Jejunal Pouch and Interposition Reconstruction After Total Gastrectomy for Cancer

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Abstract: The authors modified the operative procedures used in pouch and interposition (PI) reconstruction in an attempt to improve the surgical results after total gastrectomy, because a randomized controlled trial had revealed that the clinical assessment of PI was quite poor, even though it is a physiological route. In most of the treated patients, the gastric emptying test revealed delayed emptying, and an X-ray video film showed folding and twisting of the jejunal conduit between the pouch and duodenum, which disturbed the transmission of nutrition. Modified PI (m-PI) was performed by decreasing the length of the jejunal conduit and widening the mesenteric pedicle to preserve the blood and nerve supply. This procedure was retrospectively compared with the previously used PI reconstruction by evaluating the postprandial symptoms, food intake, body weight, serum nutritional parameters, and emptying time of the gastric substitute. The m-PI group (n = 6) showed a lower incidence of symptoms, a greater food intake, and a greater weight recovery than the PI group (n = 6). The gastric emptying test also revealed an acceptable degree of emptying. We thus conclude that the m-PI reconstruction is more useful for improving the postoperative quality of life than the previously used method of PI reconstruction.

Key Words: gastric cancer, reconstruction after total gastrectomy, jejunal pouch and interposition, quality of life

Introduction

Since Schlatter performed the first successful total gastrectomy, many types of gastric replacement with various enteric reservoirs have been applied in an effort to improve both the overall symptoms and the nutrition of patients undergoing total gastrectomy. However, the optimum reconstruction after total gastrectomy for malignant disease remains to be clarified, and there have been few prospective clinical trials to examine this question.

In a previous study, we conducted a randomized controlled trial to compare the usefulness of the three reconstruction procedures of simple Roux-en-Y (RY), Hunt-Lawrence pouch and Roux-en-Y (PR), and Hunt-Lawrence pouch and interposition (PI). The results indicated that PR reconstruction was the most useful of the three procedures for improving the postoperative symptoms and the quality of life. In the patients with PI reconstruction, even though it is a physiological route, the clinical assessment was quite poor. In most of our patients, an X-ray video film revealed apparent folding and twisting of the jejunal conduit between the pouch and duodenum, which thus disturbed the transmission of nutrition from the pouch to the duodenum, while a motility disturbance of the jejunal conduit was also observed. These phenomena might be partly due to the operative procedures.

In an attempt to improve the poor results after PI reconstruction, we modified our operative procedure for PI reconstruction and retrospectively compared the modified version with the previously used PI reconstruction by evaluating both the postoperative symptoms and the quality of life.

Operative Procedures

Previously Used Pouch and Interposition Procedure

After total gastrectomy with systematic lymphadenectomy, the jejunum was divided using a linear stapler (GIA-60, U.S. Surgical Norwalk, CT, USA) approximately 20cm distal to Treitz's ligament. In this procedure, the marginal artery of the jejunal mesentery was ligated and divided. For the construction of the Hunt-Lawrence pouch, the distal portion of the divided
Fig. 1a–c. Pouch construction using doubled limbs of the jejunum. a At the midportion of each limb, a small stab wound is made. b Enteroenteric anastomosis is performed using the linear stapler through this stab wound. Care is taken to leave a small gap (nonanastomotic area, 1.0–1.5 cm in length) between the suture line and the apex of the folded loop. c Area of the jejunal wall in which blood circulation is impaired. A, esophagojejunostomy; B, jejunojejunostomy.

Fig. 2a,b. Procedure for widening the mesenteric pedicle. a The jejunum is divided 20 cm distal to Treitz's ligament. In dividing the jejunal mesentery, the vasa rectae are ligated and divided only a few cm in length. b A length of about 10 cm of the jejunal loop is sacrificed. In this procedure, care is taken not to disturb the marginal artery of the mesentery.

The efferent limb measuring 20 cm in length was brought up retrocolically, plicated to the proximal efferent limb, and then held in place by traction sutures. At the midportion of each limb of the plicated loops, a small stab wound was made (Fig. 1a). The linear autosuture stapler (GIA-90, U.S. Surgical) was introduced through this stab wound twice, both upward and downward, and a side-to-side anastomosis was thus performed at the antimesenteric borders of the bowel. Care was taken to leave a gap wide enough to admit the index finger between the proximal end of the anastomosis and the apex of the folded loop (Fig. 1b). This was done to prevent any possible compromise of the vascular supply of the jejunal wall at the site to be used for subsequent anastomosis to the esophagus (Fig. 1c). After an inspection of the anastomotic lines for hemostasis, an end-to-end jejunoduodenostomy was performed using a circular stapler device (EEA 25, U.S. Surgical) introduced through the center hole of the pouch, followed by an end-to-side esophagojejunostomy with the EEA instrument. The hole was closed transversely with two layer closures. The completed pouch measured about 20 cm in length. Leakage of the constructed pouch was checked by injecting 200–300 ml of warm saline through a nasogastric tube. Intestinal continuity was then reestablished manually with an end-to-end jejunojejunostomy measuring about 20 cm distal to Treitz's ligament.

Modified Jejunal Pouch and Interposition Procedure

For m-PI, we modified three aspects, as described below, of the pouch and interposition. First, in dividing the jejunal mesentery at 20 cm distal to Treitz's ligament, only the vasa rectae were ligated and divided along the jejunal wall for a few cm in length, as shown in Fig. 2a. Care was taken not to disturb the marginal artery in order to preserve the blood and nerve supply. Secondly, in performing a jejunoduodenostomy, the length of the isoperistaltic jejunal conduit thus decreased from 20 cm