Resected Early Gastric Cancer —Clinicopathological Studies on 610 Cases—

JINRYO TAKEDA*, ATSUSHI TOYONAGA*, KIKUO KOUFUJI,
ISSEI KODAMA, KEISHIRO AOYAGI, JUNJI OHTA,
YUKO AOYAMA AND HIROFUMI HATA

Departments of Gastroenterology and Surgery,
Kurume University School of Medicine, Kurume 830, Japan*

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Summary: A total of 610 cases of early gastric cancer were studied, retrospectively. Of these, 541 (88.7%) cases were single and 62 (10.1%) cases were multiple cancers. Lymph node metastasis occurred in 11.2% of the elevated, in 8.2% of the depressed and in 15.1% of the mixed type. There was no lymph node metastasis when a mucosal or submucosal cancer was less than 10 mm in diameter. By contrast, in the cases in which the preoperative diagnosis was suspected advanced cancer, the incidence of lymph node metastasis was high, at 33%. Therefore, when the preoperative diagnosis is advanced cancer, standard radical gastrectomy and/or extended radical gastrectomy should be selected even though they are found to be early gastric cancer. The age-corrected 5-year survival rate was 98.5% in the cases with no lymph node metastasis and 93.0% in the cases with lymph node metastasis ($p>0.05$). The 5-year survival rate was 100% in mucosal cancer and 95.5% in submucosal cancer ($p>0.05$).

Key words: adenocarcinoma — early gastric cancer — lymph node metastasis — preoperative diagnosis — prognosis

Introduction

Early detection and aggressive surgical treatment have markedly improved the prognosis of gastric cancer. In Japan, the frequency of detection of early gastric cancer (EGC) has increased each year, due mainly to mass screening in addition to advances in radiographic, endoscopic and biopsy techniques.

EGC is defined as an adenocarcinoma confined to the mucosa or submucosa of the stomach, with or without

lymph node metastasis. Although it is generally considered to have an excellent prognosis, EGC can occasionally be associated with cancer recurrence and mortality following surgical resection. A fatal outcome occurs more frequently in EGC with lymph node metastasis than in EGC with no metastasis. Metastasis from an EGC to the regional lymph nodes of the stomach is thought to be the most important factor affecting prognosis. The purpose of this study was to evaluate the independent influence of clin-

ical and pathological variables on lymph node metastasis and on the prognosis in EGC.

Materials and Methods

During the 15 years from 1976 to 1990, 1,527 patients with gastric cancer underwent gastrectomy in the First Department of Surgery, Kurume University Hospital. Of these, 610 (39.9%) were pathologically classified as early cancers and were further examined in this study,

as shown in Table 1. Sixty-two cases of multiple EGC and 7 remnant-stump EGC were included. However, any multiple gastric cancer, involving a combination with an advanced cancer was not included in this study (Table 2). Malignant lymphomas and leiomyosarcomas were also excluded.

The macroscopic classification of early gastric cancer provided by the Japanese Research Society for Gastric Cancer (1993) was used, as shown in Fig. 1. The five-year survival rate of patients with cancer was assessed by the

TABLE 1.

Total number of resected gastric cancer

Resected	No. of Patients (%)
Early	610 (39.9)
Advanced	910 (60.1)
Total	1527 (100)

1st Dept. Surg. Kurume Univ. (1976-1990)

TABLE 2.

Total number of early gastric cancer

Early Cancer	No. of Patients (%)
Single	541 (88.7)
Multiple	62 (10.2)
Remnant	7 (1.1)
Total	610 (100)

Kurume Univ. (1976-1990)

Fig. 1. Classification of early gastric cancers

Kaplan-Meier method (1958).

Results

Of the 610 patients with EGC, 427 were men and 183 were women (a ratio of 2.3:1). The age distribution and cancer depths are shown in Table 3.

EGC can be divided into three fundamental types; elevated type (I, IIa, IIa+IIc), flat type (IIb), and depressed type (IIc, IIc+III, IIc+IIa, III). The details of this macroscopic classification of the EGC, and details of the rate of lymph node metastasis are summarized in Table 4. A mixed pattern of these fundamental types was fairly common, and so we included this mixed pattern as a fourth fundamental type. Lymph node metastasis rate was highest in this mixed type, as shown in Table 5. The correlation of tumor size in the 3 fundamental types with the rate of lymph node metastasis is summarized in Table 6. The rate of lymph node metastasis in both mucosal and submucosal cancer and the longi-

TABLE 4.

Macroscopic classification of early cancer and lymph node metastasis

Type	No. of Patients	Positive Lymph Node (%)
I	24	3 (12.5)
I+IIa	6	1 (16.7) I—12.5%
I+IIc	1	0 (0)
IIa	92	10 (10.8)
IIa+I	2	0 (0)
IIa+IIb	7	1 (14.3) IIa—10.8%
IIa+IIc	41	2 (4.9)
IIb	8	0 (0)
IIb+IIa	4	0 (0) IIb— 5.9%
IIb+IIc	4	1 (25.0)
IIb+III	1	0 (0)
IIc	337	28 (8.4)
IIc+IIa	21	4 (19.0) IIc— 8.4%
IIc+IIb	2	0 (0)
IIc+III	54	13 (24.0)
III	3	0 (0) III— 0%
III+IIc	3	0 (0)
Total	610	63 (10.3) Mixed 22/146=15.1%

TABLE 3.

The incidence of early gastric cancer by age

Age	Mucosal cancer	Submucosal cancer	Total
>29	4 (2)	1 (0)	5 (2)
30-39	15 (6)	15 (7)	32 (13)
40-49	39 (16)	27 (10)	66 (26)
50-59	83 (22)	79 (17)	162 (39)
60-69	112 (27)	102 (33)	214 (60)
70-79	55 (21)	69 (20)	124 (41)
80<	4 (0)	3 (2)	7 (2)
Total	314 (94)	296 (89)	610 (183)

(): Number of female patients

TABLE 5.

Macroscopic classification and rate of lymph node metastasis

Type	No. of Cases	Lymph Node Meta. (%)
Elevated (I, IIa)	116	13 (11.2)
Depressed (IIc, III)	340	28 (8.2)
Flat (IIb)	8	0 (0)
Mixed	146	22 (15.1)
Total	610	63 (10.3)

TABLE 6.
Size of tumor and rate of lymph node metastasis

Largest Diameter (mm)	>10	—20	—30	—40	—50	—60	60<	Total (%)
Elevated	0/19	2/50	1/32	6/30	3/13	1/14	4/15	17/170 (9.8)
Flat	0	0/3	0/5	0/2	1/2	0/1	0/4	1/17 (5.9)
Depressed	0/56	7/118	9/95	9/70	7/36	5/18	8/30	45/423 (10.7)
Total (%)	0/75 (0)	9/171 (5.3)	10/132 (7.6)	15/102 (11.4)	11/51 (21.6)	6/32 (18.8)	12/47 (25.5)	63/610 (10.3)

TABLE 7.
Lymph node metastasis according to the longitudinal cancer location

Early	C (%)	M (%)	A (%)	Total (%)
m	1/26 (3.8)	7/167 (4.2)	2/121 (1.7)	10/314 (3.2)
sm	7/54 (13.0)	22/124 (17.7)	24/118 (20.1)	53/296 (17.8)
Total	8/80 (10.0)	29/291 (10.0)	26/239 (10.5)	63/610 (10.3)

Seven remnant-stump early cancers were included as being in C region, while multiple cancers were included in the dominant tumor location.

TABLE 8.
Lymph node metastasis rates for macro- and microscopic types

mucosal (m) cancer

Type	pap	tub ₁	tub ₂	por	muc	sig	others	Total (%)
Elevated	0/7	1/78	0/5	0/2	0	0	0/2	1/94 (1.1)
Flat	0	1/6	0/3	0	0	0/2	0	1/11 (9.1)
Depressed	0	2/75	2/36	2/27	0	2/69	0/1	8/208 (3.8)
Total	0/7	4/160	2/44	2/29	0	2/71	0/3	10/314 (3.2)

submucosal (sm) cancer

Type	pap	tub ₁	tub ₂	por	muc	sig	others	Total (%)
Elevated	3/10	5/45	5/14	1/2	1/1	1/2	0/2	16/76 (21.1)
Flat	0	0/3	0/1	0	0/1	0/1	0	0/6 (0)
Depressed	3/4	12/72	7/51	5/37	3/7	7/43	0	37/214 (17.2)
Total	6/14	17/120	12/66	6/39	4/9	8/46	0/2	53/296 (17.5)

pap: papillary adenocarcinoma; tub₁: well differentiated tubular adeno. ca.; tub₂: moderately diff. adeno.; por: poorly diff. adeno.; muc: mucinous adeno.; sig: signetring cell ca.; others: carcinoid

TABLE 9.
Number of early gastric cancer and
histological stage

Stage	No. of Patients (%)
I	545 (89.3)
II	51 (8.4)
III	10 (1.6)
IV	4 (0.7)
Total	610 (100)

n_1 =stage II, n_2 =stage III,
stage IV=H (+): 2, n_3 : 2

TABLE 10.
Lymph node metastasis rate according to
the preoperative diagnosis

Preop. Diag.	LN Meta. Rate (%)
Early Ca.	8.1
I	11.8
IIa	6.9
IIa+IIc	20.0
IIc	7.9
IIc+III	23.9
Advanced Ca.	33.0
Borrmann II	25.0
Borrmann III	40.0
V	27.0

tudinal cancer location are summarized in Table 7. The rate of lymph node metastasis according to the cross-sectional circumference of cancer location is also summarized in Fig. 2. The correlation of the macroscopical and pathological details and the rate of lymph node metastasis in both mucosal and submucosal cancers are summarized in Table 8. The number of EGC and histological cancer stage are summarized in Table 9. Two positive hepatic metastasis

Fig. 2. Lymph node metastasis according to the cross-sectional circumference cancer location.

Fig. 3. Prognosis of early gastric cancer according to the cancer depth.

Fig. 4. Prognosis of early gastric cancer according to N-factor.

and two n_3 are included in stage IV. The lymph node metastasis rate according to the preoperative diagnosis by mainly X-ray and endoscopic studies are summarized in Table 10. When the preoperative diagnosis was a suspected advanced cancer, the rate of lymph node metastasis was highest at 33%. The postoperative prognosis of EGC according to the cancer depth is shown in Fig. 3. The prognosis of the EGC according to the absence and presence of lymph node metastasis is shown in Fig. 4.

Discussion

The incidence of EGC, as a percentage of the total number of gastric cancers, has progressively increased from 10% or less in the 1960's to more than 40% in the 1990's, due mainly to mass screening in addition to advances in radiographic, endoscopic and biopsy techniques. The frequency of EGC was 39.9% (610/1527) of the total number of resected gastric cancers in the present study.

Macroscopically, EGC of the depressed type is much more frequent than cancers of the elevated type. The incidence of depressed type in this series was 68.9% (420/610), and of elevated type was 28.4% (173/610). The flat type was uncommon, with an incidence of only 2.9% in this study. When the mixed type is included as a fourth type, the incidence of the depressed type was 55.7%, of the elevated type was 19%, of the mixed type was 23.9% (146/610), and of the flat type was 1.3%. Metastasis from the EGC to the regional lymph nodes of the stomach was found to be

the most important factor in selecting the surgical management. Lymph node metastasis is known to be present even in EGC. The incidence of lymph node metastasis in EGC has been reported to be 1-5% in mucosal cancer and 15-20% in submucosal cancer (Fujita et al. 1983; Abe et al. 1984; Ohta et al. 1987; Hioki et al. 1990; Iriyama et al. 1992). The positive lymph node metastasis was 3.2% for mucosal cancer and 17.5% for submucosal cancer in the present study. Habu et al. (1989) reported that lymph node metastasis was significantly more frequent when the cancer was of the mixed type, of larger diameter and penetrating into the submucosa. Lymph node metastasis was most frequently observed in the mixed type (15.1%), and next in the elevated type (11.2%). However, of the three fundamental types, the rate was highest in the depressed type (10.7%) in the present study. In the mucosal cancer, the rate was 3.8% in the depressed type IIc. By the detailed macroscopic classification, IIc+III had the highest rate at 24% (13/54). In mucosal cancer, the lymph node metastasis rate has been reported to be high in IIc having an ulcer scar (Sowa et al. 1989). In the small EGC of less than 1 cm in diameter, there was no lymph node metastasis, and in the elevated mucosal cancers from 1 to 3 cm in diameter, there were 2 positive Group 1 lymph node metastasis observed in the present study. Baba et al. (1994) reported that there was no lymph node metastasis unless the tumor exceeded 3 cm in diameter.

There was no statistical correlation between the longitudinal tumor location and the incidence of lymph node metastasis. However, on the cross-sectional

circumference, lymph node metastasis was found in 8.7% on the lesser curvature, in 5.9% on the posterior wall, in 15.6% on the anterior wall, in 15.9% on the greater curvature, and in 20% on the whole circumference of the stomach.

The correlation of preoperative diagnosis by X-ray and endoscopy and the rate of lymph metastasis was 11.8% in 0-I type, 6.9% in 0-IIa type, 7.9% in 0-IIc, 23.9% in 0-IIc+III, 25% in Borrmann II and 40% in Borrmann III. Therefore, when the preoperative diagnosis of EGC was a suspected advanced cancer, the overall lymph node metastasis rate was high, occurring in 33% of cases in the present study.

The age-corrected 5-year survival rate was 98.5% in cases with negative lymph node metastasis (n(-)) and 93.6% in positive cases (n(+)) ($p < 0.05$). The cumulative 5-year survival was 90% in n(-) and 79% in n(+), by Endo and Habu (1990). The 5-year survival rate was 100% in m-cancer and 95.5% in sm-cancer ($p < 0.05$), in the present study. However, synchronous hepatic metastasis was observed in 2 cases and juxta lymph node metastasis was also observed in 2 cases of EGC in the present study. Kawada et al. (1992) counted a total of 16 cases of an EGC associated with n_4 (+), and 10 cases of an EGC with synchronous hepatic metastasis has been reported by Ohta et al. (1993).

It can be concluded that small early gastric cancers of less than 1 cm in diameter can be treated by endoscopic mucosal resection of the stomach. Elevated mucosal early cancers from 1 to 3 cm in diameter could be treated by modified radical gastrectomy such as pylorus preserving gastrectomy, laparo-

scopic-assisted partial gastrectomy, or partial gastrectomy. When the preoperative diagnosis is advanced cancer, then a standard radical gastrectomy and/or extended radical gastrectomy should be performed because the lymph node metastasis rate is high, occurring in 33% in the present study compared with an overall lymph node metastasis rate of 10.1%.

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