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· 专家论坛 ·

腹腔镜内括约肌切除术的一些难点问题及思考

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摘要

腹腔镜内括约肌切除术（ISR）是实现超低位直肠癌极限保肛的重要术式。本文基于团队400例手术经验，围绕手术一些关键难点提出系统优化策略。针对括约肌间隙游离困难，采用“折刀位经肛优先”策略，改善盆底暴露并降低环周切缘阳性风险；为预防降低吻合口漏的发生，探索ISR联合改良Bacon（Turnbull-Cutait）延期吻合方案，实现“安全免造口”；对吻合口大范围裂开，建立造口治疗师参与的全程管理体系，并开展经肛“U”形修补以促进吻合口快速愈合；在功能重建方面，尝试经腹肛提肌成形术以增强盆底支撑、改善控便功能。初步实践表明，这一系列策略有助于在ISR术中实现肿瘤根治与功能保护的平衡，为超低位直肠癌保肛治疗的规范化与个体化提供了新的思路，但仍需要更多高质量临床研究进一步证实。

关键词

直肠肿瘤；内括约肌切除术；吻合口漏；排便异常

中图分类号：R735.3

Reflections on the technical challenges and strategies in laparoscopic intersphincteric resection

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Abstract

Laparoscopic intersphincteric resection (ISR) represents a key technique for achieving maximal sphincter preservation in ultra-low rectal cancer. Based on 400 cases of surgical experience, this study proposes a series of systematic strategies addressing some major technical challenges of ISR. To facilitate precise dissection of the intersphincteric space, a "knife-edge position transanal-priority" approach was adopted, improving exposure and reducing the risk of circumferential margin positivity. To prevent and reduce anastomotic leakage, ISR combined with the modified Bacon (Turnbull-Cutait) delayed anastomosis was introduced as a "stoma-free but safe" alternative. For large anastomotic disruptions, a stoma-therapist-involved management protocol with transanal "U-shaped" repair was implemented to promote healing. Furthermore, a transabdominal levatorplasty was explored to enhance

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pelvic floor support and improve postoperative continence. Our initial experience suggests that, these strategies contribute to optimizing the balance between oncological radicality and functional preservation, offering a practical and individualized pathway for sphincter-saving surgery in ultra-low rectal cancer.

Key words

Rectal Neoplasms; Intersphincteric Resection; Anastomotic Leakages; Abnormal Defecation

CLC number: R735.3

超低位直肠癌的保肛治疗是结直肠外科的难点。腹会阴联合切除术(abdominoperineal resection, APR)虽为传统根治手段,但永久性造口严重影响生活质量。1994年Schiessel等^[1-2]首创内括约肌切除术(intersphincteric resection, ISR),通过沿括约肌间隙(intersphincteric space, ISS)分离实现“极限保肛”,使其成为功能保护性手术的重要代表。随着新辅助治疗及盆底解剖学的发展,ISR得到进一步推广应用^[3]。然而,ISR始终在争议中前进:其肿瘤学安全性虽与APR相当^[2],但在“困难骨盆”中确保切缘仍是焦点;功能方面,因内括约肌的切除易致严重低位前切除综合征(low anterior resection syndrome, LARS)^[4-5]。此外,其吻合口漏发生率较高(10%~20%)^[6-7],后者更是功能障碍的“放大器”。尽管ISR的术式与入路不断丰富^[3,8-10],但国际共识指出,部分改良术式未严格符合ISR的解剖学定义,故强调需加以规范^[11]。本文结合本团队400例腹腔镜ISR经验,重点探讨ISS游离、吻合口漏防治及功能重建等核心环节的难点与对策,并对未来的发展方向进行思考。

1 ISR手术ISS游离难点及对策

ISS作为ISR手术的核心解剖层面,一直是外科医生最为关注、同时也是最具挑战性的区域。ISS位于内括约肌与外括约肌之间,自肛管皮肤缘向上延伸至耻骨直肠肌水平,与直肠尿道肌(rectourethral muscle, RU)及耻骨直肠肌等盆底重要结构密切相关^[12-13]。其层面狭窄、界限模糊,加之骨盆深部操作空间有限,使得ISS游离成为ISR手术成败的关键。过去相当长一段时间,ISS的分离主要依赖传统的经腹经肛联合入路^[8]。由于经腹在狭骨盆或肥胖患者中往往视野受限,单纯经腹操作难以充分辨认ISS层面,因此需要截石位经肛辅助。随着腹腔镜技术的不断进步,高清放大视

野和多角度照明显著提升了盆底解剖的可视化,越来越多学者开始尝试并推荐采用完全经腹入路完成ISS游离^[14]。笔者在临床实践中也发现,经腹入路在ISS的后方和两侧游离时优势尤为明显,不仅有助于确保切缘,而且能提高手术效率;但在ISS前方,尤其是接近RU的区域^[12],操作仍然存在相当大的挑战。近年来,机器人辅助ISR的兴起为解决这一问题提供了新的思路。其三维高清放大视野可显著增强深盆腔的解剖辨识能力,而灵活的腕式机械臂则能在狭小空间内实现精准操作,尤其在RU区的精细分离、盆底结构保护以及低位缝合过程中展现出一定的优势。多项研究报道,机器人辅助ISR在切缘质量、术中出血控制以及早期排便功能方面较传统腹腔镜ISR更具优势,并可能在难度较高的男性狭骨盆或经放疗病例中提高手术的安全性与可重复性^[15]。

在传统截石位经肛ISS游离过程中,经常遇到三大挑战:一,前方视野暴露不足,RU难以明确辨识,可能增加环周切缘阳性的风险;二,由于暴露受限,术者操作空间狭小、易于疲劳,若ISS辨认不准确,易误伤外括约肌,从而造成控便功能损伤;三,牵拉暴露欠佳时,远端下切缘容易发生撕裂,直接影响病理学评估与切缘质量。随着经验的积累,笔者逐渐认识到,ISS游离关键并非耻骨直肠肌的识别,而是RU的识别与保护。RU位于直肠前壁与尿道之间,是盆底的重要结构。其前方邻近尿道膜部,后方与直肠纵肌相连,被认为是Denonvilliers筋膜远端的延续,构成直肠远端解剖中最后一道屏障。经肛入路分离时,应靠近直肠侧离断RU以免损伤尿道膜部,同时亦能较好保留会阴浅横肌和会阴深横肌及其支配的神经血管束^[16]。在临床实践中,笔者发现对于少部分患者经肛入路未能较好地显露和精准地离断RU。近年来,对ISR相关的解剖学研究已取得新进展,例如, Park等^[17]在其低位直肠癌手术综述中强调,

前壁解剖（包括 Denonvilliers 筋膜与邻近结构）识别的准确率，是决定切缘安全与功能保留的关键一环；另一项尸体解剖-影像结合研究^[18]系统测量了直肠前壁与膜部尿道之间的距离，并总结了尿道损伤风险的解剖因素，为理解 RU 与尿道之间的安全操作区提供了一些指导。这些进展有助于我们更好理解 ISR 中的解剖界限与暴露策略，从而优化手术路径选择与安全性。

针对上述难点，笔者团队提出了折刀位经肛优先 ISS 游离、联合腹腔镜全直肠系膜切除（total mesorectal excision, TME）的策略。这一策略包含两层含义：一是“经肛先行”，这一理念与最早由国外学者提出的经肛腹经肛直乙状结肠切除术（transanal-abdominal transanal radical proctosigmoidectomy, TATA）颇为相似，即通过经肛入路率先完成 ISS 与远端直肠游离；二是折刀位的应用。国内学者邓俊晖等^[19]早前也开展了折刀位直视下经肛 ISR 的探索，证实该体位能通过拉钩充分暴露肛门，使术者在直视下近距离操作，获得更清晰的视野与更舒适的体位，从而利于 ISS 的精准游离及环周切缘的保证。然而，折刀位 ISS 游离的不足之处在于，手术遵循“先经肛，后经腹”的顺序，需在折刀位与改良截石位之间转换，延长手术时间并增加流程复杂度；同时在经肛操作前无法完成腹腔探查，可能在术中决策上存在局限性。

根据笔者目前已完成 13 例折刀位经肛优先 ISS 游离的经验，笔者中心初步推荐的适应证相对较窄，主要集中在：(1) BMI>28 kg/m² 的肥胖患者；(2) 骨盆狭窄（术前 MRI 提示坐骨结节间距≤10 cm）者^[20]；(3) 肿瘤位于前壁 RU 或会阴体附近，尤其接受过新辅助放疗的病例。在操作方式上，笔者强调经肛 ISS 游离需遵循“两侧后方→后正中→侧前方→前方”的分离顺序。该顺序有助于循序渐进地显露 ISS 层面，避免因过早在前方操作而增加前方环周切缘阳性风险。先从两侧及后方入手，逐

步形成清晰的解剖间隙，再转向后正中和侧前方，最后处理最具挑战性的前方 RU 区域，能够显著降低误切和切缘不足的发生率。本文介绍 3 例特殊复杂病例，这些病例均通过折刀位经肛优先 ISS 游离联合腹腔镜 TME 顺利完成手术，获得了满意的切缘，显示了该策略在不同复杂病例条件下的可行性。病例 1 为接受过新辅助放化疗的男性前壁直肠癌患者，该患者肿瘤位于直肠前壁/齿线稍上方（肿瘤新辅助放化疗后，术前多点穿刺活检阴性）。笔者体会，折刀位直视下，术者手可较好地感知尿道膜部，指引 RU 的大部分分离（图 1）。

病例 2 为肿瘤紧邻会阴体的女性患者，患者直肠前壁距齿线 1 cm，肿瘤 T2 期。笔者体会，折刀位直视下经肛 ISS 游离可确保下切缘及环周切缘的阴性（图 2）。

病例 3 为双侧股骨头坏死导致双下肢无法外展的超低位直肠癌（前壁、距肛缘 3.5 cm、新辅助放化疗后）男性患者。笔者体会，采用折刀位，使坐骨结节间距过小患者的 ISS 游离更为方便（图 3）。

对于肿瘤较大、肥胖、男性或经过新辅助放疗的超低位直肠癌，单纯经腹腔镜 TME 或 ISR 往往因盆腔狭窄、远端暴露不足而难以施行。十余年来涌现的经肛腔镜技术，尤其是经肛 TME，通过自下而上的逆向操作，改善了远端直肠的暴露，在确保足够的远切缘和环周切缘方面展现出独特优势，并在国内外得到广泛应用和验证^[21-22]。与此同时，国内学者团队^[23]报道，经肛腔镜 ISR（taE-ISR）凭借近距离、高倍放大的直视视野，可实现 ISS 的精准游离，提高了解剖与组织分离的精确性。在狭窄盆腔内，这一技术为术者创造了更宽敞的操作空间，显著提升了经肛操作的可行性。该研究显示，taE-ISR 不仅在极低位直肠癌中具备肿瘤学上的安全性，还在短期功能保留方面展现出潜力。

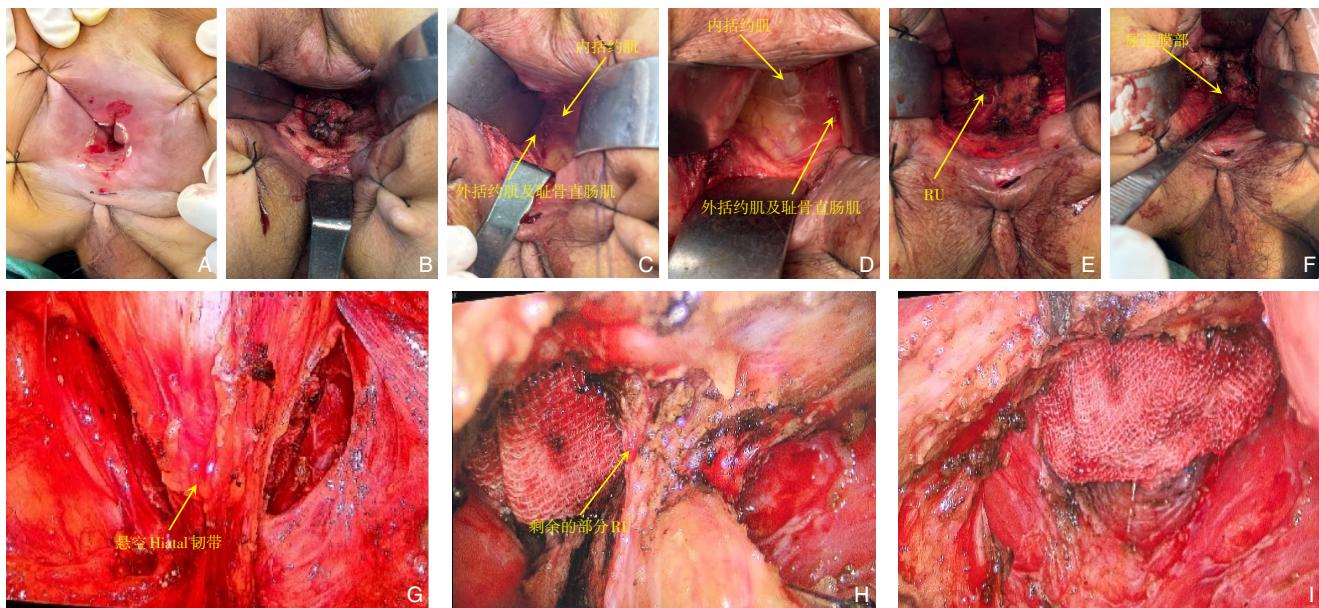


图1 病例1 (前壁直肠癌男性患者) A-B: 确定安全的下切缘,适当游离ISS做荷包关闭/碘伏冲洗; C-D: 左侧/右侧/后方内括约肌间隙游离 (intersphincteric dissection, ISD); E-F: 前方ISD (以两侧的外括约肌环为指引寻找并离断RU,保护尿道膜部); G-I: 更换体位行传统TME (以肛门部填塞的大纱布为指引,经腹离断后方悬空Hiatal韧带及前方剩余的RU)

Figure 1 Case 1 (a male patient with anterior rectal cancer) A-B: Determination of a safe distal resection margin; appropriate dissection of the ISS followed by purse-string closure and povidone-iodine irrigation; C-D: Left, right, and posterior intersphincteric dissections (ISD); E-F: Anterior ISD (the rectourethralis muscle (RU) is identified and divided with reference to the bilateral external sphincter rings while protecting the membranous urethra); G-I: After repositioning, conventional TME is performed, guided by the large gauze packed in the anal canal, to divide the posterior hiatal ligament and the remaining anterior RU

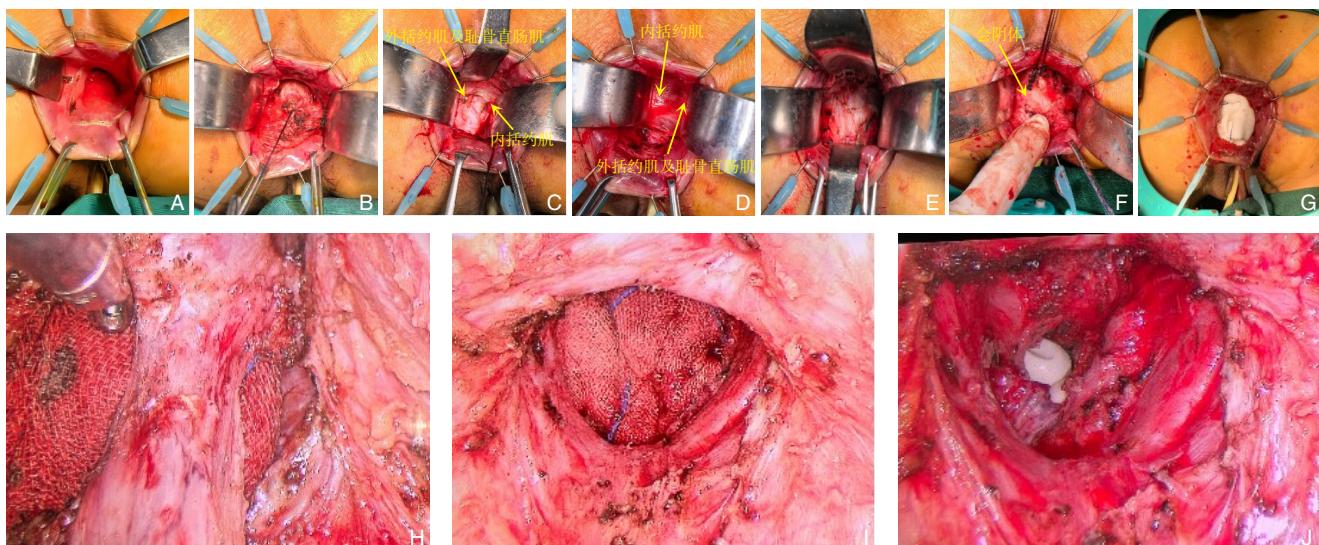


图2 病例2 (肿瘤紧邻会阴体的女性患者) A-B: 确定安全的下切缘,适当游离ISS做荷包关闭下切缘; C-E: 左侧/右侧/后方ISD; F: 前方ISD; G: 经肛游离完成后用一大纱布填塞肛管; H-J: 更换体位行传统TME,与肛门部操作汇合

Figure 2 Case 2 (a female patient with a tumor adjacent to the perineal body) A-B: Determination of a safe distal resection margin; appropriate dissection of the ISS followed by purse-string closure of the distal margin; C-E: Left, right, and posterior ISD; F: Anterior ISD; G: After completion of transanal dissection, the anal canal is packed with a large gauze; H-J: Following repositioning, conventional TME is performed, meeting the dissection plane from the anal side

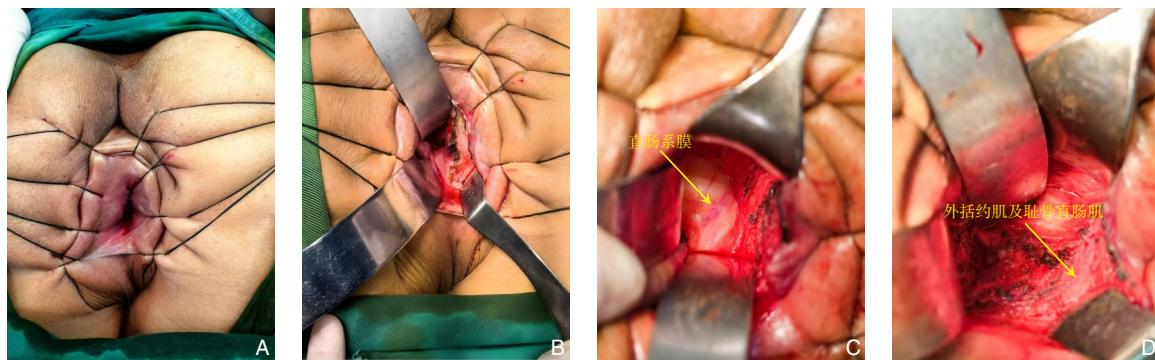


图3 病例3 (双下肢无法外展的超低位直肠癌男性患者)
至显露直肠系膜，然后更换体位行腹腔镜TME

Figure 3 Case 3 (a male patient with ultra-low rectal cancer and bilateral hip abduction limitation) A-B: Patient positioned in the jackknife posture, and using No. 7 sutures placed around the anus for exposure; C-D: Retrograde transanal ISD is performed until the mesorectum is visualized, followed by laparoscopic TME after repositioning

在此背景下，笔者初步的实践结果显示，折刀位直视下能够较好地改善ISS的暴露，尤其是在前方RU区域的辨识与保护上，操作更为安全可控，学习曲线相对较短。对于直肠前壁肿瘤或接受过新辅助放疗的患者，如何在RU区域实现精准离断，是折刀位经肛ISD游离与经肛腔镜ISS游离的核心分歧所在，是依靠经肛腔镜提供的放大直视视野，还是依赖折刀位直视下的“视觉+触觉”配合来完成精准离断，这一问题仍待临床进一步探索。另一方面，经肛腔镜技术作为一项对技术和设备要求较高的新术式，推广受限于对操作平台、恒压气腹机及双组团队的依赖，且学习曲线较长。而折刀位ISD游离的技术门槛相对较低，主要不足是需要额外体位转换，类似于折刀位肛提肌外腹会阴联合切除术，多数病例并不需要，但在个别困难病例（如RU暴露差、盆腔狭窄等）时，可以作为一种安全可行的补充选择。其优势在于直视下近距离操作，改善RU的解剖辨识与保护，从而提高手术安全性，并可能避免经肛腔镜特有并发症的发生，如误入错误层面导致的尿道损伤^[24]或CO₂栓塞^[25]。需要强调的是，折刀位与经肛腔镜并非对立关系，而是互为补充。折刀位适合在条件受限、难以开展经肛腔镜的情况下使用，而在具备设备与经验的中心，经肛腔镜则能进一步提升操作的精准性和切除质量。甚至已有学者尝试在折刀位体位下结合经肛腔镜实施前列腺肥大合并低位直肠癌的切除，结果提示二者结合或许能“锦上添花”^[26]。未来仍需更多循证研究来明确两者的适应证边界和最佳应用人群。

2 ISR联合改良Bacon(Turnbull-Cutait)延期吻合的初步探索

在超低位直肠癌高风险人群的保肛治疗中，“一期直接结肠肛管吻合+保护性回肠造口”的经典路径始终面临两难：要么接受较高的吻合口漏与盆腔感染风险，要么以造口“保护”换取安全，却引入造口本身及回纳手术的一系列并发症与失败概率^[27]。大型多中心数据^[28]反复提示，低位前切除/结肠肛管吻合的吻合口漏可高达约30%~36%（部分研究更高），一旦发生不仅显著增加短期并发症发生与死亡风险，也会恶化长期肠道功能、提高永久性造口率^[29]并增加肿瘤复发风险，这正是“在争议中前进”的现实动力。基于“远离粪便、让吻合在更‘安静’的局部环境完成”的朴素理念，拖出-延期结肠肛管吻合[国内习惯称“改良Bacon”^[30]，国际文献多称“Turnbull-Cutait pull-through”^[31-32]或“delayed coloanal anastomosis(DCAA)”^[33-34]]被再度系统化研究：第一步完成超低位直肠切除并将结肠段经肛拖出固定，不立即吻合；经1~4周等待期形成牢固粘连后，第二步在肛管处手工吻合。这样处理的核心在于：不做“一期吻合”，即可在最脆弱的术后窗口期回避吻合口漏与污染；同时又无需造口，从源头免除造口相关并发症与“造口不能还纳”的长久负担——这一术式的生物学合理性与临床吸引力不言自明。

循证证据方面，JAMA Surgery 2020年的多中心随机对照试验（randomized controlled trial, RCT）^[35]将两期拖出-延期结肠肛管吻合与“标准手工结肠

肛管吻合+回肠造口”正面比较,结果显示,两组30 d总体并发症发生率相当,延期吻合策略并未增加围手术期并发症;值得注意的是,约15%的患者最终未能行造口还纳,提示“造口-保护”并非零成本且存在“回不去”的可能。2024年同团队的长期结局RCT进一步报道,延期吻合组与标准手工吻合+保护性回肠造口组在肛门功能方面无显著差异(LARS、Wexner及COREFO评分相近),提示延期吻合并不牺牲长期功能;同时,延期吻合显著减少了患者行肠造口的机会,总体生活质量与满意度相当。由此,延期吻合的功能学优势更体现在不降低长期功能的前提下,减少造口相关负担^[36]。

由此可见,在ISR一期吻合面临“高风险-高代价”的人群中,改良Bacon/Turnbull-Cutait的延期吻合策略提供了一条“更安全且可能免造口”的可行路径。其关键在于将吻合窗口期推迟至炎症消退、局部粘连巩固之后,从而明显降低吻合口漏与感染风险,并大大降低了预防性造口率及还纳手术的风险。然而,我们也需正视此策略的“特有”风险。GRECCAR多中心报告^[37]指出,延期吻合(包括主动延期吻合与一期吻合失败后再行挽救性延期吻合)虽能在一定程度上避免造口,但其总体并发症发生率高达约30%,吻合口漏发生率约18%,且伴有外置肠管段坏死、腹腔内结肠缺血等严重风险;肠道连续性在术后3年虽达74%,但仍有约40%的患者遭遇重度LARS或转为永久性造口。此外,国内研究针对81例改良Bacon手术患者的回顾性分析^[38]中指出,外置肠管缺血性坏死发生率亦不可忽视:共发现8例(9.9%)发生该并发症,其中3例发展为急性腹膜炎需紧急行乙状结肠造口术。此外,在笔者的临床体会中,在改良Bacon二期吻合重建过程中,局部常伴随系膜和肠管水肿、炎症与瘢痕粘连,使得术中难以实现理想的“适形切除”。为了完成吻合,往往必须切除部分瘢痕及粘连组织,这在客观上可能牺牲了部分正常组织,甚至带来肛门功能的损伤。换言之,改良Bacon策略虽拓宽了保肛的边界,但也不可避免地引入了其独有的并发症谱和功能学代价,提示其应用必须建立在严格的适应证选择与精准的术中评估之上,也要求我们把“成功率/安全性”的讨论从短期漏发生率扩展到长期功能与永久性造口的层面。

因此,STAR-TAR全国多中心前瞻性RCT(NCT06662643)应运而生。该研究由笔者中心牵头,联合中国人民解放军火箭军特色医学中心、复旦大学附属华山医院等国内共14家医院,研究方案已发表^[39],设计上将改良Bacon(延期吻合Turnbull-Cutait)与“直接吻合+保护性回肠造口”进行严格比较,不仅以吻合口漏与感染等短期并发症为主要结局,更将LARS等功能学指标、永久性造口率与生活质量作为同等重要的核心终点,以回答“安全地免造口”能否同时带来“更好的长期功能与更少的永久性造口”。目前该研究已顺利入组180余例,随访与数据锁定正在推进,期待以高质量循证证据为这一策略的适应证选择与风险-收益平衡提供更清晰的答案。

3 ISR术后吻合口大范围裂开的预防及处理

文献报道,ISR术后吻合口漏发生率差异较大,一项纳入1 289例ISR患者的系统综述^[2]统计总体吻合口漏发生率为9.1%(0.9%~48%)。日本一项纳入2 117例ISR患者的全国性调查^[40]显示总体吻合口漏发生率为9.5%。其中,迟发性漏并不少见,一项针对132例新辅助放化疗后ISR患者的研究^[41]报道,总漏率高达31.1%,迟发漏占18.9%。临床常采用Clavien-Dindo并发症分级系统^[42]和国际直肠癌研究组(International Study Group of Rectal Cancer,ISREC)的分级系统来评估其严重程度^[43]。由于ISR术后多数患者已建立预防性肠造口,绝大多数吻合口漏表现为A级(亚临床漏)或B级(可保守治疗),仅少数发展为需要再次手术干预的C级漏。值得注意的是,大范围或全周裂开是吻合口漏中最为严重的一类,其定义在不同文献中不尽一致。据日本的一项报道^[6],ISR术后吻合口完全裂开发生率约为3.8%,占所有吻合口漏的22%。此类严重裂开带来的危害远超普通吻合口漏,不仅带来难以控制的盆腔感染,还可能破坏肛管结构,导致继发慢性骶前窦道、吻合口狭窄和直肠阴道瘘,部分患者造口回纳后再次出现吻合口漏,以及长期肛门功能差等原因导致患者永久造口^[6-7,44-46]。因此,它已成为临床处理中的“难点中的难点”,值得给予特殊关注。

首先,如何预防ISR术后吻合口漏,以下措施

尤为关键^[47]: 预防性造口; 尽量保留左结肠动脉以保证血运; 尽量游离脾曲, 减少吻合口张力, 确保吻合肠管充分游离、紧贴骶前, 避免“桥样悬空”; 尽量避免使用超过2个切割闭合器; 吻合口进行检测, 必要时加固。在笔者中心的实践中发现, 由于盆底解剖位置深在, ISR术后常伴随渗血或渗液, 且常规盆腔引流效果有限, 肛提肌裂孔平面以下或吻合口周围容易积液, 引发吻合口漏。因此, 笔者的经验是: 吻合前应充分冲洗盆腔, 尽可能保证无菌环境; 手工结肠吻合时吻合针距不宜过密; 吻合前充分扩肛, 若吻合时发现肠道准备不充分, 必要时可留置肛管。此外, 笔者在临床实践中发现, 为进一步减少吻合口周围积液, 笔者团队探索了“经吻合口间隙置管引流(trans-anastomotic drainage tube, TADT)”的方法: 在ISR行手工吻合的患者中, 除常规盆腔引流管外, 于吻合口缝针间隙置入2~3根带有多个小侧孔、长度约10 cm的细管通向盆腔, 并持续冲洗约1周以保持通畅(图4)。回顾性分析2017—2021年34例接受ISR并行手工吻合的患者手术结果^[48]显示, 非TADT组(20例)中有6例发生吻合口漏, 而TADT组(14例)无1例发生($P=0.031$)。

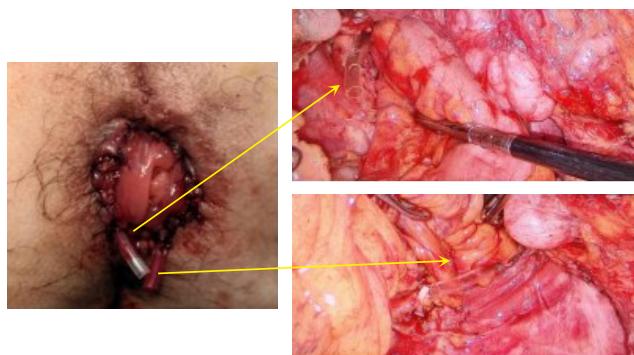


图4 吻合口缝针间隙置入带有小侧孔输液管冲洗

Figure 4 Irrigation through a transfusion tube with multiple side holes placed via the anastomotic suture gaps

而关于吻合口大范围或完全裂开后的最佳处理方式, 目前尚无统一结论, 缺乏高级别的循证医学证据。国内外学者多倾向于采用一些非手术策略, 包括:(1)灌洗与负压引流: 多通过在盆腔及肛管放置引流管, 联合实施双向冲洗和负压吸引。其作用在于持续清除局部感染源、降低炎症反应、促进肉芽组织生长, 从而为后续修复创造

条件^[49]。(2)内镜下封闭治疗: 主要包括负压海绵、覆膜支架覆盖漏口、OTSC(over-the-scope clip)钳闭合等。上述手段能够直接封闭漏口, 阻断肠内容物外漏, 配合引流可促进裂口愈合^[47,50]。

笔者中心建立了由造口治疗师参与ISR术后吻合口全程管理的模式, 以降低炎症、缩短愈合时间及减少狭窄为目标。处理方式主要包括两类:(1)保守处理: 适用于次全/完全ISR患者。关闭造口远端、保持盆腔引流并动态监测; 造口治疗师负责肛门部吻合口的处理。这种处理方法特点: 吻合口愈合时间较长且造口治疗师工作量大;(2)经肛手术修补: 针对部分ISR患者, 如近端肠管无缺血性坏死、吻合口近远端纵向脱离间距不大, 可借鉴Altemeier术后裂口经肛吻合口修补的经验^[51]。在彻底清除坏死感染组织后, 直视下以2-0可吸收线行间断“U”形缝合修补, 形成“丝瓜架”样支撑结构, 加速裂口闭合并降低重度吻合口狭窄发生风险。

4 肛门功能重建的探索: 经腹肛提肌成形术

在超低位直肠癌的保肛治疗中, 即使重建了肠道连续性, ISR术后患者的肛门功能仍常受到严重影响。由于切除了部分或全部内括约肌, 静息压下降, 部分患者会出现频繁排便、急迫感甚至重度LARS, 而传统康复手段改善有限^[4]。

为此, 笔者中心借鉴了直肠脱垂手术中重建肛提肌的理念^[52], 在腹腔镜ISR手术中探索同时行经腹肛提肌成形术^[53], 从而缩小肛提肌裂孔、加强盆底支撑、重建肛直角, 以期望在一定程度上增强ISR术后肛门功能(图5)。该方法可能的潜在优势在于:(1)结构重建: 通过缩小肛提肌裂孔、加强盆底肌群并重建肛直角, 改善肛门控便相关解剖和力学基础, 改善括约肌-肛提肌的协同作用。(2)一体化操作: ISR手术过程中本就需显露耻骨直肠肌, 可在吻合前直接完成缝合重建, 无需额外入路或增加操作复杂度。(3)预防新直肠脱垂的作用: ISR术后新直肠脱垂的发生率据文献报道约为4.5%~8%^[54-55]。其主要机制包括Hiatal韧带离断、肛提肌裂孔过大及盆底支撑不足, 导致新直肠向下移位和逐渐脱垂。在这一背景下, 经腹肛提肌成形术通过缩小肛提肌裂孔、加强盆底支撑及改善肛直角, 能够在解剖上恢复对新直肠的固

定和承托,从而有望减少此类并发症的发生。

研究的主要目标是评估经腹肛提肌成形术对ISR术后新直肠脱垂发生率及肛门功能恢复的影响。前期纳入10余例患者的小样本数据显示,术

后3~6个月内LARS评分较同期未行成形术者明显改善(未发表数据),但尚需加大样本量进一步证实其疗效。

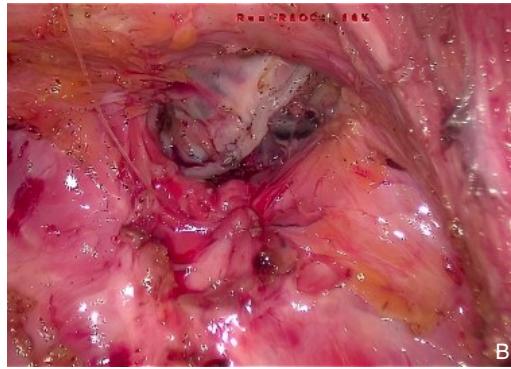
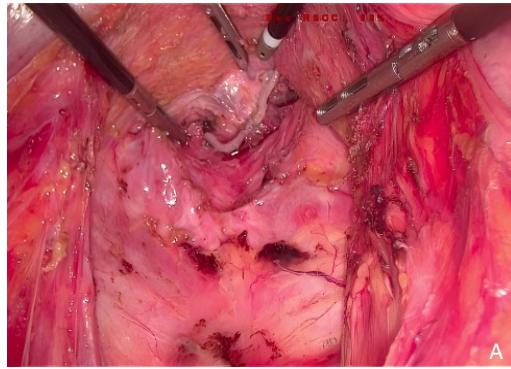


图5 腹腔镜下使用强生不可吸收的倒刺线(SXPL1B400)连续缝合耻骨直肠肌3~4针 A: 成形前; B: 成形后

Figure 5 Laparoscopic continuous suture of the puborectalis muscle with 3-4 stitches using Johnson & Johnson non-absorbable barbed suture (SXPP1B400) A: Before reconstruction; B: After reconstruction

5 小结及展望

超低位直肠癌保肛手术的发展始终伴随着争议与创新。从经腹/经肛协同的ISS游离,到改良Bacon延期吻合的多中心循证探索,再到吻合口并发症的全程管理模式,以及功能重建的创新尝试,每一步都源于对“更安全的肿瘤根治”与“更好的功能保留”这一双重目标的持续追求。ISR并非单一术式,而是一个可根据解剖特点、肿瘤位置、患者条件与团队经验进行个体化组合的技术体系。其未来的优化,不仅依赖于手术入路与操作策略的不断迭代,更需要来自多中心、高质量临床研究的循证验证,力求在肿瘤根治与功能重建之间寻求最佳平衡点,为患者带来更长远的获益。

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利益冲突:所有作者均声明不存在利益冲突。

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