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食管前壁全层固定并胃管引导法在腹腔镜食管空肠Overlap吻合术中的应用价值

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【摘要】 目的 探讨食管前壁全层固定并胃管引导法在腹腔镜食管空肠Overlap吻合术中的应用价值。**方法** 食管前壁全层固定并胃管引导的食管空肠Overlap吻合术适用于术前临床分期为进展期胃癌(cT1b~4aN0~3M0)、肿瘤侵犯食管长度<3 cm、行腹腔镜全胃根治术并食管空肠Overlap吻合术的患者。手术关键步骤如下:在食管空肠Overlap吻合前使用1枚钛夹固定食管前壁全层,并在胃管引导下使用直线切割闭合器进行食管空肠侧侧吻合,在检查确认吻合器进入食管正确腔道后取出钛夹,采用双倒刺线缝合关闭共同开口。本文采用描述性病例系列研究方法,回顾性分析2021年5月至2023年6月于广东省中医院胃肠外科、广州中医药大学第一附属医院胃肠外科行腹腔镜下全胃根治术,且吻合方式均为食管前壁全层固定并胃管引导的Overlap食管空肠吻合术患者的临床资料。**结果** 共收集42例患者,均成功完成腹腔镜下全胃根治术,无中转开腹,无围手术期死亡。食管空肠吻合时间为17(15~25) min,手术时间、术中出血量分别为(258.8±38.0) min和50(20~200) ml,术中食管"假道"发生率为0,无术中并发症。术后胃管拔除时间为2(1~5) d,全流时间以及术后住院时间分别为4(1~8) d和8(4~21) d,无术后吻合口出血、吻合口狭窄等其他相关并发症。1例

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（2.4%）患者出现 Clavien-Dindo Ⅲb 级并发症，为术后腹腔出血，经二次手术探查证实为胃十二指肠动脉破裂出血，给予术中缝扎止血、扩容、输血等治疗后，于术后第 15 天好转出院。3 例（7.1%）患者出现 Clavien-Dindo Ⅱ 级并发症，分别为吻合口漏、乳糜漏、肺部感染各 1 例，经抗感染、延长引流管留置时间等保守治疗后好转出院。**结论**　采用食管前壁全层固定并胃管引导法的改良 Overlap 食管空肠吻合术能够缩短食管空肠吻合时间，避免食管“假道”发生，且不增加吻合口相关并发症发生率。

【关键词】 腹腔镜；　食管空肠 Overlap 吻合术；　食管前壁全层固定；　胃管引导

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Application of anterior esophageal wall full layer fixation and gastric tube guidance in total laparoscopic overlap method for intracorporeal esophagojejunostomy

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【Abstract】 **Objective**　To explore the application of anterior esophageal wall full layer fixation and gastric tube guidance in total laparoscopic overlap method for intracorporeal esophagojejunostomy. **Methods**　Overlap esophagojejunostomy with anterior esophageal wall full layer fixation and gastric tube guidance is suitable for patients with advanced gastric cancer (clinical stage: cT1b~4aN0~3M0) and esophageal invasion <3 cm, who underwent radical total gastrectomy+ overlap esophagojejunostomy. The main operation procedure was performed as follows: A titanium clip was used for fixation of the full anterior wall of esophagus before overlap esophagojejunostomy, and the side-to-side esophagojejunostomy was performed with the linear stapler under the guidance of gastric tube. Then the titanium clip was removed after confirming that the correct cavity was entered. Finally, the common outlet was closed by two barbed sutures. A descriptive case series study was conducted. The clinical data of patients who underwent laparoscopic radical gastrectomy and overlap esophagojejunostomy with anterior esophageal wall full layer fixation and gastric tube guidance in Guangdong Provincial Hospital of Chinese medicine and the First Affiliated Hospital of Guangzhou University of Chinese medicine from May 2021 to June 2023 were retrospectively analyzed. **Results**　A total of 42 patients were collected, and all of them were successfully completed laparoscopic total radical gastrectomy without conversion to laparotomy or perioperative death. The esophagojejunostomy time, operative time, intraoperative blood loss was 17(5 - 25) minutes, (258.8±38.0) minutes and 50(20 - 200) ml, respectively. The incidence of esophageal false lumen was 0%, and there were no intraoperative complications. The time of gastric tube removal, initial fluid diet intake and the duration of postoperative hospital were 2(1-5) , 4(1-8) and 8(4-21) days, respectively. There were no postoperative anastomotic hemorrhage, anastomotic stenosis and other related complications. One patient (2.38%) developed a Clavien - Dindo IIIb complication, which was abdominal hemorrhage after operation. The second surgical exploration confirmed that the patient was bleeding due to gastroduodenal artery rupture. After intraoperative suture hemostasis, fluid expansion, blood transfusion and other treatments, the patient was discharged on the 15th day after the operation. Three patients (7.14%) developed Clavien - Dindo grade II complications, including anastomotic leakage, chylous leakage and pulmonary infection, and were discharged after conservative treatment such as anti - infection and prolonged retention of drainage tube. **Conclusions**　Laparoscopic overlap method for intracorporeal esophagojejunostomy with anterior esophageal wall fixation and gastric tube guidance can shorten the time of esophagojejunostomy and prevent the occurrence of false lumen, and do not increase anastomose - related complications.

【Key words】 Total laparoscopic;　Overlap method in esophagojejunostomy;　Anterior esophageal wall fixation;　Gastric tube guidance

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全胃切除后消化道重建是腹腔镜下全胃切除术后的难点和争议之一。目前完全腹腔镜腔内吻合已被广泛运用，但由于吻合位置特殊、解剖空间狭小以及食管回缩等问题，腹腔镜下食管空肠吻合术具有一定难度[1-2]。其中，Overlap吻合术具有无需置入抵钉座及荷包缝合、吻合口大小不受食管及空肠横径限制等优点[3-5]。在Overlap食管空肠吻合术中使用双倒刺线牵引可以克服食管残端回缩至纵隔导致的视野狭窄、吻合困难等问题[6-8]。但在吻合时，由于双倒刺线的牵拉导致食管的真实腔道难以暴露，直线切割吻合器容易进入食管的黏膜层与肌层间之间，形成假性隧道，同时延长吻合时间[9-12]。若形成“假道吻合”且术中未及时发现和处理，则术后会出现吻合口漏、消化道重建通道闭合等严重并发症[13]。

为避免食管假性隧道形成，降低食管空肠吻合难度，本中心探索并发现可在食管空肠吻合前使用1枚金属钛夹固定食管前壁全层后，在胃管的指引下行Overlap吻合术。本研究旨在探究该技术的安全性及其应用价值。

一、手术指征

适应证：(1)年龄18~80岁；(2)术前临床分期为进展期胃癌(cT1b~4aN0~3M0)；(3)肿瘤侵犯食管<3 cm；(4)行腹腔镜全胃根治术并食管空肠Overlap吻合术；(5)术前美国东部肿瘤协作组(Eastern Cooperative Oncology Group，ECOG)体力状态评分为0~1分；(6)美国麻醉医师协会评分(American Society of Anesthesiology，ASA)1~3级。禁忌证：(1)妊娠或哺乳期妇女；(2)患有严重精神疾患；(3)5年内有其他恶性肿瘤病史；(4)术中联合其他脏器切除。

二、手术方法

1.全胃切除术：根据胃癌D2根治术的标准进行全胃淋巴结清扫，顺序为No.4sb和No.4sa→No.11d和No.2→No.4d和No.6→No.5和No.12a→No.7、No.8a、No.9和No.11p→No.1和No.3。置入直线切割闭合器离断十二指肠和食管，上腹部正中切口取出标本。

2.消化道重建：体外辅助切口(3~5 cm)下行Roux-en-Y肠袢制作和空肠吻合袢的预制作[14]。见图1A和1B。

重建气腹，行腹腔镜下食管前壁全层固定并胃管引导的食管空肠Overlap吻合术(详见视频)。(1)在食管断端的中部向左右距0.5 cm处各缝合1针3-0倒刺线，用于悬吊牵引。(2)主刀与助手分别牵拉倒刺线，联合巡回护士或者麻醉医师，在胃管的指引下使用超声刀全层切开食管断端中部约1cm的小孔，见图1C。(3)主刀左手使用分离钳仔细辨认并撑开食管管壁，确认食管真实腔道位置，直至食管腔显露至直径约1 cm圆形小口，分离钳撑开固定暴露食管管腔，助手右手将金属钛夹置入腹腔内，固定食管前壁全层(注意将食管黏膜层、黏膜下层、肌层以及纤维膜4层固定)。再次用分离钳撑开检查，此时食管真实腔道得以显露，嘱巡回护士或者麻醉医师将胃管拉出食管1~2 cm，进一步证实该空间为食管真实腔道，见图1D和1E。(4)主刀将直线切割闭合器钉仓臂置入空肠，嘱巡回护士或者麻醉医师退出胃管的同时，助手用分离钳固定钛夹向上暴露食管腔，此时主刀将非钉仓臂置入食管，直线切割闭合器进入食管真实腔道，判断对合良好后，激发直线切割闭合器行食管空肠Overlap吻合术。见图1F。(5)嘱巡回护士或者麻醉医师将胃管拉出共同开口3~4 cm，检查该空间是否为食管真实腔道，然后取出钛夹于腹腔外，见图1G。使用牵引的双倒刺线缝合关闭共同开口并加固缝合吻合口，见图1H和1I。

三、临床应用

根据上述手术指征，回顾性收集2021年5月至2023年6月期间，42例于广东省中医院胃肠外科(39例)和广州中医药大学第一附属医院胃肠外科(3例)行腹腔镜全胃根治术以及食管前壁全层固定并胃管引导法的食管空肠Overlap吻合术的胃癌患者。42例患者年龄为(61.8±10.5)岁，体质指数为(21.1±2.8) kg/m^2，其余基线资料见表1。本研究已通过广东省中医院伦理委员会(批件号：ZF2018-219)和广州中医药大学第一附属医院伦理委员会伦理审查(批件号：K-2023-183)，患者及授权家属均签署知情同意书。

42例患者均成功完成食管前壁全层固定并胃管引导的食管空肠Overlap术+全腹腔镜根治性全胃切除术，无中转开腹，无围手术期死亡。具体术中与术后情况见表2。

术中均未发生食管“假道”，未发生术中并发症以及术后并发症。术后1例(2.4%)出现Clavien-Dindo Ⅲb级并发症。该患者在术后第3天因弥漫性腹膜炎进行二次手术探查，术中发现胃十二指肠动脉破裂出血，给予缝扎止血、扩容、输血等治疗后，于术后第15天好转出院。3例(7.1%)术后出现Clavien-Dindo Ⅱ级并发症。其中1例(2.4%)出现吻合口漏，通过抗感染等治疗后好转出院；1例(2.4%)发生乳糜漏，通过延长引流管留置时间等保守治疗后痊愈出院；1例(2.4%)出现肺部感染，经抗感染、促进排痰等治疗后好转出院。

四、讨论

消化道重建是全胃根治术中的关键步骤，与患者术后康复和远期生活质量有着密切的关系[15-17]。腹腔镜下食管空肠Overlap吻合术已逐渐在全胃根治术中广泛运用，但仍存在食管“假道”等并发症发生风险。既往有研究提出，使用胃管引导食管残端的管腔来预防食管假道吻合。2010年Inaba等[18]提出，使用胃管指引行食管空肠Overlap吻合后缝合关闭共同开口；燕速等[19]提出，在胃管引导下边插入吻合器边后退胃管，暴露食管腔内黏膜并确定进入食管腔内后进行吻合，以减少食管“假道”的发生率。Chen等[20]

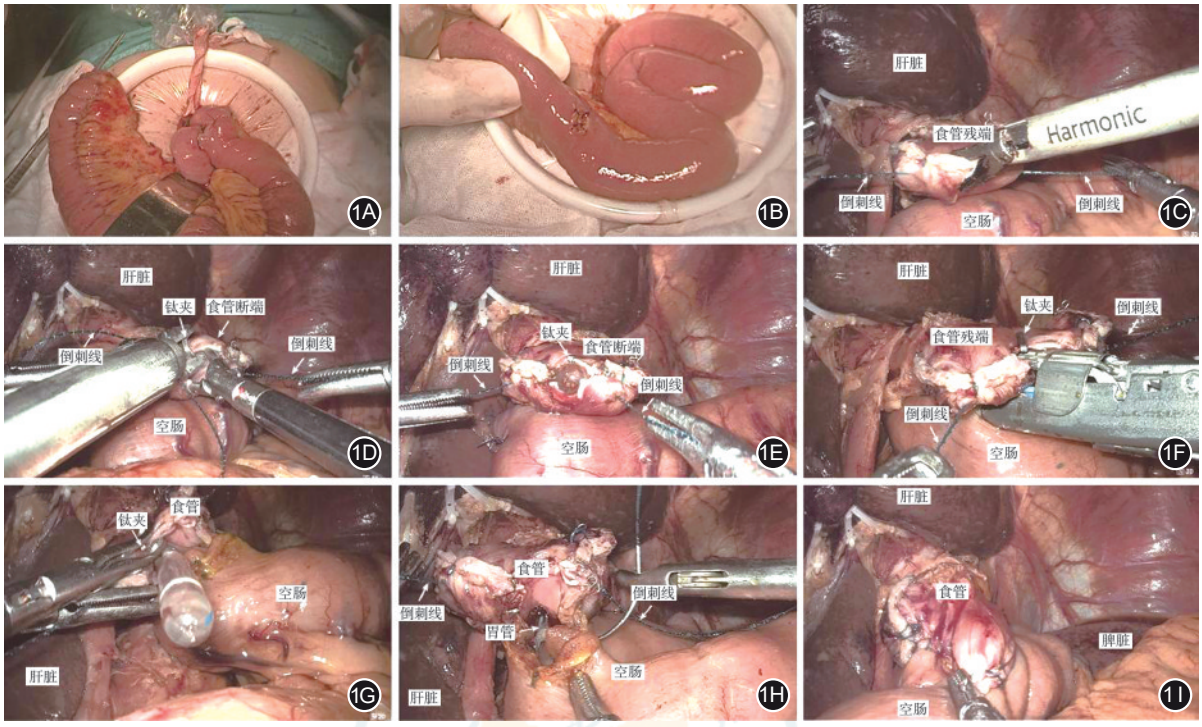

图 1　采用食管前壁全层固定并胃管引导的食管空肠 Overlap 吻合术　1A. 体外 Roux-en-Y 肠袢制作；1B. 预制作空肠吻合袢；1C. 在食管断端的中间全层切开食管；1D. 用 1 枚金属钛夹固定食管前壁全层；1E. 将胃管拉出食管 1~2 cm，暴露食管真实腔道；1F. 在胃管引导下置入直线切割闭合器行食管空肠 Overlap 吻合；1G. 退出胃管，证实进入食管真实腔道并取出钛夹；1H 和 1I：使用牵引的双倒刺线缝合关闭共同开口

表 1　42 例胃癌患者的基线资料

基线资料	数据
性别[例(%)]	
男	30(71.4)
女	12(28.6)
年龄(岁，$\bar{x}\pm s$)	61.8±10.5
体质指数(kg/m^2，$\bar{x}\pm s$)	21.1±2.8
美国麻醉医师协会评分[例(%)]	
1	2(4.8)
2	26(61.9)
3	14(33.3)
肿瘤位置[例(%)]	
贲门	18(42.9)
胃体	14(33.3)
胃窦	8(19.0)
胃底	2(4.8)
肿瘤最大径(cm，$\bar{x}\pm s$)	4.9±3.3

表 2　42 例胃癌患者的术中及术后情况

术中及术后情况	数据
食管空肠吻合时间[min，M(范围)]	17(15~25)
手术时间(min，$\bar{x}\pm s$)	258.8±38.0
术中出血量[ml，M(范围)]	50(20~200)
淋巴结清扫数目(枚，$\bar{x}\pm s$)	39.6±13.8
淋巴结阳性个数[枚，，M(范围)]	3(0~42)
肿瘤病理分期[例(%)]	
Ⅰ	5(11.9)
Ⅱ	11(26.2)
Ⅲ	26(61.9)
术后肛门首次排气时间[d，M(范围)]	2(1~4)
胃管拔除时间[d，M(范围)]	2(1~5)
全流时间[d，M(范围)]	4(1~8)
吻合口旁引流管拔除时间[d，M(范围)]	5(2~17)
术后住院时间[d，M(范围)]	8(4~21)

通过自制的 Overlap 引导管行食管空肠吻合来避免进入食管“假道”，提高钉砧插入食管的一次性成功率，但使用该方法具有引导管容易脱落的风险。对比上述使用胃管引导法的 Overlap 吻合法，本技术使用胃管引导，在钛夹固定食管后暴露食管管腔的检查、指引直线切割闭合器吻合，并具有检查食管真实腔道的作用。Son 等[7]提出双倒刺线牵引行食管空肠 Overlap 吻合能克服食管残端回缩等问题。但在临床实践中我们发现，牵拉双倒刺线时会导致食管残端开口变小，在吻合时难以辨认食管真实腔道，即使胃管起到指引的作用，置入直线切割闭合器时仍容易误入食管“假道”，延长吻合时间，严重时形成“假道吻合”，同时有夹断胃管的风险。本中心采用食管前壁全层固定并胃管引导的 Overlap 食管空肠吻合法，降低了直线切割闭合器非钉仓臂置入食管的难度，避免食管“假道”的发生，使

吻合更加安全。

既往研究多使用缝线全层缝合食管开口和旋转食管等方法，暴露食管真实腔道来进行食管空肠吻合术。Kim等[21]提出，食管空肠Overlap吻合时在食管开口处行3针全层缝合，然后使用缝线提起共同开口并使用吻合器，行食管空肠吻合术。Lee等[22]报道，使用缝线缝合食管全层使食管腔容易识别，避免腹腔镜操作中因胃管指引导致的食管损伤以及食管各层的滑移。本中心采用“钛夹固定食管前壁全层法”与上述“缝合法固定食管开口前壁法”相比，可简化操作，且能够在较小食管残端开口的情况下暴露食管管腔，在直视下将吻合器钉砧安全置入食管腔。“缝合法固定食管开口前壁”时食管残端开口较大，关闭共同开口时手工缝合时操作难度大，对侧壁、后壁缝合技术要求高；或使用直线切割闭合器关闭共同开口，再进行缝合加固，增加了吻合时间。薛佩等[23]提出，调整食管开孔由腹腔向膈肌旋转45°~90°的位置来显露食管管腔，使吻合器与食管纵轴呈一定角度，避免吻合时进入食管黏膜下假腔，该方法食管空肠吻合时间为（22±7）min。Sun等[9]提出，通过旋转食管使食管开口视野广阔、食管管腔便于识别，则吻合时可以避免进入黏膜和肌层之间的假腔，该方法平均吻合时间为22.5 min。韦明光等[12]收集采用多模式改良食管空肠Overlap吻合法的152例胃癌患者的病例资料，该方法采用“三向牵引”胃管引导方式显露食管腔，可以确切置入吻合器钉砧并完成食管空肠侧侧吻合，有效地避免吻合器臂钉砧误入“假道”，其吻合时间为（29.8±5.4）min。本中心采用食管前壁全层固定并胃管引导的Overlap食管空肠吻合法未通过旋转食管，而是采用钛夹固定食管前壁全层来暴露食管管腔，吻合时间为17（15~25）min，吻合的安全性和流畅性好。

吻合口相关并发症是食管空肠吻合的主要关注点之一[24-25]。食管空肠吻合时，若吻合器进入食管假道则进行“假道吻合”，会造成吻合口漏甚至更严重的术后并发症。Kumaga等[26]指出，在腹腔镜腔内食管空肠吻合时，食管损伤是造成中转开腹手术的原因之一，且尽管进行了开腹重建术，术后发生吻合口相关并发症的几率增高。Nakamura等[27]提出，食管空肠Overlap吻合中，若线性闭合器击发后形成假性隧道，此时应在腹腔镜下切开此处黏膜，避免开腹重建吻合。KLASS-03试验报道了腹腔镜全胃切除术中15例（9.4%）患者出现Clavien-Dindo Ⅲ级或以上并发症，其中5例（3.2%）患者发生吻合口漏[28]。本研究1例（2.4%）出现吻合口漏，提示本改良Overlap吻合法安全可行。

本研究采用食管前壁全层固定并胃管引导法的食管空肠Overlap吻合术具有以下优点：（1）钛夹固定食管前壁全层后，在胃管的引导下进行吻合，便于暴露食管管腔，增加吻合器置入食管腔道的一次性成功率，降低吻合难度，减少吻合时间。（2）钛夹固定食管前壁全层，避免吻合器非钉仓臂进入食管假道，降低了术中和术后并发症发生率。（3）钛夹费用不高，不明显增加手术费用。本研究不足之处及需要注意的事项：（1）该改良的Overlap吻合术需要巡回护士或麻醉医生多次配合送入和退出胃管，需要团队熟悉合作。（2）采用该改良吻合方法取出钛夹时，应小心操作，避免撕裂食管残端组织。

综上，本研究表明，采用食管前壁全层固定并胃管引导法在完全腹腔镜食管空肠Overlap吻合术中安全可行，近期疗效好。但其远期的生存率和生存质量仍需随访研究进一步验证。

利益冲突 所有作者均声明无利益冲突

作者贡献声明 陈妍和叶歆睿：采集数据、分析数据和撰写文章；罗立杰：参与手术和稿件修改；张子敬和熊文俊：参与手术，对文章的知识性内容作批评性审阅；杨海淦：解释数据和修改稿件；彭耀辉、林泽宇和张焯铉：采集数据并分析数据；王伟：酝酿及设计实验，对文章的知识性内容作批评性审阅，修改稿件，获取研究经费及提供行政和技术及材料的支持

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