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Research Article/Özgün Araştırma

Effect of tumor location and lymph node involvement on prognosis and survival in gastric cancer patients

Mide kanseri hastalarında tümör lokalizasyonu ve lenf nodu tutulumunun prognoz ve sağkalıma etkisi

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Abstract

Aim: The present study evaluates the effect of tumor localization and lymph node involvement on prognosis and survival in patients undergoing surgery for gastric cancer.

Materials and Methods: The clinical and histopathological characteristics of patients who underwent surgery in our clinic were evaluated to determine the prognostic factors.

Results: No difference was observed in the survival rates of the groups in terms of tumor locations and metastatic lymph nodes (Log Rank p=0.255 and 0.188). A significant difference was found in the survival rates of the groups based on stage and age over 60 years (p=0.001, p=0.003). The number of metastatic lymph nodes dissected was high in gastric cancers located in the upper-third of the stomach (p=0.026, 0.036).

Conclusion: No effect of tumor localization or lymph node involvement was determined on survival in patients with gastric cancer; however, age over 60 years and stage III were found to be poor prognostic factors.

Keywords: Gastric Cancer; Gastrectomy; Metastatic Lymph Nodes; Advanced Age, Prognosis.

Öz

Amaç: Mide kanseri nedeniyle ameliyat edilen hastalarda tümör yerleşimi ve lenf nodu tutulumunun prognoz ve sağkalım üzerine etkisini değerlendirmeyi amaçladık.

Gereç ve Yöntem: Prognostik faktörleri belirlemek için kliniğimizde ameliyat edilen hastaların klinik ve histopatolojik özelliklerini araştırdık.

Bulgular: Tümör lokalizasyon grupları arasında ve metastatik lenf noduna göre sağkalım farkı gözlenmedi (Log Rank p=0,255 ve 0,188). Evreye ve 60 yaş üstü olma durumuna göre anlamlı sürvi farkı vardı (p=0,001, p=0,003). Üst 1/3 yerleşimli gastrik kanserde diseke edilen metastatik lenf nodu sayısı fazlaydı (p=0,026, 0,036)

Sonuç: Mide kanseri hastalarında tümör lokalizasyonu ve lenf nodu tutulumunun sürviye etkisi saptanmamışken, 60 yaş üzeri olma ve Evre-III kötü prognostik faktörler olarak saptandı.

Anahtar Kelimeler: Mide Kanseri; Gastrektomi Metastatik Lenf Nodu; İleri yaş; Prognoz.

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Introduction

Gastric cancer is currently the fifth most common cancer worldwide and third among cancer-related deaths[1]. Gastric cancer is the fifth common cancer type in males and sixth in females, and third among cancer related deaths in our country. Unfortunately, 46% of gastric cancer patients are metastatic at the time of diagnosis[2]. Five-year survival in gastric cancer is approximately 27% (range; 9-94%) and higher survival rates are only seen in early-diagnosed patients[3-7]. Survival rate varies between countries and several prognostic factors are considered responsible for this variation. Consequently, different management approaches that may affect prognosis are brought forward. Among them, extended lymph node (LN) dissection or spleen-pancreas preserving D2 LN dissections which are adopted as a surgical approach that may have an impact on prognosis are performed as standart therapy[8-13]. In this study, we aimed to evaluate prognostic factors and impact of tumor localization and LN involvement on prognosis and survival rates in gastric cancer patients.

Materials and Methods

The prospectively recorded clinical data, pathology reports and operation notes related to 95 patients who underwent gastrectomy for gastric adenocarcinoma between January 2011 and July 2014 in the General Surgery Clinic of the Adana Numune Training and Research Hospital were evaluated retrospectively. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The Institutional Review Board of the Adana City Hospital approved the present study (2014/61). In order to evaluate the prognostic factors affecting survival in these surgical patients, gender, age, duration of follow-up, patient status (survivor or exitus), location and dimensions of the tumor, operation type, T, N, M stages according to the IUCC 2010 TNM Classification, stage, number of dissected and metastatic lymph nodes, positivity of the surgical margin, hemoglobin and albumin levels, platelet and leucocyte counts and status of adjuvant treatment were defined as prognostic parameters, and an analysis was made accordingly. The tumor locations were divided into four groups as upper-third gastric cancer (UTGC), middle-third GC (MTGC), lower-third GC (LTGC) and diffuse (≥two-thirds) GC (DGC), and their effect on early survival and other prognostic parameters was evaluated. Furthermore, the patients were also divided into four groups in accordance with their baseline N status, as N0, N1, N2 and N3, and prognostic factors and survival were evaluated.

A total gastrectomy was applied in tumors with proximal or diffuse locations, and a subtotal gastrectomy was applied in distally located tumors. The surgeries were evaluated from the operation reports written by the surgeon who carried out the operation.

After scrutinizing the operation notes, patients with a pathological diagnosis of adenocarcinoma with D2 dissection and who underwent a curative resection were included in the study. Patients with metastatic stage 4 cancer, gastric malignancies other than adenocarcinoma, and patients with a synchronous malignancy in addition to gastric cancer were excluded from the study. Furthermore, patients who receive neoadjuvant treatment, who had undergone a previous abdominal operation, who had a D1 dissection or other surgical procedure, and those with a fatal outcome in the postoperative 30 days were excluded from the study.

Statistical Analysis

The SPSS 15.0 for Windows software package was used for the statistical analysis. Descriptive statistics were presented as numbers and percentages for categorical variables, while quantitative variables were presented as mean, standard deviation, minimum, maximum and median values.

The independent numerical values in more than two groups was analyzed with a One Way ANOVA test, and a Kruskal Wallis Test in groups with normal distribution and non-

normal distribution, respectively. Subgroup analyses were made with a Mann-Whitney U test, and the results were interpreted using a Bonferroni correction.

Survival was analyzed with a Kaplan Meier Analysis. Risk factors were evaluated with a Cox Regression Analysis. The alpha level of statistical significance was accepted as $p<0.05$.

Results

A total of 95 patients had undergone a gastrectomy for gastric cancer, of which 17 who had undergone palliative operations due to metastasis or who had a fatal outcome in the first 30 days following the operation were excluded from the study. Consequently, 78 patients with a D2 dissection were included in the study. Among the patients, 54 (69.2%) were male and 24 (30.8%) were female. The mean age of the patients was 63.4±12.8 years.

The number of patients who were found to have LTGC, MTGC, UTGC and DGC was 39 (50%), 17 (21.8%), 19 (24.4%) and three (3.8%), respectively. The N status of the patients was N0, N1, N2 and N3 in 26, 16, 18 and 18, respectively according to the number of metastatic LNs. The majority of patients were stage III. The patients were evaluated in four groups, depending on their tumor localization (Table 1).

Statistically significant differences were noted in the gender ratio depending on the tumor localization (p=0.019). The ratio of females was lower in the LTGC and DGC localizations, and the ratio of males was lower in the MTGC and UTGC localizations. A statistically significant difference was found in the mean number of LNs dissected according to tumor localization (p=0.026). The number of LNs dissected was statistically significantly higher in the UTGC group than in the DGC group. Furthermore, the ratio of "two or more metastatic LNs" was significantly different between different localizations (p=0.036). The rate of two or more metastatic LNs was higher in the UTGC localization when compared to other localizations. That said, no statistically significant difference was noted in the overall survival rates of patients with LN involvement of "<2" and "2 or more" (Log Rank p=0.331).

The evaluation of metastatic LN was carried out in accordance with the N (metastatic LN count) in the TNM staging system. T stages were statistically significantly different between the N stages (p=0.041). The rate of T1 tumors was high among tumors with N0 and N1, and T3 tumors were high among those with tumors with N3 involvement. The stages were also statistically significantly different depending on the different N status ($p<0.001$). Stage I-II rates were high among tumors with N0 and N1, and stage III was high among tumors with N2-N3. Furthermore, the total number of lymph nodes dissected was high among patients with N-positive tumors (p=0.009). The mean number of lymph nodes dissected was statistically significantly lower in N0 tumors when compared to N3 tumors (p=0.001). The rates of adjuvant treatment were statistically significantly different, since the N stage was important in adjuvant treatment decisions (p=0.001). The administration of no treatment was high in tumors with N0 status, while CT and CRT rates were higher in the N2, and N1 and N3 tumors, respectively (Table 2).

The median survival of the patients was 20 months (95% CI 15.7–24.3). The 1-year, 2-year and 3-year survival rates of the patients was 66.6%, 44.9% and 27.8%, respectively (Table 3). Overall survival data is given in Figure 1.

No statistically significant difference was found in survival rates according to tumor localization among the patients (Log Rank p=0.255) (Table 4) (Figure 2-a). No statistically significant difference was found in the survival rates according to the metastatic LN groups (p=0.188). (Figure 2-b)

"Age <60 years" compared to "age 60 years and above", and "stage II" compared to "stage III" were identified as the most significant prognostic factors affecting mortality with the enter and backward method in a multivariate Cox Regression Analysis Model that was formed through the addition of tumor localizations to the model (Model;

Age.Status, N, Stage, Differantiation, Surgical.Margin, Hgb, Albumin) composed of variables with $p<0.250$ among univariate analysis ($p<0.001$ $p=0002$) (Table 5-7) (Figure 3).

Table 1. Patient characteristics according to Tumor Localization

			Tumor Localization				
		Total N=78	**LTGC** n=39 (50%)	**MTGC** n=17 (21.8%)	**UTGC** n=19 (24.4%)	**DGC** n=3 (3.8%)	*p*
Age Mean±SD		63.4±12.8	64.8±13.8	59.9±10.1	63.2±13,9	65.3±4.0	0,626
Age.Status n (%)	<60	27 (34.6)	13 (33.3)	8 (47.1)	6 (31.6)	0 (0.0)	0.467
	60 and over	51 (65.4)	26 (66.7)	9 (52.9)	13 (68.4)	3 (100)	
Gender n (%)	Female	24 (30.8)	7 (17.9)	7 (41.2)	10 (52.6)	0 (0.0)	0.019
	Male	54 (69.2)	32 (82.1)	10 (58.8)	9 (47.4)	3 (100)	
Follow-up Time Median (Min-Max)		15 (1-48)	15 (2-48)	16 (2-41)	12 (1-30)	15 (13-16)	
Survival n (%)	Alive	35 (44.9)	19 (48.7)	10 (58.8)	6 (31.6)	0 (0.0)	0.164
	Death	43 (55.1)	20 (51.3)	7 (41.2)	13 (68.4)	3 (100)	
Tumor Size Mean±SD		5.63±3.04	5.25±2.66	4.62±2.96	7,07±3,50	7,33±2,52	0,050
Operation Type-Subtotal Gastrectomy		37 (47.4)	35 (89.7)	2 (11.8)	0 (0.0)	0 (0.0)	<0.001
	Total Gastrectomy	41 (52.6)	4 (10.3)	15 (88.2)	19 (100)	3 (100)	
T - n (%)	T1(T1a and T1b)	10 (12.8)	5 (12.8)	5 (29.4)	0 (0.0)	0 (0.0)	0.095
	T2	9 (11.5)	5 (12.8)	1 (5.9)	3 (15.8)	0 (0.0)	
	T3	40 (51.3)	23 (59.0)	8 (47.1)	8 (42.1)	1 (33.3)	
	T4(T4a and T4b)	19 (24.4)	6 (15.4)	3 (17.6)	8 (42.1)	2 (66.7)	
N - n (%)	N0	26 (33.3)	16 (41.0)	8 (47.1)	2 (10.5)	0 (0.0)	0.097
	N1	16 (20.5)	6 (15.4)	4 (23.5)	4 (21.1)	2 (66.7)	
	N2	18 (23.1)	7 (17.9)	3 (17.6)	7 (36.8)	1 (33.3)	
	N3(N3a and N3b)	18 (23.1)	10 (25.6)	2 (11.8)	6 (31.6)	0 (0.0)	
M (%)	M0	78 (10)	39 (100)	17 (100)	19 (100)	3 (100)	
Stage n (%)	Stage-I	15 (19.2)	8 (20.5)	6 (35.3)	1 (5.3)	0 (0.0)	0.283
	Stage-II	25 (32.1)	12 (30.8)	6 (35.3)	6 (31.6)	1 (33.3)	
	Stage-III	38 (48.7)	19 (48.7)	5 (29.4)	12 (63.2)	2 (66.7)	
Lymph.Node Median (Min-Max)		18.5 (3-55)	17 (3-41)	20 (4-39)	22 (7-55)	6 (3-16)	0,026
Metastatic.Lymph.Node Median (Min-Max)		2 (0-24)	2 (2-3)	4 (0-24)	1 (0-15)	2 (0-22)	0,060
Metastatic Lymph Node Ratio n (%)	0	26 (33.3)	16 (41.0)	8 (47.1)	2 (10.5)	0 (0.0)	0.063
	1-25	26 (33.3)	9 (23.1)	7 (41.2)	9 (47.4)	1 (33.3)	
	26-50	10 (12.8)	6 (15.4)	0 (0.0)	3 (15.8)	1 (33.3)	
	over 50	16 (20.5)	8 (20.5)	2 (11.8)	5 (26.3)	1 (33.3)	
Number Metastatic Lylymph Node n (%)	<2 LN	33 (42.3)	19 (48.7)	9 (52.9)	3 (15.8)	2 (66.7)	0.036
	2 and over 2 LN	45 (57.7)	20 (51.3)	8 (47.1)	16 (84.2)	1 (33.3)	
Surgical Margin n (%)	Negative margine	71 (91.0)	35 (89.7)	17 (100)	17 (89.5)	2 (66.7)	0.218
	Positive margine	7 (9.0)	4 (10.3)	0 (0.0)	2 (10.5)	1 (33.3)	
Hgb Mean±SD		11.3±2.2	11.3±2.3	11.5±2.1	11,4±2,3	8,7±2,5	0,242
Wbc Median (Min-Max)		7 (4-16)	7 (4-16)	6 (4-13)	6 (5-10)	7 (6-10)	0,814
Plt Median (Min-Max)		262.5 (100-2320)	262 (135-538)	257 (100-2320)	273 (163-425)	373 (248-467)	0,547
Albumin Median (Min-Max)		3.7 (1.7-4.9)	3.7 (1.7-4.8)	3.8 (2.3-4.5)	3,7 (3-4,9)	2,7 (2,2-3,5)	0,134
Adjuvant Therapy n (%)	No adjuvant therapy	18 (23.1)	10 (25.6)	5 (29.4)	3 (15.8)	0 (0.0)	0.326
	CT	14 (17.9)	5 (12.8)	1 (5.9)	7 (36.8)	1 (33.3)	
	RT	1 (1.3)	1 (2.6)	0 (0.0)	0 (0.0)	0 (0.0)	
	CRT	45 (57.7)	23 (59.0)	11 (64.7)	9 (47.4)	2 (66.7)	

Table 2. Characteristics of patients according to metastatic Lymph Nodes (N Status).

		Metastatik Lenf Nodu				
		N0 n=26	**N1** n=16	**N2** n=18	**N3** n=18	*p*
Age Mean±SD		66.5 (40-88)	64.5 (45-87)	67.5 (35-85)	60.5 (38-75)	0.228
Age.Status n (%)	<60	8 (30.8)	6 (37.5)	5 (27.8)	8 (44.4)	0.713
	60 and over	18 (69.2)	10 (62.5)	13 (72.2)	10 (55.6)	
Gender n (%)	Female	7 (26.9)	3 (18.8)	8 (44.4)	6 (33.3)	0.407
	Male	19 (73.1)	13 (81.3)	10 (55.6)	12 (66.7)	
Follow-up Time Median (Min-Max)		18 (1-48)	15.5 (6-41)	11 (1-26)	16 (1-32)	0.094
Survival n (%)	Alive	15 (57.7)	5 (31.3)	7 (38.9)	8 (44.4)	0.363
	Death	11 (42.3)	11 (68.8)	11 (61.1)	10 (55.6)	
Tumor Size Mean±SD		4.25 (1-13)	5 (1-13)	5.9 (1-8)	5 (4-15)	0.182
T- n (%)	T1(T1a and T1b)	7 (26.9)	3 (18.8)	0 (0.0)	0 (0.0)	0.041
	T2	4 (15.4)	0 (0.0)	3 (16.7)	2 (11.1)	
	T3	12 (46.2)	8 (50.0)	8 (44.4)	12 (66.7)	
	T4(T4a and T4b)	3 (11.5)	5 (31.3)	7 (38.9)	4 (22.2)	
M (%)	M0	26 (100)	16 (100)	18 (100)	18 (100)	
Stage n (%)	Stage-I	12 (46.2)	3 (18.8)	0 (0.0)	0 (0.0)	<0.001
	Stage-II	13 (50.0)	8 (50.0)	3 (16.7)	1 (5.6)	
	Stage-III	1 (3.8)	5 (31.3)	15 (83.3)	17 (94.4)	
Lymph.Node Median (Min-Max)		16 (3-32)	19.5 (3-36)	19.5 (9-41)	22.5 (11-55)	0.009
Metastatic.Lymph.Node Median (Min-Max)		0 (0-0)	2 (1-2)	4.5 (3-12)	13 (7-24)	<0.001
Metastatic Lymph Node Ratio n (%)	0	26 (100)	0 (0.0)	0 (0.0)	0 (0.0)	<0.001
	1-25	0 (0.0)	14 ()87.5	10 (55.6)	2 (11.1)	
	26-50	0 (0.0)	1 (6.3)	6 (33.3)	3 (16.7)	
	over 50	0 (0.0)	1 (6.3)	2 (11.1)	13 (72.2)	
Number Metastatic Lylymph Node n (%)	<2 LN	26 (100)	7 (43.8)	0 (0.0)	0 (0.0)	<0.001
	2 and over 2 LN	0 (0.0)	9 (56.3)	18 (100)	18 (100)	
Surgical Margin n (%)	Negative margine	25 (96.2)	15 (93.8)	14 (77.8)	17 (94.4)	0.214
	Positive margine	1 (3.8)	1 (6.3)	4 (22.2)	1 (5.6)	
Hgb Mean±SD		11 (7-15)	10 (6-14)	11 (7-17)	12 (7-15)	0.183
Wbc Median (Min-Max)		6 (4-10)	8 (4-16)	6.5 (5-10)	6 (4-10)	0.135
Plt Median (Min-Max)		260 (101-2320)	319.5 (184-467)	274 (100-538)	244 (138-415)	0.062
Albumin Median (Min-Max)…		3.8 (2.3-4.5)	3.5 (2.7-4.3)	3.7 (2.2-4.9)	3.7 (1.7-4.8)	0.741
Adjuvant Therapy n (%)	No adjuvant therapy	10 (38.5)	0 (0.0)	7 (38.9)	1 (5.6)	0.001
	CT	2 (7.7)	3 (18.8)	6 (33.3)	3 (16.7)	
	RT	1 (3.8)	0 (0.0)	0 (0.0)	0 (0.0)	
	CRT	13 (50.0)	13 (81.3)	5 (27.8)	14 (77.8)	

Table 3. Survival status of patients.

Medians for Survival Time (95% CI)		20 (15,7-24,3)
Cumulative Proportion Surviving at the Time n (%)	6 months	82,1%
	1 year	66,6%
	2 years	44,9%
	3 years	27,8%

Discussion

Prognostic factors, survival and the treatment strategy associated with gastric adenocarcinoma vary between Western and Eastern countries in the world[14,15]; and so studies in this region are also important. The median survival and overall rate of survival of the patients in this study was 20 months and 27.8%, respectively, while tumor stage and age above 60 years were found to be prognostic factors affecting survival. Although no significant differences were identified in the survival rates of the groups in

terms of tumor localizations and metastatic LNs the number of LNs dissected was lower in the DGC group than in the UTGC group, and the rate of two or more metastatic LNs in the UTGC localization was higher when compared to other localizations.

One limitation of this study is the low number of patients and short median duration of follow-up; although its findings can still be considered important, since we reached some conclusions.

Survival has been found to be better in LTGC in some studies in literature[5,14], while others[3,15,16] that are compatible with this present study report that the site of involvement alone has no significant effect on survival. In addition, as expected, the number of LNs dissected and the number of metastatic LNs was high in patients with UTGC in the present study. This might be attributed to the fact that we dissected more LN stations and made larger dissections in patients with UTGC and who needed a total gastrectomy while performing a D2 dissection.

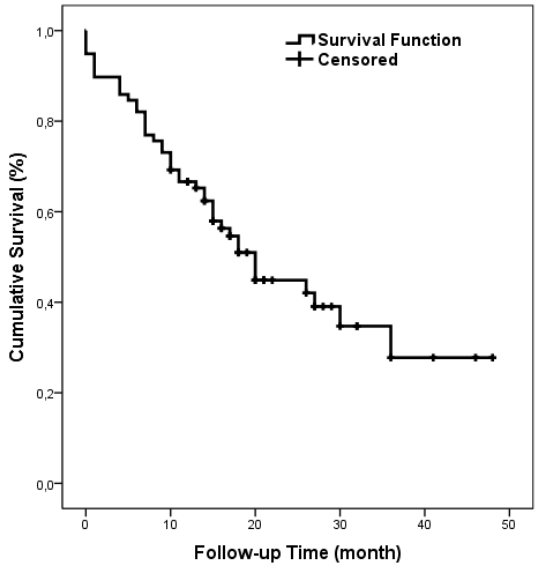


Figure 1. General Survival

Table 4. Survival of patients according to Tumor Location

		LTGC	MTGC	UTGC	DGC
Medians for Survival Time (95% CI)		27 (11,3-42,7)	-	20 (9,1-30,9)	15 (11,8-18,2)
Cumulative Proportion Surviving at the Time (%)	6 ay	87,2%	76,5%	84,2%	100%
	1 yıllık	64,1%	76,5%	57,4%	100%
	2 yıllık	50,4%	53,5%	38,3%	33,3%
	3 yıllık	43,2%	53,5%	-	-

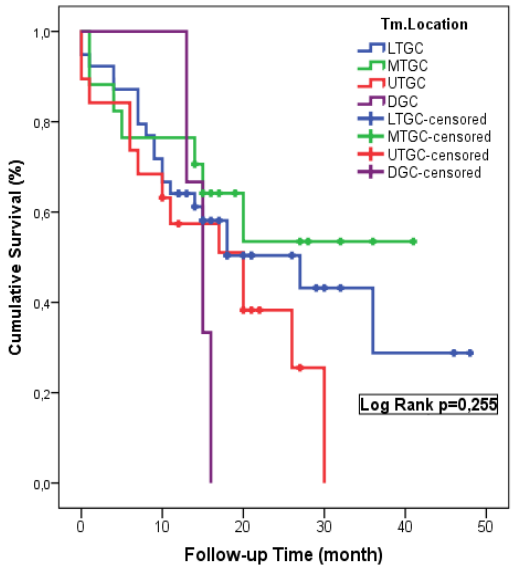
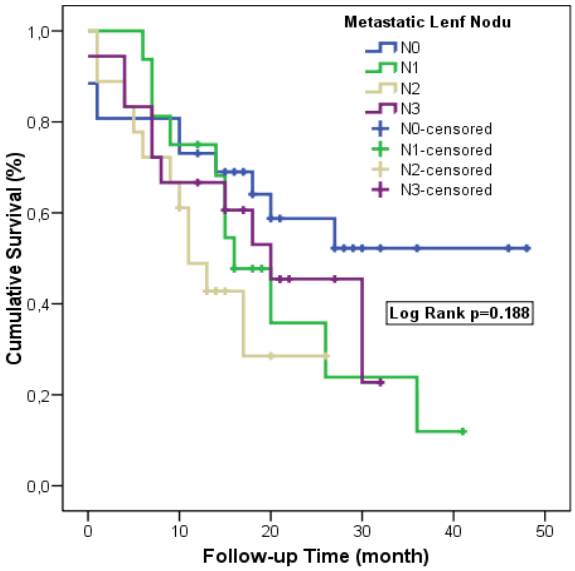


Figure 2. a) Survival according to tumor localization.



b) Survival according to metastatic Lymph Nodes.

Where do we stand according to the Western and Eastern countries in the world in terms of prognostic and certain histopathological properties in gastric cancer? Jung Ho Shim et al[15]. investigated the effects of tumor localization on prognosis in patients with gastric cancer in two different centers in Korea and the United States, and found that the rate of patients with UTGC was 8.8%, with mostly undifferentiated, diffuse type and advanced stage cancers when compared to the Korean patients with LTGC, MTGC and

UTGC. The rate of UTGC and LTGC was 25.7% and 40.9%, respectively, in the United States, and T stage was more significantly distributed according to tumor localization. Furthermore, the independent predictors affecting survival were found to be T stage, tumor size, retrieved and positive lymph node counts, and age in the Korean center, and only T stage and a positive lymph node count in the US center. In short, significant differences were noted between the tumor characteristics of tumors in different localizations between these two countries. When the patients in the region covered by the present study were evaluated in terms of tumor localization and characteristics, half had LTGC and 24.4% had UTGC, and the distribution of localization was similar to those reported for US patients. The ratio of T3-T4 tumors was 75.7%, and 48.7% were stage-III and had poorer histological findings in a comparison in both two groups of patients. Furthermore, the number of Stage-IV patients who underwent palliative operations due to metastasis and were excluded from the study was not low. An additional finding in the present study when compared to the above-mentioned study was that age over 60 years was a poor prognostic factor.

Table 5. Survival effect according to multivariate Cox Regression Analysis.

		p	HR (95% CI)
Enter Method			
Age.Status (Ref: 60 and over)			
	<60	0,001	0,188 (0,071-0,499)
Tumor Location			
	LTGC	0,384	2,202 (0,373-13,009)
	MTGC	0,656	1,435 (0,292-7,052)
	UTGC	0,855	1,143 (0,272-4,802)
	DGC	.	
OperationType	(Ref:Subtotal Gastrectomy)		
	Total Gastrectomy	0,278	1,966 (0,579-6,676)
N	(Ref:N3)	0,678	
	N0	0,855	1,145 ()0,270-4,858
	N1	0,285	1,824 (0,606-5,489)
	N2	0,719	1,206 (0,435-3,349)
Stage (Ref:Stage-III)		0,018	
	Stage-I	0,985	1,015 (0,213-4,844)
	Stage-II	0,043	0,274 (0,078-0,962)
Differantiation	(Ref:Poorly differentiated)	0,445	
	Moderately differentiated	0,244	2,771 (0,500-15,368)
	Well differentiated	0,205	3,047 (0,544-17,055)
Surgical.Margin (Ref:positive margine)			
	negative margine	0,206	0,484 (0,157-1,491)
Hgb		0,514	0,947 (0,806-1,114)
Albumin		0,581	1,197 (0,632-2,266)
Backward Method			
Age.Status (Ref:<60)			
	60 and over	<0,001	0,226 (0,099-0,513)
Stage (Ref:Stage-III)		0,008	
	Stage-I	0,411	0,708 (0,311-1,613)
	Stage-II	0,002	0,293 (0,135-0,637)

LN dissection remains a controversial issue. While the discussions of this subject are continuing worldwide, some studies in Western countries have reported that D2 dissection without a pancreato-splenectomy could be performed with an acceptable level of mortality and morbidity, although the number of dissected lymph nodes is considered more important[17,18]. In parallel to this, the addition of paraaortic LN dissection

to D2 was found to have no effect on survival in a prospective randomized Japanese study[19]. Finally, the development of a universal TNM system and the dissection of at least 15 LNs is a widely accepted approach.

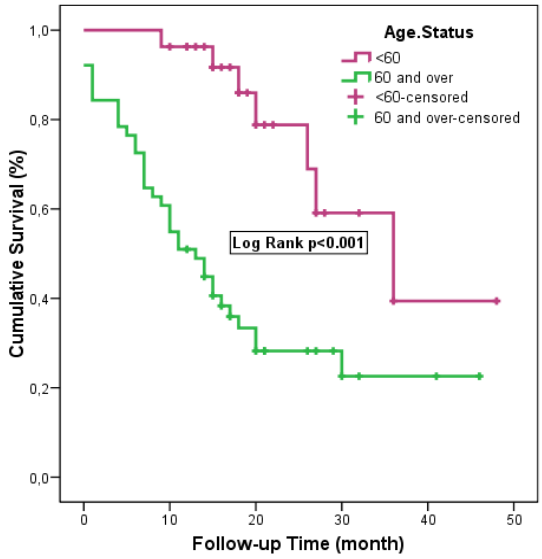
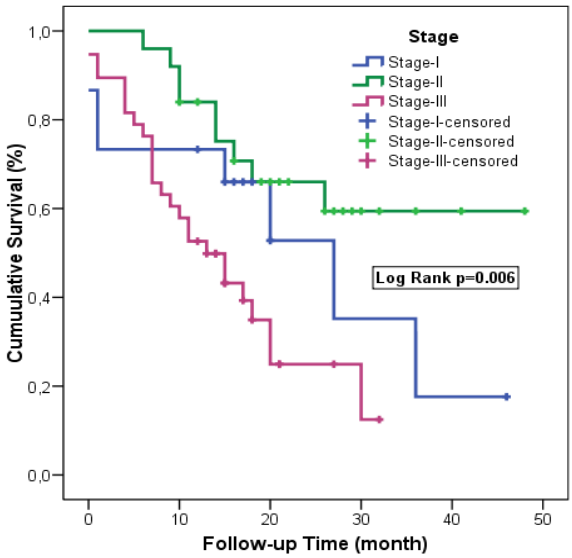


Figure 3: a) Bad survival over 60



b) Survival by stage

Tablo 6. Survival by age 60

		Age Status	
		<60	60 and over
Medians for Survival Time (95% CI)		36 (19,3-52,7)	13 (8,7-17,3)
Cumulative Proportion Surviving at the Time (%)	6 ay	100%	72,5%
	1 yıllık	96,3%	51,0%
	2 yıllık	78,8%	28,2%
	3 yıllık	39,4%	22,6%

Tablo 7. a) Survival by stage

		Stage I	Stage II	Stage III
Medians for Survival Time (95% CI)		27 (13,5-40,5)	-	13 (7,6-18,4)
Cumulative Proportion Surviving at the Time (%)	6 ay	73,3%	96,0%	76,3%
	1 yıllık	73,3%	84,0%	52,6%
	2 yıllık	52,8%	66,0%	24,9%
	3 yıllık	17,6%	59,4%	12,5%

Tablo 7. b) Subgroup analysis:

Stage	**Stage-I**	**Stage-II**
	Log Rank p	Log Rank p
Stage-II	0,200	
Stage-III	0,147	0,002

Japanese guidelines also recommends performing N stage according to the number of LNs, concurring with the International Union Against Cancer (UICC)/TNM staging system[20]. The Japanese D1-D2 LN dissection has also changed, with, for example, LN station 7 being included in the extent of D1 dissections[21]. In conclusion, D2 LN dissection is preferred in our clinic for patients who undergo curative resections, although a mean 19 LNs were dissected in those patients. Adjuvant treatment administered at our clinic is based on the International Union Against Cancer (UICC)/TNM staging system. However, when the stages of the patients in this present series is considered, it is apparent that neoadjuvant therapy is not yet standardized in our clinic. Accordingly, the

number of patients who received neoadjuvant therapy and were thus excluded from the study was low.

Should D2 LN dissection be performed in all patients? Can prognostic factors offer predictions in this subject? What important achievement can be provided by knowing the prognostic factors and their effect on survival? Ozer I et al.[22], in a study at a high-volume hospital specializing in gastric cancer surgery , evaluated the causes of postoperative early phase mortality in patients over 70 years with gastric cancer, and identified age, albumin levels lower than 3 mg/dl, higher American Society of Anesthesiologists Advanced scores, palliative resections and resections of two or more additional organs as independent risk factors for mortality. They concluded that a more limited surgery can be performed considering not only advanced age, but all risk factors. In addition, Zhou C-J et al.[23], in their manuscript evaluating the applicability of radical gastrectomy in elderly patients, identified high comorbidity and TNM stage III as strong predictive factors. The authors emphasized the importance of making surgical decisions taking into account the postoperative complications and low survival associated with this group of patients. Age over 60 years and stage III tumors were found to be poor prognostic factors in the present study. That said, larger and more extensive, randomized and controlled studies are required to clarify the effect of these findings on patient management.

Preoperative serum albumin level is a significant prognostic factor in gastric cancers, especially in intensive care patients, and also in APACHE scoring and in the determination of treatment. In their study involving patients from Mexico, which emphasized such findings, Onate-Ocana, LF et al.[24] found the prognostic value of serum albumin. Albumin is a parameter that is used to determine the nutritional condition of the patient, with low albumin levels being associated with severe nutritional risk. The provision of nutritional support prior to major surgery in patients at significant perioperative nutritional risk, and even delaying surgery, has been reported to be indicated[25-27]. Nutritional risk is especially high in esophagus, stomach and pancreas malignancies, and nutrition, and even immunonutrition, is recommended especially in such cases[28]. The mean albumin level was found to be 2.7 in DGC and 3.7 in the remaining three groups in the present study of patients who were mostly at an advanced stage, although the difference was found not to be statistically significant. That said, statistics indicate that this may be due to the low number of patients with DGC. Related to this issue, preoperative and postoperative nutritional support is generally provided to patients with gastric cancer in our hospital.

The median survival time and the three-year overall survival in patients with gastric cancer was found to be 20 months and 27.8%, respectively in this center, which is a reference center for most of the southern cities in the country. This result is underwhelming. Nevertheless, variable survival rates have been reported related to gastric cancer worldwide. Median survival was reported to be 32.8 months and 18.5 months in stage IIIB and stage IIIC, respectively in a review of 45,411 patients treated at 59 centers in 15 countries, including Japan, Korea and some eastern and western countries, within the International Gastric Cancer Association Staging Project. Survival was found to be 64.4%, 48.2% and 27.7% in patients with stage IIIA, stage B and stage C tumors, respectively[29].

In conclusion, stage III tumor and age over 60 years were found to be poor prognostic factors affecting survival. Although no significant difference was found in the survival of those with different tumor localizations and metastatic LNs, the number of dissected LNs was found to be lower in the DGC group than in the UTGC group, and the rate of two or more metastatic LNs was found to be higher in the UTGC localization when compared to other localizations. Median survival and overall survival were found to be 20 months and 27.8%, respectively, in this center for patients with gastric cancer.

Ethics Committee Approval

Ethics committee approval was received for this study from the hospital (2014/61).

Informed Consent

Requirement for informed consent was waived by the hospital ethics committee.

Author Contributions

Conception–C.G., O.I.; Design–C.G., E.R.; Supervision–O.I:, H.B.; Materials–C.G., O.I., E.R.; Data Collection and/or Processing–C.G., M:G.; Analysis and/or Interpretation–C.G., E.R.; Literature review–C.G., H.B., M.G.; Writer–C.G., E.R.; Critical Review–C.G., O.I., M.G.

Conflict of Interest

No conflict of interest was declared by the authors.

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