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Usefulness of Modified Devine Gastrojejunostomy as a Palliative Surgery

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ABSTRACT

Background : A modified Devine gastrojejunostomy has commonly been advocated as a palliative surgery for unresectable gastric or periampullary carcinomas. The present study reviewed patients who had undergone modified Devine gastrojejunostomy to evaluate its efficacy and safety.

Methods : The subjects were 40 consecutive patients who had undergone modified Devine gastrojejunostomy without partial gastrectomy. The variables analyzed were operation time, blood loss, postoperative complications, the state and duration of adequate oral ingestion, hospital stay, mortality rate, and serum albumin. Postoperative complications, state of oral intake, hospital stay, and mortality rate were compared between patients with complete obstruction and patients with incomplete obstruction.

Results : Mean operation time was shortest for scheduled operations without concomitant procedures. Early complications occurred in 5 patients (13%). Late complications occurred in 4 patients (10%). Thirty-eight of the 40 patients (95%) resumed an oral diet at a mean of 5.5 days after surgery. Thirty-seven patients (93%) were discharged from hospital. No significant differences in the postoperative course were evident between patients with complete obstruction and patients with incomplete obstruction.

Conclusions : A modified Devine gastrojejunostomy is a feasible procedure, affording good quality of life after surgery with low rates of morbidity and mortality for patients with gastroduodenal outflow obstruction due to malignancy. (Jikeikai Med J 2010 ; 57 : 121-6)

Key words : gastrojejunostomy, modified Devine gastrojejunostomy, palliative surgery, quality of life

INTRODUCTION

Because conventional side-to-side gastrojejunostomy in patients with gastroduodenal outflow obstruction often fails due to delayed gastric emptying[1,2], many modified techniques have been advocated[3-7]. Recently, laparoscopic approaches have also been reported[6-12]. Among various procedures, a modification of the gastrojejunostomy developed by Devine[13] in 1925 has commonly been advocated because of its effectiveness[11-14]. A modified Devine gastrojejunostomy without resection of the stomach has been introduced at our institution. Although some reports have recommended the same type of modified Devine gastrojejunostomy[15,16], the numbers of reported cases have been small, and assessment for this procedure remains insufficient. The present study reviewed 40 consecutive patients who underwent modified Devine gastrojejunostomy to evaluate its efficacy and safety from the perspectives of quality of life and surgical stress.

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PATIENTS AND METHODS

The subjects were 40 consecutive patients (15 women and 25 men) with a mean age of 70 years (range, 47–86 years) with malignant gastroduodenal outflow obstruction who underwent modified Devine gastrojejunostomy at our institution from 2004 through 2009.

The modified Devine gastrojejunostomy was performed as follows: after a 10-cm-long upper-median laparotomy was made, the stomach was transected with a 3-row stapling device along the same line as for distal gastrectomy for peptic ulcer. During transection, a 1- to 2-cm-long segment of the lesser curvature was left unstapled. The proximal jejunum approximately 30 cm from the ligament of Treitz was brought to the operative field in a retrocolic fashion, and isoperistaltic end-to-side gastrojejunostomy was performed (Fig. 1A).

In patients who presented with obstructive jaundice, choledochojejunostomy was added. In such cases, after transection of the jejunum approximately 30 cm from the ligament of Treitz, the distal site of the jejunum was brought to the common bile duct in a retrocolic fashion, and gastrojejunostomy was performed approximately 30 cm distal to the choledochojejunostomy (Fig. 1B).

Causes of obstruction included: pancreatic carcinoma ($n=20$); gastric carcinoma ($n=11$); cholangiocarcinoma ($n=6$); and duodenal carcinoma ($n=3$). Complete obstruction was seen in 21 cases, and incomplete obstruction was seen in 19 cases. The degree of obstruction was judged with fluorography. Nineteen patients underwent initially scheduled bypass operations. The remaining 21 patients underwent bypass operations after curative operation was judged impossible. Concomitant procedures were performed in 17 patients, including choledochojejunostomy in 12 patients, intestinal bypass in 3 patients, and construction of an intestinal fistula in 2 patients. A Braun anastomosis was constructed in 1 patient.

For all patients, the variables analyzed consisted of operation time, blood loss, postoperative complications, the state and duration of adequate oral ingestion, the duration of hospital stay, in-hospital mortality, and serum albumin before and after operations. For assessments of operation time and blood loss, patients were divided into 4 groups according to whether concomitant procedures were added or whether bypass operation was initially planned.

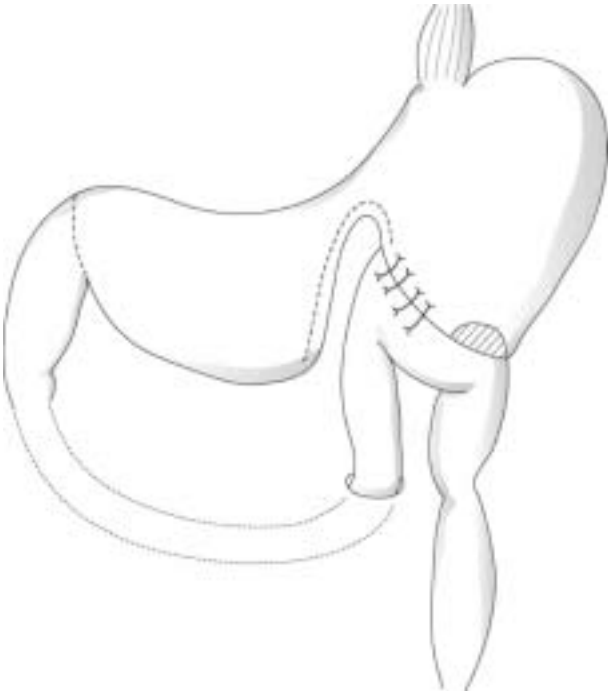

Fig. 1A. Gastrojejunostomy with the modified Devine method applied at our institution

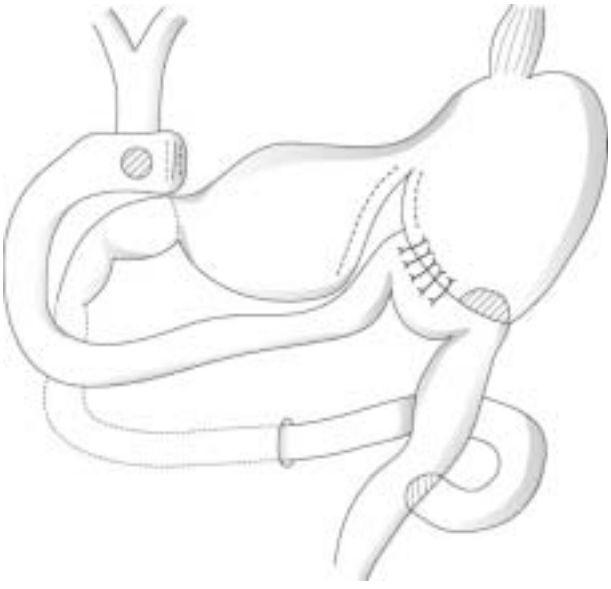

Fig. 1B. Gastrojejunostomy with choledochojejunostomy by means of the modified Devine method applied at our institution

Patients who required endoscopic treatment after surgery were included in the study.

Furthermore, patients were divided into 2 groups depending on the degree of gastroduodenal obstruction. To investigate the effectiveness of prophylactic construction, postoperative complications, state and duration of adequate oral intake, duration of hospital stay, and in-hospital mortality rate were compared between the 2 groups

Either Student's t-test or Fisher's exact test was used for intergroup comparisons of the incidence of postoperative complications, the number of patients who could obtain adequate oral intake, time until restoration of oral feeding, the interval from the start of a liquid diet to the start of a regular diet, duration of hospitalization, and in-hospital mortality rate. Values of $P < 0.05$ were considered to indicate statistical significance.

Results

Mean operation time was shortest (99 minutes) for scheduled operations without concomitant procedures and was longest (222 minutes) for unscheduled operations with concomitant procedures. Blood loss showed a similar tendency, and mean blood loss was least (60 ml) for scheduled operations without concomitant procedures (Fig. 2).

Early complications (within 1 month) occurred in 5 patients (13%). These consisted of sepsis in 2 patients and subphrenic abscess, cholecystitis, and leakage from the choledochojejunostomy in 1 patient each. Late complications (after 1 month) occurred in 4 patients (10%): cholangitis in 2 patients and hemorrhage from the tumor and pancreatic fistula in 1 patient each. No patients died within 1 month.

Thirty-eight of the 40 patients (95%) resumed an oral diet at a mean of 5.5 days after surgery. Of the 38 patients, 30 patients could eat a regular diet and 8 patients could eat semisolid meals a mean of 15.6 days after oral intake was resumed (Fig. 3).

Thirty-seven patients (93%) were discharged

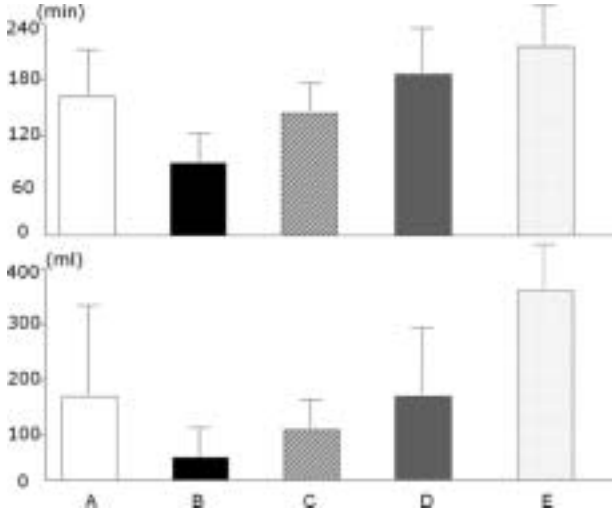

Fig. 2. Mean operation time (top) and blood loss (bottom)
A) The mean of all operations; B) scheduled gastrojejunostomy without concomitant procedures; C) scheduled gastrojejunostomy with concomitant procedures; D) unscheduled gastrojejunostomy without concomitant procedures; and E) unscheduled gastrojejunostomy with concomitant procedures.

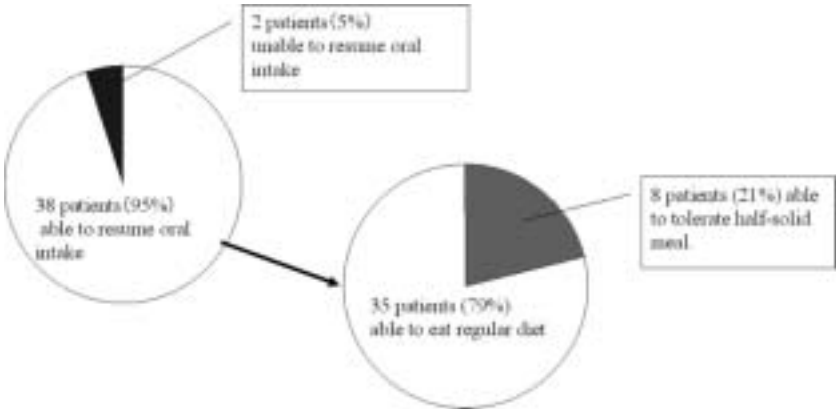

Fig. 3. State of oral ingestion after surgery

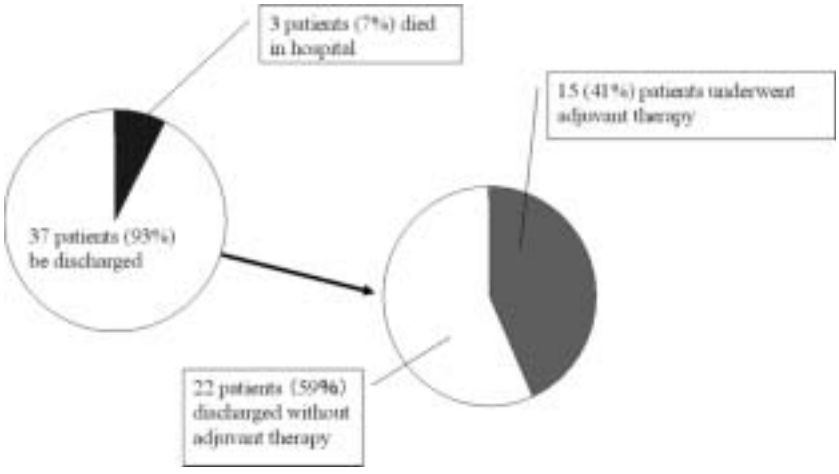

Fig. 4. Postoperative course

Table 1. Comparison of variables between complete and incomplete obstruction

	Obstruction		
	Complete	Incomplete	*P*
Postoperative complications	3 (14%)	2 (10%)	0.3758
Able to resume oral diet	19 (90%)	19 (100%)	0.1675
Time at beginning of oral feeding (days)	5.1	5.8	0.7262
Period between liquid diet and regular Or half-regular diet (days)	16.9	16.3	0.8412
Hospital stay (days)	24.8	26.8	0.7752
Hospital death (mortality : %)	2 (9%)	1 (5%)	0.8524

from hospital. Of these 37 patients, 15 underwent chemotherapy. Twenty-two patients who did not undergo adjuvant therapy were discharged at a mean of 21.0 days after surgery. Three patients died in the hospital due to the progression of advanced carcinoma (Fig. 4).

Preoperative and postoperative mean serum albumin levels were 3.38 and 3.27 g/dl, respectively, and did not differ significantly.

Four patients required endoscopic treatments, including 3 patients with biliary endoprosthesis and 1 patient with hemostasis with an argon beam coagulator for hemorrhage from a tumor. All patients underwent successful interventions with smooth insertion of an endoscope to target points.

No significant differences were evident between patients with complete obstruction and patients with incomplete obstruction in the incidence of postoperative complications, number of patients who could obtain adequate oral intake, time until resumption of oral feeding, interval from the start of a liquid diet to the start of a regular diet, duration of hospitalization, and in-hospital mortality rate (Table 1).

DISCUSSION

Numerous modifications have been described to improve or maintain oral intake after gastrojejunostomy[3-7, 12-16]. Of these modifications, the modified Devine gastrojejunostomy without partial resection of the stomach was selected at our institution as a palliative surgery for unresectable gastric or periampullary carcinomas[14-16]. This procedure offers several advantages. Transection of the stomach prevents ingested food from being retained in the antrum, which causes delayed gastric emptying[1,2]. In patients with incomplete stenosis, viscious circle often occurs after prophylactic gastrojejunostomy using a

side-to-side technique. No differences in quality of life were seen in the current series between complete stenosis and incomplete stenosis, despite approximately half of our patients showing incomplete stenosis. Furthermore, complications, such as hemorrhage from tumors, are unlikely to occur without passage of food in the lesion.

Ninety-five percent of our patients were able to resume oral intake, and 79% could tolerate a regular diet. A remnant lumen that is not partitioned at the lesser curvature as a drainage route from the antrum facilitates endoscopic observation of the lesion and intervention. Although 4 patients in our series required endoscopic intervention, all endoscopic treatments were successful.

Oida et al.[11] have reported a modified Devine gastrojejunostomy with partial resection to obtain smooth passage of gastric contents to the jejunum. Our procedure does not require gastrectomy to facilitate the operation. Instead, several modifications were adopted to ensure the straight flow of food to the jejunum. One of these modifications is to transect the stomach from the greater curvature toward the left side as much as possible, as with reconstruction of the gastric tube after esophagectomy. The other modification is to fix the afferent loop in the partitioned stomach to the oral side with sutures. We believe that construction of an anastomosis no wider than the transverse length of the jejunal limb is important. An anastmosis wider than the transverse length of the jejunal limb may prevent gastric contents from moving smoothly to the efferent loop.

The effectiveness of the modified Devine gastrojejunostomy without partial gastrectomy has been reported, but every report consisted of a small series of less than 10 patients[12-14]. Recently, laparoscopic approaches for gastrojejunostomy have been described[4-9]. For example, Suzuki et al.[7] have reported 8 cases in which this type of gastrojejunostomy was performed by means of laparoscopic surgery. Moreover, Gentileshi et al.[9] have performed laparoscopic gastrojejunostomy with hepaticojejunostomy. Because candidates for palliative surgery usually present with a poor condition, less-invasive surgeries are preferable.

In conclusion, the modified Devine's gastrojejunostomy applied at our institution is a feasible procedure, affording good quality of life after surgery with low morbidity and mortality rates for patients with gastroduodenal outflow obstruction due to malignancy.

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