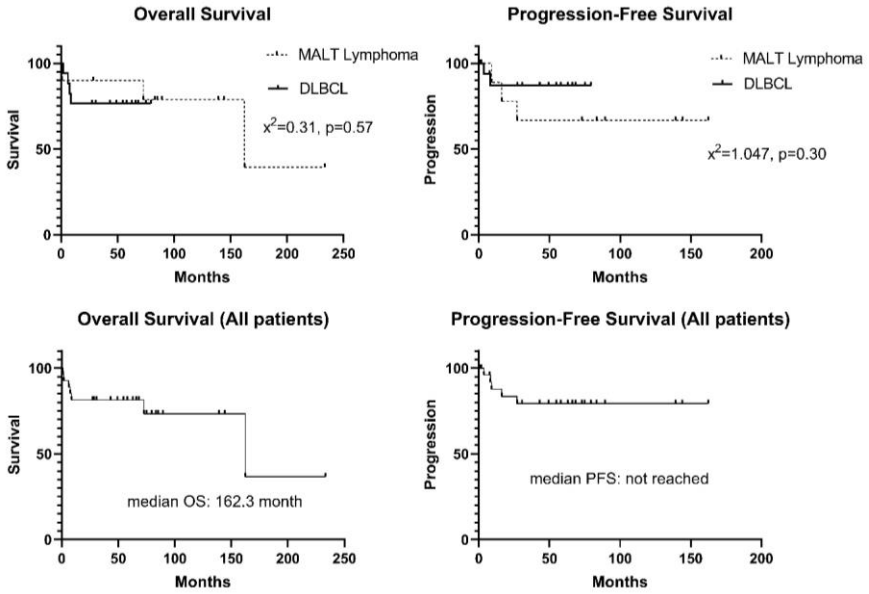

Figure 2. Overall survival and progression-free survival of patients

When patients with MALT lymphoma and DLBCL were compared based on laboratory parameters and Ki-67 levels, no significant difference was found between the two groups with respect to WBC, lymphocyte, monocyte, and platelet counts and Hgb, LDH, and β2-microglobulin levels. According to neutrophil levels and Ki-67 percentages, there was a significant difference between the two groups in favor of DLBCL (*p*= 0.027, *p*=0.0144, respectively) (Table 2). In patients diagnosed with DLBCL, both the median neutrophil levels (4.86 $\times 10^9$/L vs. 5.91 $\times 10^9$/L) and Ki-67 percentages (27% vs. 62.3%) were found to be higher. When the groups were compared according to Lugano and Ann–Arbor stages at the time of diagnosis, it was found that patients with DLBCL were diagnosed at a more advanced stage for both staging systems and there was a statistical difference between the groups in terms of staging (Lugano *p*= 0.0125, Ann–Arbor *p*= 0.0057) (Figure 1). Although no statistical difference was found between the two groups in terms of survival analysis, the median OS for patients diagnosed with MALT lymphoma was 162.3 (range: 1–233) months, whereas the median OS for patients diagnosed with DLBCL could not be reached (range: 2–80 months; *p*= 0.57). The median PFS could not be reached in both groups (*p*= 0.30). The median OS for all patients was 162.3 months, and the median PFS could not be reached (Figure 2).

The study also evaluated whether there was any relationship between the Ki-67 index; β2-microglobulin, LDH, neutrophil, and platelet values; Ann–Arbor and Lugano stages; and patients' OS and PFS rates and mortality status (Table 3). There was no correlation between the parameters and the mortality status of the patients. No relationship was found between LDH, β2-microglobulin, and platelet values and Ann–Arbor stage with patients' OS and PFS, a negative correlation was found between Lugano stage, Ki-67 index, and PFS (*p*=0.019 and *p*= 0.023, respectively). Additionally, a negative correlation was found between neutrophil count and OS (*p*= 0.042). As the Lugano stage and Ki-67 index increased, the PFS decreased. Furthermore, as the neutrophil count at the time of diagnosis increased, the OS of the patients decreased.

Table 3. Correlation values of parameters

	Ann–A	Lugano	Neut	Throm	LDH	β2	OS	PFS	Exitus/Alive
Ki-67	0.524**	0.630**	0.346	0.410*	0.158	0.205	-0.222	-0.436*	0.070
Ann–A		0.851**	0.327	0.391*	-0.164	0.237	-0.166	-0.301	-0.123
Lugano			0.415*	0.462*	0.150	0.264	-0.270	-0.448*	0.053
Neut				0.393*	0.147	0.431*	-0.394*	-0.275	0.180
Throm					-0.091	0.253	-0.019	0.101	-0.286
LDH						-0.016	-0.297	-0.312	0.364
β2							0.037	0.059	-0.152
OS								0.629**	-0.323
PFS									-0.251

Pearson correlation * *p*<0.05; ** *p*<0.01

Ann–A: Ann–Arbor; Neut: neutrophil; Throm: platelet; β2: beta-2 microglobulin; PFS: progression-free survival; OS: overall survival; Ex: exitus; LDH: lactate dehydrogenase

Discussion

MALT lymphomas are low-grade tumors, DLBCL is a high-grade tumor, and gastric DLBCL lymphomas are more commonly observed. Of the 27 patients evaluated in the present study, 17 were diagnosed with DLBCL and 10 with MALT lymphoma. The most important differences between these two groups were that Ki-67 scores were higher in DLBCL group and that patients with DLBCL were diagnosed at a more advanced stage.

In the present study, approximately 70% of the patients were females, which is not consistent with the literature. Studies have shown that the male-to-female ratio varies between 1 and 3, but there is generally a predominance of males (1, 11, 12). This difference in our study may be explained by the small group size. The median age of our patient group was 55 years, which is consistent with the literature (11, 13). The findings obtained from staging at the time of diagnosis were also consistent with the literature. A study on patients diagnosed with gastric DLBCL found that Lugano stages I/II and IIE/IV were identified in 46% and 54% of patients, respectively (9). In another study examining patients diagnosed with gastric lymphoma, 90 patients were classified as having stages I–II according to the Ann–Arbor classification, while 50 patients were classified as having stages II–IV (1). In the present study, 15 patients were in stages I–II-IIE and 12 patients were in stage IV according to the Lugano classification, whereas 14 patients were in stages I–II and 13 patients were in stages III–IV according to the Ann–Arbor classification. These differences in our study and in the literature arise from the fact that Lugano staging is a PET-based staging system compared to the Ann–Arbor staging system and that the Ann–Arbor staging system cannot fully reflect the primary gastric lesion in MALT lymphomas (5, 14).

In terms of international prognostic indices, the median IPI score was 3 (0–4) for patients with DLBCL and the median MALT-IPI score was 1 (0–2) for patients with MALT lymphoma. In a study involving 219 patients diagnosed with gastric lymphoma, predominantly MALT lymphoma and DLBCL, although the majority (59.8%) had DLBCL, 83.1% had an IPI score of 0–2 and 16.9% had an IPI score of 3–5 (1). In our study, the difference in IPI scores among patients diagnosed with DLBCL compared to the literature was likely due to the majority of patients being in advanced stages.

In the literature, some negative risk factors have been identified for survival in primary gastric DLBCL. These include being over 65 years old; having an ECOG performance status of 2–3, B symptoms, “bulky” disease, and IPI scores of 3–4; and receiving three or more lines of treatment (15). In another study on gastric DBBHL, high β2-microglobulin levels, an IPI score of ≥3, and elevated LDH levels (above the upper limit) were identified as poor prognostic indicators (9). In terms of the overall population in our study, no association was found between β2-microglobulin, LDH, and platelet values; Ann–Arbor stage; and OS and PFS. Lugano stage and Ki-67 level were negatively correlated with PFS. Patients with high Ki-67 levels and Lugano stages had a lower PFS, while no correlation was found between these parameters and OS (Table 3). Another finding was the negative correlation between neutrophil count and OS in the overall patient population. OS decreased as the absolute neutrophil count increased. A study conducted on patients with gastric lymphoma investigated the relationship between certain hematological parameters and OS. It was observed that patients with an absolute neutrophil count above 5.1 × 10^9/L had a significantly lower OS rate than those with counts below this threshold (16). This may be due to the protumor properties of neutrophils. Neutrophils can increase tumor proliferation by secreting proangiogenic chemokines such as interleukin-17, transforming growth factor-β, and CXCL-5 in the tumor microenvironment. In the present study, the median neutrophil count for patients with the DLBCL subtype was 5.91 ×10^9/L, whereas it was 4.86 ×10^9/L for patients with the MALT lymphoma subtype. Despite this difference in neutrophil count, no significant difference was found in terms of OS between the two groups.

No significant difference was found in terms of OS and PFS between patients diagnosed with DLBCL and MALT lymphoma (Figure 2). There was a significant difference between the two groups in terms of Lugano and Ann–Arbor stages and Ki-67 scores (Figure 1). Patients with DLBCL were diagnosed at a more advanced stage than patients with MALT lymphoma, and the Ki-67 score of patients with DLBCL was found to be higher than that of patients with MALT lymphoma. In a study conducted on patients with gastric DLBCL, the median Ki-67 score was found to be 70% (9). In the present study, the anatomical location and disease genetics could explain why patients with DLBCL were diagnosed at a more advanced stage and had higher Ki-67 scores, despite having a similar survival profile to patients with MALT lymphoma. It has been emphasized in the literature that gastric DLBCL has better survival rates than nodal DLBCL. In one study, the 5-year OS was found to be 62% in gastric DLBCL and 52% in all other DLBCL populations (17). The c-myc rearrangement is commonly observed in aggressive gastric lymphomas. However, the c-myc rearrangement does not contribute negatively to prognosis in gastric DLBCLs compared to nodal DLBCLs (18). Although gastric DLBCL is classified as an aggressive lymphoma, the gastric type responds better to conventional chemotherapies, contributing significantly to survival.

The treatment of gastric NHLs varies according to subgroups. *H. pylori* infection has been associated with 80%–90% of patients with MALT lymphomas. In a large series of 474 patients, the rate of *H. pylori* occurrence was found to be 80% (19). In about 20% of patients, *H. pylori* cannot be detected, and in these cases, it is believed that genetic factors and other microorganisms such as *Campylobacter jejuni* may play a role in lymphoma pathogenesis (2). Eradication therapy for *H. pylori* involves the addition of two or three antibiotics to a proton pump inhibitor, as outlined in the guidelines of the American Gastroenterological Society (20). In the

present study, *H. pylori* was detected in seven (70%) patients with the MALT lymphoma subtype and all of them received eradication therapy. Furthermore, four patients out of seven with MALT lymphoma received systemic chemotherapy. In patients with MALT lymphoma, chemotherapy may be considered for those with localized disease unresponsive to eradication therapy or for patients who are at an advanced stage at the time of diagnosis (2). Systemic treatment is usually a combination of chemotherapy with rituximab, a CD20 monoclonal antibody (12). The response rates with rituximab, whether in monotherapy or combination therapy, reach up to 70% (21). In the present study, all patients diagnosed with DLBCL received systemic chemotherapy. The most commonly used regimen was R-CHOP (19/21). In a study involving 72 patients diagnosed with primary gastric DLBCL, 65 patients received systemic treatment. Of these 65 patients, 40 received rituximab and CHOP-like chemotherapy regimens (9). In another study involving 219 patients with primary gastric NHL, 60% of the patients were diagnosed with the DLBCL subtype and the most commonly used regimens were CHOP and R-CHOP. In this study, no significant difference was found in terms of OS in both chemotherapy arms (1). In other studies, it has been observed that the response rates of systemic therapy given to patients with primary gastric DLBCL in the early stages reached 90% (5, 8).

The present study showed that patients diagnosed with primary gastric NHL, whether MALT or DBBHL subtype, may have a long OS and PFS. *H. pylori* positivity and eradication at the time of diagnosis should not be overlooked, especially in MALT lymphomas, and the efficacy of CHOP-based regimens should be considered in DLBCL. It is also important to keep in mind that OS could be related to the neutrophil count at diagnosis.

Limitations: The limitations of this study include the small group size, lack of genetic results, and the absence of patients with lymphoma subtypes other than MALT and DLBCL.

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