Gastric Cancer Invading the Esophagus —Improved Management—

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Received for publication October 2, 1991

Summary: From 1978 to 1989, a total of 1272 patients with gastric cancer were admitted to Kurume University Hospital. Of these, 1184 (93%) underwent gastric resections. Of the resected cancers, 140 cases were gastric cancers invading the esophagus, as confirmed by postoperative pathological studies. For all 168 gastric cancers invading the esophagus, the resectability rate was 83% (140/168). These cancers were subdivided chronologically, with those during 1978-1983 included in Group 1 and those during 1984-1989 in Group 2. Group 2 patients were treated with a higher proportion of aggressive extended radical operations, such as combined resections of the diaphragm and lymph node dissections as far as the paraaortic lymph nodes (N4). The resectability rate was 76% in Group 1 and 93% in Group 2, due to the more aggressive operations. A lower esophagectomy with a total gastrectomy, mainly from a left thoracoabdominal approach, was performed for 71% of the patients in Group 1, and for 90% in Group 2. Lymph node metastasis was related to the extent of esophageal invasion and inversely related to the 5 year-survival rate. In all cases of esophageal invasion of less than 1 cm, there were no mediastinal lymph node metastases, and the 5 year-survival rate was 76%. On the other hand, when esophageal invasion was more than 4 cm, 50% had mediastinal lymph node metastases and the 5 year-survival rate was zero. The tumor size was also related to lymph node metastasis. When the maximal tumor length was less than 5 cm, a negative lymph node metastasis was found in 78% of cases, and the 5 year-survival rate was 76%. On the other hand, when the tumor length was more than 10 cm, only 6% had a negative lymph node metastasis and the 5 year-survival rate was only 15%. The 5 year-survival rate with curative resection was 45% for Group 1, and 71% for Group 2. For those at stage III, 12% of Group 1 could be curatively resected with an extended radical operation, 46% of Group 2 ($p < 0.05$) were cured due to the more aggressive operations in this group. The more aggressive extended radical operation is useful for improving the cure rate without increasing operative mortality.

Key words: gastric cancer — esophageal invasion — left thoracoabdominal — mediastinal node — paraaortic node — extended radical operation

Introduction

The prognosis for a gastric cancer invading the esophagus is generally poorer than for an adenocarcinoma in the corpus

or distal stomach, due to the particular characteristics of the cancers. The location of the carcinoma gives rise to specific pathological peculiarities, with various modes of lymph node metastases,

involving both mediastinal and abdominal regions, due to their anatomical peculiarity. There are a high proportion of advanced gastric cancers. One hundred and forty cases with gastric cancer invading the esophagus, that were resected were retrospectively investigated and compared for clinico-pathological features and prognosis during 1978-1983 and during 1984-1989. The later group was more likely to have undergone an extended radical operation to further improve surgical outcome.

Patients and Methods

During 12 years from 1978 to 1989, 1272 patients with gastric cancer were admitted for surgery to the First Department of Surgery, Kurume University Hospital. Of these, 1184 (93%) underwent resection and 88 (7%) could not be resected. Among the resected cases, 140 were gastric cancers invading the esophagus, as confirmed postoperative pathological studies. The resectability rate for those cancers was 83% (140/168). Squamous cell carcinomas, malignant lymphomas and leiomyosarcomas were excluded from the present study. The 140 cases were subdivided into two groups, chronologically, with Group 1 having surgery from 1978-1983, and Group 2 from 1984-1989. The resectability rate was 76% for Group 1, and 93% for Group 2, due to more aggressive operation (Table 1). The operative approach, type of gastrectomy and extent of the lymph node dissection are summarized in Table 2. Lower esophagectomy plus total gastrectomy primarily by a left thoracoabdominal approach was performed for 71% in Group 1 and 90% in Group 2 cases. Extended radical lymph adenectomy was employed for 8% of Group 1 and 37% of Group 2 cases. When group 3 lymph nodes, such as lymph nodes along the hepatoduodenal ligament, were not com-

TABLE 1
Resectability of esophageal invasions

	No of Cases		Resectability	
	Total	Eso. Invasion	Total	Eso. Invasion
Group 1 (1978-1983)	615	104 (16.9%)	85.5%	76.0%
Group 2 (1984-1989)	723	82 (11.3%)	96.0%	93.1%

TABLE 2
Types of approaches, gastrectomies and lymph node dissections

Type	Group 1 1978-1983 No. of cases (%)	Group 2 1984-1989 No. of cases (%)
Thoracoabdo.	46 (63)	44 (57)
Abdominal	20 (27)	23 (34)
Sternotomy	7 (10)	0
Proximal Gast.	21 (29)	7 (10)
Total Gast.	52 (71)	60 (90)
R2>	67 (92)	42 (62)
R3	6 (8)	25 (37)

pletely dissected; the standard lymph adenectomy (R2) was included. Para-aortic lymph node (N4) dissection plus R3 was included with R3, according to the criteria of the Japanese Research Society for Gastric Cancer Study (1981) (Table 2).

Results

In cases with esophageal invasion of 0-1 cm, lymph node metastasis rate, including both mediastinal and abdominal nodes, was 50%. On the other hand, when esophageal invasion was more than 4 cm, the lymph node metastasis rate was 100%, while the metastasis rate in group 1 regional lymph nodes (n₁) was only 7% pathologically (Table 3). With esophageal invasion of less than 1 cm, there was no

mediastinal lymph node metastasis, and the 5 year-survival rate was 67%. On the other hand, when esophageal invasion was more than 4 cm, 50% had a mediastinal lymph node metastasis, and the 5 year-survival rate was zero (Table 4).

In cases with maximal tumor length of less than 5 cm, a negative lymph node metastasis was found in 78% of the patients, and the 5 year-survival rate was 76%. On the other hand, in cases with maximal tumor length of more than 10 cm, only 6% had a negative lymph node metastasis and the 5 year-survival rate was only 15% (Table 5). Anastomotic

leakage occurred in 14% of Group 1 and in 3% of Group 2 patients. Other postoperative complications are summarized in Table 6. The operative mortality rate was 7% for Group 1 and 4% for Group 2 (Table 6).

The 5 year-survival rates, according to the cancer stage, are showed in Fig. 1. The overall 5 year-survival rates after curative resections were 45% for Group 1, and 71% for Group 2. At stage III, it was 12% for Group 1, and 46% for Group 2 ($p < 0.05$), due to more aggressive operation for patients in Group 2 (Table 7).

TABLE 3

Esophageal invasion and rate of lymph node metastasis

Length (cases)	Metastatic Rate (%)	n ₁ (%)	>n ₂ (%)
0-1cm (n=18)	50	6	45
1-2cm (n=17)	59	12	47
2-3cm (n=29)	76	17	59
3-4cm (n=30)	88	17	71
4cm- (n=15)	100	7	93

TABLE 5

Maximal tumor length, lymph node metastasis and prognosis

Lymph Nodes	Maximal Tumor Length		
	<5cm (n=18) (%)	5-10cm (n=57) (%)	>10cm (n=34) (%)
n ₀ (n=29)	78	23	6
n ₁ (n=15)	0	21	9
n ₂ (n=65)	23	56	85
5 Yr-Survival	76	22	15

TABLE 4

Esophageal invasion, mediastinal lymph node metastasis and prognosis

Esophageal Invasion	Metastatic Rate n/total (%)	5 Year-Survival Rate (%)
0-1 cm	0/10 0	67
1-2 cm	2/13 15	32
2-3 cm	6/24 25	42
3-4 cm	9/30 30	7
4 cm-	10/20 50	0

TABLE 6

Postoperative complications following resection

Complication	Group 1	Group 2
	1978-1983	1984-1989
Anastomotic Leakage	10/96 (14%) Eso-jejuno. 10 (minor 2)	2/72 (3%) Eso-jejuno. 2 (minor 1)
Subphrenic Abscess	3 (4%)	1 (2%)
Pancreatitis	4 (6%)	2 (3%)
Panc. Fistula	1 (1%)	2 (3%)
Pulmonary	1 (1%)	2 (3%)
Op. Mortality	6/96 (7%)	3/72 (4%)

Fig. 1 5 year-survival rates according to stages.

TABLE 7
Prognosis of esophageal invasion
5 year-survival rate

	Curative	stage III
Group 1+2 (1878-1989)	58% (n=68)	31% (n=53)
Group 1 (1978-1983)	45% (n=35)	12% (n=27)
Group 2 (1984-1989)	71% (n=33)	46% (n=26)

Discussion

The prognosis for gastric cancer has improved year by year due to the earlier detection of the cancer and recent advancements in various techniques for treatment. However, gastric cancer still remains the leading cause of cancer death in Japan. A recent detection rate of early gastric cancer has been reached to about 50% (Nagata et al. 1983). However, upper gastric cancer, including cardia cancer, the rate for early gastric cancer was 12% in our recent study (Tanaka et al. 1990), in comparison with 4% for Europe. The prognosis for gastric adenocarcinoma invading the esophagus is generally poorer than for adenocarcinoma in the middle or lower third of the stomach due to the inherent anatomical characteristics, such as a large tumor size and, frequently, a wide distribution of lymph node metastases to both mediastinal and abdominal regions.

To further improve the surgical treatment of gastric cancer invading the esophagus, 140 resected cases were retrospectively investigated with special attention to the radical extended operations and the prognosis.

There have been some studies on the prognostic significance of the primary tumor resection, in which the tumor was removed to prevent all the complications of obstruction, bleeding and invasion, enabling the patient to eat normally. This improves the survival time even when performed palliatively (Moreaux et al. 1988). Clinically, before the operation, direct tumor infiltration into adjacent organs, regional and juxta lymph node enlargement, the presence of ascites, liver metastasis (H-factor) and peritoneal dissemination (P-factor) should be determined using CT, MRI and US. When H (+) and/or P (+) is confirmed, palliative operation is generally indicated. The resectability is ill-defined, but the tumor is considered to be unresectable only when it cannot technically be removed with safety; that is, there is infiltration of the great vessels. However, there have been only few cases involving infiltration to the great vessels.

Ellis et al. (1983) reported that operability and resectability rates have generally improved in recent years. These improvements are obviously due to a number of factors. Patients are coming to surgeons sooner. Surgeons have become more aggressive in operating on and resecting lesions for palliation and cure, because the risk of surgery has declined markedly due to better preoperative preparation and postoperative care, particularly with regard to the use of hyperalimentation and intensive respiratory therapy in selected patients both before and after the operation. Intravenous hyperalimentation, physiotherapy and cessation of smoking were used preoperatively to optimize respiratory function,

and the resectability rate was 76% for Group 1, and 93% for Group 2 patients due mainly to more aggressive operations in this group.

The left thoracoabdominal approach provides an effective method for undertaking lower esophagectomy with low morbidity and mortality rates (Pradhan et al. 1989). The new left thoracoabdominal approach is a satisfactory procedure. The most important surgical factor to improve the prognosis is the treatment of stage III gastric cancer invading the esophagus, since this is now curable by an extended radical operation mainly by a left thoracoabdominal approach. In the present study, the 5 year-survival rate in stage III was 12% for Group 1 and 46% for Group 2 which usually underwent more radical operations including combined resections of the diaphragm and lymphadenectomy beyond the paraaortic lymph nodes (Hashimoto et al. 1990).

Orel et al. (1981) reported the disrupted anastomosis and cardiorespiratory failure accounted for most of the post-operative morbidity and mortality. Anastomotic leakage including minor leakage occurred in 14% of Group 1 patients and in 3% of Group 2 patients, while the operative mortality rate was 7% for Group 1 and 4% for Group 2. The aggressive operation can be performed with a mortality rate that is no greater than the rate for the less extensive standard operation, and causes of death do not appear to be related to the more radical extended lymph node dissection.

The conclusion of this report is recommendation for more aggressive extended radical operations including para-

aortic lymph node dissections to improve the treatment of gastric cancer invading the esophagus, and increase the curability without increasing the operative mortality.

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