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Necessity of D2 lymph node dissection in older patients ≥80 years with gastric cancer

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ABSTRACT

Objectives: This study analyzed the effect of D2 lymph node (LN) dissection on complications and survival in older patients with gastric cancer.
Materials and Methods: A total of 103 octogenarian patients who underwent curative gastrectomy for gastric cancer were divided into two groups (D2 and D1) according to the extent of LN dissection and analyzed retrospectively for complications and survival.
Results: No differences were observed in short-term postoperative outcomes, including complication rates, between the two groups. In a survival analysis, D2 LN dissection did not improve overall survival (OS) in any patient, including advanced cases. A Cox regression analysis revealed that the independent risk factors for OS were history of coronary artery disease (hazard ratio [HR], 11.095), postoperative short-term complications (HR, 9.939), and TNM stage (HR, 6.299). The extent of LN dissection was not an independent risk factor for OS, and D2 or more LN dissection (odds ratio, 10.89) increased the risk independently.
Conclusions: D2 or more LN dissection did not improve survival, but rather increased the risk of complications. Thus, LN dissection should be performed sparingly in octogenarian patients with gastric cancer.

1. Introduction

The life expectancy of humans has continued to increase, reaching 81 years in Korea in 2015 [1]. As the number of older patients is increasing, interest in geriatric medicine is rising [2–4]. However, older patients are usually excluded from clinical trials due to their frailty [5]. Therefore, whether standard treatments can be applied to older patients is controversial.

Although the survival rate of patients with gastric cancer has improved with the development of therapeutic methods and chemotherapeutic agents, there is a gap of survival improvement in younger and older patients [6,7]. Such a phenomenon could occur due to the frailty of older patients, which tends to reduce treatment. In fact, frailty, rather than standard prognostic factors such as curability, might be required to choose the treatment modality for older patients. D2 lymph node (LN) dissection is performed as a standard procedure for advanced gastric cancer (AGC) [8]. However, D1 or D1 + LN dissection is usually performed instead of D2 LN dissection in older patients with AGC because of the risk of complications [9].

The present study analyzed the effect of D2 LN dissection on complications and the survival of older patients and assessed the relevance of D2 LN dissection in older patients with gastric cancer.

2. Materials and Methods

2.1. Patients and Data Collection

Patients who underwent curative radical gastrectomy for gastric cancer from 2006 to 2016 at Seoul St. Mary's Hospital and who were ≥80 years of age at the time of surgery were enrolled in the present study. Patients with stage IV gastric cancer and who had a synchronous malignancy were excluded. All operations were performed by three gastric cancer specialized surgeons. The 103 enrolled patients comprised 62 who underwent D1 or D1 + LN dissection (D1 group) and 41 who underwent D2 or more LN dissection (D2 group). Demographics, clinical and pathological characteristics, operative details, short-term postoperative outcomes, and long-term survival data, which were collected retrospectively from the hospital registry of patients with gastric cancer, were compared between the two groups.

Preoperative clinical characteristics were classified according to the Eastern Cooperative Oncology Group (ECOG). Surgical procedures were performed according to the Japanese Gastric Cancer Treatment Guidelines [8]. Pathological stage was classified according to the Seventh American Joint Cancer Committee T(tumor)N(lymph nodes)M(metastasis) classification system [10]. All cancers were

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categorized histologically as differentiated or undifferentiated. Poorly differentiated tubular adenocarcinoma, signet ring cell adenocarcinoma, and mucinous adenocarcinoma were considered undifferentiated.

This study was approved by the Institutional Review Board of the Ethics Committee of the College of Medicine, Catholic University of Korea (KC17RESI0280). Patient records were anonymized and de-identified prior to analysis.

Table 1
Clinicopathological characteristics.

Variable	D1 group (n = 62)	D2 group (n = 41)	*P*-value
Age, mean ± SD (years)	82.8 ± 2.8	82.8 ± 2.7	0.920
Sex, n (%)			0.224
Male	39 (62.9)	20 (48.8)	
Female	23 (37.1)	21 (51.2)	
ECOG, n (%)			0.429
0	4 (6.5)	2 (4.9)	
1	27 (43.5)	12 (29.3)	
2	29 (46.8)	26 (63.4)	
3	2 (3.2)	1 (2.4)	
BMI, mean ± SD (kg/m^2)	23.2 ± 3.6	22.7 ± 3.0	0.548
Comorbidity, n (%)	53 (85.5)	33 (80.5)	0.691
HTN or atrial fibrillation	31 (50.0)	25 (61.0)	0.372
CAD	12 (19.4)	3 (7.3)	0.159
DM	13 (21.0)	8 (19.5)	1.000
Pulmonary disease	7 (11.3)	5 (12.2)	1.000
Renal disease	5 (8.1)	3 (7.3)	1.000
Hepatic disease	1 (1.6)	0 (0.0)	1.000
Others	17 (27.4)	15 (36.6)	0.443
History of abdominal surgery, n (%)	17 (27.4)	15 (36.6)	0.443
Smoking, n (%)			0.434
Non-smoker	38 (61.3)	30 (73.2)	
Ex-smoker	16 (25.8)	8 (19.5)	
Smoker	8 (12.9)	3 (7.3)	
Alcohol, n (%)			0.660
Non-drinker	51 (82.3)	31 (75.6)	
Social drinker	8 (12.9)	8 (19.5)	
Heavy alcoholic	3 (4.8)	2 (4.9)	
Tumor size, mean ± SD (cm)	4.7 ± 3.2	5.6 ± 3.1	0.174
Location, n (%)			0.668
Upper 1/3	8 (12.9)	4 (9.8)	
Middle 1/3	20 (32.3)	11 (26.8)	
Lower 1/3	33 (53.2)	26 (63.4)	
Whole stomach	1 (1.6)	0 (0.0)	
Location, n (%)			0.432
LC	29 (46.8)	21 (51.2)	
GC	5 (8.1)	3 (7.3)	
AW	13 (21.0)	9 (22.0)	
PW	13 (21.0)	4 (9.8)	
Circular	2 (3.2)	4 (9.8)	
Differentiation, n (%)			0.842
Differentiated	32 (51.6)	20 (48.8)	
Undifferentiated	30 (48.4)	21 (51.2)	
Number of retrieved LNs, mean ± SD	35.1 ± 13.1	43.8 ± 15.9	0.003
Depth of invasion, n (%)			0.004
T1	34 (54.8)	13 (31.7)	
T2	16 (25.8)	8 (19.5)	
T3	8 (12.9)	7 (17.1)	
T4	4 (6.5)	13 (31.7)	
Lymph node metastasis, n (%)			0.092
N0	40 (64.5)	19 (46.3)	
N1	12 (19.4)	7 (17.1)	
N2	5 (8.1)	5 (12.2)	
N3	5 (8.1)	10 (24.4)	
Pathological stage(7th AJCC), n (%)			0.026
I	42 (67.7)	17 (41.5)	
II	10 (16.1)	10 (24.4)	
III	10 (16.1)	14 (34.1)	

SD, standard deviation; ECOG, Easter Cooperative Oncology Group; BMI, body mass index; HTN, hypertension; CAD, coronary artery disease; DM, diabetes mellitus; LC, lesser curvature; GC, greater curvature; AW, anterior wall; PW, posterior wall; LN, lymph node; AJCC, American Joint Cancer Committee.

Table 2
Operative details and short-term post-operative outcomes.

Variable	D1 group (n = 62)	D2 group (n = 41)	*P*-value
Approach, n (%)			0.226
Open	29 (46.8)	25 (61.0)	
Laparoscopy	33 (53.2)	16 (39.0)	
Resection, n (%)			0.457
TG	14 (22.6)	6 (14.6)	
DG	48 (77.4)	35 (85.4)	
Combined resection, n (%)	1 (1.6)	5 (12.2)	0.070
Reconstruction, n (%)			0.444
B-I	4 (6.5)	2 (4.9)	
B-II	43 (69.4)	33 (80.5)	
R-Y	15 (24.2)	6 (14.6)	
OP time, mean ± SD (min)	180.5 ± 52.4	179.7 ± 48.6	0.944
EBL, mean ± SD (ml)	130.8 ± 135.7	138.7 ± 115.5	0.761
Duration to flatus, mean ± SD (days)	3.5 ± 0.8	3.6 ± 1.13	0.511
Duration to soft diet, mean ± SD (days)	6.9 ± 6.3	7.0 ± 4.0	0.902
Complications (CDC), n (%)			0.174
0	42 (67.7)	25 (61.0)	
1	2 (3.2)	3 (7.3)	
2	15 (24.2)	6 (14.6)	
3	3 (4.8)	6 (14.6)	
CDC ≥ 3, n (%)	3 (4.8)	7 (17.1)	0.087
Duration to discharge, mean ± SD (days)	11.8 ± 13.2	11.8 ± 7.4	0.984
Mortality, n (%)	0 (0.0)	1 (2.4)	0.834

TG, total gastrectomy; DG, distal gastrectomy; B-I, Billroth-I; B-II, Billroth-II; R-Y, Roux en Y; OP, operation; SD, standard deviation; EBL, estimated blood loss; CDC, Clavien-Dindo classification.

2.2. Statistical Analysis

The chi-square or Fisher's exact test was used to compare categorical variables between the groups. A student's *t*-test was used to compare continuous variables. A Kaplan-Meier survival curve was used to analyze survival rates. A Cox regression analysis was used to analyze proportional hazards, and a logistic regression analysis was used to conduct univariate and multivariate analyses. All statistical analyses were performed with R ver. 3.2.3 software (R Foundation for Statistical Computing, Vienna, Austria); *P*-values <0.05 were considered significant.

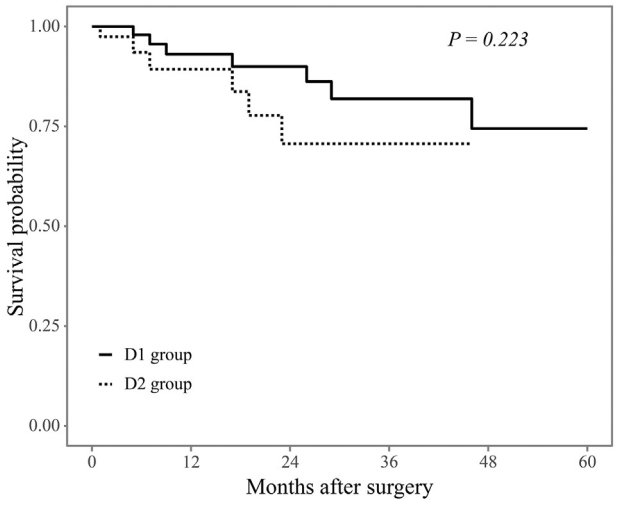

Fig. 1. Overall survival (OS) rate according to the extent of lymph node (LN) dissection in all patients.

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