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의학석사 학위논문

Should adenocarcinoma of the
esophagogastric junction should be
classified as esophageal cancer?

– Comparative analysis according to the
seventh AJCC TNM classification –

식도위 경계부 선암은 식도암으로
분류되어야 하는가?

– 제 7 판 AJCC TNM 병기분류법에 따른 비교 –

2012년 08월

서울대학교 대학원

의학과 외과학 전공

서 윤 석

A thesis of the Master's degree

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The Department of Surgery,
Seoul National University
College of Medicine
Yun-Suhk Suh

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by

Yun–Suhk Suh

A thesis submitted to the Department of Surgery in partial
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Approved by Thesis Committee:

Professor _____ Chairman

Professor _____ Vice chairman

Professor _____

ABSTRACT

Introduction: The seventh AJCC TNM classification proposed the new classification for AEJ as a part of esophageal cancer depending on the esophagogastric junction (EGJ) involvement. However there are still many controversies over the classification system for AEJ. The aim of this study was to evaluate the adequacy of esophageal classification for adenocarcinoma of the esophagogastric junction (AEJ) of the seventh AJCC TNM classification.

Methods: A review of pathologic reports and photographic findings at Seoul National University Hospital from 2003 to 2009 identified 4,524 patients with single, primary adenocarcinoma of the EGJ (n=497) and other regions of the stomach (GC, n=4,027) who underwent an operation with curative intent. We analyzed the clinicopathologic features and postoperative prognosis of AEJ using the Siewert classification and the seventh AJCC TNM classification.

Results: There was no Siewert type I (AEJ I) in this study. The prognosis of AEJ was similar to that of GC. There was no difference in clinicopathologic features between AEJ II and AEJ III. Even though AEJ extending into the EGJ (AEJe) showed more advanced pathologic features than AEJ not extending into the EGJ (AEJg), the prognosis of AEJe and AEJg was not

significantly different when stratified by T stage. Compared with the classification of gastric cancer applied for AEJ, esophageal classification for AEJ from the seventh AJCC TNM classification showed a loss of distinctiveness at each TNM stage.

Conclusions: To evaluate the postoperative prognosis of AEJ within the stomach, AEJ II and AEJ III should be considered as a part of gastric cancer irrespective of EGJ involvement.

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LIST OF ABBREVIATIONS

AEJ: adenocarcinoma of the esophagogastric junction

UT: the remaining upper one-third gastric adenocarcinoma except for AEJ

GC: gastric adenocarcinoma except for AEJ

AEJ II : adenocarcinoma of the esophagogastric junction with an epicenter located within 1 cm oral and 2 cm aboral from the esophagogastric junction

AEJ III: adenocarcinoma of the esophagogastric junction with an epicenter located below 2–5 cm from the esophagogastric junction

AEJe: adenocarcinoma of the esophagogastric junction whose epicenter in the esophagogastric junction or within 5 cm of the stomach that extend into the esophagogastric junction or distal esophagus

AEJg: adenocarcinoma of the esophagogastric junction with epicenter within 5 cm of the esophagogastric junction but not extending into the esophagogastric junction.

eTNM: classification for adenocarcinoma of esophagogastric junction

gTNM: classification for gastric adenocarcinoma

INTRODUCTION

The incidence of adenocarcinoma of the esophagogastric junction (AEJ) has increased in Western countries.(1, 2) AEJ has been known to show different clinicopathologic characteristics from adenocarcinoma in other regions of the stomach, such as poorer prognosis and higher incidence of lymph node metastasis/hematogenous metastasis.(3–5) On the other hand, in the East, AEJ has often been considered as a part of adenocarcinoma of the upper one-third of the stomach and a very rare type, even though some authors have reported an increasing trend similar to Western countries.(6–8) In addition, characteristics of AEJ have been reported to be significantly different between the East and the West.(9–10)

There has been limited consensus about the classification of AEJ and the definition of the cardia. Siewert et al.(11, 12) proposed the classification of AEJ as 3 types: type I (distal esophageal adenocarcinoma), type II (true carcinoma of the cardia) and type III (subcardial gastric carcinoma). This classification was approved at the second International Gastric Cancer Congress (IGCA) in 1997 and International Society of the Disease of the Esophagus (ISDE) in 1995. There have also been many controversies regarding an adequate staging system for AEJ.(9, 13–15) Some authors applied different staging systems to AEJ and adenocarcinoma of the distal esophagus,(9,

13) whereas others proposed an integrated staging system for both AEJ and adenocarcinoma of the distal esophagus.(14, 15) Recently, a new seventh American Joint Committee on Cancer (AJCC) TNM classification was proposed for AEJ in the esophageal category.(16, 17) From this new esophageal classification for AEJ, cancers whose epicenter is in the esophagogastric junction (EGJ) or within 5 cm of the stomach that extend into the EGJ or esophagus are considered as esophageal cancer, and all other cancers with epicenter in the stomach which is greater than 5 cm distal to the EGJ or within 5 cm of the EGJ but not extending into the EGJ are considered as gastric cancer.(16)

To examine the validity of this new classification, we investigated the clinicopathologic characteristics of AEJ and analyzed the postoperative prognosis of AEJ according to the Siewert classification and the seventh AJCC TNM classification. Author contribution was as follows: overall study conception and design by Yun-Suhk Suh, Seong-Ho Kong, and Han-Kwang Yang, data acquisition and analysis by Yun-Suhk Suh, Dong-Seok Han, Young-Tae Kim, Woo-Ho Kim, Kuhn Uk Lee and Han-Kwang Yang, data interpretation by Yun-Suhk Suh, Seong-Ho Kong and Hyuk-Joon Lee, drafting of manuscript by Yun-Suhk Suh, critical revision by Yun-Suhk Suh, Seong-Ho Kong and Han-Kwang Yang, supervision by Seong-Ho Kong and Han-Kwang Yang. This research was supported by Seoul

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MATERIALS AND METHODS

A review of the medical records at Seoul National University Hospital from 2003 to 2009 identified 4,524 patients with single primary adenocarcinoma of the stomach and EGJ who underwent an operation with a curative intent. Patients who had multiple primary malignancy, recurrent adenocarcinoma or remnant gastric cancer, were excluded from the review. Patients who could not receive R0 resection or showed distant metastasis or whose entire stomach was involved by adenocarcinoma were also excluded.

Based on the specimen photographic findings and pathologic reports, AEJ (n=497), which was defined as the tumors with their center within 5 cm proximal and distal of the EGJ, was classified into 3 types using a similar manner as the Siewert classification(11): AEJ I (tumors with an epicenter located more than 1 cm above the EGJ), AEJ II (tumors with an epicenter located within 1 cm oral and 2 cm aboral from the EGJ) and AEJ III (tumors with an epicenter located below 2 cm from the EGJ). Considering the seventh AJCC TNM classification,(16) AEJe indicates tumors whose epicenter in the EGJ or within 5 cm of the stomach that extend into the EGJ or distal esophagus, and AEJg, tumors with epicenter within 5 cm of the EGJ but not extending into the EGJ. The remaining upper one-third gastric adenocarcinoma except for AEJ was

defined as upper gastric tumor (UT, n=109). Gastric adenocarcinoma except for AEJ was defined as remaining gastric cancer (GC, n=4,027).

Among AEJ and GC, we analyzed and compared clinicopathologic features, including age, the male to female ratio, the WHO classification, the Lauren classification, tumor size and the number of metastatic and retrieved lymph node. For the analysis of the WHO classification, papillary, well differentiated and moderately differentiated types were classified as a differentiated group, and poorly differentiated, mucinous, signet-ring cell types were classified as an undifferentiated group, based on the Japanese classification of gastric cancer.(18)

Prospectively collected data about lymph node metastasis to each nodal station according to the Japanese classification of gastric cancer were available for 227 of the 497 cases of AEJ, and 47 of the 109 cases of UT.(18) The probability of lymph node metastasis to each lymph node station were compared between AEJ vs. UT, AEJ II vs. III and AEJe vs. AEJg.

To examine the validity of the seventh AJCC TNM classification which emphasizes the EGJ involvement of AEJ and discriminates AEJ from gastric cancer, the differences in postoperative prognosis between AEJe and AEJg as well as between AEJ and GC were analyzed. To assess the adequacy of esophageal classification for AEJ (eTNM), the gastric cancer

classification system (gTNM) from the seventh AJCC TNM classification and eTNM were applied to AEJ and compared.

The Kaplan–Meier method was used to estimate the 5–year survival rate, and postoperative prognosis was compared using the log rank test. The mean follow–up period was $1,236 \pm 735$ days. The Student’s *t* test and the chi–square test were used for comparative statistical analysis. All tests were 2–sided and performed at the 5% level of significance using SPSS version 17.0 (SPSS Inc, Chicago, IL, USA).

The study protocol was approved by the Institutional Review Board of Seoul National University Hospital.(H–1005–031–318)

RESULTS

AEJ vs. GC

There was no significant difference between AEJ and GC except that AEJ showed a larger tumor size, a larger number of retrieved lymph nodes, a higher proportion of advanced T and N stages (Table 1). Considering a larger number of retrieved lymph nodes in AEJ than in GC may result from the higher probability of total gastrectomy for AEJ, AEJ was detected at a more advanced T and N stage than GC. Compared with UT, the lymph node metastasis of AEJ tended to be confined to station 1, 2 and 3 (peritumoral and lesser curvature side), and AEJ showed rare lymph node metastasis ($\leq 2.1\%$ of probability) to station 4Sa, 4Sb, 4d, and 10 (greater curvature side) (Fig 1). On the other hand, the probability of lymph node metastasis around celiac axis was not so low as that could be ignored to be dissected, even though that probability of AEJ was lower than that of UT. Considering the circumferential location of the primary tumor, AEJ was likely to be detected more frequently at the lesser curvature side than GC (Table 1). The 5-year survival rates of GC and AEJ were 83.3% and 79.5% respectively, which revealed there was no significant difference (Fig. 1).

Table 1. Clinicopathologic characteristics of AEJ and GC

		AEJ (n=497)	GC (n=4027)	P value
Sex (M:F ratio)		2.2:1	2.1:1	0.611
Age (yr)		58.1±11.3	58.6±11.7	0.332
WHO	Differentiated	252 (50.7%)	2073 (51.5%)	0.922 ^a
	Undifferentiated	223 (44.9%)	1811 (45.0%)	
	Unknown	22 (4.4%)	143 (3.5%)	
Lauren	Intestinal	245 (49.3%)	2143 (53.2%)	0.831 ^b
	Diffuse	165 (33.2%)	1405 (34.9%)	
	Mixed or gastric	87 (17.5%)	479 (11.9%)	
Tumor size (cm)		4.2±2.4	3.9±2.6	0.027
No. of metastatic LN		2.4±4.5	2.3±5.5	0.736
No. of retrieved LN		37.3±46.8	32.9±14.3	0.037
T stage ^c	T1	190 (38.3%)	307 (57.3%)	<0.001
	T2-T4	306 (61.7%)	1720 (42.7%)	
N stage	N0	293 (59.0%)	2686 (66.7%)	<0.001
	N1-N3	204 (41.0%)	1341 (33.3%)	
Circumferential distribution	Lesser Curvature	254 (51.1%)	1689 (41.9%)	< 0.001 ^d
	Greater Curvature	19 (3.8%)	637 (15.8%)	
	Anterior wall	65 (13.1%)	752 (18.7%)	
	Posterior wall	152 (30.6%)	799 (19.8%)	
	Circular	7 (1.4%)	150 (3.7%)	

AEJ indicates adenocarcinoma of the esophagogastric junction; GC, gastric adenocarcinoma except for adenocarcinoma of the esophagogastric junction; LN, lymph node

^aanalysis excluding unknown differentiation

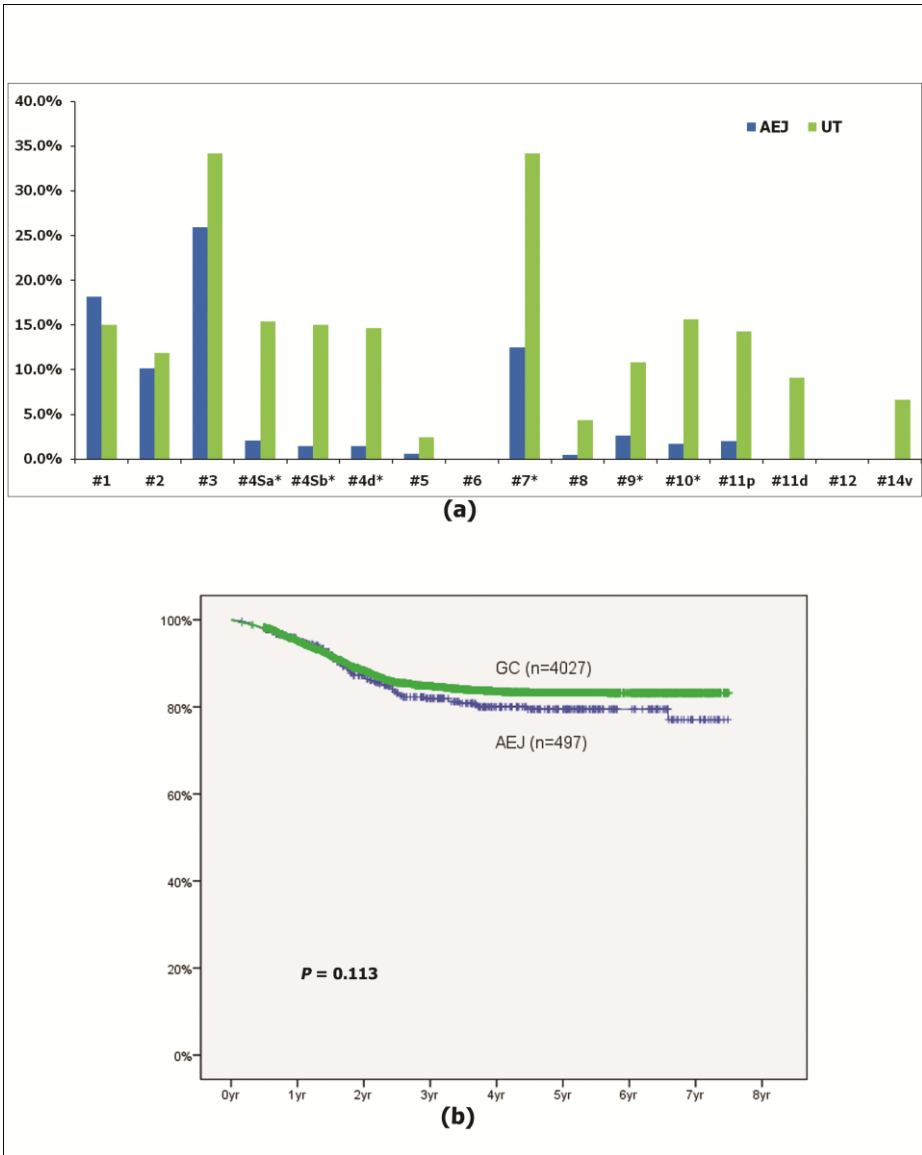
^banalysis excluding the mixed or gastric type

^cT0 excluded

^danalysis between lesser curvature and greater curvature

Fig. 1. the probability of lymph node metastasis of AEJ and UT
 (a) and postoperative survival curves for AEJ and GC (b)

* $P < 0.05$



AEJ II vs. AEJ III

No AEJ I was found in this study (Table 2). AEJ II and AEJ III had very similar clinicopathologic characteristics, and there were no significant differences in all variables analyzed in this study, even though AEJ II seemed to have a higher male to female ratio and a smaller tumor size than AEJ III ($P=0.052$, $P=0.055$). The probability of lymph node metastasis to each lymph node station in the AEJ was not significantly different between AEJ II and AEJ III (Fig. 2). As seen in Fig. 2, there was no significant difference in prognosis between AEJ II and AEJ III (5-year survival rate: 81.5% for AEJ II and 78.7% for AEJ III, $P=0.464$).

Table 2. Clinicopathologic characteristics of AEJ I, AEJ II and AEJ III.

		AEJ I (n=0)	AEJ II (n=139)	AEJ III (n=358)	<i>P</i> value ^a
Sex (M:F ratio)			3.1:1	2.0:1	0.052
Age (yr)			58.7±11.1	57.9±11.4	0.472
WHO	Differentiated		75 (54.0%)	177 (49.4%)	0.218 ^b
	Undifferentiated		55 (39.6%)	168 (46.9%)	
	Unknown		9 (6.4%)	13 (3.7%)	
Lauren	Intestinal		72 (51.8%)	173 (48.3%)	0.214 ^c
	Diffuse		39 (28.1%)	126 (35.2%)	
	Mixed or gastric		28 (20.1%)	59 (16.5%)	
Tumor size (cm)			3.8±2.2	4.3±2.5	0.055
No. of metastatic LN			2.3±4.1	2.5±4.7	0.785
No. of retrieved LN			33.7±16.9	38.7±54.1	0.289
T stage ^d	T1		52 (37.7%)	138 (38.6%)	0.918
	T2–T4		86 (62.3%)	220 (61.5%)	
N stage	N0		82 (59.0%)	211 (58.9%)	1.000
	N1–N3		57 (41.0%)	147 (41.1%)	

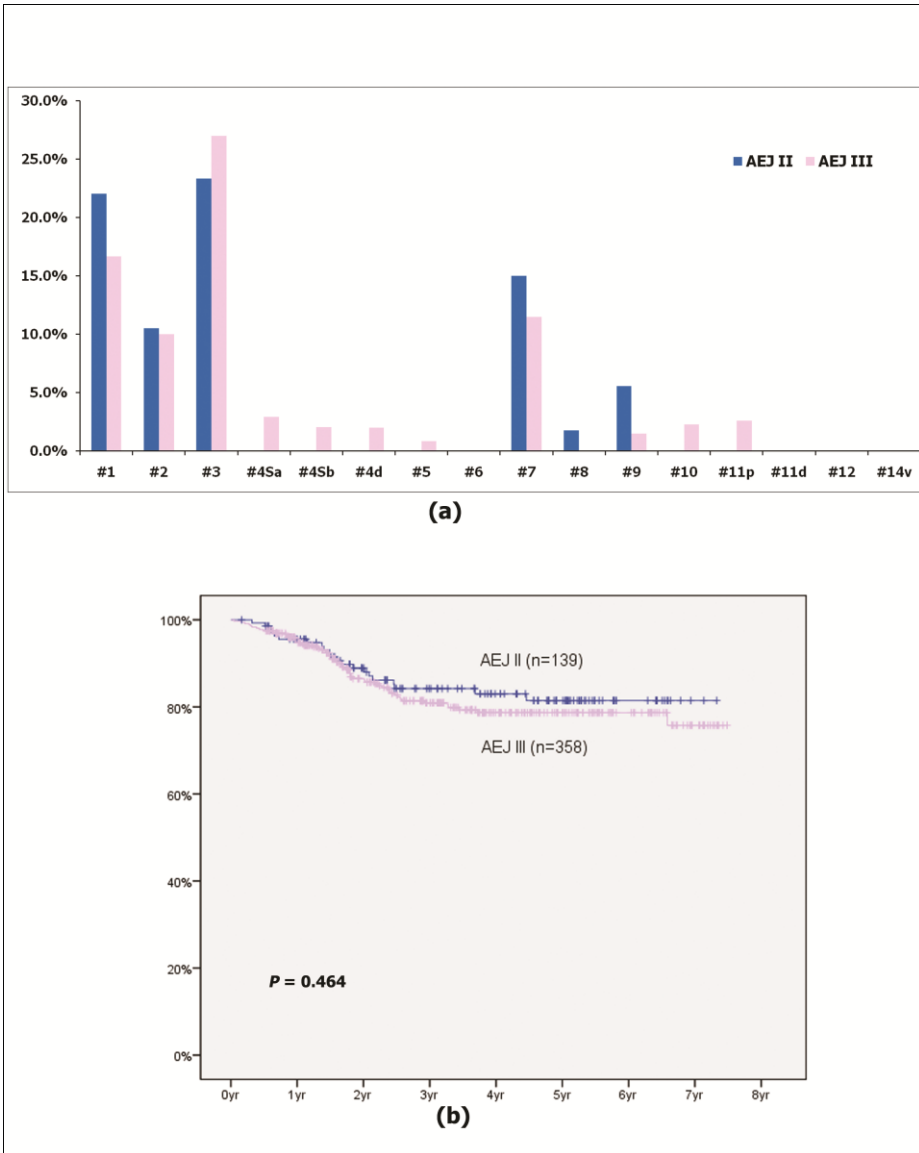
^a analysis between AEJ II and AEJ III

^b analysis excluding unknown differentiation

^c analysis excluding the mixed or gastric type

^d T0 excluded

Fig. 2. The probability of lymph node metastasis of AEJ II and AEJ III (a) and postoperative survival curves for AEJ II and AEJ III (b)



AEJe vs. AEJg

Compared with AEJg, AEJe showed no significant difference except for T and N stage distribution which was closely related to a larger tumor size and a larger number of metastatic lymph nodes (Table 3). The lymph node metastasis of AEJe also showed similar topographic distribution (confined to peritumoral, lesser curvature side and around celiac axis) as that of AEJg, although there was statistical difference in the probability of lymph node metastasis to some stations probably due to more advanced stage of AEJe than AEJg (Fig. 3). The overall postoperative prognosis of AEJe was significantly worse than AEJg (Fig. 3). The 5-year survival rate was 71.7% for AEJe and 83.1% for AEJg ($P=0.021$). However, when stratified by T stage, the stratified-survival rates at each T stage was not significantly different between AEJe and AEJg ($P=0.518$) (Fig. 4).

Table 3. Clinicopathologic characteristics of AEJe and AEJg

		AEJe (n=150)	AEJg (n=347)	P value
Sex (M:F ratio)		2.8:1	2.0:1	0.139
Age (yr)		59.1±11.2	57.6±11.3	0.187
WHO	Differentiated	70 (46.7%)	182 (52.4%)	0.366 ^a
	Undifferentiated	71 (47.3%)	152 (43.8%)	
	Unknown	9 (6.0%)	13 (3.8%)	
Lauren	Intestinal	66 (44.0%)	179 (51.6%)	0.224 ^b
	Diffuse	54 (36.0%)	111 (32.0%)	
	Mixed or gastric	30 (20.0%)	57 (16.4%)	
Tumor size (cm)		5.2±2.6	3.7±2.2	<0.001
No. of metastatic LN		4.4±6.0	1.6±3.3	<0.001
No. of retrieved LN		36.6±17.9	37.6±54.8	0.832
T stage ^c	T1	33 (22.0%)	157 (45.4%)	<0.001
	T2–T4	117 (78.0%)	189 (54.6%)	
N stage	N0	56 (37.3%)	237 (68.3%)	<0.001
	N1–N3	94 (62.7%)	110 (31.7%)	

^aanalysis excluding unknown differentiation

^banalysis excluding the mixed or gastric type

^cT0 excluded

Fig. 3. The probability of lymph node metastasis of AEJe and AEJg (a) and postoperative survival curves for AEJe and AEJg (b)

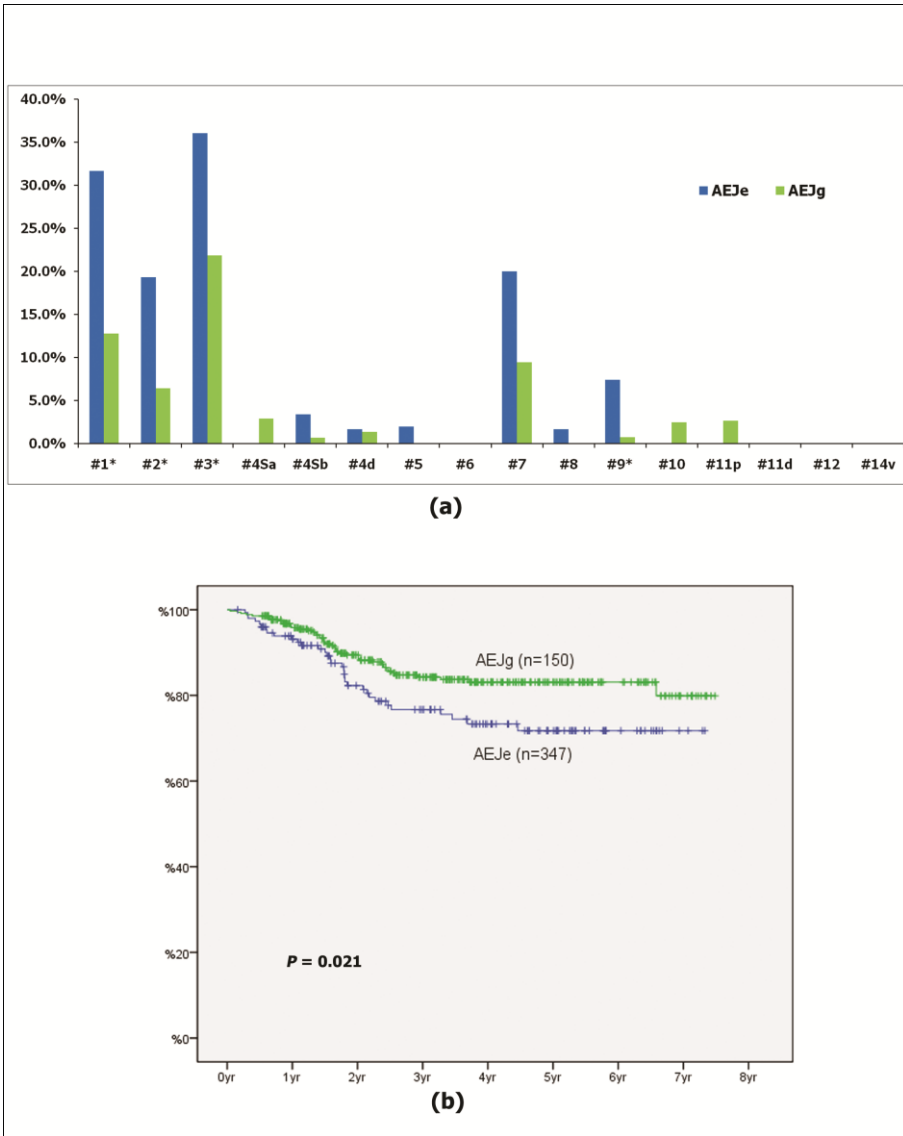
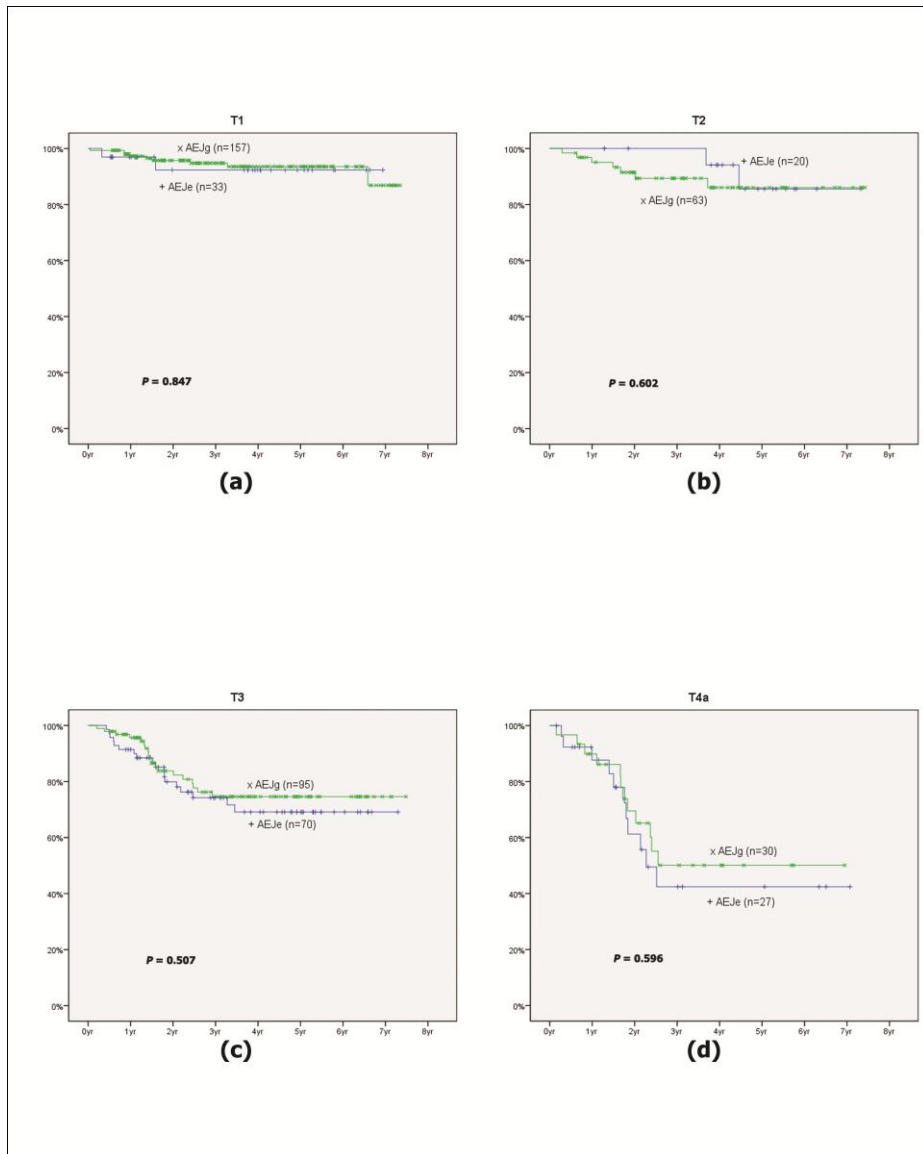


Fig. 4. Postoperative survival curves of AEJe and AEJg for T1 stage (a), T2 stage (b), T3 stage (c), and T4 stage (d), which showed no significant difference between AEJe and AEJg at each T stage (overall $P=0.518$).

T0 and T4b stages were excluded in this analysis.



eTNM vs. gTNM

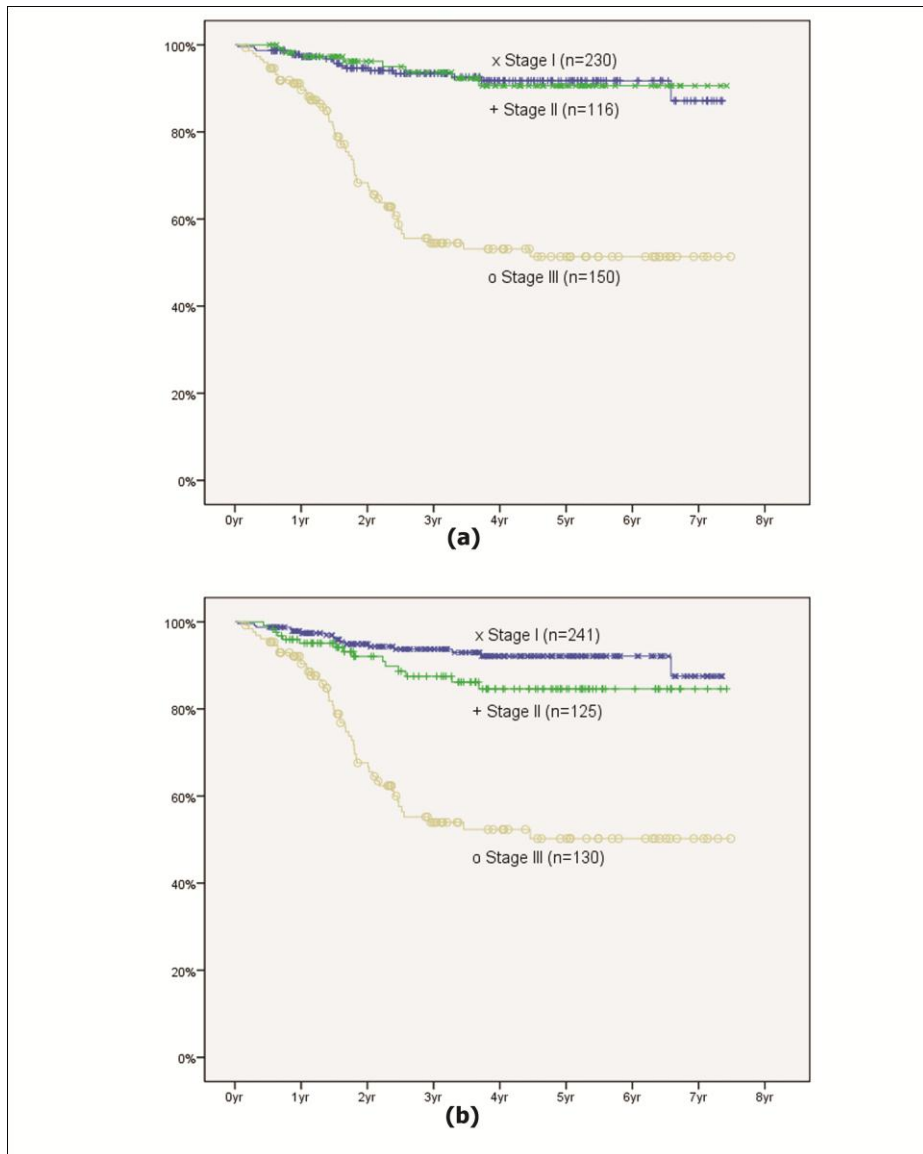
Considering stage distribution by eTNM and gTNM, 4.6% of stage I tumors and 16.0% of stage II tumors in gTNM was shifted to higher stage II and III in eTNM (Table 4). Even though the difference in the postoperative survival rate, as assessed by eTNM and gTNM, was not significantly different in stage I and stage II ($P=0.970$ for eTNM, $P=0.084$ for gTNM), the survival curves assessed by gTNM showed a more distinctive separation than that by eTNM (Fig. 5). The 5-year survival rate at each stage from eTNM was 91.7% for stage I, 90.6% for stage II and 51.4% for stage III; that from gTNM was 92.1% for stage I, 84.6% for stage II and 50.2% for stage III.

Table 4. Stage shift from gTNM to eTNM according to the seventh AJCC TNM classification(16)

gTNM eTNM	stage I	stage II	stage III
Stage I	230	0	0
Stage II	11	105	0
Stage III	0	20	130

stage 0 was excluded.

Fig. 5. Postoperative survival curves for AEJ stratified by TNM stage using the Kaplan–Meier method according to the seventh AJCC TNM classification(16) (a) The survival curves stratified by eTNM. (b) The survival curves stratified by gTNM. T0 stage was excluded in this analysis.



DISCUSSION

There have been some reports on different features of AEJ from gastric cancer, including its higher incidence in Western countries, risk factors for carcinogenesis such as Barrett mucosa and intestinal metaplasia for Siewert type I, and poor clinicopathologic characteristics.(1, 3–5, 19–23) Regarding the incidence or prevalence, it has been reported that AEJ in the East showed much lower prevalence than distal gastric cancer, extremely low prevalence of Siewert type I and much more common Siewert type III than type II, compared with that in the West.(8–10) Especially, extremely low incidence of Siewert type I compared with type III has been reported several times by other Eastern reports, which is concordant with our results. Cultural or epidemiologic/epigenetic factors may be involved regarding the proportion or expression of AEJ subtypes, but have not been reported as independent prognostic factors for AEJ.(24–26) Considering risk factors for carcinogenesis, AEJ may have some different pathogenesis form gastric cancer. However, unlike a protective effect or inverse relationship of *H. pylori* infection to the esophageal adenocarcinoma, the relationship between gastric cardia cancer and GER as well as *H.pylori* infection was relatively weak or doubtful.(19, 27, 28) Siewert and Feith reported that only 9.8% of the Siewert type II tumors and 2.0% of type III tumors showed Barrett mucosa

and 72% of type II tumors developed, irrespective of Barrett metaplasia unlike type I tumors.(29) Regarding clinicopathologic features, our study showed that there were no other differences between AEJ II/III and GC except for the stage distribution, and also revealed very similar characteristics between AEJ II and AEJ III for all variables. The postoperative prognosis, which is the most important determinant for stage grouping, was not significantly different for AEJ and GC. Regarding the difference of stage distribution related to tumor size or the number of metastatic lymph nodes, previous studies suggested that the overall poor prognosis of proximal gastric cancer including AEJ might be caused mainly by the advanced tumor stage due to the late detection and early detection was the most important to improve the survival outcome.(30, 31) The further investigation about the tumor biology or epidemiology should be required. However it would be more reasonable to assume that the most potential cause of previously reported poorer prognosis of AEJ than GC may be the late detection of AEJ with their relevant distribution of advanced stage. Therefore the previous concept that AEJ may be different from GC because of poorer prognosis should be reconsidered.

The Japanese population which can represent the Eastern one usually has a much shorter length of the lesser curvature (about 15–20 cm) than the American population which can

represent Western one.(32) Considering distance criteria from the Siewert classification which was aimed at the Western population at first, there remains only a very small area inevitably for upper one-third of the stomach, especially around the fundus, after excluding the upper 5 cm of both lesser and greater curvatures for AEJ. Because of its unavoidable small proportion, the same application of the distance criteria for AEJ like the Siewert classification would be inadequate for the Eastern population.

There has been considerable disagreement regarding whether AEJ should be classified as a gastric cancer or an esophageal cancer. Because of the extremely different incidence of esophageal adenocarcinoma, AEJ and stomach cancer between Western and Eastern countries, the well-designed comparative study between these three groups could have been hardly investigated. Some authors have suggested that adenocarcinomas of the cardia and distal esophagus tend to be classified as one group of tumor because of many similarities between them.(14, 15, 33) However, previous studies analyzed AEJ with inadequate definition as in a tumor involving the lower esophagus extensively irrespective of its epicenter. Furthermore these studies did not perform comparative analyses with gastric cancer and often revealed much poorer treatment outcomes than our study. These poor outcomes might be related to the higher proportion of the transthoracic

approach to AEJ II or AEJ III and the omission of lymph node dissection around the celiac axis which was often recognized as a distant metastasis area for AEJ especially in the West. On the other hand, there have been some proposals that carcinoma of the cardia is a type of gastric cancer which must be treated or classified according to criteria for gastric cancer surgery. (9, 13, 34)

According to the seventh AJCC TNM classification, small tumors within 5-cm aboral but apart from the EGJ is classified as gastric cancer (AEJg), but when it grows, it may be classified as esophageal cancer (AEJe) because it is large enough to extend into the EGJ. Our study found that the histopathologic differences between AEJe and AEJg were only their T and N stage distributions. For N stage, tumor depth and size are found to be significant factors for nodal metastasis, whereas the Siewert subtypes are not. (10) For T stage, we revealed that the tumor size of AEJe was significantly larger than AEJg, and that the prognosis difference between AEJe and AEJg was not significant when stratified by T stage. Therefore the involvement of the EGJ itself does not influence the prognosis of AEJ, and the classification of AEJ based on the involvement of the EGJ would have a risk of selection bias regarding tumor size. In this new stage grouping, eTNM causes an up-stage shift from gTNM at the same T and N stage. Furthermore, this stage shift between gTNM and eTNM could

influence prognosis analysis, which caused a more distinctive survival curve between stages I and II by gTNM than by eTNM. The current results revealed that the newly proposed esophageal classification from the seventh AJCC TNM classification showed a loss of distinctiveness and was not so adequate as gTNM.

The reference database of this esophageal classification for AEJ was collected through Worldwide Esophageal Cancer Collaboration (WECC) at which only 2 Asian hospitals out of 48 worldwide institutions participated, and about 65% of the data used for the analysis was collected before 2000.(35) Even though the data analyzed in our study was collected from a single high-volume institution in Asia, this database was also qualified and accepted as a reference data for gastric cancer in the seventh AJCC TNM classification like the data from WECC for esophageal cancer.(36) Therefore we suggest the collaborative study of more Eastern institutes and the Western institutes for more adequate classification of AEJ II/III as well as AEJ I.

According to the Japanese Classification of Gastric Cancers,(18) we observed the distinctive laterality in the lymph node metastasis of AEJ; the lymph node metastasis mainly occurred on the peritumoral and lesser curvature side (#1, #2 and #3) and lymph nodes around celiac axis, whereas rare on the greater curvature side (#4Sa, #4Sb and #4d), irrespective of

whether the tumor is AEJ II or III, or whether AEJe or AEJg. The result is closely related to the similar frequency of the tumor itself on the lesser curvature side. This laterality was not concordant with the treatment guidelines from the Japanese Gastric Cancer Association.(37) Our result could support an oncologic rationale for Ivor–Lewis operation for AEJ and revealed that total gastrectomy would not be always needed for AEJ. In addition, it might also partly explain why the comparison between D1 and D2 dissection was not so definite in previous clinical trials in Western countries where AEJ is more prevalent. Therefore, another modified recommendation of lymph node dissection strategy for AEJ could be considered including dissection around celiac axis. And this analysis can provide strong evidence that we should keep special approaches to AEJ, although there were no other differences in clinicopathologic features between AEJ and GC except for stage distribution, and support our suggestion against previous reports on higher incidence of lymph node metastasis of AEJ than GC.

This study may have similar limitations as other studies using the Siewert classification. There are the difficulties in defining tumor epicenter and in measuring the distance from it.(10, 38) Therefore, we attempted to overcome this ambiguity by repeated examinations for all controversial cases by 3 other doctors. Most of the initial surgical approaches in this study

were the transhiatal approach regardless of whether the operation was converted into the transthoracic procedure or not, which was closely related to the proportion of AEJ II/III. Several large scale studies proved that, for Siewert type II or III, the transhiatal operation had a similar survival rate but better postoperative morbidity compared with the transthoracic approach.(13, 39–41) And our study did not provide the data on metastases to lymph nodes above the diaphragm. Some previous reports on radioisotope injection in the lower esophagus and cardia demonstrated that the radioisotope injected into the cardia almost exclusively appears in abdominal nodes,(42) whereas other studies indicated that the lymphatic drainage pathways of Siewert type II and type III tumors preferentially spread toward the celiac axis nodes.(43, 44)

To the best of our knowledge, this study is the first comparative analysis of adenocarcinoma of the EGJ using the seventh AJCC TNM classification in Korea.

In conclusion, the postoperative prognosis between AEJ II/III and GC was similar. AEJ II/III also showed very similar prognosis as well as clinicopathologic characteristics. When stratified by T stage, the involvement of the EGJ did not influence the prognosis of AEJ. Regarding the postoperative prognosis of AEJ II/III, the newly proposed esophageal classification of AEJ showed loss of distinctiveness and was not as adequate as the classification of gastric cancer. Therefore,

we recommend the integration of AEJ II/III into gastric AEJ and propose that AEJ II/III should be considered as a part of gastric cancer, irrespective of the EGJ involvement.

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국문 초록

서론: 제 7 판 AJCC TNM 병기 분류법에서는 식도위 경계부 선암을 식도위 경계부 침범 여부에 따라 식도암의 일부로 분류하는 새로운 병기 분류법이 제시되었다. 이 연구에서는 제 7 판 AJCC TNM 병기 분류법의 식도위경계부 선암을 위한 병기 분류법의 타당성을 검증해보고자 한다.

방법: 2003 년부터 2009 년 까지 서울대병원에서 단일, 원발성 위선암 및 식도위 경계부 선암으로 근치적 목적의 수술을 시행 받은 4,524 명의 환자들을 대상으로 의무기록과 병리보고서 및 수술 검체 표본 사진을 후향적으로 분석하였다. 식도위 경계부 선암의 임상병리학적 특징과 수술 후 예후를 Siewert 분류법 및 제 7 판 AJCC TNM 병기분류법을 이용하여 식도위 경계부 선암을 제 1, 2, 3 형으로 나누고 식도위 경계부의 침범 여부를 기준으로 비교 분석하였다.

결과: 본 연구에서 식도위 경계부 선암 제 1 형은 관찰되지 않았다. 식도위경계부 선암의 예후는 위선암과 유사하였으며, 식도위 경계부 선암 제 2 형과 제 3 형 간의 임상병리학적 양상 및 예후는 유사하였다. 식도위 경계부를 침범한 식도위 경계부 선암이, 경계부를 침범하지 않은 식도위 경계부 선암에 비하여 보다 진행된 병리학적 특징을 보였으나, T 병기를 기준으로 계층화 분석을

시행하였을 때, 두 그룹 간에 예후의 차이는 없었다. 식도위 경계부 선암을 제 7 판 AJCC TNM 병기분류법의 위 선암을 위한 병기분류법을 이용하여 분석하였을 때와 비교하여, 새로 제정된 식도암으로서의 병기분류법에서는 각 TNM 병기에서의 병기 별 예후의 특수성이 소실되었다.

결론: 위에 위치한 식도위 경계부 선암의 수술 후 예후를 평가하기 위해서는 식도위 경계부 선암 제 2 형과 3 형은 식도위 경계부의 침범여부와 관계없이 위 선암의 일부로 인식되어야 할 것이다.

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