

## **Comparative Analysis of the Effects of SPLT Anastomosis and Esophagojejunostomy Roux-en-Y Anastomosis in Laparoscopic Surgery for Advanced Gastric Cancer and Its Impact on Prognosis**

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**Introduction.** To explore the effect of using SPLT anastomosis and roux en y anastomosis of the esophagus and jejunum after laparoscopic surgery for advanced gastric cancer patients, and its impact on prognosis.

**Methods.** 96 patients with advanced gastric cancer from January 2022 to June 2023 were selected as the study population. All patients underwent laparoscopic surgery and were divided into two groups with 48 cases in each group based on different anastomosis methods. The control group was treated with roux en y esophagojejunal anastomosis, while the observation group was treated with SPLT anastomosis. The patient's effect was evaluated 7 days after surgery in both groups, and the inflammatory factors, nutritional status, and postoperative complications were compared.

**Results.** Both groups had varying degrees of inflammatory reactions 7 days after surgery, but the observation group had IL-6, IL-8, and TNF levels-  $\alpha$  The CRP level was lower than that of the control group ( $P < 0.05$ ); The nutritional status of both groups improved significantly 4 weeks after surgery; The levels of SF, ALB, and PA in the observation group were higher than those in the control group ( $P < 0.05$ ); There was no statistically significant difference in the incidence of postoperative complications between the two groups ( $P > 0.05$ ).

**Conclusion.** Both SPLT anastomosis and roux-en-y esophagojejunal anastomosis can achieve good results in laparoscopic surgery for advanced gastric cancer patients, and SPLT anastomosis has a lighter inflammatory response, which helps improve patient nutritional

status and does not increase the incidence of postoperative complications. It is worth promoting and applying.

Keywords. SPLT anastomosis; Esophageal jejunal roux en y anastomosis; Progressive gastric cancer; Laparoscopic surgery; Inflammatory factors; Nutritional status; Postoperative complications

## INTRODUCTION

Gastric cancer is a malignant tumor that occurs in the stomach, and the main pathological type is adenocarcinoma. The common causes of patients include *Helicobacter pylori* infection, environment, genetic factors and dietary factors [1]. Most patients do not have obvious symptoms at the initial stage of the disease, but with the prolongation of the course of the disease, they may be manifested as fullness and discomfort, upper abdominal pain and weight loss, increasing the difficulty of clinical diagnosis and treatment [2]. Laparoscopic surgery is a common intervention method for patients with gastric cancer, and it has gradually replaced the traditional open surgery. It has the advantages of small surgical trauma, rapid postoperative recovery and low incidence of complications. However, there is no unified standard for patients to choose the method of digestive tract reconstruction during surgery [3]. Billroth-I and Billroth-II are the common methods of digestive tract reconstruction after laparoscopic gastrectomy. Although they can meet the needs of surgery, there are many limitations in different anastomosis methods. The operation of roux-en-y esophagojejunostomy is relatively complicated, but the indications of this operation are wide, and the patients recover well after operation [4]. SPLT anastomosis is relatively simple for patients after laparoscopic surgery, with low cost and high safety [5]. This study aims to investigate the effect of SPLT anastomosis and roux-en-y esophagojejunostomy in patients with advanced gastric cancer undergoing laparoscopic surgery. Here's the report.

## MATERIALS AND METHODS

### General Information

From January 2022 to June 2023, 96 patients with advanced gastric cancer were selected. All patients underwent laparoscopic surgery and were divided into two groups according to different anastomosis methods. There were 48 patients in the control group, including 31 males and 17 females, aged (41-77) years, with an average age of (61.25±4.51) years. The tumor diameter was (1-6) cm, with an average of (3.23±0.61) cm. TNM staging: 21 cases in stage I, 18 cases in stage II, 9 cases in stage III; There were 24 cases of poorly differentiated, 17 cases of moderately differentiated and 7 cases of well differentiated. There were 48 cases in the observation group, 29 males and 19 females, aged (43-79) years, with an average age of (61.63±4.58) years. The tumor diameter was (1-7) cm, with an average of (3.31±0.67) cm. According to TNM staging, there were 19 cases in stage I, 19 cases in stage II, and 10 cases in stage III. There were 22 cases of poorly differentiated, 18 cases of moderately differentiated and 8 cases of well differentiated. The study was approved by the hospital ethics committee, and the patients signed the consent form. There was no significant difference in general data between the two groups ( $P>0.05$ ).

### Inclusion and Exclusion Criteria

Inclusion criteria: (1) All patients were advanced gastric cancer admitted to our hospital [6]; (2) All patients underwent laparoscopic surgery and could tolerate it. (3) There were no contraindications to SPLT anastomosis and roux-en-y esophagojejunostomy.

Exclusion criteria: (1) patients with brain metastasis and spinal cord metastasis; (2) patients with autoimmune diseases or emergency surgery due to gastrointestinal perforation.

### Methods

All patients underwent laparoscopic surgery. Before surgery, all the examinations were completed, the physical status of the patients was evaluated, and the gastric juice pH value was dynamically monitored and the gastric tube was indwelling. At the same

time, oral administration of ethylene glycol (Beijing Shengyong Pharmaceutical Co., LTD., Chinese Medicine approved number H20090226, specification: 500mL) before operation can reduce the incidence of postoperative constipation. After the preparation for the operation was completed, general anesthesia was performed, the surgical site was disinfected, the surgical towel was spread, the patient was assisted to maintain the supine position, and the artificial pneumoperitoneum was established, and the pneumoperitoneum pressure was set at 12-15 MMHG. The laparoscope was routinely placed under the umbilicus as the observation hole, and the laparoscope was placed on both sides as the operation hole. Through the magnifying effect of laparoscope, the pelvic cavity, subphrenic, viscera, intestinal canal and the root of mesentery were clearly displayed, and the stomach was exposed to further determine the accurate location of the lesion and understand the stage and infiltration degree of the lesion.

**Control group:** All patients were treated with roux-en-y esophagojejunostomy. After laparoscopic resection of the lesion, the stomach was mobilized, the lower esophagus and the lower pyloric duodenum were reached, the intestinal tube and surrounding blood vessels were treated, the lymph nodes were dissected, and artificial pneumoperitoneum was removed. With the observation hole as a reference point, a 10cm incision was made upward, and the free gastrointestinal tissue was lifted upward. To ensure that the distance between the upper end of the esophagus and the tumor tissue is more than 3cm, and the distance between the inferior pyloric duodenum and the tumor tissue is more than 5cm. The stapler head was embedded in the esophageal stump, and the duodenum was cut off at 4m below the pylorus. The duodenogastric and surrounding lymph nodes were dissected, and the roux-en-y esophagojejunostomy was completed. The proximal and distal jejunal anastomosis was performed 60cm below the anastomotic site with the help of a stapler. The anastomosis and duodenal stump were sutured manually, and the mesenteric hiatus was closed after suture. For patients without active bleeding, the surgical incision was sutured to complete the operation. **Observation group:** All patients were treated with SPLT anastomosis. After laparoscopic eradication of gastric cancer, after lymph node

dissection, the duodenum was cut off by the nail compartment, and the lower part of the esophagus was ligated by sterile hemp rope (the esophagus was pulled to the caudal end and the left upper abdomen). The efficacy of the two groups was evaluated 7 days after the operation.

#### Indicators of Observation

(1) Inflammatory factors; The levels of interleukin-6, 8 (IL-6, 8) and tumor necrosis factor- $\alpha$  (TNF- $\alpha$ ) were detected by enzyme-linked immunosorbent assay before and after intervention in the two groups. C-reactive protein (CRP) was measured by immunoturbidimetry [7]. (2) nutritional status; The level of serum ferritin (SF) was measured by cyanmethemoglobin before and after intervention in the two groups [8]. The level of albumin (ALB) was detected by bromocresol green method [9]. The level of serum prealbumin (PA) was measured by turbidimetry [10]. (3) complications. The incidences of anastomotic leakage, pulmonary infection, bile duct injury, intestinal obstruction and dumping syndrome were recorded.

#### Statistical Analysis

SPSS26.0 software was used to process the data. The enumeration data were analyzed by  $\chi^2$  test, expressed by n (%), and the measurement data were analyzed by t test, expressed by  $(\bar{x} \pm s)$ ,  $P < 0.05$  was statistically significant.

## RESULTS

### The Inflammatory Factors Were Compared Between the Two Groups

Both groups were accompanied by different degrees of inflammatory reaction 7 days after operation, but the levels of IL-6, IL-8, TNF- $\alpha$  and CRP in the observation group were lower than those in the control group ( $P < 0.05$ ), as shown in Table 1.

Table 1 Comparison of inflammatory factors between the two groups ( $\bar{x} \pm s$ )

Groups	Point of time	IL-6 (ng/L)	IL-8 (ng/L)	TNF- $\alpha$ (pg/L)	CRP (mg/L)
Observation group (n=48)	Before intervention	7.62 $\pm$ 1.36	3.51 $\pm$ 0.37	115.32 $\pm$ 6.31	5.79 $\pm$ 0.98
	After the intervention	32.29 $\pm$ 5.53 <sup>#*</sup>	16.36 $\pm$ 2.69 <sup>#*</sup>	125.39 $\pm$ 15.39 <sup>#*</sup>	9.34 $\pm$ 1.32 <sup>#*</sup>
Control group (n=48)	Before intervention	7.65 $\pm$ 1.39	3.53 $\pm$ 0.39	116.41 $\pm$ 6.39	5.81 $\pm$ 1.00
	After the intervention	30.69 $\pm$ 3.41 <sup>*</sup>	25.74 $\pm$ 4.36 <sup>*</sup>	156.94 $\pm$ 22.44 <sup>*</sup>	14.72 $\pm$ 1.96 <sup>*</sup>

Compared with the control group, #P<0.05; Compared with that before intervention, \*P<0.05

### The Nutritional Status of the Two Groups Were Compared

The nutritional status of the two groups was significantly improved at 4 weeks after operation. The SF, ALB and PA in the observation group were higher than those in the control group (P<0.05), as shown in Table 2.

Table 2 Comparison of nutritional levels between the two groups ( $\bar{x} \pm s$ )

Groups	Number of cases	SF ( $\mu$ g/L)		ALB (g/L)		PA (mg/L)	
		Before intervention	After 4 weeks of intervention	Before intervention	After 4 weeks of intervention	Before intervention	After 4 weeks of intervention
Observation group	48	73.42 $\pm$ 3.51	93.27 $\pm$ 5.63 <sup>#</sup>	35.67 $\pm$ 4.31	45.32 $\pm$ 6.52 <sup>#</sup>	218.62 $\pm$ 16.21	253.44 $\pm$ 22.24 <sup>#</sup>
Control group	48	73.45 $\pm$ 3.53	84.14 $\pm$ 4.82 <sup>#</sup>	35.69 $\pm$ 4.33	38.84 $\pm$ 5.71 <sup>#</sup>	219.11 $\pm$ 16.24	232.97 $\pm$ 20.19 <sup>#</sup>
t	/	0.086	4.763	0.331	5.413	0.725	5.115
P	/	0.326	0.000	0.498	0.000	0.592	0.000

Compared with before intervention, #P<0.05.

### The Complications Were Compared Between the Two Groups

There was no significant difference in the incidence of postoperative complications between the two groups (P>0.05), as shown in Table 3.

Table 3 Comparison of complications between the two groups [n (%) ]

Groups	Number of cases	Anastomotic leak	Pulmonary infection	Bile duct injury	Intestinal obstruction	Dumping syndrome	Incidence rate
Observation group	48	0 (0.00)	1 (2.08)	0 (0.00)	0 (0.00)	1 (2.08)	2 (4.17)
Control group	48	1 (2.08)	1 (2.08)	1 (2.08)	1 (2.08)	1 (2.08)	5 (10.42)
$\chi^2$	/						1.387
P	/						0.239

## DISCUSSION

Gastric cancer is a malignant tumor with high clinical incidence. Most patients have no obvious symptoms in the early stage of the disease, which makes clinical diagnosis and treatment difficult [11]. Laparoscopic surgery, as a minimally invasive treatment method, can make up for the shortcomings of open surgery in patients with gastric cancer. With the help of the magnifying effect of laparoscopy, it can clearly show the anatomical plane and location of the lesion, determine the course of blood vessels, and facilitate lymph node dissection, in line with the principle of "tumor no contact". However, there is no unified standard for the method of digestive tract reconstruction after lesion resection in patients with gastric cancer [12]. In this study, both groups were accompanied by different degrees of inflammatory reaction 7 days after operation, but the levels of IL-6, IL-8, TNF- $\alpha$  and CRP in the observation group were lower than those in the control group ( $P < 0.05$ ). The results showed that SPLT anastomosis and roux-en-y esophagojejunostomy can meet the needs of surgical treatment in patients with advanced gastric cancer undergoing laparoscopic surgery. The inflammatory reaction of the former operation is lighter, which is conducive to the recovery of patients. Reasons for analysis: The roux-en-y esophagojejunostomy with Y incision on one side of the jejunum can form a storage bag at the proximal and

distal end of the jejunum, which can store food and improve the quality of life of patients. However, SPLT anastomosis starts by pulling the esophagus itself, dragging it into the free abdominal cavity, and cutting it off after resection [13]. Inflammatory factors are mainly composed of the immune system, which can secrete active substances in the state of trauma or inflammation, regulate and mediate inflammatory reaction and immune response, manifested as increased levels of IL-6, IL-8, TNF- $\alpha$  and CRP, and their expression levels can reflect the stress response in the body [14]. In this study, the nutritional status of the two groups was significantly improved at 4 weeks after operation. The levels of SF, ALB and PA in the observation group were higher than those in the control group ( $P < 0.05$ ). There was no significant difference in the incidence of postoperative complications between the two groups ( $P > 0.05$ ). From the results, SPLT anastomosis can improve the nutritional status of patients with advanced gastric cancer undergoing laparoscopic surgery, and can obtain a good prognosis. Analysis of reasons: the use of SPLT anastomosis can reduce the symptoms of gastroesophageal reflux, maximize the protection of gastrointestinal barrier function, promote the body's absorption of nutrients, so as to improve the nutritional status of patients [15]. Yang Hui et al. [16] showed that SPLT anastomosis intervention for patients with advanced gastric cancer after laparoscopic surgery can increase the secretion of gastric juice, reduce postoperative anastomotic stimulation, thus alleviate the postoperative symptoms of patients, avoid the erosion of gastric mucosa by gastric juice, protect the normal operation of gastrointestinal barrier function, promote the absorption of gastric nutrients, and consolidate the surgical effect. Most patients can benefit from it.

In conclusion, both SPLT anastomosis and roux-en-y esophagojejunostomy can achieve good results in patients with advanced gastric cancer undergoing laparoscopic surgery, and SPLT anastomosis has less inflammatory reaction, helps to improve the nutritional status of patients, and does not increase the incidence of postoperative complications, which is worthy of promotion and application.



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