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·临床研究·

腹部无辅助切口经直肠取标本的腹腔镜右半结肠部分切除术（保留回盲部）1例报告并文献复习

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摘　要

背景与目的：近年来，经自然腔道取标本手术（NOSES）在早期结直肠肿瘤外科治疗中广泛开展。该手术的主要优势包括降低手术创伤、加速患者康复和减轻患者不良心理暗示等。然而，目前NOSES在右半结肠癌的治疗中仍处于发展阶段，该技术诸多操作要点仍需不断完善。因此，本研究旨在探讨右半结肠NOSES手术的可行性与安全性以及相关的关键问题。

方法：回顾性分析中国医学科学院北京协和医学院肿瘤医院1例行腹部无辅助切口经直肠取标本的腹腔镜右半结肠部分切除术（保留回盲部）患者的临床资料，并结合NOSES相关文献报道，系统分析结肠癌NOSES手术的肠管切除范围、淋巴结清扫程度、消化道重建方式以及标本取出途径等关键问题。

结果：患者为49岁男性，因体检发现右半结肠肿物入院行手术治疗。术前临床分期为cT2N0M0。手术主要操作步骤包括右半结肠游离，结扎右结肠动静脉血管，区域淋巴结清扫；距肿瘤近端10 cm处裸化结肠并离断，于回盲瓣入口处远端肠管5 cm充分裸化升结肠并进行离断，行横结肠与升结肠的侧侧吻合；于腹膜返折线上5 cm处切开直肠壁，体外助手经直肠将标本拉出体外；倒刺线全层缝合直肠切口，并进行浆肌层加固。术后病理分期为pT2N0。患者术后第1天排气，第2天进流食，第5天出院。10篇相关文献复习显示，NOSES与常规腹腔镜手术比较，术后并发症无增加，甚至有所降低，在术后恢复方面表现出更好的微创效果，而其他手术指标无明显差异。

结论：本例保留回盲部的右半结肠NOSES手术展示了外科手术的微创化、功能化与精准化。然而该手术也存有一定技术难度，因此术前一定要做到充分评估与术中密切配合，才能确保手术顺利实施。未来需要更多高质量临床研究，提供有力循证医学证据，全面评估该术式的近期远期疗效。

关键词　结肠肿瘤；腹腔镜；结肠切除术；自然腔道内镜手术；最小侵入性外科手术

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Laparoscopic right colon cancer resection by transrectal specimen extraction without abdominal auxiliary incision (ileocecal junction preservation): a case report and literature review

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Abstract

Background and Aims: In recent years, natural orifice specimen extraction surgery (NOSES) has been widely carried out in the surgical treatment of early colorectal cancer. The main advantages of this procedure include reducing surgical trauma, accelerating patient recovery, and alleviating adverse psychological implications in patients. However, NOSES is still in the development stage in the treatment of right colon cancer, and many key points of this technique still need to be continuously improved. Therefore, this study was conducted to investigate the feasibility and safety as well as the relevant key issues of NOSES surgery for right colon cancer.

Methods: The clinical data of a patient who underwent laparoscopic right hemicolectomy (ileocecal junction preservation) and transrectal specimen extraction without abdominal auxiliary incision at the Cancer Hospital Chinese Academy of Medical Sciences were retrospectively analyzed. Combined with the relevant literature reports on NOSES, the key issues such as the scope of bowel resection, the degree of lymph node dissection, the reconstruction method of the digestive tract, and the way of specimen removal in the NOSES operation for right colon cancer were systematically analyzed.

Results: The case was a 49-year-old male patient who was admitted to the hospital for surgery because of a right-sided colon mass detected by physical examination. The preoperative clinical stage was cT2N0M0. The surgical procedures mainly included dissociation of the right colon, ligation of the right colic artery and vein and dissection of regional lymph nodes; division of the colon at appropriately 10 cm from the proximal end of the tumor after dissection of the mesentery, and division of the ascending colon at 5 cm distal to the entrance of the ileocecal valve after complete shaving of the mesentery, and side-to-side anastomosis between the ascending and transverse colons; incision of the rectum at 5 cm above the peritoneal reflection, and transanal extraction of the specimen; closure of the rectal incision with a barbed suture followed by reinforcement of the seromuscular layer. The postoperative pathological stage was pT2N0. The patient showed first bowel movement at postoperative day (POD) 1, had liquid food intake at POD 2, and was discharged from the hospital at POD 5. Literature review of 10 previous articles indicated that in NOSES compared with conventional laparoscopic surgery, the incidence of postoperative complications did not increase but was even somewhat reduced, and offered better minimally invasive results in terms of postoperative recovery, while showed no obvious differences in other surgical variables.

Conclusion: This case of NOSES with ileocecal junction preservation for right colon cancer demonstrates the combination of minimal invasiveness, functional preservation and meticulous operation. However, this procedure also has specific technical difficulties, so comprehensive preoperative assessment and close cooperation are necessary to ensure the successful implementation of the process. In the future, more high-quality clinical studies are needed to provide evidence-based

information to systemically evaluate its short-term and long-term efficacy.

Key words Colonic Neoplasms; Laparoscopes; Colectomy; Natural Orifice Endoscopic Surgery; Minimally Invasive Surgical Procedures

CLC number: R735.3

随着外科理念更新与手术平台发展，结直肠肿瘤外科手术已经步入了微创外科、精准外科与功能外科并重的全新时代。如何更好地掌握肿瘤功能外科原则和损伤效益比原则，为患者量身定制合理的个体化手术策略是外科医生当下面临的挑战[1-2]。对于结直肠肿瘤患者而言，如何能在完整根治肿瘤的同时，最大程度保留机体功能是目前亟待解决的问题。笔者现将结合1例右半结肠癌经自然腔道取标本手术（natural orifice specimen extraction surgery，NOSES）病例，探讨早期结直癌肠管切除范围、淋巴结清扫程度、消化道重建方式以及标本取出途径等若干问题。

1 病例报告

患者 男，49岁。因体检发现结肠肿物10 d就诊。体格检查未见明显异常。肠镜检查提示，距肛门70 cm可见溃疡隆起型肿物，大小约2.0 cm×2.0 cm，肿物活检病理结果为腺癌。腹部增强CT提示：结肠肝曲处肠壁略增厚，浆膜面边缘清晰，结肠系膜内未见明显肿大淋巴结。术前临床分期：cT2N0M0。手术主要操作步骤如下：⑴ 术中探查：肝脏、腹盆腔未见转移病灶，腹腔内无腹水，结肠系膜未见肿大淋巴结。肿瘤位于结肠肝曲（术前纳米炭定位），未侵透浆膜。⑵ 右半结肠游离：在十二指肠水平部表面打开后腹膜，向右分离进入Toldt间隙，充分显露十二指肠降部及水平部（图1A），寻找并结扎右结肠动静脉血管（图1B），清扫相应血管根部淋巴脂肪组织。沿Toldt间隙由左向右分离，分离升结肠系膜至右侧结肠旁沟，注意保护右侧生殖血管，完整游离末段回肠系膜、升结肠系膜及右侧横结肠系膜。沿横结肠中段打开大网膜与结肠附着处，进入小网膜囊（图1C），并向肝曲进行充分游离，离断肝结肠韧带（图1D）。自回盲部起始沿右侧结肠旁沟打开侧腹膜（图1E），至结肠肝曲，至此充分游离回盲部便于吻合。⑶ 消化道重建：裁剪近端横结肠系膜至肿瘤近端10 cm处肠管，充分裸化肠管后进行离断（图1F）。距肿瘤远端10 cm处裁剪升结肠系膜，于回盲瓣入口处远端肠管5 cm充分裸化肠管，并切断闭合升结肠（图1G）。将待吻合的横结肠与升结肠断端平行摆放（图1H），并将横结肠闭合端固定于升结肠断端近端10 cm处结肠，分别在升结肠断端与横结肠断端近端10 cm切开肠壁，用闭合器行侧侧吻合（图1I），倒刺线关闭共同切口，并间断缝合浆肌层加固（图1J）。⑷ 标本经直肠取出：经主操作口放入取标本保护套，将结肠标本及纱条放置标本套内，再将标本移至盆腔（图1K）。体外助手充分扩肛，并用碘伏溶液冲洗直肠。术者于腹膜返折线上5 cm处纵行切开直肠壁约5 cm（图1L），经主操作孔再次置入取标本保护套，并经直肠拉出体外，在保护套保护下将结肠标本取出（图1M）。倒刺线连续全层缝合直肠切口，并进行浆肌层加固（图1N）。大量蒸馏水冲洗腹、盆腔至清亮，创面彻底止血。术中使用肛门镜进行直肠切口处探查，未见活动性出血（图1O）。于结肠肝曲处及盆腔各放置引流管1根，关闭戳卡孔。术后病理结果显示，结肠盘状隆起型低分化黏液腺癌，癌侵犯固有肌层浅层，未见明确脉管瘤栓，上切缘、下切缘及系膜切缘均未见癌，淋巴结未见转移癌（0/17），pTNM：pT2N0，术后标本及患者腹壁见图2。患者于术后第1天排气，第2天开始进流食，并于术后第5天出院。

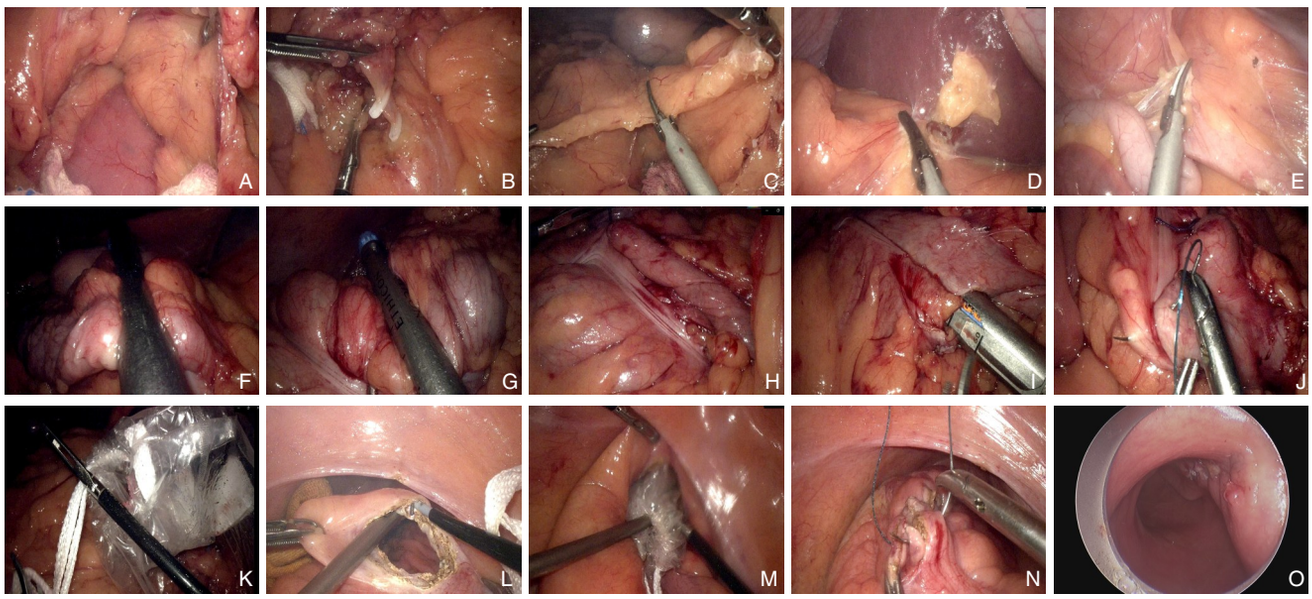

图 1　手术主要操作步骤　A：游离右半结肠系膜；B：切断右结肠血管；C：打开大网膜与结肠附着处；D：离断肝结肠韧带；E：沿右侧结肠旁沟打开侧腹膜；F：离断肿瘤近端结肠；G：离断肿瘤远端结肠；H：将横结肠与升结肠平行摆放；I：行横结肠与升结肠侧侧吻合；J：关闭共同开口；K：将标本装入保护套内；L：切开直肠前壁；M：经直肠取标本；N：缝合直肠切口；O：肛门镜检查直肠切口

Figure 1　Main steps of the procedure　A: Dissection of the right mesocolon; B: Division of the ileocolic vessels; C: Dissection of the attachments of the greater omentum to the colon; D: Transection of the hepatocolic ligament; E: Dissection of the lateral peritoneum along the right colon; F: Dissection of the colon proximal to the tumor; G: Dissection of the colon distal to the tumor; H: Placing the transverse colon parallel to the ascending colon; I: Side-to-side anastomosis between ascending and transverse colons; J: Closure of the common opening; K: Placing the specimen into the protective sleeve; L: Incision of the anterior wall of the rectum; M: Specimen extraction through the rectum; N: Closure of the rectal incision; O: Examination of the rectal incision

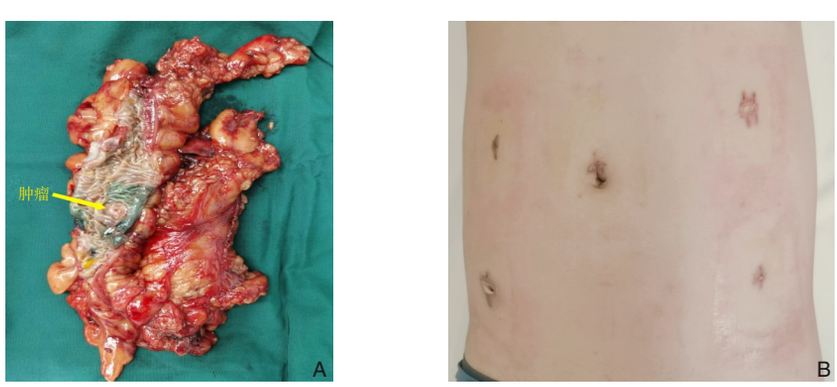

图 2　标本及腹壁照片　A：结肠标本；B：术后患者腹壁

Figure 2　View of the specimen and abdominal wall　A: Colon specimen; B: Abdominal wall of the patient after operation

2　讨　论

本例手术的成功实施是外科手术多元化发展的一个重要缩影。该手术融合了多种外科手术的先进理念和指导思想，其中包括 NOSES 的无切口微创外科理念，选择性淋巴结清扫的精准外科理念，以及顺蠕动吻合与回盲部保留的功能外科理念。下文中笔者将围绕这几个关键点进行重点讨论与阐述。

对于早期右半结肠癌患者，如何选择合理的淋巴结清扫范围也一直没有明确定论[3-4]。争议的关键点在于 D_2 淋巴结清扫是否不够充分，D_3 淋巴结清扫是否过度治疗。既往研究[5-8]表明，与 D_2 淋巴结清扫相比，I期右半结肠癌的 D_3 淋巴结清扫可

以降低肿瘤分期偏倚，提高阳性淋巴结诊断比例，但两者在生存预后方面没有明显差异。此外，D_3淋巴结清扫也将增加手术难度以及手术风险，尤其是术中出血、乳糜漏等并发症的发生。因此，在早期结肠癌的临床实践中，应结合患者实际情况，制定个体化治疗方案和手术策略[9-10]。本例患者也是在进行充分术前评估基础上，排除淋巴结转移风险，决定实施D_2站淋巴结清扫。根据本例患者术后病理结果可知，该手术的淋巴结清扫数量超过12枚，均为阴性，符合淋巴结切除手术质控要求。

传统外科观念认为右半结肠癌切除范围包括了回盲部及部分小肠，这是由于保留回盲部将可能增加肿瘤复发风险[11]。然而，回盲瓣作为肠管解剖中的分水岭，具有重要的生理作用与功能。保留回盲瓣可以防止结肠内容物反流，延长肠内容物通过时间，增加营养物质吸收时间，还可以更充分调节水、电解质回收及生理浓度，从而促进患者恢复，提高生活质量[12]。在本例手术中，鉴于肿瘤位置位于结肠肝曲，加之病变小分期早，因此在确保肿瘤近端与远端切除10 cm肠管基础上，充分保留了回盲部以及重要生理功能，这也充分践行了肿瘤功能外科原则的基本要求[13]。

右半结肠全腔镜下消化道重建方式主要包括两种，即逆蠕动的功能性端端吻合与顺蠕动的功能性侧侧吻合[14]。从理论上，功能性侧侧吻合消化道重建术保持了近端肠管与远端肠管蠕动方向的连续性，使肠管蠕动更加顺畅，这对于患者术后的恢复具有重要作用。此外，顺蠕动吻合可以缩短预吻合肠管的长度，减少吻合口张力，可以降低因吻合张力过大而导致的吻合口瘘风险。在本例手术中，肠管吻合的优势就在于，回盲部充分游离后可被轻松牵拉至左上腹与横结肠中段进行无张力吻合，操作方便，不需对肠管和系膜进行较大的空间位置调整，这也降低了术后吻合口瘘和肠梗阻的发生[15]。

右半结肠经直肠取标本也是本例手术的亮点和特色。与传统的腹腔镜辅助右半结肠手术相比，NOSES避免了腹部辅助手术切口，减少了手术切口导致患者术后疼痛、降低切口并发症风险[16-17]。同时，NOSES也避免了手术切口对患者生理和心理的创伤，促进患者术后快速康复，也节约了医疗成本。此外，NOSES术后患者腹壁无手术疤痕，具有极佳的美容效果[18]。对于经直肠取标本操作，有几个重要问题需要重视：第一，严格把关手术适应证至关重要。经直肠取标本并非适用于所有右半结肠手术，在术前必须严格把控适应证，尽量选择肿瘤体积小、临床分期早的患者。第二，术前与患者进行充分沟通。经直肠切口取标本理论上存在术后直肠切口瘘的风险，因此术前必须与患者及家属进行充分沟通，在得到充分理解认可的情况下再开展此手术。结合笔者中心开展的经直肠取标本手术结果表明，目前没有出现直肠切口瘘的患者，这也表明该手术是安全可行的[19-20]。第三，对于女性患者而言，右半结肠经自然腔道取标本途径首选阴道，这也更加符合外科手术的损伤效益比原则[21]。

为深入探讨右半结肠癌开展NOSES手术的安全性与可行性，本研究汇总了10篇于2011—2022年发表的右半结肠癌NOSES手术相关研究[22-31]（表1）。与常规腹腔镜手术相比，NOSES术后并发症不仅没有明显增加，其中有研究[23]还表明NOSES术后并发症发生明显低于常规腹腔镜手术。主要原因是NOSES术后没有切口，因此减少了切口并发症的发生，进而降低了整体并发症发生率。此外，在淋巴结清扫数量、术中出血量及手术时间等指标中，NOSES手术与常规腹腔镜也无明显差异[23-26]。在术后恢复方面，NOSES手术表现出更好的微创效果，这也是NOSES手术最大的价值体现[22-24, 26-27]。结合上述文献结果可知，NOSES手术用于右半结肠癌的外科治疗表现出良好的安全性与可行性。

表 1　右半结肠癌 NOSES 手术与常规腹腔镜手术对比研究列表

Table 1　Studies of comparison between NOSES surgery and laparoscopic surgery for right colon cancer

作者	发表时间	研究设计	手术方式	例数（*n*）	术后并发症发生率（%）
Cheng,等[22]	2020	单中心回顾性研究	经腹部切口取标本 *vs.* 经阴道或直肠取标本	272 *vs.* 25	12.9 *vs.* 4.0
Li,等[23]	2019	单中心回顾性研究	经腹部切口取标本 *vs.* 经阴道取标本	31 *vs.* 31	29.0 *vs.* 6.4[1)]
Park,等[24]	2011	单中心回顾性研究	经腹部切口取标本 *vs.* 经阴道取标本	34 *vs.* 34	26.5 *vs.* 11.8
Awad,等[25]	2014	单中心回顾性研究	经腹部切口取标本 *vs.* 经阴道取标本	20 *vs.* 20	50.0 *vs.* 10.0
林斯峰, 等[26]	2021	多中心回顾性研究	经腹部切口取标本 *vs.* 经阴道或直肠取标本	48 *vs.* 42	8.3 *vs.* 0
庄孟,等[27]	2021	单中心回顾性研究	经腹部切口取标本 *vs.* 经阴道取标本	29 *vs.* 29	62.1 *vs.* 20.7
张纯博,等[28]	2020	单中心回顾性研究	经阴道取标本	14	0
李兴旺,等[29]	2018	单中心回顾性研究	经阴道取标本	13	0
卢召,等[30]	2018	单中心回顾性研究	经阴道取标本	14	0
邓建中,等[31]	2022	单中心回顾性研究	经阴道取标本	25	12.0

注：1）差异有统计学意义

Notes：1) Statistically different

表 1　右半结肠癌 NOSES 手术与常规腹腔镜手术对比研究列表（续）

Table 1　Studies of comparison between NOSES surgery and laparoscopic surgery for right colon cancer (continued)

作者	发表时间	淋巴结检出数（*n*）	术中出血量（mL）	手术时间（min）	术后进食时间（d）	住院时间（d）
Cheng,等[22]	2020	—	45.0 *vs.* 32.0	248.0 *vs.* 247.8	4.3 *vs.* 2.6[1)]	8.3 *vs* 5.2[1)]
Li,等[23]	2019	14.5 *vs.*14.7	68.3 *vs.* 62.2	182.3 *vs.* 185.8	3.4 *vs.* 2.5	9.5 *vs.* 6.6[1)]
Park,等[24]	2011	30.4 *vs.* 33.8	32.3 *vs.* 42.5	146.7 *vs.* 170.8	5.0 *vs.* 4.6	8.8 *vs.* 7.9[1)]
Awad,等[25]	2014	20.8 *vs.* 17.8	—	222.6 *vs.* 148.2[1)]	—	5.3 *vs.* 7.7
林斯峰, 等[26]	2021	36.7 *vs.* 37.6	50.2 *vs.* 28.2[1)]	180.2 *vs.* 205.2[1)]	4.2 *vs.* 3.1[1)]	9.6 *vs.* 6.3[1)]
庄孟,等[27]	2021	—	70.9 *vs.* 27.6	151.5 *vs.* 179.6[1)]	3.0 *vs.* 3.0	7.1 *vs.* 6.1[1)]
张纯博,等[28]	2020	18.0	56.0	145.0	3.2	8.0
李兴旺,等[29]	2018	14.0	100.0	176.0	2.8	6.8
卢召,等[30]	2018	37.5	50.0	217.5	4.0	6.5
邓建中,等[31]	2022	25.4	68.4	203.3	3.3	8.2

注：1）差异有统计学意义

Notes：1) Statistically different

综上所述，NOSES 手术展示了外科手术发展的微创化、功能化与精准化 3 个重要方向。然而，为了确保手术安全，开展该类手术也一定要做到术前充分评估、术中量力而行、术后全程管护。同时，期待未来有更大样本量的相关研究，可以提供更有力的循证医学证据支持该术式的临床开展。

利益冲突：所有作者均声明不存在利益冲突。

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