—Report on Experiments and Clinical Cases—

Significance of Gastrectomy as Palliative Surgery for Gastric Carcinoma with Pyloric Stenosis

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Abstract

We conducted a clinicopathological study of cases of gastric carcinoma with pyloric stenosis and examined treatment outcomes and the prognosis of cases of stage IV gastric carcinoma with pyloric stenosis and the validity of gastrectomy as palliative surgery in these cases. The outcomes of 49 surgeries for gastric carcinoma with pyloric stenosis were compared with those of 671 surgeries for gastric carcinoma without pyloric stenosis. The diagnosis of pyloric stenosis was confirmed with both upper gastrointestinal endoscopy and an upper gastrointestinal barium series. The frequency of pyloric stenosis in patients with gastric carcinoma was 7.3%. Serosal invasion was observed in about 70% of all cases. Of these cases, 53.1% were classified as stage IV. The resection rate was 73.5%, and the resection was classified as curative in 44.9% of cases. The incidence of complications after surgery in cases of stage IV gastric carcinoma was 47.1%. The median survival time was significantly greater in patients undergoing resection group than in those not undergoing resection ($p=0.025$). Most patients with gastric cancer and pyloric stenosis can be considered to have stage IV disease, which is associated with high rates of morbidity and mortality; thus, prevention of complications, and therefore, avoidance of gastrectomy is recommended in such patients. Nonetheless, in this study, gastrectomy was shown to improve prognoses in these patients.
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Key words: gastric carcinoma, pyloric stenosis, palliative surgery, prognosis

Introduction

Pyloric stenosis (PS) frequently develops in patients with gastric carcinoma. Even if distant metastases are present, palliative gastrectomy is often performed in these patients for symptomatic relief of stenosis and bleeding and for improvement of the quality of life.

Although endoscopic stenting has recently been attempted[1,2], we prefer abdominal surgery because of the certainty of the therapeutic outcome. In this

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Table 1 Characteristic of gastric carcinoma

	PS (49cases)	non-PS (671cases)	*p value*
Tumor invasion			
pT1	0 %	38.7%	
pT2	30.6	30.3	
pT3	49.0	24.8	
pT4	20.4	6.2	*p<0.01*
Stage			
I	12.2%	47.5%	
II	14.3	11.1	
III	20.4	17.8	
IV	53.1	23.6	*p<0.01*

study, we examined the clinical outcome of cases of gastric carcinoma with pyloric stenosis. We conducted a clinicopathological examination focusing on cases of stage IV disease[3] and evaluated the validity of gastrectomy as a palliative treatment in these cases.

Patients and Methods

Forty-nine patients with gastric carcinoma and PS diagnosed in our department from 1992 through 2004 were enrolled and their characteristics and treatment outcomes were reviewed.

PS was defined as stenosis of the vestibular part of the pylorus and absence of passage of contrast medium towards the anal side of the lesion in an upper gastrointestinal series. Patients showing infiltration of the entire thickness of the stomach wall by gastric carcinoma, that is, those with B-4 disease, were excluded from this study. Upper gastrointestinal endoscopy confirmed the difficulty of passing the scope through the stenosis of the pylorus. The histologic type of cancer was determined with biopsy. The diagnosis of stage IV cancer was confirmed by perioperative and pathological examinations in all cases. Surgery in all cases was performed by one of five gastrointestinal surgical specialists. Whether gastrectomy should be performed in cases of stage IV disease with PS was decided on the basis of the age and performance status of patients. All patients who were expected to require pancreaticoduodenectomy preoperatively were excluded as candidates for resection.

Statistical analysis was performed with Student's *t*-test and the χ^2 test. Survival was calculated with the Kaplan-Meier method and compared between groups by means of the log-rank test. Independent prognostic factors for survival were determined with Cox's proportional hazards model. The StatView software program (Abacus Concepts, Inc., Berkeley, CA, USA) was used for all statistical analyses, and the significance level was set at $p< 0.05$.

Results

Characteristics of Cases of Gastric Carcinoma with PS

The frequency of PS in patients with gastric carcinoma was 7.3%. The rate of serosal invasion (S1) was 70% in the PS group and about 30% in the non-PS group ($p<0.01$). Half of patients with gastric carcinoma in the PS group had stage IV disease, compared with 20% in the non-PS group ($p<0.01$, **Table 1**).

There was no significant difference in the distribution of histological types of cancer between the PS and non-PS groups. In spite of being a few, there was no significant difference between the outcomes of patients with and without PS among patients with stage I to III disease. The 5-year survival rate of patients with stage IV gastric carcinoma was 0% for those with PS and 10% for those without PS; although the difference was not significant, overall the survival rate tended to be low.

Surgery

Distal gastrectomy was performed in 31 patients (63.3%), and total gastrectomy was performed in 5 patients (10.2%). Among the patients undergoing distal gastrectomy, the Billroth I procedure was performed for reconstruction in 21 patients, and the Billroth II procedure was performed in 10 patients. The Roux-en Y procedure was performed in all patients undergoing TG. Gastroenteric anastomosis was performed in 12 patients (24.5%), exploratory laparotomy was performed in 1 patient (2.0%) elsewhere, and the resection rate was 73.5%. The numbers of patients who had undergone curative resection A, B, and C were 10 (20.4%), 12 (24.5%), and 27 (55.1%), respectively. Of the 36 patients who underwent gastrectomy, 6 (16.7%), 7 (19.4%), 10 (27.8%), and 13 (36.3%) had stage I, stage II, stage III, and stage IV carcinoma, respectively. The resection rate in patients with stage I to III disease and PS was 100%. However, among the patients with stage IV disease and PS, the numbers of those undergoing distal gastrectomy, total gastrectomy, gastroenteric anastomosis, and exploratory laparotomy were 9 (34.6%), 4 (15.4%), 12 (46.2%), and 1 (3.8%), respectively, with the resection rate falling to 50.0%, and the extent of resection in all of these patients were classified as curative resection C (**Table 2**). Of the 36 patients who underwent gastrectomy, 17 (47.2%) had complications. The complications included anastomotic leakage, stenosis, intraperitoneal abscess, pancreatic juice leakage, stasis, methicillin-resistant *Staphylococcus aureus* enteritis, and pneumonia. The complication rate was was 47.1% in stage IV cases, 10% higher than the constitution ratio (36.1%) of stage IV.

Table 2 Treatment of Gastric carcinoma patients with PS

Over all (49 cases)		Stage IV (26 cases)	
DG	31 (63.3%)	DG	9 (34.6%)
TG	5 (10.2%)	TG	4 (15.4%)
G-E	12 (24.5%)	G-E	12 (46.2%)
Probe	1 (2.0%)	Probe	1 (3.8%)
Resectability 73.5%		Resectability 50.0%	
curability		curability	
A)	10 (20.4%)	C)	26 (100%)
B)	12 (24.5%)		
C)	27 (55.1%)		

DG: distal gastrectomy, TG: total gastrectomy, G-E: gastro-enteric anastomosis, Probe: exploratory laparotomy

Examination of Stage IV Cases

Twenty-six patients with stage IV disease and PS were examined. The diagnostic criteria for stage IV disease were reviewed by dividing the patients into a gastrectomy group, who underwent palliative gastrectomy, and a nongastrectomy group, who did not. Dissemination was observed in 6 and 9 cases in the gastrectomy and nongastrectomy groups, respectively, whereas positive peritoneal washing cytology results were observed in 3 and 2 cases, respectively; liver metastasis was observed in 3 and 4 cases, respectively; and distant metastasis was observed in 1 and 0 cases, respectively. No significant differences were observed between the two groups. Peritoneal washing cytology was not evaluated in 11 cases. Because lymph node metastasis could not be accurately examined in the nongastrectomy group, the T and N categories could not be analyzed[3].

The background characteristics of the 13 patients who underwent palliative gastrectomy and of the 13 patients who did not are shown in **Table 3**. There were no differences in gender, age, histological type, or adjuvant therapy between the two groups. However, the distribution of the depth of tumor invasion (T classification) differed significantly between the two groups. The T4 factor in the gastrectomy group was defined by invasion into the pancreas and portal vein, whereas the T4 factor in the nongastrectomy group was defined by invasion into the pancreas, liver, and mesentery of the transverse colon. In two cases of the gastrectomy group, the carcinoma has been left ahead of abrasion and the amputation stump.

The rate of complications was significantly higher in the gastrectomy group (8 patients, 61.5%) than in the nongastrectomy group (1 patient, 7.7%). Stasis developed after gastroenteric anastomosis in 1 patient in the nongastrectomy group.

The mean interval until the start of food intake

Table 3 Back Ground of stage Ⅳ of pyloric stenosis

	Gastrectomy	non-Gastrectomy	*p value*
	(13 cases)	(13 cases)	
gender (m/f)	10/3	7/6	N.S.
age	65.3	66.7	N.S.
T factor (T2/T3/T4)	1/10/2	0/5/8	*p=0.01*
histological type (diff./undiff./unkn.)	6/7/0	6/6/1	N.S.
adjuvant chemo (yes/no)	6/7	5/8	N.S.

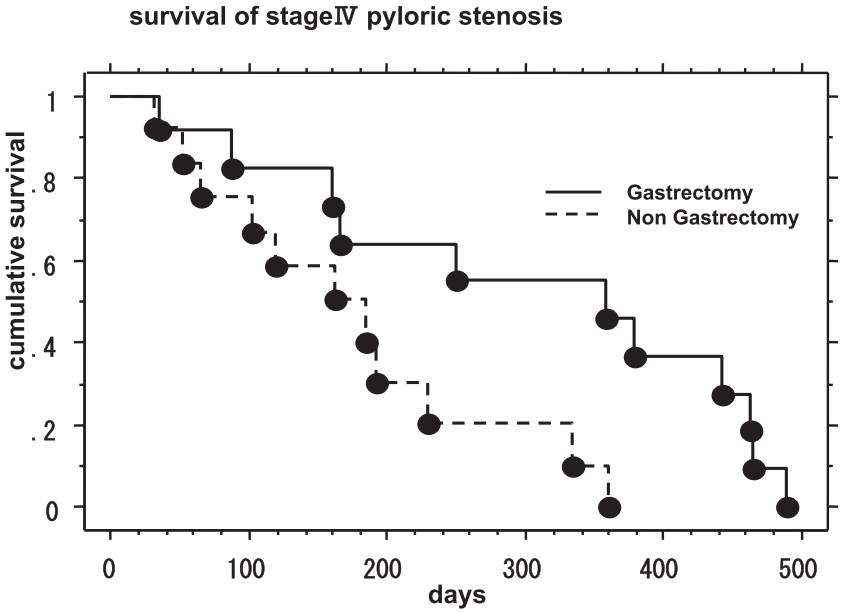

Fig. 1 Survival curves of 13 patients undergoing palliative gastrectomy and 13 patients undergoing gastrojejunostomy and exploratory laparotomy. MST of gastrectomy group (358days) is significant longer than that of non-gastrectomy group (173days) (P=0.025). *Logrank test*

was 18 ± 17.1 days in the gastrectomy group, and 9 ± 1.9 days in the nongastrectomy group. Although the difference was not significant, the interval tended to be longer in the gastrectomy group. The length of postoperative hospitalization of was slightly greater in the gastrectomy group (41 ± 19.1 days) than in the nongastrectomy group (30 ± 10.7 days).

The median survival time in the gastrectomy group (358 days) was significantly longer than that in the nongastrectomy group (173 days, p=0.025, **Fig. 1**). Multivariate regression analysis found that the performance/nonperformance of resection was the only significant independent prognostic factor in cases of stage IV disease (**Table 4**).

Discussion

This study found that the most cases of gastric carcinoma with PS can be classified as stage IV disease and that curative surgery in these cases is difficult. It is still open to debate whether palliative surgery is indicated for stage IV cases. In this study, factors including tumor invasion, dissemination, presence/absence of liver metastasis, histological type, and performance/nonperformance of resection were shown to be significant prognostic factors in these cases The median survival time in the

Table 4 statistical analysis of significant prognostic factor

Factor	*p value*	relative risk
Resection (Gastrectomy/ Non Gastrectomy)	0.033	3.36
Tumor invasion (T4/T1 ～ 3)	0.523	1.41
Dissemination (P1/P0)	0.819	0.90
histological type (undiff./diff.)	0.627	1.29

Cox's proportional hazard model

gastrectomy group (PS stage IV, 358 days) was significantly greater than that in the nongastrectomy group (PS stage IV, 173 days). However, the length of survival did not differ significantly between the T1～3 and T4 cases. Some reports have suggested that palliative surgery may yield some improvemen in cases of gastric carcinoma with PS[4–6]. There are some reports that in cases of gastric carcinoma without hepatic metastases, gastrectomy may yield survival improvement if the main lesion is resectable, regardless of the presence or absence of dissemination[6,7]. The complication rate of palliative gastrectomy in stage IV cases was about 10% higher than the constitution ratio of stage IV. It has been reported that palliative surgery becomes progressively less effective as the degree of dissemination increases[8]. While prevention of complications is important in stage IV cases, palliative gastrectomy was shown to lengthen survival in these cases[9].

Recently, prolongation of survival by treatment with S-1 has also been reported for many cases of stage IV disease. We therefore propose that the combination of gastrectomy and chemotherapy may have a beneficial effect on prognosis in patients with stage IV disease[10–12].

Conclusions

Half of the patients of gastric carcinoma and PS stenosis had stage IV disease. Prevention of complications is important in patients with stage IV disease; however, gastrectomy was shown to improve the prognosis in these cases.

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