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· 专题笔谈 ·

低位直肠癌术后吻合口相关并发症的治疗及改良 Bacon 术再保肛的要点

徐晓佳¹, 王昕¹, 黄平^{1, 2}

(1. 南京医科大学附属逸夫医院 肛肠外科, 江苏 南京 211100; 2. 江苏省人民医院 结直肠肛门外科, 江苏 南京 210029)

摘要

随着腔镜技术的发展、吻合器的出现及手术理念的提升, 直肠癌的手术操作越发精细, 保肛率逐年提升, 直肠癌的吻合口位置也越来越低, 但吻合口相关并发症的发生率却未明显下降。吻合口瘘及吻合口狭窄作为直肠癌保肛术后最严重及常见的并发症之一, 一旦出现不仅延长患者的住院时间、增加患者的经济负担、影响患者的生活质量甚至会降低患者的生存率。近年来, 国内外不同团队针对吻合口相关并发症展开了广泛深入的研究, 但吻合口相关并发症的治疗目前国内尚未有统一的标准。本文结合相关文献对吻合口瘘及吻合口狭窄的定义、影响因素、治疗等作一阐述; 同时结合团队经验介绍应用改良 Bacon 术治疗吻合口瘘、吻合口狭窄为患者实行再保肛手术过程中的要点及难点, 以期为临床治疗提供参考。

关键词

直肠肿瘤; 手术后并发症; 吻合口瘘; 器官保留治疗; 再手术
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The treatment of anastomosis-related complications after low rectal cancer surgery and the key points of using modified Bacon procedure for redo sphincter-preserving surgery

XU Xiaojia¹, WANG Xin¹, HUANG Ping^{1,2}

(1. Department of Anorectal Surgery, Sir Run Run Hospital Nanjing Medical University, Nanjing 211100, China; 2. Department of Colorectal and Anal Surgery, Jiangsu Province Hospital, Nanjing 210029, China)

Abstract

With the development of endoscopic technology, the emergence of staplers, and the improvement of surgical concepts, the surgical operation for rectal cancer has become increasingly sophisticated. The anal preservation rate has increased year by year, and the anastomotic position of rectal cancer has also become lower and lower. However, the incidence of anastomosis-related complications has not decreased significantly. As one of the most severe and common complications following rectal cancer surgery, anastomotic leakage, and anastomotic stenosis not only prolong the patients' hospital stay, increase their economic burden, and affect their quality of life, but may even reduce their survival rates. Numerous scholars have conducted extensive and in-depth research on anastomosis-related complications in recent

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作者简介: 徐晓佳, 南京医科大学附属逸夫医院住院医师, 主要从事结直肠恶性肿瘤、盆底瘘等方面的研究。

通信作者: 黄平, Email: huangpindoctor@163.com

years. However, there is no unified standard for treating anastomosis-related complications in China. Based on relevant literature, this article elaborates on the issues related to anastomotic leakage and stenosis, including definitions, influencing factors, and treatment. At the same time, it introduces the key points and challenges in adopting the modified Bacon procedure for redo sphincter-preserving surgery in patients with anastomotic leakage and anastomotic stenosis, so as to provide a reference for clinical treatment.

Key words Rectal Neoplasms; Postoperative Complications; Anastomotic Leak; Organ Sparing Treatments; Reoperation

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近几年来,我国直肠癌的发病率呈逐渐上升趋势,其发病率居全球恶性肿瘤的第三位,病死率居第二位^[1]。临床上距离肛缘5~8 cm以下的直肠癌称为低位直肠癌,其发病率占直肠癌患者的50%~70%^[2-5]。随着患者对生活质量要求的提高以及对保留肛门的愿望迫切、手术方式及吻合器械的逐步发展,低位保肛甚至超低位保肛成为可能。低位直肠癌在保留肛门的同時也易发生吻合口相关并发症,包括早期和晚期吻合口瘘、盆腔脓肿、吻合口瘘管形成、慢性窦道形成及吻合口狭窄,其中吻合口瘘及吻合口狭窄最为常见,严重影响了患者的生活质量及生存率^[6-8]。

1 相关定义

1.1 吻合口瘘

国际直肠研究组(International Study Group of Rectal Cancer, ISREC)^[9]将吻合口瘘定义为结肠-直肠吻合处、结肠-肛管吻合处肠壁的中断或缺失,使得直肠腔内、外发生连通(包括重建直肠储袋缝合线部位的瘘,如“J”形储袋)以及吻合部分旁发生盆腔脓肿。其发生率约为3%~15%。常发生在术后第3~7天,临床上通常表现为:(1)患者的吻合口旁引流管内出现粪渣或恶臭的脓性引流物;(2)患者出现发热、腹痛、腹胀、里急后重或肛门坠胀感等症状;(3)影像学上表现为腹腔内出现积气、积液;(4)实验室检查中患者的白细胞、中性粒细胞比值及C-反应蛋白升高。以出现的时间为界,术后1个月内发生的瘘为早期瘘,1个月后发生的则为迟发瘘。根据瘘的严重程度分为A~C级,A级瘘无临床症状,影像学上表现为造影剂在吻合口部位外漏,无需特殊治疗;B级瘘患者

常常出现发热、腹痛、引流管内出现粪渣等临床症状,积极保守治疗可以好转;C级瘘患者常常伴有严重的全身症状,如腹膜炎、脓毒症等,需要再次行手术治疗。对于缺损超过1 cm或超过1/3周径,则需要切除原吻合口重新吻合或行吻合口近端肠管造瘘手术。

1.2 吻合口狭窄

直肠术后吻合口狭窄尚无统一定义,临床上将内镜或食指无法通过吻合口或出现梗阻作为吻合口狭窄的诊断标准^[10-11]。患者多出现腹胀、排便困难、大便变细、便秘的症状。按照狭窄程度可以分为三类:(1)膜性狭窄:局部未形成纤维化;(2)管状狭窄:吻合口周围肠壁增厚并形成瘢痕,狭窄长度>1 cm但不超过3 cm;(3)弥漫性狭窄:吻合口周围肠壁弥漫性增厚形成瘢痕,狭窄长度超过3 cm^[12]。

2 导致吻合口瘘发生的因素

导致吻合口瘘发生的原因包括患者自身因素和吻合口相关因素。自身因素主要有:性别^[13-16]、营养状况差(贫血及低蛋白血症)^[15-17]、肥胖^[13, 15]、术前接受新辅助放疗^[14-15]等。吻合口相关因素包括:吻合口的位置过低、张力过大^[15, 18-19]、切割闭合器使用>2次^[19-20]、吻合器使用不当^[21]、吻合口血运不佳^[15]等。男性、肥胖、术前新辅助放疗和吻合口过低等不仅是发生吻合口瘘的危险因素,同时也是发生吻合口狭窄的危险因素^[22-24]。吻合口瘘是吻合口狭窄发生的重要独立因素^[11, 23, 25-27],行保护性造口的患者术后也可能出现不同程度的吻合口膜性狭窄^[25, 27]。

3 治疗

3.1 吻合口瘘

对于低位直肠癌患者,一旦怀疑其发生吻合口瘘,即使临床症状不严重,也应当密切关注患者病情变化,及时做出处理。A级吻合口瘘患者通常无临床表现,仅影像学检查发现瘘口存在,不需要特殊的治疗。B级吻合口瘘常伴随相关临床表现,应积极实施治疗:(1)早期禁食、支持治疗。患者一旦考虑发生吻合口瘘,应立即禁食,予肠外营养支持提供充足能量,减少胃肠道负荷,同时可使用生长抑素减少消化液分泌。对于腹腔感染,尽早开始抗感染治疗。(2)充分冲洗引流。直肠癌保肛术后多常规放置骶前引流管,吻合口瘘发生时可通过引流管判断。此外,还可以通过引流管进行充分引流。必要时,通过骶前引流管进行双套管冲洗,减轻盆腔感染。充分的引流对于感染的控制和瘘的愈合至关重要,是保守治疗的核心环节^[28-29]。(3)内镜下治疗。对于吻合口瘘持续存在,但盆腔感染不严重的患者也可考虑创伤较小的内镜下治疗。内镜下治疗方式较多,各医院可根据实际情况开展治疗,主要方式有:内镜下特殊海绵堵塞治疗、内镜下支架置入治疗、内镜下夹子闭合吻合口、内镜下注射纤维蛋白胶等^[30-34]。(4)手术治疗。对于迁延不愈的B级吻合口瘘,可考虑行手术治疗。C级吻合口瘘,由于吻合口裂开较大,非手术治疗往往难以控制病情,需要考虑手术治疗。对于病情持续加重的腹膜炎患者,腹腔感染严重,可能出现脓毒血症,应及时行急诊手术治疗。急诊手术中如发现吻合口缺血坏死应拆除吻合口,切除坏死段肠管,术中视患者情况行回肠造口或结肠造口,同时彻底清除腹腔内感染;无肠管坏死的患者在充分清洗腹腔的基础上行转流性近端肠造口即可,待炎症消退后再择期行手术治疗。对于无生命安全威胁的患者,可考虑在第一次手术后3~6个月后再行手术治疗。

3.2 吻合口狭窄

吻合口狭窄的研究报道样本量较少,目前尚没有低位直肠癌吻合口狭窄防治的专家共识与指南,笔者团队根据既往经验和文献报道做出一些建议:(1)机械扩肛治疗。患者术后1个月在门诊

复查时,进行充分润滑后使用手指轻柔缓慢地进入肛门,检查吻合口强度及是否发生狭窄。如果直肠指检触及吻合口局部有膜状柔软感觉即考虑发生吻合口膜性狭窄。这类狭窄患者在医师指导下使用手指或扩肛器扩肛治疗即可,简单可行、安全经济。造口还纳后,因粪便对吻合口有扩张作用,无需担心再次出现狭窄^[35]。(2)内镜下扩张治疗。手指不能达到的膜性狭窄及管状狭窄,可考虑行内镜下治疗。内镜下球囊扩张术广泛应用于吻合口狭窄的治疗,具有创伤小、可反复进行的优点,扩张效果良好^[36-37]。近年来,也有一些医生将内镜下自扩张金属支架置入术运用到吻合口狭窄的治疗中来^[34, 38]。内镜下自扩张金属支架置入术多用于肿瘤所导致的机械梗阻^[39],在良性吻合口狭窄的运用比较有限。可能会出现支架脱落、移位的发生,造成再发狭窄和肠道支架相关性肠穿孔的发生^[40-41]。(3)狭窄环切开或切除术。对于上下界清晰且宽度有限的管状狭窄,可考虑经肛门或内镜下狭窄环切开或切除治疗^[26, 42-44]。有团队^[45-46]报道将前列腺电切技术运用于吻合口狭窄的切除中,电切技术能够瞬间将热能传递到目标组织迅速碳化,并在切割组织上产生2~3 mm的凝固层,有着良好的切割及止血作用,且电切设备在各级医院均有配置。术者可根据狭窄位置及个人操作习惯经肛或者经内镜放射状切开狭窄的吻合口,并切除吻合口周围增生的纤维组织。无论是内镜下切除还是经肛门电切解除吻合口狭窄,在术前均应告知有发生肠瘘的可能,并做好中转开腹的准备^[47]。狭窄切开或切除术后需要定期经肛手指或扩肛器扩张,避免狭窄再发生。对于非手术治疗无效的吻合口狭窄,经肛门微创手术易于被患者所接受。(4)经腹再次手术治疗。对于严重影响患者生活质量重度环形吻合口狭窄,经过多次其他治疗往往无法达到预期的效果,经腹手术解除狭窄及梗阻是唯一的解决方法。对于肠管长度足够且盆腔条件良好的患者,双吻合仍然是首选;无法行双吻合又难以接受永久性转流性肠造口术的患者,改良Bacon术提供了再保肛的可能^[48],尤其是吻合口并发症合并盆腔感染,甚至“冷冻骨盆”的患者,在盆腔廓清后无直肠残端保留,无法再次吻合,改良Bacon术将结肠直接经肛门拖出可有效解决这类难题。

4 再保肛改良 Bacon 术中的要点及难点

手术治疗是发生低位直肠癌吻合口并发症患者的最后希望，直肠癌保肛手术是外科难点之一，直肠癌术后并发症患者再次保肛更是难上加难。再保肛手术应该在综合实力过硬的医学中心开展，由有着丰富结直肠手术经验的外科医师进行主刀，以便制订最佳手术方案，应对各种突发状况。再保肛手术中双吻合技术同低位直肠癌保肛中无较大差别，在此不赘述。改良 Bacon 术在切除标本后直接将结肠经肛门拖出，待肠管与外科肛管愈合牢固后二期切除肛门外置结肠，其没有吻合口的特点使得改良 Bacon 术在低位直肠癌保肛手术以及直肠吻合口瘘、吻合口狭窄的治疗中有着重要价值。改良 Bacon 术为患者保留了肛门，改善了患者的生活质量、减轻了心理负担，也是该术式的优势之一。笔者团队对于改良 Bacon 术治疗直肠癌吻合口并发症有着丰富的经验，现就改良 Bacon 术再保肛中的难点、要点介绍如下。

4.1 手术指征的严格把控

患者追求保肛的愿望可以理解，但并不是所有的患者都适合二次甚至三次保肛，只有严格把握再次保肛手术指征，才能提高患者再保肛的成功率。低位直肠癌患者保肛的前提是“三好”[肛门功能好、全身基础情况好、肿瘤特性（生物学行为）好]患者。对于再保肛患者而言，这三个条件也是缺一不可。术前直肠指检提示肛门功能收缩功能良好的患者在保肛术后才可控制排气排便；患者接受保肛手术后往往需要6个月至1年的时间才能完全恢复正常肛门功能，在肛门功能恢复前，患者可能会出现便频或者便秘的症状，对于身体情况较差、不能自理的患者来说短期生活质量不升反降，生存期有限的患者也不能充分享受肛门功能恢复带来的生活质量的提高。

4.2 解剖结构改变

患者行第一次手术后，盆腔和腹腔中的结肠已经发生移位愈合。再次保肛手术切除盆腔中病变的吻合口和附近的结肠，还要将下腹部已经移位愈合的结肠和系膜经肛门拖出。由于下腹部的这段结肠和系膜与肛门距离较远，将其重新游离后必须进一步向上腹部游离与其相连的结肠及其

系膜，使得有足够长度的血供良好的结肠和系膜经肛门拖出。这就需要精准分离第一次手术后已经移位并愈合好的平面，也就是需要建筑物平移技术。

4.3 保护周围组织

手术需要充分暴露手术视野，在二次手术中小肠常局部或者广泛粘连在盆腔，需采用组织剪锐性分离耐心将粘连在盆腔中的小肠全部游离出来。分离时遇到肠壁破损，应及时修补，甚至将破损肠段切除后予以吻合。将游离好的肠管下拉经肛门拖出时，由于盆腔中的瘢痕组织增生导致盆腔狭小，多数情况下盆腔容纳不下新的结肠，需要精准的盆腔廓清技术。术者应在矢状面上前后廓清盆腔，前方狭窄时可先在前正中切开狭窄环，再进行中间横缝，向后不能损伤骶骨和骶神经，同时保护好两侧支配排尿生殖功能的盆丛神经，并保持泌尿系连续性，防止尿路损伤和尿瘘。手术医生要对输尿管走向胸有成竹，术前可以请泌尿外科会诊膀胱镜下留置输尿管支架，或显露术野输尿管。术前放置输尿管支架可发现前次手术瘢痕或放疗后引起的输尿管狭窄，术中一并解除梗阻，避免术后肾积水甚至肾功能衰竭的发生。

4.4 电火花烧灼黏膜

术中经肛门用电火花烧灼外科肛管齿状线以上的全部黏膜，能够有效消除肛管黏膜的分泌功能，有利于结肠与外科肛管的愈合。传统黏膜切除可能损伤周围括约肌组织，电火花烧灼能有效保留周围组织，避免括约肌缺损带来的肛门功能受损^[49]。

4.5 拖出结肠血供不良

首先要保证游离肠管边缘血管弓的完整：拖出时采用保护套，减少结肠拖出时与盆壁及肛管的摩擦力，动作尽量轻柔；同时要尽量减少外科肛管对拖出结肠系膜的压迫：拖出前需扩肛至4指，如果拖出肠管受肛门压迫导致血供不良，可在肛门后方把肛门括约肌切断，将结肠经肛门拉出约3~5 cm，同时术中做保护性造口。在切除肛门外多余肠管的手术中，一并修补肛门括约肌。这样既不损伤肛门功能，也避免了肛门对外置段肠管的压迫。使得从技术层面上增加了改良 Bacon 术的成功率（图1）。



图1 游离足够结肠后使用保护套经肛门直接拖出, 血供良好

Figure 1 After the colon has been dissociated enough, use the protective sleeve to drag it out directly through the anus, and the blood supply is good

4.6 骶前出血

在结肠镜肛门拖出前应仔细检查盆腔有无出血, 及时彻底止血。对于超声刀止血效果不佳的盆腔组织, 可使用妇科双极电凝进行止血。如经肛门拖出后出现骶前出血, 盆腔无操作空间, 可以采用经后会阴弧形切口纱条压迫止血, 待术后一周左右取出纱条。

4.7 预防感染

再次手术, 由于吻合口瘘和切除病损段肠管可能破坏肠管完整性, 术后盆腔发生感染的可能性较大。术中常规于骶前并排放置双根乳胶管引流, 术后根据情况行经骶前双套管引流。对术前感染很重的患者, 术中盆腔冲洗难以解决盆腔感染, 可以辅以经后会阴弧形切口, 术后骶前换药引流。关腹前, 认真冲洗腹部切口。一律可吸收线间断关腹, 必要时行腹壁切口减张缝合, 皮下放置皮筋引流^[50]。

4.8 充分利用开放手术与腹腔镜手术的优势

患者再次手术时, 下腹部与盆腔解剖结构已经不是很清晰, 笔者团队采用下腹正中及绕脐上3 cm切口, 做开放手术以应对术中突发情况。但标本切除后, 结肠长度不够, 须常规游离结肠脾曲或者左半结肠; 脾曲边缘血供不佳的患者, 可继续于根部离断结肠中动静脉、右结肠动静脉, 保留回结肠动静脉和结肠边缘动静脉, 将升结肠逆时针旋转180°经肛门拉出^[49]。笔者团队采用连续缝合的方法关腹建立气腹在腹腔镜下游离肠管及系膜, 使结肠充分延长, 在保证安全的前提下尽可能减少手术切口大小^[51]。

5 小结与展望

低位直肠癌术后吻合口并发症涉及多方面因素, 随着手术理念和解剖认知的不断更新, 保肛已经不再是低位直肠癌患者的奢望, 但低位直肠癌术后吻合口瘘及吻合口狭窄的发生仍然是患者保肛的一大障碍。为了减少吻合口并发症的发生, 提高保肛成功率, 防治工作应注重术前全面评估手术风险, 对合并有相关因素的患者进行早期干预, 把握手术时机和手术指征, 合理选择术式; 术中选择合适的吻合器, 视吻合口情况决定是否行保护性造口; 术后做到早期观测、加强营养支持、患者出院后加强随访。已经发生吻合口并发症的患者, 积极评估并发症情况及采取合理的治疗措施可以有效预防病情进一步发展, 对于有再保肛指征的患者, 不应畏惧手术风险, 应积极开展再次手术治疗, 提高生活质量。外科医生在再次保肛手术中不仅要拥有精准的技术、更要有必胜的信念和坚定的毅力。期待再次保肛手术能够广泛开展, 为更多吻合口并发症患者带来福音。

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参考文献

[1] Sung H, Ferlay J, Siegel RL, et al. Global cancer statistics 2020:

- GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries[J]. *CA Cancer J Clin*, 2021, 71(3):209–249. doi:10.3322/caac.21660.
- [2] 韩加刚, 王振军. 低位直肠癌保肛手术方式选择[J]. *中国实用外科杂志*, 2019, 39(7): 676–680. doi: 10.19538/j.cjps.issn1005–2208.2019.07.08.
Han JG, Wang ZJ. Selection of anal preservation surgery of low rectal cancer[J]. *Chinese Journal of Practical Surgery*, 2019, 39(7): 676–680. doi:10.19538/j.cjps.issn1005–2208.2019.07.08.
- [3] 郁宝铭. 低位直肠癌的诊治进展[J]. *中国实用外科杂志*, 2002, 22(1):34–37. doi:10.3321/j.issn:1005–2208.2002.01.015.
Yu BM. Progress in diagnosis and treatment of low rectal cancer[J]. *Chinese Journal of Practical Surgery*, 2002, 22(1): 34–37. doi: 10.3321/j.issn:1005–2208.2002.01.015.
- [4] 姚宏伟, 李心翔, 崔龙, 等. 中国结直肠癌手术病例登记数据库2022年度报告: 一项全国性登记研究[J]. *中国实用外科杂志*, 2023, 43(1):93–99. doi:10.19538/j.cjps.issn1005–2208.2023.01.13.
Yao HW, Li XX, Cui L, et al. Annual report of Chinese Colorectal Cancer Surgery Database in 2022: a nationwide registry study[J]. *Chinese Journal of Practical Surgery*, 2023, 43(1): 93–99. doi: 10.19538/j.cjps.issn1005–2208.2023.01.13.
- [5] Varela C, Kim NK. Surgical treatment of low-lying rectal cancer: updates[J]. *Ann Coloproctol*, 2021, 37(6): 395–424. doi: 10.3393/ac.2021.00927.0132.
- [6] Koedam TWA, Bootsma BT, Deijen CL, et al. Oncological outcomes after anastomotic leakage after surgery for colon or rectal cancer: increased risk of local recurrence[J]. *Ann Surg*, 2022, 275(2):e420–e427. doi:10.1097/SLA.0000000000003889.
- [7] Arron MNN, Greijdanus NG, Bastiaans S, et al. Long-term oncological outcomes after colorectal anastomotic leakage: a retrospective Dutch population-based study[J]. *Ann Surg*, 2022, 276(5):882–889. doi:10.1097/SLA.0000000000005647.
- [8] Peltrini R, Carannante F, Costa G, et al. Oncological outcomes of rectal cancer patients with anastomotic leakage: a multicenter case-control study[J]. *Front Surg*, 2022, 9: 993650. doi: 10.3389/fsurg.2022.993650.
- [9] Rahbari NN, Weitz J, Hohenberger W, et al. Definition and grading of anastomotic leakage following anterior resection of the rectum: a proposal by the International Study Group of Rectal Cancer[J]. *Surgery*, 2010, 147(3):339–351. doi:10.1016/j.surg.2009.10.012.
- [10] Bong JW, Lim SB. Transanal minimally invasive surgery as a treatment option for a completely occluded anastomosis after low anterior resection: a new approach to severe anastomotic stenosis[J]. *Asian J Endosc Surg*, 2019, 12(2): 175–177. doi: 10.1111/ases.12599.
- [11] Cong J, Zhang H, Chen C. Definition and grading of anastomotic stricture/stenosis following low anastomosis after total mesorectal excision: a single-center study[J]. *Asian J Surg*, 2023, 46(9):3722–3726. doi:10.1016/j.asjsur.2023.03.027.
- [12] Placer C, Urdapilleta G, Markinez I, et al. Benign anastomotic strictures after oncologic rectal cancer surgery. Results of treatment with hydrostatic dilation[J]. *Cir Esp*, 2010, 87(4): 239–243. doi: 10.1016/j.ciresp.2009.12.010.
- [13] Vu L, Penter C, Platell C. Long-term significance of an anastomotic leak in patients undergoing an ultra-low anterior resection for rectal cancer[J]. *ANZ J Surg*, 2019, 89(10): 1291–1295. doi: 10.1111/ans.15373.
- [14] Arron MNN, Greijdanus NG, Ten Broek RPG, et al. Trends in risk factors of anastomotic leakage after colorectal cancer surgery (2011–2019): a Dutch population-based study[J]. *Colorectal Dis*, 2021, 23(12):3251–3261. doi:10.1111/codi.15911.
- [15] Zarnescu EC, Zarnescu NO, Costea R. Updates of risk factors for anastomotic leakage after colorectal surgery[J]. *Diagnostics (Basel)*, 2021, 11(12):2382. doi:10.3390/diagnostics11122382.
- [16] Parthasarathy M, Greensmith M, Bowers D, et al. Risk factors for anastomotic leakage after colorectal resection: a retrospective analysis of 17 518 patients[J]. *Colorectal Dis*, 2017, 19(3): 288–298. doi:10.1111/codi.13476.
- [17] Kwag SJ, Kim JG, Kang WK, et al. The nutritional risk is a independent factor for postoperative morbidity in surgery for colorectal cancer[J]. *Ann Surg Treat Res*, 2014, 86(4):206–211. doi: 10.4174/astr.2014.86.4.206.
- [18] Tschann P, Weigl MP, Szeverinski P, et al. Are risk factors for anastomotic leakage influencing long-term oncological outcomes after low anterior resection of locally advanced rectal cancer with neoadjuvant therapy? A single-centre cohort study[J]. *Langenbecks Arch Surg*, 2022, 407(7): 2945–2957. doi: 10.1007/s00423–022–02609–2.
- [19] Brisinda G, Chiarello MM, Pepe G, et al. Anastomotic leakage in rectal cancer surgery: retrospective analysis of risk factors[J]. *World J Clin Cases*, 2022, 10(36):13321–13336. doi:10.12998/wjcc.v10.i36.13321.
- [20] Balciscueta Z, Uribe N, Caubet L, et al. Impact of the number of stapler firings on anastomotic leakage in laparoscopic rectal surgery: a systematic review and meta-analysis[J]. *Tech Coloproctol*, 2020, 24(9): 919–925. doi: 10.1007/s10151–020–02240–7.
- [21] Sparreboom CL, van Groningen JT, Lingsma HF, et al. Different risk factors for early and late colorectal anastomotic leakage in a nationwide audit[J]. *Dis Colon Rectum*, 2018, 61(11): 1258–1266. doi:10.1097/DCR.0000000000001202.
- [22] Davis B, Rivadeneira DE. Complications of colorectal

- anastomoses: leaks, strictures, and bleeding[J]. *Surg Clin North Am*, 2013, 93(1):61-87. doi:10.1016/j.suc.2012.09.014.
- [23] He F, Yang FY, Chen DF, et al. Risk factors for anastomotic stenosis after radical resection of rectal cancer: a systematic review and meta-analysis[J]. *Asian J Surg*, 2024, 47(1):25-34. doi:10.1016/j.asjsur.2023.08.209.
- [24] 郁宝铭, 李东华, 郑民华, 等. 双吻合器在低位直肠癌手术中的地位(附113例分析)[J]. *中国实用外科杂志*, 1996, 16(3):140-141. Yu BM, Li DH, Zheng MH, et al. The role of double stapling device in surgical treatment in low rectal cancer[J]. *Chinese Journal of Practical Surgery*, 1996, 16(3):140-141.
- [25] Kumar A, Daga R, Vijayaragavan P, et al. Anterior resection for rectal carcinoma-risk factors for anastomotic leaks and strictures[J]. *World J Gastroenterol*, 2011, 17(11):1475-1479. doi:10.3748/wjg.v17.i11.1475.
- [26] Osera S, Ikematsu H, Odagaki T, et al. Efficacy and safety of endoscopic radial incision and cutting for benign severe anastomotic stricture after surgery for lower rectal cancer (with video)[J]. *Gastrointest Endosc*, 2015, 81(3):770-773. doi:10.1016/j.gie.2014.11.011.
- [27] Hu X, Guo P, Zhang N, et al. Nomogram for benign anastomotic stricture after surgery for rectal cancer[J]. *Asian J Surg*, 2023, 46(1):111-119. doi:10.1016/j.asjsur.2022.01.045.
- [28] Akiyoshi T, Ueno M, Fukunaga Y, et al. Incidence of and risk factors for anastomotic leakage after laparoscopic anterior resection with intracorporeal rectal transection and double-stapling technique anastomosis for rectal cancer[J]. *Am J Surg*, 2011, 202(3):259-264. doi:10.1016/j.amjsurg.2010.11.014.
- [29] Rondelli F, Bugiantella W, Vedovati MC, et al. To drain or not to drain extraperitoneal colorectal anastomosis? A systematic review and meta-analysis[J]. *Colorectal Dis*, 2014, 16(2):O35-O42. doi:10.1111/codi.12491.
- [30] Prasad LM, DeSouza AL, Blumetti J, et al. Endoscopic-assisted closure of a chronic colocolic fistula[J]. *Gastrointest Endosc*, 2010, 72(3):662-664. doi:10.1016/j.gie.2009.12.028.
- [31] Lamazza A, Fiori E, Schillaci A, et al. Treatment of anastomotic stenosis and leakage after colorectal resection for cancer with self-expandable metal stents[J]. *Am J Surg*, 2014, 208(3):465-469. doi:10.1016/j.amjsurg.2013.09.032.
- [32] 池畔, 王泉杰, 林惠铭, 等. 肠镜下被膜自膨式金属支架置入治疗结直肠癌术后吻合口瘘的疗效及并发症分析[J]. *中华胃肠外科杂志*, 2015(7): 661-666. doi: 10.3760/cma. j. issn. 1671-0274.2015.07.008. Chi P, Wang XJ, Lin HM, et al. Endoscopic covered self-expandable metal stents implantation in the management of anastomotic leakage after colorectal cancer surgery[J]. *Chinese Journal of Gastrointestinal Surgery*, 2015(7):661-666. doi:10.3760/cma.j.issn.1671-0274.2015.07.008.
- [33] Kjaer M, Kristjánssdóttir H, Andersen L, et al. The effect of gender on early colonic anastomotic wound healing[J]. *Int J Colorectal Dis*, 2018, 33(9):1269-1276. doi:10.1007/s00384-018-3089-4.
- [34] Deng S, Liu K, Gu J, et al. Endoscopic fully covered self-expandable metal stent and vacuum-assisted drainage to treat postoperative colorectal cancer anastomotic stenosis with fistula[J]. *Surg Endosc*, 2023, 37(5):3780-3788. doi:10.1007/s00464-022-09831-5.
- [35] 俞权, 刘壮壮, 马仪超, 等. 规范化扩肛预防低位直肠癌保肛加回肠预造口术后吻合口狭窄[J]. *中国现代普通外科进展*, 2024, 27(1):66-68. doi:10.3969/j.issn.1009-9905.2024.01.016. Yu Q, Liu ZZ, Ma YC, et al. Standardized anal dilatation to preventing anastomotic stenosis after anus preserving and ileostomy for low rectal cancer[J]. *Chinese Journal of Current Advances in General Surgery*, 2024, 27(1):66-68. doi:10.3969/j.issn.1009-9905.2024.01.016.
- [36] Biraima M, Adamina M, Jost R, et al. Long-term results of endoscopic balloon dilation for treatment of colorectal anastomotic stenosis[J]. *Surg Endosc*, 2016, 30(10):4432-4437. doi:10.1007/s00464-016-4762-8.
- [37] Chan RH, Lin SC, Chen PC, et al. Management of colorectal anastomotic stricture with multidiameter balloon dilation: long-term results[J]. *Tech Coloproctol*, 2020, 24(12):1271-1276. doi:10.1007/s10151-020-02318-2.
- [38] Caruso A, Conigliaro R, Manta R, et al. Fully covered self-expanding metal stents for refractory anastomotic colorectal strictures[J]. *Surg Endosc*, 2015, 29(5):1175-1178. doi:10.1007/s00464-014-3785-2.
- [39] 王世焄, 丁永强, 胡欢, 等. 自膨式金属支架在结直肠梗阻中的应用进展[J]. *中国普通外科杂志*, 2019, 28(10):1281-1287. doi:10.7659/j.issn.1005-6947.2019.10.017. Wang SY, Ding YQ, Hu H, et al. Advances in application of self-expandable metallic stenting for colorectal obstruction[J]. *China Journal of General Surgery*, 2019, 28(10):1281-1287. doi:10.7659/j.issn.1005-6947.2019.10.017.
- [40] Small AJ, Young-Fadok TM, Baron TH. Expandable metal stent placement for benign colorectal obstruction: outcomes for 23 cases[J]. *Surg Endosc*, 2008, 22(2):454-462. doi:10.1007/s00464-007-9453-z.
- [41] Geiger TM, Miedema BW, Tsereteli Z, et al. Stent placement for benign colonic stenosis: case report, review of the literature, and animal pilot data[J]. *Int J Colorectal Dis*, 2008, 23(10):1007-1012. doi:10.1007/s00384-008-0518-9.
- [42] Chen HL, Liu W, Jiang S, et al. A completely occluded colorectal

- anastomotic stenosis treated using an endoscopic incision method[J]. *Am J Gastroenterol*, 2018, 113(2): 174. doi: 10.1038/ajg.2017.488.
- [43] Takayanagi S, Ohata K, Kimoto Y, et al. Endoscopic strictureplasty for severe colonic anastomotic stricture[J]. *Endoscopy*, 2023, 55(S 01):E301-E302. doi:10.1055/a-1982-3756.
- [44] Lin DZ, Liu W, Chen ZX, et al. Endoscopic stricturotomy for patients with postoperative benign anastomotic stricture for colorectal cancer[J]. *Dis Colon Rectum*, 2022, 65(4):590-598. doi: 10.1097/DCR.0000000000001944.
- [45] Xu W, Qin Y, Yang F, et al. Application of transurethral prostate resection instrumentation for treating rectal anastomotic stenosis: case series[J]. *Medicine (Baltimore)*, 2023, 102(19): e33799. doi: 10.1097/MD.00000000000033799.
- [46] Zhang ZM, Hu ZT, Qin YJ, et al. Application of transurethral prostate resection instrumentation for treating low rectal anastomotic leakage: a pilot study[J]. *Cancer Manag Res*, 2022, 14: 1987-1994. doi:10.2147/CMAR.S367039.
- [47] 张念杰, 苟晓梅, 文坤明, 等. 腹腔镜直肠癌低位前切除术罕见吻合口完全闭锁1例报告[J]. *中国普通外科杂志*, 2020, 29(4): 494-497. doi:10.7659/j.issn.1005-6947.2020.04.014.
- Zhang NJ, Gou XM, Wen KM, et al. A case report of complete anastomosis stoma closure after laparoscopic low anterior resection for rectal cancer[J]. *China Journal of General Surgery*, 2020, 29(4): 494-497. doi:10.7659/j.issn.1005-6947.2020.04.014.
- [48] 夏文豪, 黄平, 吴作友, 等. 改良Bacon术在低位直肠吻合口良性狭窄再次保肛手术中的应用[J]. *结直肠肛门外科*, 2022, 28(1): 73-76. doi:10.19668/j.cnki.issn1674-0491.2022.01.016.
- Xia WH, Huang P, Wu ZY, et al. Modified Bacon's procedure as repeated sphincter-preserving operation for benign rectal anastomotic stenosis[J]. *Journal of Colorectal & Anal Surgery*, 2022, 28(1): 73-76. doi: 10.19668/j.cnki.issn1674-0491.2022.01.016.
- [49] 黄平, 王锋, 肇毅, 等. 改良Bacon术在低位直肠癌保肛术中的应用[J]. *中国现代手术学杂志*, 2007, 11(4):269-272. doi:10.16260/j.cnki.1009-2188.2007.04.022.
- Huang P, Wang F, Zhao Y, et al. Modified bacon operation in sphincter-preserving surgery for low rectal cancer[J]. *Chinese Journal of Modern Operative Surgery*, 2007, 11(4):269-272. doi: 10.16260/j.cnki.1009-2188.2007.04.022.
- [50] 洪勇智, 黄平, 戴青松, 等. 皮下橡皮筋引流对直肠癌患者再次保肛手术污染切口感染的防治效果[J]. *江苏医药*, 2022, 48(5):516-518. doi:10.19460/j.cnki.0253-3685.2022.05.022.
- Hong YZ, Huang P, Dai QS, et al. Efficacy of abdominal subcutaneous rubber band drainage in prevention and treatment of contaminated incisions after anus preservation reoperation for rectum cancer[J]. *Jiangsu Medical Journal*, 2022, 48(5): 516-518. doi:10.19460/j.cnki.0253-3685.2022.05.022.
- [51] 陈启, 黄平, 孔连宝, 等. 双入路法在腹腔镜下游离结肠脾曲的直肠癌保肛术中的应用[J]. *中华结直肠疾病电子杂志*, 2018, 7(2): 145-149. doi:10.3877/cma.j.issn.2095-3224.2018.02.009.
- Chen Q, Huang P, Kong LB, et al. Application of double-entry approach in laparoscopic lower rectal sphincter preservation for rectal cancer with splenic flexure[J]. *Chinese Journal of Colorectal Diseases:Electronic Edition*, 2018, 7(2):145-149. doi:10.3877/cma.j.issn.2095-3224.2018.02.009.

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