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Retrospective Cohort Study

Does the addition of Braun anastomosis to Billroth II reconstruction on laparoscopic-assisted distal gastrectomy profit patients?

Li XG *et al.* Braun anastomosis to Billroth II reconstruction

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Abstract

BACKGROUND

Operation is the primary therapeutic option for patients with distal gastrectomy. Braun anastomosis is usually performed after Billroth II reconstruction, which is widely applied on distal gastrectomy because it is believed to profit patients. But studies are needed to confirm that.

AIM

To identify whether the addition of Braun anastomosis to Billroth II reconstruction on laparoscopy-assisted distal gastrectomy profits patients.

METHODS

A total of 143 patients with gastric cancer underwent laparoscopy-assisted distal gastrectomy at Centre 1 of PLA general hospital between January 2015 and December 2019. Clinical data of the patients are collected and 93 of the 143 patients are followed up. These 93 patients were divided into two groups: Group 1 (Billroth II reconstruction, 33 patients) and group 2 (Billroth II reconstruction combined with Braun anastomosis, 60 patients). Postoperative complications follow-up data and relevant clinical data were compared between the two groups.

RESULTS

There was no significant differences between groups 1 and group 2 in postoperative complications (6.1% *vs* 6.7% $P = 0.679$), anal exhaust time, or blood loss. The follow-up prevalence of reflux gastritis indicates no significant difference between groups 1 and group 2 (68.2% *vs* 51.7%, $P = 0.109$). The follow-up European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core-30 scores turned out no evident difference between group 1 and group 2 as well. Despite the fact that group 1 takes less operating time than group 2 on average (234.6 min *vs* 262.0 min, $P = 0.017$).

CONCLUSION

Combined with Billroth II reconstruction, Braun anastomosis has been applied due to the ability of it to reduce the prevalence of reflux gastritis. Whereas in this study, the prevalence of reflux gastritis shows no significant difference, leading to a conclusion that under the circumstance of Braun anastomosis spending more time and more money, simple Billroth II reconstruction should be widely applied.

Key Words: Gastric cancer; Billroth II reconstruction; Braun anastomosis; Bile reflux

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Core Tip: Braun anastomosis is usually performed after Billroth II reconstruction, which is wildly applied on distal gastrectomy because it is believed to profit patients. This study indicated that the addition of Braun anastomosis to Billroth II reconstruction makes no significant difference to reduce the incidence of reflux gastritis.

INTRODUCTION

Billroth I, Billroth II, and Roux-en-Y reconstruction are the there most wildly applied reconstructions for distal gastrectomy^[1]. Among these reconstructions, Billroth II reconstruction is recognized to reduce a high proportion of patients with reflux gastritis and reflux gastritis that break the patients' life qualities^[2] and potentially lead to malignancy, gastritis, and reflux esophagitis^[3,4]. In accordance with recent studies, the incidence of reflux gastritis after Billroth II reconstruction varies from 40% to 90%^[5-7]. The addition of Braun anastomosis has been performed after Billroth II reconstruction since 1885, aiming to reduce complications after Billroth II reconstruction.

However, based on the working experiences in the hospital, it is found that patients who underwent Braun anastomosis could get serious reflux gastritis as well. Moreover, one recent study^[8] found ⁴ that the addition of a Braun anastomosis is not effective in preventing enterogastric bile reflux. Other studies suggested that Braun anastomosis has a minor impact on the incidence of reflux gastritis to pancreatoduodenectomy^[9,10] and one anastomosis gastric bypass^[11]. Thus, whether Braun anastomosis can truly decrease the incidence of bile reflux to distal gastrectomy remains unknown.

The current study is aiming to identify whether Braun anastomosis can truly decrease the incidence of bile reflux and improve the life qualities of the patients after Billroth II reconstruction on laparoscopic distal gastrectomy.

MATERIALS AND METHODS

Study design and data source

This retrospective cohort study is approved by our ethics committee at our institution. Between January 2015 and December 2019, a total of 143 patients with distal gastric cancer converted Billroth II reconstruction were collected in the 1st center of People's Liberation Army General Hospital (PLA general hospital), Beijing, China.

Laparoscopic-assisted distal gastrectomy with D2 Lymphadenectomy was performed on all of the patients under the conduct of the Japanese classification of gastric carcinoma and the guidelines for the treatment of gastric carcinoma^[12,13]. The arteries and veins were cut in the laparoscopic vision and then a small incision (less than 10 cm) was made in the center of the abdominal wall.

In group 1, a small opening was made in the jejunum 20 cm away from the Treitz ligament on the anti-mesenteric margin and the residual gastric wall. The Billroth II anastomosis was performed with a 60 mm linear stapler in the end. In group 2, jejunum-jejunum anastomosis was made 40 cm from the afferent limb. Clinical data of the patients are collected and 93 of the 143 patients are followed up. The follow-up data contents: (1) The European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core-30 (EORTC QLQ-C30) scores^[14] of patients; and (2) The

number of patients with reflux gastritis. All the follow-up were done between January, 2021 and June, 2021. Postoperative complications contents, relevant clinical data and follow-up data were compared as well.

Participate selection

The inclusion criteria include: (1) Age from 18 to 75; (2) pathologically diagnosed as distal gastric cancer; (3) cancer pathological stage I-III (the 8th edition of the American Joint Committee on Cancer^[15]); and (4) clinical details are completed. Exclusion criteria contents: patients with serious heart disease or brain disease which is influential to live qualities. Finally, a total of 143 patients were selected. Clinical data of the patients are collected and 93 of the 143 patients are followed up. Among other 50 patients, 40 patients are out of contact and 10 patients were dead.

Outcomes definition

The main outcomes of this study are the incidence of reflux gastritis after the operation and EORTC QLQ-C30 scores that is wildly applied in varieties of clinical studies^[16-18]. Patients were called and required to answer 30 questions from EORTC QLQ-C30 with their scores calculated. Scores were calculated based on five multi-item functional scales (emotional, physical, role, social and cognitive function), of which higher scores indicating better life qualities; three multi-item and six single-item symptom scores, of which higher scores indicating poorer life qualities. Reflux gastritis is diagnosed according to the gastroscope reports.

Statistical analysis

All statistical analyses were performed with the support of SPSS v23.0 for Windows software. Continuous variables are expressed as mean \pm SD and compared by Student's *t*-test. Categorical variables were analyzed by Pearson χ^2 test. A two-tailed *P* value < 0.05 was considered statistically significant.

RESULTS

There were 33 patients in group 1 and 60 patients in group 2. The age, pathological tumor stage, sex, mean blood loss and mean exhaust time between the two groups are similar, while group 2 had a significantly longer mean operation time (Table 1).

In the comparison of postoperative complications, 1 of the 33 patients in group 1 suffered from bile reflux and 2 patients had anastomotic fistula. In group 2, 1 patient had anastomosis bleeding and 3 patients had anastomotic fistula. The total incidence of postoperative complications indicates no significant difference between the two groups (Table 2).

During follow-up, 11 patients in group 1 and 29 patients in group 2 had reflux gastritis on their gastroscopy report during the postoperative review. The total incidence of reflux gastritis shows no significant difference (66.7% vs 51.7%, $P = 0.109$). For five multi-item functional scales (physical, emotional, role, cognitive and social function), three multi-item and six single-item symptom scores, it showed no significant difference between these two groups (Figure 1 and Table 3).

DISCUSSION

Billroth II reconstruction was invented in 1885 by Billroth as a modification of Billroth I. Due to the unique structure of Billroth II reconstruction, bile will flow through the residual stomach to the afferent loop, causing reflux gastritis (Figure 2A). Until now, Billroth II reconstruction is recognized with complications including anorexia, loss of appetite, dumping syndrome, nutritional anemia, and alkaline reflux esophagitis^[19]. In the previous study, the addition of Braun anastomosis is regarded a method to reduce the incidence of reflux gastritis. That is because Braun anastomosis could relieve the afferent loop pressure^[20,21], making bile flow through the jejunum- jejunum anastomosis, rather than residual stomach (Figure 2B).

In this study, the incidence of reflux gastritis in group 1 is lower than that in group 2, but the difference is insignificant. It is indicated that bile may flow through both

residual and the jejunum- jejunum anastomosis (Figure 2C). More experiments are needed to ensure this judgement.

In terms of postoperation complications, group 1 and group 2 are similar. The ¹five multi-item functional scales (physical, emotional, role, cognitive and social function), three multi-item and six single-item symptom scores showed no significant difference as well.

CONCLUSION

In conclusion, this study indicated that the addition of Braun anastomosis to Billroth II reconstruction makes no significant difference to reduce the incidence of Reflux Gastritis. The addition can hardly improve the life qualities of the patients, but extends the operation time. Thus, the addition of Braun anastomosis is not necessary, and simple Billroth II reconstruction should be widely applied.

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