

# 不同吻合方式在食道癌微创手术中的临床研究

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**【摘要】目的** 研究不同吻合方式在食道癌微创手术(MIE)中的临床效果。**方法** 选择2021年1月至2023年12月于我院行MIE的食道癌患者90例,依据随机数字表法分为端端组( $n=45$ )与端侧组( $n=45$ )。端端组行端端分层吻合,端侧组行端侧分层吻合。观察两组术中出血量、淋巴结清扫数目、吻合时间、手术时间、引流管拔除时间及术后住院时间等围术期指标;胃食道返流、肺部感染、吻合口狭窄及吻合口瘘等术后并发症;术前、术后3个月生活质量;分析导致吻合口瘘的危险因素。**结果** 两组术中出血量、淋巴结清扫数目、手术时间差异均无统计学意义( $P>0.05$ );端端组吻合时间、引流管拔除时间、术后住院时间及胃食道返流、吻合口狭窄、吻合口瘘发生率均短(低)于端侧组( $P<0.05$ );两组肺部感染发生率差异无统计学意义( $P>0.05$ );术后3个月,端端组进食困难、吞咽困难、反流评分均低于对照组( $P<0.05$ );多因素Logistic回归分析,肺部感染、制作管状胃为导致患者术后吻合口瘘发生的独立危险因素( $P<0.05$ )。**结论** 与端侧分层吻合相比较,端端吻合可有效促进MIE患者术后康复,提高其术后生活质量,减少术后并发症。肺部感染、制作管状胃为导致患者术后吻合口瘘发生的独立危险因素。

**【关键词】** 端端分层吻合;端侧分层吻合;食道癌微创手术;生活质量;吻合口瘘

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**Clinical study of different anastomosis methods in minimally invasive surgery for esophageal cancer** YANG Yan-gang, LUO Ji-wen, Ren Jie, LIU Gui-xian, XIA Bang-lin, PENG Xiang-dong, YANG Wei, ZHANG Lin, LIU Wen *Department of Cardiothoracic Surgery, NHC Key Laboratory of Nuclear Technology Medical Transformation, Mianyang Central Hospital, Mianyang 621000, China*

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**【Abstract】Objective** To investigate the clinical effects of different anastomosis methods in minimally invasive esophageal cancer surgery. **Methods** A total of 90 esophageal cancer patients with who underwent minimally invasive esophagectomy (MIE) in our hospital from January 2021 to December 2023 were selected. The patients were divided into an end-to-end group and an end-to-side group according to the random number table method, 45 in each group. The end-to-end group underwent end-to-end layered anastomosis. The end-to-side group underwent end-to-side layered anastomosis. The perioperative indicators such as intraoperative blood loss, number of lymph node dissection, anastomosis time, operation time, drainage tube removal time, and postoperative hospital stay were observed in both groups. Postoperative complications such as gastroesophageal reflux, pulmonary infection, anastomotic stenosis, and anastomotic leakage were also observed. The quality of life was evaluated before and after 3 months of surgery was compared. The risk

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factors leading to anastomotic leakage were analyzed. **Results** There were no significant differences in intraoperative blood loss, number of lymph node dissection, and operation time between the two groups ( $P>0.05$ ). The anastomosis time, drainage tube removal time, postoperative hospital stay, and the incidences of gastroesophageal reflux, anastomotic stenosis, and anastomotic leakage in the end-to-end group were shorter or lower than those in the end-to-side group ( $P>0.05$ ). There was no significant difference in the incidence of pulmonary infection between the two groups ( $P>0.05$ ). After 3 months of surgery, the scores for dysphagia, swallowing difficulty, and reflux were lower in the end-to-end group than those in the control group ( $P<0.05$ ). Multivariate logistic regression analysis revealed that pulmonary infection and the creation of a tubular stomach were independent risk factors for anastomotic leakage in the patients ( $P<0.05$ ). **Conclusions** Compared with end-to-side layered anastomosis, end-to-end layered anastomosis can effectively promote postoperative recovery, improve postoperative quality of life, and reduce postoperative complications in patients undergoing MIE. Pulmonary infection and the creation of a tubular stomach are independent risk factors for postoperative anastomotic leakage.

**【Key words】** End-to-end layered anastomosis; End-to-side layered anastomosis; Minimally invasive esophagectomy; Quality of life; Anastomotic leakage

食道癌是食道上皮细胞异常增殖导致的恶性疾病,因其发病隐匿,确诊时多已至中晚期<sup>[1]</sup>。微创食道癌根治术(MIE)具有病灶切除率高、创伤小等特点,目前已成为晚期局部食道癌治疗的首选术式<sup>[2]</sup>。食道胃吻合是影响 MIE 患者食道重建的关键,若方法选择或术中操作不当,常易导致吻合口瘘、吻合口狭窄等术后并发症,影响患者预后<sup>[3]</sup>。端端吻合、端侧吻合是 MIE 中食道胃重建的重要方法,但临床尚缺乏两种吻合方式比较的相关研究<sup>[4]</sup>。我院于 2021 年 1 月至 2023 年 12 月将端端吻合、端侧吻合应用于 MIE,以评价其临床效果,并分析导致吻合口瘘发生的危险因素。

## 1 资料与方法

### 1.1 一般资料 选择 2021 年 1 月至 2023 年 12 月

表 1 两组基线资料比较

| 指标                     | 端端组( $n=45$ )    | 端侧组( $n=45$ )    | 统计量            | $P$   |
|------------------------|------------------|------------------|----------------|-------|
| 性别(男/女)                | 35/10            | 37/8             | $\chi^2=0.275$ | 0.600 |
| 年龄(岁)                  | 63.36 $\pm$ 6.55 | 63.20 $\pm$ 6.50 | $t=0.116$      | 0.908 |
| TNM 分期(I 期/II 期/III 期) | 5/26/14          | 7/22/16          | $\chi^2=0.800$ | 0.670 |
| 病理类型(鳞癌/腺癌/其他)         | 38/6/1           | 40/4/1           | $\chi^2=0.451$ | 0.798 |
| 病灶位置(上段/中段/下段)         | 5/37/3           | 7/34/4           | $\chi^2=0.603$ | 0.740 |

**1.2 方法** ①端端组:行端端分层吻合。三叶钳辅助下环形切开食道、胃拟吻合部位肌层,将食道、胃相邻后壁肌层缝合半周,切开胃黏膜及食道,并使胃黏膜切开缺口与食道口基本对合,肌层略低于黏膜层,两者黏膜层连续缝合,前排肌层间断缝合。②端侧组:行端侧分层吻合。三叶钳辅助下于大弯侧胃前壁切出较残端食道口略大吻合切口,并使胃壁切开缺口与食道口基本对合,肌层略低于黏膜层,缝合半周胃、食道相邻后壁肌层,连续缝合胃、食道黏膜,前排肌层间断缝合,直线切割缝合器于吻合口上约 2 cm 位将胃底切除,浆肌层包埋切口。

### 1.3 观察指标 观察两组术中出血量、淋巴结清扫

于我院行 MIE 的食道癌患者 90 例,纳入标准:经病理学、影像学诊断食道癌;行 MIE;均知情同意;术前未行放化疗;预期生存>6 个月。排除标准:MIE 禁忌证者;食道手术史;病灶已转移者;合并其他恶性肿瘤;肝肾功能异常者;依从性差者;术中中转开胸术。其中男 72 例,女 18 例,年龄 53~71 岁[(63.28 $\pm$ 6.52)岁];TNM 分期:I 期 12 例,II 期 48 例,III 期 30 例;病理类型:鳞癌 78 例,腺癌 10 例,其他 2 例;病灶位置:上段 12 例,中段 71 例,下段 7 例。依据随机数字表法将 90 例患者分为端端组( $n=45$ )与端侧组( $n=45$ ),两组基线资料比较差异无统计学意义( $P>0.05$ )。见表 1。本研究通过医院伦理委员会批准。

数目、吻合时间、手术时间、引流管拔除时间及术后住院时间等围术期指标;胃食道返流、肺部感染、吻合口狭窄及吻合口瘘等术后并发症;术前、术后 3 个月生活质量;分析导致吻合口瘘的危险因素。生活质量以食道癌专用量表(QLQ-OES18)<sup>[4]</sup>进行评价,量表共包括 10 个分项,每项 0~100 分,患者得分越低说明其生活质量越高。

**1.4 统计学方法** 应用 SPSS 19.0 统计学软件进行数据分析,定量资料以均数 $\pm$ 标准差描述,组内比较行配对  $t$  检验,两组间比较行独立样本  $t$  检验;定性资料以例数(%)表示,组间比较行  $\chi^2$  检验,等级资料行秩和检验,影响术后吻合口瘘发生的危险因素行多因素 Logistic 分析。检验水准  $\alpha=0.05$ 。

## 2 结果

### 2.1 两组围术期指标比较 两组术中出血量、淋巴

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结清扫数目、手术时间差异均无统计学意义 ( $P>0.05$ ); 端端组吻合时间、引流管拔除时间及术后住院时间均短于端侧组 ( $P<0.05$ )。见表 2。

表 2 两组围术期指标比较

| 指标          | 端端组 ( $n=45$ ) | 端侧组 ( $n=45$ ) | $t$   | $P$   |
|-------------|----------------|----------------|-------|-------|
| 术中出血量 (ml)  | 104.43±12.28   | 108.21±12.31   | 1.458 | 0.148 |
| 淋巴结清扫数目 (枚) | 12.41±1.46     | 12.50±1.48     | 0.290 | 0.772 |
| 吻合时间 (min)  | 26.38±2.94     | 28.26±3.01     | 2.997 | 0.004 |
| 手术时间 (min)  | 243.26±26.55   | 251.47±26.59   | 1.466 | 0.146 |
| 引流管拔除时间 (d) | 5.35±0.56      | 6.28±0.64      | 2.995 | 0.004 |
| 术后住院时间 (d)  | 10.54±1.22     | 11.38±1.34     | 3.110 | 0.003 |

**2.2 两组术后并发症比较** 端端组胃食道返流、吻合口狭窄、吻合口瘘发生率均低于对照组 ( $P<0.05$ )。两组肺部感染发生率比较, 差异无统计学意义 ( $P>0.05$ )。见表 3。

表 3 两组术后并发症比较 [ $n(\%)$ ]

| 并发症   | 端端组      | 端侧组       | $\chi^2$ | $P$   |
|-------|----------|-----------|----------|-------|
| 胃食道返流 | 9(20.00) | 23(51.11) | 9.399    | 0.002 |
| 肺部感染  | 1(2.22)  | 2(4.44)   | 0.341    | 0.559 |
| 吻合口狭窄 | 5(11.11) | 14(31.11) | 5.344    | 0.021 |
| 吻合口瘘  | 2(4.44)  | 8(17.78)  | 4.005    | 0.045 |

**2.3 两组 QLQ-OES18 评分比较** 术后 3 个月, 两组咳嗽、口干、梗阻、言语功能、吞咽唾液、食欲减退等评分与术前比较差异无统计学意义 ( $P>0.05$ ); 两组进食困难、吞咽困难、反流评分均降低, 且端端组进食困难、吞咽困难、反流评分均低于对照组 ( $P<0.05$ )。见表 4。

表 4 两组 QLQ-OES18 评分比较 (分)

| 指标   | 时间      | 端端组        | 端侧组        | $t$   | $P$   |
|------|---------|------------|------------|-------|-------|
| 咳嗽   | 术前      | 70.24±7.21 | 70.15±7.19 | 0.059 | 0.953 |
|      | 术后 3 个月 | 62.54±6.43 | 63.18±6.47 | 0.471 | 0.639 |
| 口干   | 术前      | 64.28±6.69 | 64.11±6.66 | 0.121 | 0.904 |
|      | 术后 3 个月 | 52.37±5.41 | 53.19±5.44 | 0.070 | 0.944 |
| 梗阻   | 术前      | 54.26±5.61 | 54.18±5.58 | 0.068 | 0.946 |
|      | 术后 3 个月 | 48.16±5.10 | 48.97±5.13 | 0.751 | 0.455 |
| 言语功能 | 术前      | 79.26±8.24 | 79.08±8.21 | 0.104 | 0.918 |
|      | 术后 3 个月 | 73.54±7.52 | 74.18±7.55 | 0.403 | 0.688 |
| 吞咽唾液 | 术前      | 48.26±5.13 | 48.04±5.11 | 0.204 | 0.839 |
|      | 术后 3 个月 | 42.35±4.50 | 42.88±4.52 | 0.557 | 0.579 |
| 食欲减退 | 术前      | 58.35±6.05 | 58.14±6.02 | 0.165 | 0.869 |
|      | 术后 3 个月 | 53.22±5.62 | 53.97±5.60 | 0.634 | 0.528 |
| 进食疼痛 | 术前      | 53.68±5.74 | 53.57±5.72 | 0.091 | 0.928 |
|      | 术后 3 个月 | 47.21±4.92 | 47.85±4.94 | 0.616 | 0.540 |
| 进食困难 | 术前      | 46.28±4.82 | 46.45±4.84 | 0.167 | 0.868 |
|      | 术后 3 个月 | 30.18±3.29 | 32.54±3.48 | 3.306 | 0.001 |
| 吞咽困难 | 术前      | 41.26±4.32 | 41.05±4.29 | 0.231 | 0.818 |
|      | 术后 3 个月 | 29.24±3.18 | 31.37±3.38 | 3.102 | 0.003 |
| 反流   | 术前      | 42.68±4.48 | 42.43±4.45 | 0.266 | 0.791 |
|      | 术后 3 个月 | 29.14±3.15 | 31.27±3.39 | 3.088 | 0.003 |

**2.4 发生吻合口瘘的患者一般资料比较** 发生吻合口瘘的患者性别、年龄、TNM 分期、病理类型、手

术时间差异无统计学意义 ( $P>0.05$ ); 病灶位置、吻合口位置、肺部感染(包括肺不张、肺部感染、急性呼吸窘迫综合征、呼吸衰竭)、吻合方式、制作管状

胃所占的比例差异有统计学意义 ( $P<0.05$ )。见表 5。

表 5 发生吻合口瘘的患者一般资料比较 [ $n(\%)$ ]

| 指标     |                | 例数        | 吻合口瘘      | $\chi^2$ | $P$   |
|--------|----------------|-----------|-----------|----------|-------|
| 性别     | 男              | 72(80.00) | 9(10.00)  | 0.176    | 0.675 |
|        | 女              | 18(20.00) | 1(1.11)   |          |       |
| 年龄     | <60 岁          | 19(21.11) | 2(2.22)   | 0.102    | 0.749 |
|        | $\geq 60$ 岁    | 71(78.89) | 8(8.89)   |          |       |
| TNM 分期 | I 期            | 12(13.33) | 1(1.11)   | 0.305    | 0.859 |
|        | II 期           | 48(53.33) | 6(6.67)   |          |       |
|        | III 期          | 20(22.22) | 3(3.33)   |          |       |
| 病理类型   | 鳞癌             | 78(86.67) | 9(10.00)  | 0.277    | 0.871 |
|        | 腺癌             | 10(11.11) | 1(1.11)   |          |       |
|        | 其他             | 2(2.22)   | 0(0.00)   |          |       |
| 病灶位置   | 上段             | 12(13.33) | 4(4.44)   | 7.132    | 0.028 |
|        | 中段             | 71(78.89) | 5(5.56)   |          |       |
|        | 下段             | 7(7.78)   | 1(1.11)   |          |       |
| 吻合口位置  | 颈部             | 60(66.67) | 10(11.11) | 4.064    | 0.044 |
|        | 胸内             | 30(33.33) | 0(0.00)   |          |       |
| 肺部感染   | 是              | 5(5.56)   | 4(4.44)   | 25.438   | 0.000 |
|        | 否              | 85(94.44) | 6(6.67)   |          |       |
| 吻合方式   | 端端分层吻合         | 45(50.00) | 2(2.22)   | 4.005    | 0.045 |
|        | 端侧分层吻合         | 45(50.00) | 8(8.89)   |          |       |
| 手术时间   | <270 min       | 81(90.00) | 7(7.78)   | 2.813    | 0.094 |
|        | $\geq 270$ min | 9(10.00)  | 3(3.33)   |          |       |
| 制作管状胃  | 是              | 65(72.22) | 10(11.11) | 4.279    | 0.039 |
|        | 否              | 25(27.78) | 0(0.00)   |          |       |

## 2.5 影响术后吻合口瘘发生的多因素 Logistic 分析

多因素 Logistic 回归分析结果显示,肺部感染、

制作管状胃为导致患者术后吻合口瘘发生的独立危险因素( $P<0.05$ )。见表 6。

表 6 影响术后吻合口瘘发生的多因素 Logistic 分析

| 变量    | SE    | $\beta$ | Wald $\chi^2$ | $P$   | OR    | 95% CI        |
|-------|-------|---------|---------------|-------|-------|---------------|
| 肺部感染  | 0.632 | 1.406   | 5.762         | 0.005 | 2.518 | 1.309 ~ 3.877 |
| 制作管状胃 | 0.529 | 1.665   | 6.447         | 0.003 | 2.652 | 1.203 ~ 3.450 |

## 3 讨论

在 MIE 中,食道重建较为关键,因胃壁与食道壁结构、厚度不同,食道管径与管状胃吻合口也存在一定差异,若吻合不当,常易导致多种并发症,影响患者术后生活<sup>[5]</sup>。手工分层吻合是建立在管状胃、食道结构基础上的吻合方法,可按层次吻合两者的黏膜、肌层,促进吻合口浆膜化,加快吻合口的早期愈合<sup>[6]</sup>。作为手工分层吻合的两种重要吻合方法,端侧吻合、端端吻合尽管可达到吻合的目的,但因吻合部位不同,其吻合效果及术后并发症也各不相同<sup>[7]</sup>。

本研究中,端端组吻合时间、引流管拔除时间及术后住院时间均短于端侧组,胃食道返流、吻合口狭窄、吻合口瘘发生率均低于对照组,且术后 3 个月,端端组进食困难、吞咽困难、反流评分均低于对照组,说明相较于端侧吻合,端端吻合可促进 MIE 患者术后恢复,减少术后并发症,改善患者预后。端端吻合可实现食道和管状胃的直接吻合,精准对吻合口各分层,确保同种组织的缝合,避免不同组织间的夹杂缝合,从而有效促进吻合口浆膜化,加快不同分层的黏连融合,达到吻合口早期愈合的目的<sup>[8]</sup>;端端吻合对胃壁损伤小,可有效保护胃壁

血液循环,术后早期吻合口便可获得充足的血供,为吻合口愈合奠定了基础<sup>[9]</sup>;端端吻合未改变食物摄入过程,摄入的食物直接到达胃部,不易出现进食、吞咽困难等症状,可有效提高患者生活质量<sup>[10]</sup>;端端吻合可于吻合部位形成“瓣膜”样结构,能够有效避免胃食管反流发生,还可缓解因胃食管反流导致的局部水肿,降低吻合口狭窄等术后并发症的发生率<sup>[11]</sup>。与端端吻合相比较,端侧吻合不但对胃壁创伤大,对血供损伤大,术后吻合口愈合慢,且改变了食物进入胃部的路径,致使患者出现进食、吞咽困难等症状,从而降低患者生活质量<sup>[12]</sup>。

本研究多因素 Logistic 回归分析结果显示,肺部感染、制作管状胃为导致患者术后吻合口瘘发生的独立危险因素。吻合口瘘是消化道重建的严重并发症,其发生和吻合不当、局部张力及血供差等复杂因素密切相关<sup>[13]</sup>。MIE 尽管为微创术式,但仍易导致一定程度的损伤,引发疼痛,致使患者咳嗽困难,肺部痰液不能及时排除,导致肺部感染<sup>[14]</sup>。肺部感染可降低肺氧合能力,致使吻合部位氧供应不足,从而影响吻合口愈合,引发吻合口瘘。肺部感染还可引发患者咳嗽加剧,提高吻合口张力,从而导致吻合口瘘的发生<sup>[15,16]</sup>。管状胃是胃部的延长,通过制作管状胃可弥补病灶切除导致的胃长度不足导致的吻合困难,降低吻合口张力,维持吻合口血供,避免吻合口瘘发生。管状胃制作尽管可达到上述目的,但难以彻底改变微循环及静脉回流损伤,故术后存在较高的吻合口瘘发生率<sup>[17,18]</sup>。

综上,与端侧分层吻合相比较,端端吻合可有效促进 MIE 患者术后康复,提高其术后生活质量,减少术后并发症。肺部感染、制作管状胃为导致患者术后吻合口瘘发生的独立危险因素。

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