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Surgical outcomes and survival after multiorgan resection for locally advanced gastric cancer

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Abstract

BACKGROUND: Multiple organ resection for locally advanced (assumed T4) gastric cancer is associated with high morbidity and mortality. Our aim was to evaluate the efficacy of these surgeries with regard to surgical morbidity, mortality, and survival.

METHODS: Fifty-six patients underwent potentially radical gastrectomy combined with invaded organ resection. Early and late results of multiorgan resection and clinicopathologic factors influencing these results were evaluated.

RESULTS: Forty patients (71.4%) received 1 additional organ resection and 16 patients (28.6%) received 2 or more additional organ resections. Postoperative morbidity and mortality was 37.5% and 12.5%, respectively. Resection of 2 or more additional organs increased postoperative morbidity and advanced age increased mortality. The 1- and 3-year survival rates were 53.3% and 28.1%, respectively. Advanced age, lymph node metastasis, and resection of more than 1 additional organ were significant prognostic factors for survival.

CONCLUSIONS: For patients with locally advanced gastric carcinoma, multiple organ resection is worthwhile with careful patient selection.

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Radical resection is the most effective treatment modality for gastric cancer and R0 resection is the most important indicator of long-term survival for patients with gastric cancer.¹ Despite improvements in the surgical technique, long-term survival of patients with invasion to adjacent organs has been reported to be poor.² For locally advanced gastric cancer with adjacent organ infiltration, extended resection including the invaded organ is required to achieve R0 resection with negative surgical margins. However, multiorgan resection has been associated with increased post-

operative morbidity and mortality.^{1,3} Aggressive surgical treatment and appropriate patient selection for locally advanced gastric cancer still remain controversial. The aim of this study was to evaluate the short- and long-term results of multiorgan resection for locally advanced gastric cancer and to indicate which patients might benefit from en bloc resection.

Patients and Methods

Among 722 gastric adenocarcinoma patients who underwent gastrectomy between January 1998 and December

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2006, 56 patients underwent multiorgan resection for locally advanced gastric cancer. Data from these patients were obtained retrospectively from a prospectively recorded database. Early and late results of these patients were analyzed. Clinicopathologic features of the patients also were analyzed. All patients underwent potentially curable gastrectomy with combined resection of invaded organs and with histopathologically confirmed clear surgical margins. Multiorgan resection was defined as resection of the stomach with directly invaded organs. Resection of the distal esophagus for proximal expansion of the tumor, splenectomy for lymph node dissection (LND), and additional procedures owing to disorders other than tumoral invasion were not regarded as additional organ resection and were not included in this study. Patients with peritoneal carcinomatosis and distant metastasis also were excluded. Surgical morbidity was defined as any complication that occurred in the 30-day postoperative period. Complications were reported in a graded fashion on a scale of 1–5, as previously described.⁴ A grade 1 complication required basic monitoring, oral antibiotics, bowel rest, or supportive care (bedside management). A grade 2 complication required intravenous medication (antibiotics), transfusions, chest tubes, prolonged tube feedings, or total parenteral nutrition. A grade 3 complication required interventional radiology, reoperation, intensive care unit admission, intubation, or bronchoscopy. A grade 4 complication resulted in permanent disability (renal failure requiring dialysis) or organ resection, and a grade 5 complication resulted in the patient's death.

Postoperative mortality was defined as deaths within 30 days after the surgery. A distal subtotal gastrectomy or total gastrectomy (TG) was performed depending on the location of the primary tumor. The most common preferred lymphadenectomy was D2 LND. However, D1 or D3 LND also was performed in selected cases. Staging was performed according to the 1997 TNM staging system of the Union Internationale Contra le Cancer. All of our patients after curative gastrectomy were directed to the medical oncology clinic to be evaluated for adjuvant therapy. The patients who needed to receive adjuvant therapy and the treatment protocols were determined by medical oncologists. Our patients in this series did not receive neoadjuvant treatment. Follow-up information was obtained from outpatient clinical visits and telephone interviews.

Statistical analysis was performed using SPSS software (SPSS, Chicago, IL). Statistical comparisons were performed using the Mann–Whitney *U* test, the chi-square test, or the Fisher exact test. In addition, logistic regression analysis was performed to estimate the influence of clinicopathologic factors on the development of postoperative morbidity and mortality. Odds ratios (ORs) with 95% confidence intervals (95% CIs) were calculated as a measure of association. Survival was calculated using the Kaplan–Meier method and statistical significance was assessed by the log-rank test. Cox regression analysis was performed to

estimate the influence of patient-related parameters on survival.

Results

Fifty-six patients underwent gastrectomy with additional organ resection for locally advanced (assumed T4) gastric cancer. All of the surgeries were performed with curative intent and clear surgical margins were confirmed by histopathologic examination. Details concerning the clinicopathologic factors are shown in Table 1. Forty patients (71.4%) were men and 16 (28.6%) were women. Their mean age was 57.84 ± 12.0 years, ranging between 31 and 81 years. Fifteen patients (26.8%) underwent distal subtotal gastrectomy and 41 (73.2%) underwent TG. Distal esophagectomy was added to TG for 6 patients and total esophagectomy was added for 1 patient. Twenty-six patients

Table 1 Patient characteristics

Mean age, y	57.8 ± 12.0*
Sex	
Male	40 (71.4%)
Female	16 (28.6%)
Mean tumor size, cm	91.3 ± 37.1*
Resection type	
TG	41 (73.2%)
Subtotal gastrectomy	15 (26.8%)
Primary tumor site	
Proximal	11 (19.6%)
Middle	26 (46.5%)
Distal	19 (33.9%)
Number of organs resected	
1	40 (71.4%)
≥2	16 (28.6%)
Comorbidity**	
—	34 (60.7%)
+	22 (39.3%)
Differentiation	
Well-moderate	17 (30.3%)
Poor-undifferentiated	39 (69.7%)
Borrmann	
I–II	22 (39.3%)
III–IV	34 (60.7%)
Lymph node involvement	
—	11 (19.6%)
+	45 (80.4%)
LND	
D1	16 (28.6%)
D2	26 (46.4%)
D3	14 (25.0%)
Depth of invasion	
T3	19 (33.9%)
T4	37 (66.1%)
Stage	
II	4 (7.1%)
III	17 (30.4%)
IV	35 (62.5%)

*Mean ± standard deviation.

**Cardiac, respiratory, and/or metabolic diseases.

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