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# Comparison of clinical efficacy between laparoscopic total gastrectomy and proximal gastrectomy in the treatment of adenocarcinoma of esophagogastric junction

DAI Dezhu, SHI Jin, SONG Xudong, DING Fan, TAO Guoquan

*Department of Gastrointestinal Surgery, the Affiliated Huai'an No.1 People's Hospital of Nanjing Medical University, Huai'an, Jiangsu 223300, China*

*Corresponding author: TAO Guoquan, E-mail: hayytgq@njmu.edu.cn*

**Abstract: Objective** To compare the advantages and disadvantages of two different resection margins by observing the clinical efficacy of laparoscopic total gastrectomy (TG) and proximal gastrectomy (PG) for radical resection of adenocarcinoma of esophagogastric junction (AEJ). **Methods** A total of 90 patients with AEJ who were treated by Huai'an First People's Hospital from January 2020 and December 2021 were retrospectively reviewed. Patients were divided into PG group ( $n=43$ ) and TG group ( $n=47$ ) according to the surgical resection range. The general data, surgery related statistical indicators of the two groups were compared. **Results** The TG group had a longer operation time than the PG group, with significantly more intraoperative blood loss and a greater number of intraoperatively cleared lymph nodes than the PG group ( $P<0.05$ ). There was no significant difference in terms of drainage volume of the abdominal drainage tubes in the 3-day postoperative period, postoperative period to the drainage removal, and the length of hospitalization between the two groups ( $P>0.05$ ). There was no significant difference in incidence of postoperative complications between the two groups ( $P>0.05$ ). Postoperative levels of hemoglobin (Hb), albumin (ALB), and prealbumin (PA) were significant lower in TG group compared with those in PG group ( $P<0.05$ ). The 1-year overall survival rates for the PG group and TG group were 95.3% and 87.2%, respectively, and the difference was not statistically significant ( $P>0.05$ ). **Conclusion** Compared with TG, PG is more conducive to the absorption of nutrients and the recovery of nutritional status after surgery, and it is also important to take optimal reconstruction methods to reduce reflux in patients.

**Keywords:** Adenocarcinoma of esophagogastric junction; Proximal gastrectomy; Total gastrectomy; Reflux Esophagitis; Number of lymph node dissection

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As a common malignant disease, gastric cancer has attracted increasing attention. Although the overall incidence of gastric cancer has shown a decreasing trend, the incidence of adenocarcinoma of esophagogastric junction (AEJ) has shown an increasing trend [1-3]. AEJ has showed the complexity and multiplicity in the surgical treatment due to its special anatomical location [4-5]. In addition, with the advanced technology, there is an increasing pursuit of a precise surgical approach. Minimal resection scope and maximized preservation of the original function of the stomach have become the common goals pursued by both patients and surgeons [6]. In this study, the clinical efficacy of laparoscopic treatment with two different resection ranges will be compared.

## 1 Data and methods

### 1.1 General data

Patients with AEJ who underwent surgical treatment at Huai'an First People's Hospital from January 2020 to December 2021 were retrospectively reviewed. All of the patients were pathologically diagnosed with gastric adenocarcinoma, excluded severe organ dysfunction and did not occur tumor metastasis. In order to avoid the selection bias, the selected cases were completed by the same surgical team. A total of 90 cases were finally included in the study, and were divided into total gastrectomy group (TG group) and proximal gastrectomy group (PG group) according to the surgical resection range. Forty-seven cases in the TG group were classified according to Siewert staging [7], among which 18 cases of type II, and 29 cases of type III; 34 cases of males and 13 cases of females, with a body mass index (BMI) of

(23.9±2.9) kg/m<sup>2</sup>. Forty-three cases in the PG group with 15 cases of type II, and 28 cases of type III; 30 cases of male, 13 cases of female, with a BMI of (24.1±3.1) kg/m<sup>2</sup>. There were no significant differences in general data including TNM-based staging (according to the AJCC 8th edition), clinical staging (according to the 8th edition of

AJCC), and physical status score (PS) between the two groups (*P*>0.05). [Table 1] This study was approved by the Hospital Ethics Committee (No. KY-2023-109-01), and all patients signed an informed consent form.

Tab.1 Comparison of general data between two groups [case (%)]

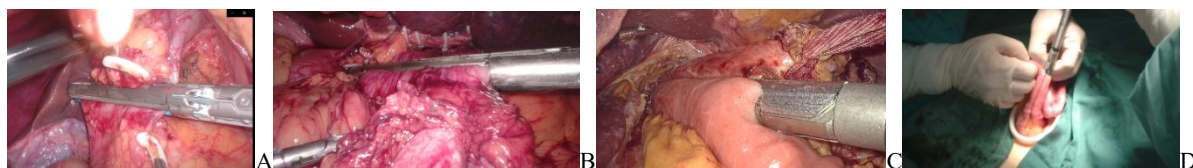
Item	TG group(n=47)	PG group (n=43)	t/χ <sup>2</sup> value	P value
Age(year, $\bar{x} \pm s$ )	68.3±9.1	66.1±6.4	1.315	0.192
<b>Gender(Case)</b>				
Male	34	30	0.072	0.788
Female	13	13		
BMI(kg/m <sup>2</sup> , $\bar{x} \pm s$ )	23.9±2.9	24.1±3.1	0.310	0.758
<b>PS (score)</b>				
0	42	38	0.022	0.989
1	4	4		
2	1	1		
<b>cT staging</b>				
1	2	1	0.692	0.875
2	15	16		
3	28	25		
4	2	1		
<b>cN staging</b>				
0	20	11	3.656	0.302
1	14	16		
2	6	10		
3	7	6		
<b>Clinical staging</b>				
I	9	8	1.168	0.761
II	18	19		
III	19	16		
IV	1	0		

## 1.2 Methods

### 1.2.1 TG group

After general anesthesia, the patient was placed spread-eagled, treated with routine sterilization, spread sheets, and cut a curved incision of about 1.2 cm at the lower edge of the umbilical fossa. After Trocar puncture, a CO<sub>2</sub> pneumoperitoneum was established, and the pressure was maintained between 13 and 15 mmHg. Trocars of 12 mm and 5 mm were placed as the primary and secondary operation holes at 2 cm below the left lateral edge of the rectus abdominis muscle and the last rib margin. A 5-mm operation hole was placed at a symmetrical position on the right side. TG+D2 lymph node dissection was performed after the intraoperative

diagnosis was clarified. A linear cutting stapler was used to dissect the duodenum. [Figure 1A] The esophagus was dissected after determining the safe cutting edge. [Figure 1B] At the same time, the mesentery was removed approximately 20 cm from Treitz, after which the intestine tube was dissected, the distal end of intestine tube was lifted, and a small port was prepped at the break of the jejunum and esophagus. A lateral jejunum-esophageal anastomosis was then performed. [Figure 1C] A laparoscopic linear cutting stapler was applied 40cm from the esophagojejunal anastomosis to perform a lateral anastomosis between the proximal and distal bowel. [Figure 1D] The Roux-en-Y anastomosis after TG was finalized, a drain was placed, the incision was sutured, and the abdominal cavity was closed.



Note: 1A shows the graft duodenum was dissected by a linear cutting stapler. 1B shows the esophagus was dissected by a linear cutting stapler. 1C shows the a lateral jejunum-esophageal anastomosis was performed. 1D shows a lateral anastomosis was performed through auxiliary incision between the proximal and distal bowel.

Fig.1 Laparoscopic total gastrectomy surgery method

1.2.2 PG group

The preoperative operation preparation was the same as that of the TG group, and PG+D2 lymph node dissection was performed after the diagnosis was clarified. A small hole was incised in the anterior wall of the residual stomach, and gastroesophageal anterior wall anastomosis was performed with a total of 25 cases. [Figure 2A and Figure 2B] Tubular gastric elongation surgery was performed. Methylthionine chloride marked the position of the expected incision line, and fabricated the tubular gastric elongation with a length of about 25 cm and a width of 3-4 cm. [Figure 2C] The tubular gastric anastomosis was finally completed with a total of 10 cases. The mesentery was removed was removed approximately 20 cm from Treitz, and construction of a Roux-en-Y esophagojejunostomy was completed first. A lateral jejunoesophageal anastomosis was performed at 10-15 cm from the esophago-jejunum [Figure 2D], and finally a double-channel anastomosis was completed in 8 cases.

The perioperative management of patients in both groups was based on the concept of enhanced recovery after surgery (ERAS), and the TG and PG groups were recommended whether to receive postoperative conventional chemotherapy according to the pathologic stages. The patients in both groups were followed up by telephone or outpatient for 1 year after surgery.

1.3 Observation indicators

The operation time, intraoperative blood loss, number of lymph nodes dissected, hospitalization time, postoperative drainage volume for 3 days, postoperative period to the drainage removal, and complications related to the operation in the two groups of patients. Levels of hemoglobin (Hb), albumin (ALB), prealbumin (PA), the time of starting fluid intake, the time of the first postoperative ventilation, the postoperative occurrence of reflux esophagitis in different surgical methods and 1-year overall survival rates of patients.

1.4 Statistical methods

SPSS 25.0 was used for statistical testing. Continuous data in accordance with normal distribution were expressed by  $\bar{x} \pm s$ , and *t*-test was used for inter-group comparison. Discrete data were expressed by cases (%), and chi-square test was used inter-group comparison. *P* < 0.05 was regarded as the difference was statistically significant.

2. Results

2.1 Comparison of surgery-related indicators between the two groups

The TG group had a longer operation time than the PG group, and the amount of intraoperative blood loss and number of lymph nodes dissected were more than those of the PG group, and the difference was statistically significant (*P* < 0.05). There was no statistically significant difference in the postoperative drainage volume for 3 days, postoperative period to the drainage removal and hospitalization time (*P* > 0.05). [Table 2]

2.2 Comparison of postoperative nutritional status-related indexes between the two groups

The differences in preoperative Hb, ALB, PA, time of starting fluid intake and time of first postoperative ventilation between the two groups were not statistically significant (*P* > 0.05). Postoperative Hb, ALB and PA levels of the patients in the TG group were lower than those in the preoperative and the PG group, and the differences were statistically significant (*P* < 0.05). [Table 3]

2.3 Comparison of perioperative complications between the two groups

Both choices of resection ranges produce relevant postoperative complications, and the differences between the PG group in postoperative reflux esophagitis, postoperative pneumonia, gastrointestinal bleeding, anastomotic leakage, and intestinal obstruction was not statistically significant (*P* > 0.05). [Table 4]

2.4 Incidence of reflux esophagitis and anastomotic stenosis in different reconstructive procedures in PG group

After surgery of PG, the incidence of reflux esophagitis and anastomotic stenosis after the gastrectomy and the double-channel anastomosis was lower than those of esophagogastric anastomosis but the difference was not statistically significant (*P* > 0.05). [Table 5]

2.5 Comparison of 1-year postoperative survival rates between the two groups

The 1-year overall survival rates of the PG and TG groups were 95.3% and 87.2%, respectively, and the differences were not statistically significant (*P* > 0.05).

Tab.2 Comparison of surgical related indicators between two groups ( $\bar{x} \pm s$ )

Group	Case	Operation	Intraoperative	Number of lymph	Postoperative	Postoperative period to the	Hospitalization
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		time(min)	blood loss(mL)	nodes dissected	drainage volume for 3 days (mL)	drainage removal (d)	time(d)
TG group	47	178.4±40.0	194.7±99.4	24.1±5.7	278.2±69.4	12.1±2.9	18.7±6.1
PG group	43	159.1±25.2	130.2±63.5	17.3±5.2	257.2±69.1	11.7±2.1	17.9±3.2
$\chi^2/t$ value		2.919	6.273	5.899	1.436	0.799	0.788
<i>P</i> value		<0.01	<0.01	<0.01	0.155	0.427	0.433

Tab.3 Comparison of postoperative nutritional status-related indicators between two groups ( $\bar{x}\pm s$ )

Group	Case	Hb(g/L)		ALB(g/L)		PA(mg/L)		Time of starting fluid intake(d)	Time of first postoperative ventilation(d)
		Pre-surgery	Post-surgery	Pre-surgery	Post-surgery	Pre-surgery	Post-surgery		
TG group	47	125.6±23.4	105.2±17.4 <sup>a</sup>	40.8±4.7	33.1±4.1 <sup>a</sup>	178.7±60.0	132.8±37.0 <sup>a</sup>	7.5±3.5	3.2±0.6
PG group	43	128.8±17.9	118.3±16.4 <sup>a</sup>	41.6±3.5	36.1±3.7 <sup>a</sup>	197.7±38.2	161.8±30.7 <sup>a</sup>	7.2±2.7	3.1±0.5
$\chi^2/t$ value		0.717	3.665	0.911	3.542	1.964	3.989	0.434	0.358
<i>P</i> value		0.475	<0.01	0.365	<0.01	0.053	<0.01	0.665	0.722

Note: Compared with pre-surgery, <sup>a</sup>*P*<0.05.

Tab.4 Comparison of surgical complications between two groups [case (%)]

Group	Case	Reflux esophagitis	Postoperative pneumonia	Gastrointestinal bleeding	Anastomotic leakage	Intestinal obstruction
TG group	47	2(4.3)	5(10.6)	2(4.3)	1(2.1)	0
PG group	43	8(18.6)	2(4.7)	3(7.0)	2(4.7)	1(2.3)
$\chi^2/t$ value		3.341	0.443	0.010	0.006	
<i>P</i> value		0.068	0.506	0.919	0.938	0.478 <sup>a</sup>

Note: <sup>a</sup> Fisher's exact test.

Tab.5 Long term complications after different reconstruction procedures [case (%)]

Methods of tract reconstruction	Case	Reflux esophagitis	Anastomotic stenosis
Esophagogastric anastomosis	25	7(28.0)	2(8.0)
Gastric tube reconstruction	10	1(10.0)	0
Double tract reconstruction	8	0	1(4.0)

### 3 Discussion

At present, the use of PG or TG in treating AEJ remains controversial [9-11], and different research centers have separate opinions. This study compared the clinical efficacy of these two different surgeries.

Although the TG group could dissect more lymph nodes, the PG group was superior to the TG group in terms of short operative time and less intraoperative bleeding. There was no statistically significant difference in postoperative complications between the two groups. Observing and analyzing the changes of the corresponding indexes, including Hb, ALB, and PA, in the collected patients before and after surgery showed no difference in these indexes between PG and TG before surgery. However, these indexes had apparent changes in both groups after surgery. PG was more conducive to restoring the patient's nutritional status with AEJ, which may be caused by the original anatomical changes of the stomach after surgical resection. After PG, the patients' residual stomach was more conducive to the recovery of the patient's postoperative nutritional status. However, due to the destruction of the cardia anti-reflux structure

and the damage to the vagus nerve, the residual stomach caused an obstacle to the patients' gastric peristalsis, increasing reflux.

The surgical treatment of gastric cancer has experienced a shift from purely emphasizing the extent of surgical resection to minimally invasive and individualized treatment that emphasizes function preservation. Combining dual-scope technology in gastric cancer has maximized the preservation of normal gastric tissue structure and function [12-14]. With the development of technology, PG will also be adopted by more and more operators, but there is no standard regarding reconstructive surgery after proximal gastrectomy currently [15-16]. In this study, three methods of tract reconstruction, including esophagogastric anastomosis, double tract reconstruction, and gastric tube reconstruction, were used in the PG group. This study showed that although there was no difference in the incidence of postoperative reflux esophagitis among the three reconstruction methods, the incidence of reflux in the esophagogastric anastomosis group was slightly higher than in the other two groups.

An optimized reconstruction method after PG will reduce these complications.

Unlike the traditional perioperative period, the ERAS model was adopted to manage the enrolled patients in this study. It has been shown that the application of ERAS in the perioperative period of gastric cancer will exert sound therapeutic effects [17-19]. The clinical practice guidelines for enhanced recovery after surgery in China consider that taking a clear liquid diet 2 hours and a liquid diet 6 hours before anesthesia is safe [20], so the patients were allowed to take 10% glucose orally for 300 mL 6 hours before surgery. Blankets were applied during the operation to create an optimal surgical environment for the patients. In the postoperative period, the patients were appropriately used analgesic drugs, and they were encouraged to do full-body activities in bed and to get out of bed as early as possible. In the PG group, gastric stimulants and acid suppressants were also applied as early as possible to reduce the occurrence of postoperative reflux esophagitis.

The long-term survival rate of the tumor is a direct indicator to evaluate the advantages and disadvantages of the treatment. The patients enrolled in the study were followed up, and the difference in 1-year survival rate between the two groups was not statistically significant. In this study, patients who died in the short-term postoperative period were mostly old and had advanced tumor stage. The shortcoming of this study is that the follow-up time for the enrolled patients was too short, and the long-term survival of the two groups needed to be better evaluated. Some studies found that there was no significant difference in the long-term survival rate between TG and PG for AEJ. However, more precise and multi-center studies are still needed to support the comparison of postoperative long-term survival rates between the two groups with different surgical treatments.

In summary, although the incidence of postoperative reflux esophagitis was high in the PG group, there was no serious reflux, and some patients could relieve reflux symptoms by taking acid suppressants. The difference was not statistically significant compared with the TG group. In this study, it was found that PG was more favorable to patients' postoperative nutrient absorption and recovery of nutritional status, and the operation time and intraoperative bleeding in the PG group were better than those in the TG group. In order to avoid or minimize the occurrence of reflux esophagitis, it is recommended to choose better anastomosis types, such as double tract reconstruction and gastric tube reconstruction, which can lead to a significant decrease in the incidence of complications. Our research center will also explore the effect of modified SOFY anastomosis on the decrease of postoperative reflux in patients. Although PG destroys the function of the lower esophageal sphincter, optimized reconstruction can rebuild the structure of the "cardia", which allows the preserved stomach to play a greater role. It is also more conducive to the psychological needs of patients, as well as to the enhancement of their autoimmunity and postoperative nutritional status. PG is a

worthwhile surgical option for patients with AEJ, and the optimized anastomosis will make PG a more favorable treatment.

#### Conflict of interest None

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· 论 著 ·

# 腹腔镜下全胃切除和近端胃切除治疗食管胃结合部腺癌的临床疗效对比

代德柱, 时谨, 宋旭东, 丁凡, 陶国全

南京医科大学附属淮安第一医院胃肠外科, 江苏 淮安 223300

**摘要:** **目的** 比较腹腔镜下行全胃切除(TG)和近端胃切除(PG)根治食管胃结合部腺癌的临床疗效及两种不同切除范围的优劣势。**方法** 回顾性分析 2020 年 1 月到 2021 年 12 月由淮安市第一人民医院收治的 90 例食管胃结合部腺癌患者的临床诊治资料,并按照手术切除范围对其进行分组,其中 PG 组 43 例,TG 组 47 例。比较两组患者的一般资料、手术相关指标等。**结果** TG 组手术时间长于 PG 组,术中出血量、术中淋巴结清扫数量多于 PG 组,差异有统计学意义( $P<0.05$ );两组术后 3 d 腹腔引流管引流量、术后拔除引流管时间、住院时间差异无统计学意义( $P>0.05$ )。两组术后并发症发生率差异无统计学意义( $P>0.05$ )。术后 TG 组患者的血红蛋白、血清白蛋白、血清前白蛋白水平低于 PG 组,差异有统计学意义( $P<0.05$ )。PG 组和 TG 组的 1 年总生存率分别为 95.3% 和 87.2%,差异无统计学意义( $P>0.05$ )。**结论** 与 TG 相比,PG 更有利于患者术后营养物质的吸收和营养状态的恢复,临床应采取优化的重建方法来减少患者的反流。

**关键词:** 食管胃结合部腺癌;胃肿瘤;近端胃切除;全胃切除;反流性食管炎;淋巴结清扫

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## Comparison of clinical efficacy between laparoscopic total gastrectomy and proximal gastrectomy in the treatment of adenocarcinoma of esophagogastric junction

DAI Dezhu, SHI Jin, SONG Xudong, DING Fan, TAO Guoquan

Department of Gastrointestinal Surgery, The Affiliated Huai'an No.1 People's Hospital of Nanjing Medical University, Huai'an, Jiangsu 223300, China

Corresponding author: TAO Guoquan, E-mail: hayytgq@njmu.edu.cn

**Abstract: Objective** To compare the advantages and disadvantages of two different resection margins by observing the clinical efficacy of laparoscopic total gastrectomy (TG) and proximal gastrectomy (PG) for radical resection of adenocarcinoma of esophagogastric junction (AEJ). **Methods** A total of 90 patients with AEJ who were treated by Huai'an No.1 People's Hospital from January 2020 to December 2021 were retrospectively reviewed. Patients were divided into PG group ( $n=43$ ) and TG group ( $n=47$ ) according to the surgical resection range. The general data, surgery related statistical indicators of the two groups were compared. **Results** The TG group had a longer operation time than the PG group, with significantly more intraoperative blood loss and a greater number of intraoperatively cleared lymph nodes than the PG group ( $P<0.05$ ). There was no significant difference in terms of drainage volume of the abdominal drainage tubes in the 3-day postoperative period, postoperative period to the drainage removal, the length of hospitalization, and postoperative complications between two groups ( $P>0.05$ ). Postoperative levels of hemoglobin, albumin, and prealbumin were significant lower in TG group compared with those in PG group ( $P<0.05$ ). The 1-year overall survival rates for the PG group and TG group were 95.3% and 87.2%, respectively, and the difference was not statistically significant ( $P>0.05$ ). **Conclusion** Compared with TG, PG is more conducive to the absorption of nutrients and the recovery of nutritional status after surgery, and it is also important to take optimal reconstruction methods to

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通信作者: 陶国全, E-mail: hayytgq@njmu.edu.cn

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reduce reflux in patients.

**Keywords:** Adenocarcinoma of esophagogastric junction; Gastric tumor; Proximal gastrectomy; Total gastrectomy; Reflux Esophagitis; Lymph node dissection

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胃癌作为一种常见的恶性肿瘤,已经引起了越来越多的关注。尽管胃癌的发生率整体呈现下降的趋势,但食管胃结合部腺癌的发生率却呈现出上升的趋势<sup>[1-3]</sup>。食管胃结合部腺癌因其特殊的解剖位置,导致了其外科治疗的复杂性和多元性<sup>[4-5]</sup>。此外,随着技术的进步,人们也越来越追求精准化的手术方式。最小的切除范围和最大化的保留胃原有功能,已经成为患者和外科医师共同追求的目标<sup>[6]</sup>。在本研究中,将比较腹腔镜下两种不同切除范围治疗食管胃结合部腺癌的临床疗效。

## 1 资料与方法

**1.1 一般资料** 选取2020年1月到2021年12月在淮安第一医院行外科治疗的食管胃结合部腺癌患者进行回顾性分析,所有患者病理诊断为胃腺癌,均排除严重的器官功能障碍,且未发生远处转移。为了避免术者的手术操作对患者的治疗产生选择偏移,选择的病例均由同一手术团队完成。最后纳入研究的共有90例,按照手术切除范围的不同分为全胃切除组(TG组)和近端胃切除组(PG组)。TG组47例,Siewert分型<sup>[7]</sup> II型18例, III型29例;男性34例,女性13例,身体质量指数(BMI)( $23.9 \pm 2.9$ ) kg/m<sup>2</sup>; PG组43例, II型15例, III型28例;男性30例,女性13例, BMI( $24.1 \pm 3.1$ ) kg/m<sup>2</sup>。两组患者TNM分期(参考AJCC第八版)、临床分期(参考AJCC第八版)、体力状态评分(PS)等一般资料差异无统计学意义( $P > 0.05$ )。见表1。本研究经医院伦理委员会批准(KY-2023-109-01),所有患者均已签署知情同意书。

### 1.2 方法

**1.2.1 TG组** 全麻后,患者摆大字位,常规消毒、铺单,脐窝下缘作长约1.2 cm弧形切口,Trocar穿刺成功后,建立CO<sub>2</sub>气腹,压力维持在13~15 mmHg。在左侧腹直肌外侧缘与肋缘下2 cm和脐水平处分别置入12 mm、5 mm Trocar作为主、副操作孔,在右侧相对称位置置入5 mm操作孔。术中明确诊断后行TG+D2淋巴结清扫。线性切割吻合器离断十二指肠(图1A)。确定安全切缘后离断食管(图1B)。同时,距屈氏韧带约20 cm处游离肠道系膜,之后离断肠管,将远端上提,在空肠和食管断端各预置一个小

口,行空肠食管侧侧吻合(图1C)。距食管空肠吻合口40 cm,应用腹腔镜直线切割吻合器作近端肠管与远端肠管侧侧吻合(图1D)。最终完成TG术后的Roux-en-Y吻合,放置引流管,缝合切口、关闭腹腔。

表1 两组患者一般资料比较 [例(%)]

Tab. 1 Comparison of general information between two groups [case(%)]

组别	TG组(n=47)	PG组(n=43)	t/χ <sup>2</sup> 值	P值
年龄(岁, $\bar{x} \pm s$ )	68.3±9.1	66.1±6.4	1.315	0.192
性别(例)				
男	34	30	0.072	0.788
女	13	13		
BMI(kg/m <sup>2</sup> , $\bar{x} \pm s$ )	23.9±2.9	24.1±3.1	0.310	0.758
PS(分)				
0	42	38		
1	4	4	0.022	0.989
2	1	1		
cT分期				
1	2	1		
2	15	16	0.692	0.875
3	28	25		
4	2	1		
cN分期				
0	20	11		
1	14	16	3.656	0.302
2	6	10		
3	7	6		
临床分期				
I期	9	8		
II期	18	19	1.168	0.761
III期	19	16		
IV期	1	0		

**1.2.2 PG组** 术前操作准备同TG组,明确诊断后行PG+D2淋巴结清扫。在残胃前壁切开一小孔,行胃食管前壁吻合(图2A、图2B),共25例;制作管状胃:美兰标记预计切线位置,制作一长度约25 cm,宽3~4 cm的管型胃(图2C),最后完成管状胃吻合,共10例;距屈氏韧带约20 cm处游离并切断肠道系膜,首先完成Roux-en-Y重建,在距食管空肠10~15 cm处行残胃空肠侧侧吻合(图2D),最后完成双通道吻合,共8例。两组患者围术期的管理均采纳了加速康复外科(enhanced recovery after surgery, ERAS)的管理理念。TG组和PG组根据病理分期建议是否术后行常规化疗,入组患者均进行了术后1年的电话随访或门诊随访。

**1.3 观察指标** 比较两组患者手术时间、术中出血

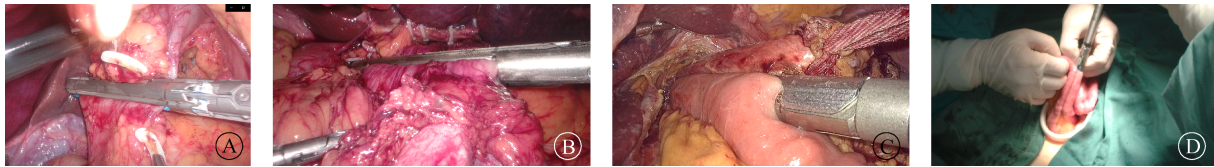


量、清扫淋巴结数目、住院时间、术后3 d腹腔引流管引流量、术后拔除腹腔引流管时间；手术相关并发症；术前及术后1个月血红蛋白(Hb)、血清白蛋白(ALB)、血清前白蛋白(PA)、开始进流质时间、术后首次通气时间；术后不同术式反流性食管炎发生的情况；患者1年的生存情况。

1.4 统计学方法 采用SPSS 25.0软件处理数据，符合正态分布的计量资料采用 $\bar{x} \pm s$ 表示，组间比较采用 $t$ 检验。计数资料以例(%)表示，组间比较采用 $\chi^2$ 检验。 $P < 0.05$ 为差异有统计学意义。

## 2 结果

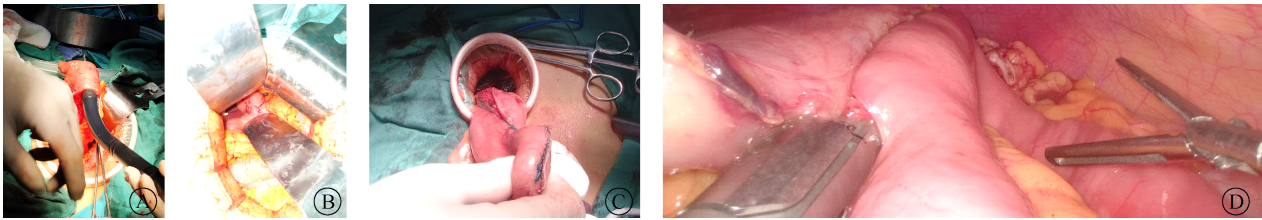
### 2.1 两组患者手术相关指标比较 TG组手术时间



注:A,腔镜下线性切割吻合器离断十二指肠;B,腔镜下线性切割吻合器离断食管;C,腔镜下空肠食管侧侧吻合;D,辅助切口直视下行近端肠管与远端肠管侧侧吻合。

图1 腹腔镜下TG手术方法

Fig. 1 Laparoscopic total gastrectomy surgery method



注:A、B,辅助切口直视下行圆形吻合器胃食管前壁吻合;C,直视下裁剪完成的管状胃;D,腔镜下行残胃空肠侧侧吻合。

图2 腹腔镜下PG手术方法

Fig. 2 Laparoscopic proximal gastrectomy surgery method

表2 两组患者手术相关指标比较 ( $\bar{x} \pm s$ )

Tab. 2 Comparison of surgical related indicators between two groups ( $\bar{x} \pm s$ )

组别	例数	手术时间(min)	术中出血量(mL)	术中淋巴结清扫数目(个)	术后3 d腹腔引流管引流量(mL)	术后拔除引流管时间(d)	住院时间(d)
TG组	47	178.4±40.0	194.7±99.4	24.1±5.7	278.2±69.4	12.1±2.9	18.7±6.1
PG组	43	159.1±25.2	130.2±63.5	17.3±5.2	257.2±69.1	11.7±2.1	17.9±3.2
$t$ 值		2.919	6.273	5.899	1.436	0.799	0.788
$P$ 值		0.008	<0.001	<0.001	0.155	0.427	0.433

表3 两组患者术后营养状态相关指标比较 ( $\bar{x} \pm s$ )

Tab. 3 Comparison of postoperative nutritional status related indicators between two groups ( $\bar{x} \pm s$ )

组别	例数	Hb(g/L)		ALB(g/L)		PA(mg/L)		开始进流质时间(d)	术后首次通气时间(d)
		术前	术后	术前	术后	术前	术后		
TG组	47	125.6±23.4	105.2±17.4 <sup>a</sup>	40.8±4.7	33.1±4.1 <sup>a</sup>	178.7±60.0	132.8±37.0 <sup>a</sup>	7.5±3.5	3.2±0.6
PG组	43	128.8±17.9	118.3±16.4 <sup>a</sup>	41.6±3.5	36.1±3.7 <sup>a</sup>	197.7±38.2	161.8±30.7 <sup>a</sup>	7.2±2.7	3.1±0.5
$t$ 值		0.717	3.665	0.911	3.542	1.964	3.989	0.434	0.358
$P$ 值		0.475	<0.001	0.365	<0.001	0.053	<0.001	0.665	0.722

注:与术前比较,<sup>a</sup> $P < 0.05$ 。

长于PG组,术中出血量、术中淋巴结清扫数量多于PG组,差异有统计学意义( $P < 0.05$ );两组术后3 d腹腔引流管引流量、术后拔除引流管时间、住院时间差异无统计学意义( $P > 0.05$ )。见表2。

2.2 两组患者术后营养状态相关指标比较 两组患者术前Hb、ALB、PA、开始进流质时间和术后首次通气时间差异无统计学意义( $P > 0.05$ );术后TG组患者的Hb、ALB和PA水平低于术前和PG组,差异有统计学意义( $P < 0.05$ )。见表3。

2.3 两组患者围手术期并发症比较 两种切除范围的选择都会产生相关的术后并发症,PG组术后反流性食管炎、术后肺炎、消化道出血、吻合口漏、肠梗阻差异无统计学意义( $P > 0.05$ )。见表4。

2.4 PG组不同重建术式反流和吻合口狭窄发生情况 PG术后,胃管状胃吻合和胃双通道吻合术后反流性食管炎、吻合口狭窄的发生率低于胃食管胃前壁吻合,但差异无统计学意义( $P>0.05$ )。见表5。

2.5 两组患者术后1年生存率的比较 PG组和TG组的1年总生存率分别为95.3%和87.2%,差异无统计学意义( $P>0.05$ )。

表4 两组患者手术并发症比较 [例(%)]

Tab. 4 Comparison of surgical complications between two groups [case(%)]

组别	例数	反流性食管炎	术后肺炎	消化道出血	吻合口漏	肠梗阻
TG组	47	2(4.3)	5(10.6)	2(4.3)	1(2.1)	0
PG组	43	8(18.6)	2(4.7)	3(7.0)	2(4.7)	1(2.3)
$\chi^2$ 值		3.341	0.443	0.010	0.006	
$P$ 值		0.068	0.506	0.919	0.938	0.478 <sup>a</sup>

注:<sup>a</sup>为Fisher确切概率检验。

表5 不同重建术式术后长期并发症情况 [例(%)]

Tab. 5 Long term complications after different reconstruction procedures [case(%)]

重建方式	例数	反流性食管炎	吻合口狭窄
胃食管胃前壁吻合	25	7(28.0)	2(8.0)
胃管状胃吻合	10	1(10.0)	0
胃双通道吻合	8	0	1(4.0)

### 3 讨论

关于PG还是TG在食管胃结合部腺癌的治疗中仍存在争议<sup>[8-11]</sup>,不同的研究中心仍存在不同的观点。在本研究中,就对比了这两种不同术式的临床疗效。

TG组能清扫较多的淋巴结,但是PG组在手术时间、术中出血量方面均优于TG组。两组患者术后并发症发面,两组差异无统计学意义。通过观察和分析患者的Hb、ALB、PA术前和术后对应指标的变化,发现PG和TG术前这些指标并无差异,但术后这些指标在两术式中差异有统计学意义,这表明PG更有利于食管胃结合部腺癌患者的营养状态恢复。分析这是由于手术切除造成胃原有解剖改变导致的。PG术后,残留的胃更有利于患者术后营养状态的恢复,但残留的胃由于其本身贲门抗反流结构的破坏和迷走神经的损伤,造成了患者胃蠕动功能的障碍,增加了反流发生的概率。

胃癌的外科治疗方式经历了从单纯强调手术切除范围向重视功能保留的微创化及个体化治疗的转变,双镜联合技术在胃癌中的应用使得胃解剖结构得到了最大的保留<sup>[12-14]</sup>。随着技术的发展,PG也将会被越来越多的术者所采用。关于近端胃术后的重建

术也尚无标准方法<sup>[15-16]</sup>。本研究PG组采用了胃食管前壁吻合、双通道吻合、管型胃吻合三种重建方法。本研究结果显示,三种重建方法术后反流性食管炎的发生率虽无差异,但食管胃前壁吻合组反流的发生率略高于其他两组。本研究可以看出,PG术后优化的重建方法将可以减少这些的并发症。

与传统的围术期不同的是,采纳了ERAS的模式对入组患者进行管理。已有研究表明,ERAS在胃癌围术期中的应用将会发挥良好的治疗效果<sup>[17-19]</sup>。中国加速康复外科临床实践指南认为麻醉前2h清流质饮食、6h流质饮食是安全的<sup>[20]</sup>,因此让患者术前6h口服10%葡萄糖300mL;术中应用保温毯为患者创造一个最适宜的手术环境;术后适当使用镇痛药物,鼓励患者在床上全身活动和尽早下床活动。在PG组,也尽早应用促胃动力药和抑酸剂,以期减少术后反流性食管炎的发生。

肿瘤的长期生存率是评价治疗方式优劣的直接指标,对入组的患者均进行了随访,两组患者1年的生存率差异无统计学意义。在本次研究中,发现术后短期死亡的患者多为年老、肿瘤分期较晚的患者。本研究的不足之处在于对入组患者的随访时间过短,并没有很好的评价两组患者长期的生存情况。有研究发现食管胃结合部腺癌行TG和PG的长期生存率无明显差别<sup>[21]</sup>。关于两组不同术式治疗食管胃结合部腺癌术后长期生存率的比较中,仍需更加精确和更多中心大数据的研究支持。

综上所述,PG组术后反流性食管炎的发生率虽高,但并未出现严重的反流情况,部分患者通过服用抑酸剂可以缓解反流症状,且与TG组相比差异无统计学意义。在本研究中发现PG更有利于患者术后营养吸收和营养状态的恢复,PG组的手术时间和术中出血量均优于TG组。为了避免或者减少反流性食管炎的发生,建议选择更佳的吻合术式,如双通道、管型胃吻合等,这可以使得并发症的发生率大大的降低。本研究中心最近也将探索改良食管残胃侧壁吻合(SOFY吻合)术对降低患者术后反流的影响。PG虽然破坏了食管下括约肌的功能,但优化的重建术式可以重建“贲门”结构,这可以使保留的胃发挥出更大的功能,更有利于患者的心理需要,也有利于增强患者的自身免疫能力和术后营养恢复。PG对于食管胃结合部腺癌患者来说是一种值得选择的手术方式,优化的吻合术式将会使得PG变成一种更有利于食管胃结合部腺癌患者的治疗方式。

利益冲突 无

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