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改良 Bacon 术联合腹腔镜下括约肌间切除术在低位直肠癌保肛术中的应用效果和安全性*

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摘要 目的:探讨改良 Bacon 术联合腹腔镜下括约肌间切除术(Lap-ISR)在低位直肠癌保肛术中的应用效果和安全性。方法:选择 2019 年 10 月到 2021 年 5 月在本院诊治的低位直肠癌患者 78 例作为研究对象,根据 1:1 随机分配原则把患者分为改良组与对照组各 39 例,对照组给予腹腔镜下括约肌间切除术,改良组在对照组治疗的基础上给予改良 Bacon 术,记录两组的治疗效果与安全性状况。结果:改良组的手术时间与对照组对比无差异($P>0.05$),改良组的术中出血量、术后正常饮食时间、术后肛门排气时间、术后住院时间少于对照组($P<0.05$)。改良组术后 14 d 的吻合口瘘、盆腔脓肿、切口出血、尿潴留、静脉血栓等并发症发生率为 5.1%,低于对照组的 30.8%($P<0.05$)。改良组术后 3 个月的肛门功能 Williams 分级好于对照组($P<0.05$)。改良组术后 1 个月与 3 个月的肛门排便 Wexner 评分少于对照组($P<0.05$)。改良组术后 3 个月的躯体功能、情绪机能、社会职能、症状体征等生活质量评分高于对照组($P<0.05$)。结论:改良 Bacon 术联合腹腔镜下括约肌间切除术在低位直肠癌保肛术中的应用能促进恢复患者的肛门功能,能减少对患者的创伤,促进患者康复,降低术后并发症,从而持续提高患者的生活质量。

关键词: 改良 Bacon 术;腹腔镜下括约肌间切除术;低位直肠癌;保肛术

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Application Effect and Safety of Modified Bacon Operation Combined with Laparoscopic Intersphinctic Resection in Sphincter-preserving Surgery for Low Rectal Cancer*

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ABSTRACT Objective: To investigate the application effect and safety of modified Bacon operation combined with laparoscopic intersphincteric resection (Lap-ISR) in sphincter-preserving surgery for low rectal cancer. **Methods:** From October 2019 to May 2021, 78 cases of patients with low rectal cancer who were diagnosed and treated in our hospital were selected as the research subjects. All the cases were divided into the modified group and the control group with 39 cases in each groups accorded to the 1:1 random allocation principle. The control group were given laparoscopic intersphincterectomy, and the modified group were given modified Bacon technique combined with laparoscopic intersphincterectomy, and the therapeutic effect and safety status of the two groups were recorded. **Results:** There were no difference in the operation time compared between the modified group and the control group ($P>0.05$). The amount of intraoperative blood loss, postoperative normal eating time, postoperative anal exhaust time, and postoperative hospital stay in the modified group were less than those in the control group. group ($P<0.05$). The incidence rates of complications such as anastomotic leakage, pelvic abscess, incision bleeding, urinary retention, and venous thrombosis in the modified group at 14 days after operation were 5.1%, which were lower than 30.8% in the control group ($P<0.05$). The Williams grade of anal function in the modified group at 3 months after operation were better than that in the control group($P<0.05$). The Wexner score of anal defecation in the modified group at 1 month and 3 months after operation were lower than that in the control group ($P<0.05$). The physical function, emotional function, social function, symptoms and signs and other quality of life scores of the improved group were higher than those of the control group at 3 months after operation ($P<0.05$). **Conclusion:** The application of modified Bacon technique combined with laparoscopic intersphincterectomy in sphincter-preserving surgery for low rectal cancer can promote the recovery of patients' anal function, reduce trauma to patients, promote patient recovery, and reduce postoperative complications. In order to continuously improve the quality of life of patients.

Key words: Modified Bacon operation; Laparoscopic intersphincteric resection; Low rectal cancer; Sphincter preservation

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前言

直肠癌是如今最常见一种消化道肿瘤,低位直肠癌是指肿瘤下缘距离肛缘 5 cm 以内的直肠癌,占比 50.0 %左右^[1]。由于各种因素的影响,低位直肠癌在部分地区的发病率约以 4.0 % 的速度快速增长,城市的发病率显著高于农村^[2]。开腹手术可有效根治低位直肠癌,但对于患者创伤较大,术后患者失去了正常的排便功能,且术后常常伴随有胃肠道动力改变,严重影响康复^[3,4]。经括约肌间切除(Intersphincteric resection, ISR)通过仅切除直肠肛管内括约肌,明确保肛的解剖基础的同时也指出了保肛的能力,保留直肠肛门外括约肌和周围组织,从而保留了肛门,为低位直肠癌患者带来许多的保肛机会,可促进改善患者预后^[5,6]。特别是腹腔镜下括约肌间切除术(Laparoscopic intersphincteric resection, Lap-ISR)能提供更好的手术视野,有利于术野显露^[7]。随着医学技术的发展,改良 Bacon 术式得到了广泛应用,其可有效降低术后感染的发生率,还可避免术后吻合口漏的发生风险,可保证足够的肿瘤切除范围,持续改善患者预后^[8,9]。本文具体探讨了改良 Bacon 术联合腹腔镜下括约肌间

切除术在低位直肠癌保肛术中的应用效果和安全性,以促进两者的联合使用。现报道如下。

1 资料与方法

1.1 一般资料

选择 2019 年 10 月到 2021 年 5 月在本医院诊治的低位直肠癌患者 78 例作为研究对象。

纳入标准:患者具有保肛意愿;符合保肛指征;符合低位直肠癌的诊断标准,肿瘤下缘距离肛缘 ≤ 5 cm 的直肠癌;术前没有给予新辅助治疗;生命体征稳定,知情同意本研究;术前肛门功能良好;医院伦理委员会批准了此次研究;术前肛门外括约肌无侵犯;无远处转移。

排除标准:妊娠与哺乳期妇女;有腹部手术史的患者;合并传染性疾病的患者;呼吸循环系统功能严重受损,不能耐受全麻和气腹者;术前行放疗或化疗者;严重心肺疾病者。

根据 1:1 随机分配原则把患者分为改良组与对照组各 39 例,两组的肿瘤下缘距肛缘距离、临床分期、组织学分化、性别等表 1 资料对比无明显差异($P>0.05$)。

表 1 两组一般资料对比

Table 1 Comparison of general data between the two groups

Groups	n	Distance from lower margin of tumor to anal margin (cm)	Body mass index (kg/m ²)	Clinical stages (Stage I/II)	Histological differentiation (highly/moderate-ly/poorly differentiated)	Gender (Male/female)	Age (years)
Improved group	39	3.02 $\pm$ 0.25	23.19 $\pm$ 2.15	20/19	11/18/10	22/17	56.22 $\pm$ 5.19
Control group	39	3.01 $\pm$ 0.33	23.22 $\pm$ 1.98	22/17	12/17/10	23/16 5	6.10 $\pm$ 4.33

1.2 治疗方法

所有患者麻醉采用气管插管静脉复合麻醉,术前胃肠道准备。

对照组:给予腹腔镜下括约肌间切除术,患者取截石位,碘附冲洗远端肛管,会阴区消毒,充分暴露肛门,按适形切除原则距肿瘤下缘 1.0 cm 左右处荷包缝合关闭肠腔,切开肠壁进入内外括约肌间隙向上游离到齿状线以。建立二氧化碳起伏,插入腹腔镜,依次环形切开肠壁黏膜、固有肌层、黏膜下层,进入内外括约肌间隙游离内外括约肌间隙至肛提肌裂孔水平。取出直肠癌标本,于肛管远端端作荷包缝合,同时在近端结肠完成结肠吻合,进行预防性回肠造口。

改良组:在对照组治疗的基础上给予改良 Bacon 术,切除直肠癌后,端间断手法吻合结肠残端与齿状线,可结肠经肛门拉出 4.0 cm 左右后,用缝线将结肠浆肌层与齿状线间断固定,术后切除肛门外多余结肠。

1.3 观察指标

1.3.1 围手术期情况记录 观察与记录两组的手术时间、术中出血量、术后正常饮食时间、术后肛门排气时间、术后住院时间。

1.3.2 并发症情况记录 记录两组术后 14 d 出现的吻合口瘘、盆腔脓肿、切口出血、尿潴留、静脉血栓等并发症。

1.3.3 患者肛门功能 Williams 分级 在术后 3 个月评定患者的肛门功能,采用 Williams 进行分级判断,分为 I-IV 级,分级越高,肛门功能越好。

1.3.4 术后肛门的排便功能 Wexner 评分分析 在术后 1 个月与术后 3 个月进行采用 Wexner 评分系统评定患者术后肛门的排便功能,总分 20 分,包括排空、疼痛、排便时间、大便次数、排便困难、协助排便等维度,评分越高,排便功能越差。

1.3.5 患者生活质量评分 在术后 3 个月采用癌症患者生活质量量表进行调查,包括躯体功能、情绪机能、社会职能、症状和体征等 4 个维度与 35 个条目,得分越好,表现生活质量越高。

1.4 统计方法

数据处理采用 SPSS19.00 统计软件, $P<0.05$ 为差异有统计学意义,计量资料以均数 $\pm$ 标准差($\bar{x} \pm s$)表示,比较采用 t 检验,计数资料采用百分率(%)表示,对比采用 χ^2 检验,检验水准为 $\alpha=0.05$ 。

2 结果

2.1 围手术期情况

改良组的手术时间与对照组对比无差异($P>0.05$),改良组的术中出血量、术后正常饮食时间、术后肛门排气时间、术后住院时间少于对照组($P<0.05$)。见表 2。

2.2 并发症发生情况对比

改良组术后 14 d 的吻合口瘘、盆腔脓肿、切口出血、尿潴留、静脉血栓等并发症发生率为 5.1 %, 低于对照组的 30.8 % ($P<0.05$)。见表 3。

表 2 两组围手术期情况(均数±标准差)

Table 2 Perioperative conditions of the two groups (Mean ± standard deviation)

Groups	n	Operation time (min)	Intraoperative blood loss (mL)	Normal postoperative eating time (d)	Postoperative anal exhaust time (d)	Postoperative hospital stay(d)
Improved group	39	184.26± 11.47	85.02± 10.36*	5.20± 0.33*	2.76± 0.36*	10.43± 1.11*
Control group	39	184.59± 12.60	117.29± 24.10	7.77± 0.87	4.02± 0.38	13.76± 2.10

Note: Compared with the control group, * $P<0.05$, the same below.

表 3 两组术后 14 d 的并发症发生情况对比(n)

Table 3 Comparison of postoperative complications between the two groups 14 days after operation (n)

Groups	n	Anastomotic fistula	Pelvic abscess	Incision bleeding	Urinary retention	Vein thrombosis	Summation
Improved group	39	0	1	0	1	0	2(5.1 %)*
Control group	39	2	3	2	3	2	12(30.8 %)

2.3 肛门功能 Williams 分级

($P<0.05$)。见表 4。

改良组术后 3 个月的肛门功能 Williams 分级好于对照组

表 4 两组术后 3 个月的肛门功能 Williams 分级(n)

Table 4 Williams classification of anal function in the two groups 3 months after surgery (n)

Groups	n	Level I	Level II	Level III	Level IV
Improved group	39	0(0.0 %)*	1(2.6 %)*	6(15.4 %)	32(82.1 %)*
Control group	39	5(12.8 %)	6(15.4 %)	10(25.6 %)	18(46.2 %)

2.4 肛门排便 Wexner 评分对比

对照组($P<0.05$)。见表 5。

改良组术后 1 个月与 3 个月的肛门排便 Wexner 评分少于

表 5 两组术后不同时间点的肛门排便 Wexner 评分对比(分,均数±标准差)

Table 5 Comparison of Wexner score of anal defecation at different postoperative time points between the two groups (score, mean ± standard deviation)

Groups	n	One month after surgery	Three months after surgery
Improved group	39	8.15± 0.21*	6.93± 0.57*
Control group	39	12.48± 1.10	9.91± 0.36

2.5 生活质量评分对比

体征等生活质量评分高于对照组($P<0.05$)。见表 6。

改良组术后 3 个月的躯体功能、情绪机能、社会职能、症状

表 6 两组术后 3 个月的生活质量评分对比(均数±标准差)

Table 6 Comparison of quality of life scores between the two groups 3 months after surgery (mean ± standard deviation)

Groups	n	The body function	Emotional function	Social functions	Signs and symptoms
Improved group	39	38.34± 4.33*	37.38± 2.87*	26.00± 2.75*	18.25± 2.95*
Control group	39	33.87± 3.77	34.39± 2.88	19.50± 3.00	13.85± 3.66

3 讨论

随着医学水平也在不断地发展,对于保留肛门在直肠癌手术的应用更为普遍^[10]。括约肌间切除术为保肛手术的主要类型,能实现括约肌间的游离和结肛吻合,特别是腹腔镜下括约肌间切除术不仅达到了肿瘤根治的效果,而且能有效保留患者

的肛门功能改良 Bacon 吻合术使得患者腹腔内没有吻合口,能减少术后并发症^[11]。

本研究显示:改良组的手术时间与对照组对比无差异,改良组的术中出血量、术后正常饮食时间、术后肛门排气时间、术后住院时间少于对照组;改良组术后 14 d 的吻合口瘘、盆腔脓肿、切口出血、尿潴留、静脉血栓等并发症发生率为 5.1 %,低于

对照组的 30.8%, 表明改良 Bacon 术联合腹腔镜下括约肌间切除术在低位直肠癌保肛术中的应用能减少对患者的创伤, 促进患者康复, 降低术后并发症。该结果与 Yang J 等人^[12]的报道具有一致性。分析可知: 改良 Bacon 吻合术联合腹腔镜下括约肌间切除术可预先在直视下离断肿瘤远端肠管, 可在肉眼直视下离断肿瘤远切缘, 避免发生切缘切缘阳性情况, 可有效避免患者术后发生肛门功能失禁^[13,14]。在具体手术中, 当肿瘤较大时, 可在直视下切除肿瘤; 当肿瘤较小时, 避免在用电刀环周切开肛管皮肤后向上剥离肛管黏膜, 可在距离肿瘤下缘 1 cm 处荷包缝合肛门, 也可减少并发症^[15]。当肿瘤位置更低或远切缘不规则而难行荷包缝合时, 为避免皮肤残留吻合钉建议考虑手工吻合, 可给予荷包或间断缝合关闭远端后经肛予吻合器吻合^[16,17]。

伴随着腹腔镜设备逐渐更新、操作人员技术提高以及手术器械不断进步, 使得腹腔镜下括约肌间切除术取得了技术性突破^[18,19]。不过内括约肌的切除范围是影响术后肛门功能的重要因素, 为此需要在手术中减少远端肠管的多余切除, 在保证远切缘阴性的前提下, 尽量保留肛管内括约肌^[20,21]。同时腹腔镜下括约肌间切除术保留了肛垫组织, 完成肿瘤远切缘的精准定位, 避免了残端肛管的浪费, 保护了肛门的精细控便功能^[22,23]。本研究显示改良组术后 3 个月的肛门功能 Williams 分级好于对照组; 改良组术后 1 个月与 3 个月的肛门排便 Wexner 评分少于对照组, 表明改良 Bacon 术联合腹腔镜下括约肌间切除术在低位直肠癌保肛术中的应用能改善患者的肛门功能与排便能力。该结果与 Zhang X 等人^[24]以及刘李等人^[25]报道具有相似性。分析可知, 改良 Bacon 手术虽然切除了肛管、直肠等部位的内括约肌, 但是其使盆腔深部接近肛门口的组织解剖层面暴露更加充分, 满足了低位直肠癌患者的保肛需求, 更利于术中对盆腔神经的保护, 从而有利于恢复患者的肛门功能^[26,27]。不过在手术中, 建议沿直肠系膜圆钝轮廓的光滑面进行锐性分离, 游离直肠后间隙时要离断直肠尾骨韧带^[28]。进一步研究发现, 改良组术后 3 个月的躯体功能、情绪机能、社会职能、症状体征等生活质量评分高于对照组, 表明改良 Bacon 术联合腹腔镜下括约肌间切除术在低位直肠癌保肛术中的应用能提高患者的生活质量。但改良 Bacon 术在实际临床上的应用还比较少, 需要通过循证医学原则进行多方总结, 从而形成更好的联合手术治疗体系^[29,30]。但由于经费问题, 本研究未进行随访分析, 纳入患者数量也较少, 将在后续探讨。

总之, 改良 Bacon 术联合腹腔镜下括约肌间切除术在低位直肠癌保肛术中的应用能促进恢复患者的肛门功能, 能减少对患者的创伤, 促进患者康复, 降低术后并发症的发生, 从而持续提高患者的生活质量。

参考文献(References)

- 贺荔枝, 李克亚, 曾娟妮, 等. 血清 Aib, PA, NLR 水平在直肠癌术后发生吻合口瘘评估中的应用[J]. 现代生物医学进展, 2021, 21(13): 5
- 张涵朔, 任镜清, 朱伟聪, 等. 手辅助腹腔镜在肛门全直肠系膜切除术治疗中低位直肠癌中的应用价值 [J]. 现代生物医学进展, 2021, 21(6): 5
- Schietroma M, Romano L, Apostol AI, et al. Mid- and low-rectal cancer: laparoscopic vs open treatment-short- and long-term results. Meta-analysis of randomized controlled trials[J]. Int J Colorectal Dis, 2022, 37(1): 71-99
- Gavrila D, Bitere O, Droc G, et al. Abdominoperineal Resection for Rectal Cancer: Open, Laparoscopic or Robotic Approach [J]. Chirurgia (Bucur), 2021, 116(5): 573-582
- Denost Q, Moreau J B, Vendrely V, et al. Intersphincteric resection for low rectal cancer: the risk is functional rather than oncological. A 25-year experience from Bordeaux [J]. Colorectal Dis, 2020, 22(11): 1603-1613
- Yamada K, Saiki Y, Takano S, et al. Long-term results of intersphincteric resection for low rectal cancer in Japan[J]. Surg Today, 2019, 49(4): 275-285
- Zhang X, Wu Q, Hu T, et al. Laparoscopic Versus Conventional Open Surgery in Intersphincteric Resection for Low Rectal Cancer: A Systematic Review and Meta-Analysis[J]. J Laparoendosc Adv Surg Tech A, 2018, 28(2): 189-200
- 罗衡桂, 唐彬, 毛岳峰, 等. 腹腔镜辅助经肛全直肠系膜切除术联合改良 Bacon 术在低位直肠癌保肛手术中的应用[J]. 中国普通外科杂志, 2020, 29(12): 9
- 江波, 孟志鹏. 低位直肠癌改良 Bacon 手术操作要点及并发症的预防和处理[J]. 结直肠肛门外科, 2020, 26(5): 4
- Vorob'ev GI, Shelygin IA, Erokin PV, et al. Proctectomy with external sphincter elements' preservation in surgery of low-ampullary rectal cancer[J]. Khirurgiia(Mosk), 2008, 15(9): 8-14
- Yu S, Deng J, Luo T, et al. Study of anorectal dynamics in patients undergoing laparoscopic ultra-low resection and transanal intersphincteric resection for rectal cancer [J]. ANZ J Surg, 2020, 90(12): 2478-2483
- Yang J, Tian L, Niu L, et al. Comparative analysis of modified Bacon operation and double stapler operation in the treatment of rectal cancer[J]. Am J Transl Res, 2021, 13(6): 7235-7241
- Kavaliuskas P, Dulskas A, Nunoo-Mensah J. Response to 'Quality of life with or without sphincter preservation for rectal cancer' [J]. Colorectal Dis, 2020, 22(4): 467-468
- Zong L, Chen P, Kitano S, et al. Clinical experience and analysis of laparoscopic total mesorectal excision combined with improved Bacon for the treatment of lower rectal cancer [J]. Hepatogastroenterology, 2011, 58(110-111): 1538-1544
- Kraima A C, West N P, Roberts N, et al. The role of the longitudinal muscle in the anal sphincter complex: Implications for the Intersphincteric Plane in Low Rectal Cancer Surgery?[J]. Clin Anat, 2020, 33(4): 567-577
- Lee L, Trepanier M, Renaud J, et al. Patients' preferences for sphincter preservation versus abdominoperineal resection for low rectal cancer [J]. Surgery, 2021, 169(3): 623-628
- Zhang J, Qi X, Yi F, et al. Comparison of Clinical Efficacy and Safety Between da Vinci Robotic and Laparoscopic Intersphincteric Resection for Low Rectal Cancer: A Meta-Analysis [J]. Front Surg, 2021, 8(2): 752009
- Liu JG, Chen HK, Wang X, et al. Analysis of risk factors of anastomotic leakage after laparoscopic intersphincteric resection for low rectal cancer and construction of a nomogram prediction model [J]. Chin J Surg, 2021, 59(5): 332-337
- Nagano S, Miyoshi N, Takahashi T, et al. Preoperative imatinib and

- laparoscopic intersphincteric resection for large rectal gastrointestinal stromal tumor: A case report [J]. *Int J Surg Case Rep*, 2020,71(1): 235-239
- [20] Shin JK, Kim HC, Lee WY, et al. Minimally invasive versus open intersphincteric resection of low rectal cancer regardless of neoadjuvant chemoradiotherapy: long-term oncologic outcomes[J]. *Sci Rep*, 2021, 11(1): 11001
- [21] Nishizaki D, Hoshino N, Hida K, et al. Nonsurgical Management Following Local Resection for Early Rectal Cancer in Patients with High-risk Factors: A Single-institute Experience [J]. *J Anus Rectum Colon*, 2020, 4(4): 174-180
- [22] Yang W, Huang L, Chen P, et al. A controlled study on the efficacy and quality of life of laparoscopic intersphincteric resection (ISR) and extralevator abdominoperineal resection (ELAPE) in the treatment of extremely low rectal cancer [J]. *Medicine (Baltimore)*, 2020, 99(22): e20245
- [23] Ou W, Wu X, Zhuang J, et al. Clinical efficacy of different approaches for laparoscopic intersphincteric resection of low rectal cancer: a comparison study[J]. *World J Surg Oncol*, 2022, 20(1): 43
- [24] Zhang X, Wu Q, Hu T, et al. Laparoscopic Versus Conventional Open Surgery in Intersphincteric Resection for Low Rectal Cancer: A Systematic Review and Meta-Analysis [J]. *J Laparoendosc Adv Surg Tech A*, 2018, 28(2): 189-200
- [25] 刘李, 杨烈, 杨柳, 等. 腹腔镜下改良 Bacon's 直肠癌根治术对患者术后肛门功能与远期疗效观察 [J]. *中华普外科手术学杂志 (电子版)*, 2020, 14(1): 46-49
- [26] Xue W, Wang S, Zhao Z, et al. Short-term outcomes of laparoscopic intersphincteric resection with intraoperative radiotherapy using low-energy X-rays for primary locally advanced low rectal cancer: a single center experience[J]. *World J Surg Oncol*, 2020, 18(1): 26
- [27] Sakr A, Sauri F, Alessa M, et al. Assessment and management of low anterior resection syndrome after sphincter preserving surgery for rectal cancer[J]. *Chin Med J (Engl)*, 2020, 133(15): 1824-1833
- [28] Kawada K, Hida K, Hasegawa S, et al. A comparison of the long-term anorectal function between laparoscopic intersphincteric resection and low anterior resection for low rectal cancer[J]. *Surg Today*, 2018, 48(10): 921-927
- [29] Wang M, Xue W, Zhao Z, et al. Laparoscopic intersphincteric resection with intraoperative radiotherapy using low-energy X-rays for locally advanced ultra-low rectal cancer [J]. *World J Surg Oncol*, 2018, 16(1): 133
- [30] Zhang B, Zhao K, Zhao YJ, et al. Variation in rectoanal inhibitory reflex after laparoscopic intersphincteric resection for ultralow rectal cancer[J]. *Colorectal Dis*, 2021, 23(2): 424-433

(上接第 3753 页)

- [19] Yektaş A, Balkan B. Comparison of sciatic nerve block quality achieved using the anterior and posterior approaches: a randomised trial[J]. *BMC Anesthesiol*, 2019, 19(1): 225
- [20] 楼洁, 陈彩艳, 沈文生. 超声引导下神经阻滞联合全身麻醉在下肢骨折手术中的应用[J]. *医学研究杂志*, 2017, 46(3): 174-177
- [21] Fang J, Shi Y, Du F, et al. The effect of perineural dexamethasone on rebound pain after ropivacaine single-injection nerve block: a randomized controlled trial[J]. *BMC Anesthesiol*, 2021, 21(1): 47
- [22] 陈小妹, 吴小芳, 赵娜, 等. 术前合理准备对老年下肢骨折全麻手术患者营养状态、糖代谢、应激反应及机体免疫功能的影响[J]. *现代生物医学进展*, 2021, 21(16): 3175-3179
- [23] 刘辉, 闽红星, 王惠娟, 等. 右美托咪定联合七氟醚麻醉对下肢骨折患者血流动力学、应激反应的影响及心肌保护作用研究[J]. *现代生物医学进展*, 2021, 21(10): 1946-1950
- [24] Zhao J, Huang Y, Fu M, et al. Ultrasound-guided suprainguinal fascia iliaca block combined with a sacral plexus block for lower extremity surgery: A case report[J]. *Medicine (Baltimore)*, 2020, 99(35): e21921
- [25] 明颖, 李慧禄, 潘立镇. 超声引导下腰丛 - 坐骨神经阻滞对老年股骨颈骨折患者疼痛、应激反应的影响 [J]. *川北医学院学报*, 2021, 36(12): 1630-1633
- [26] Dingemans SA, de Ruiter KJ, Birnie MFN, et al. Comparable Postoperative Pain Levels Using 2 Different Nerve Blocks in the Operative Treatment of Displaced Intra-articular Calcaneal Fractures [J]. *Foot Ankle Int*, 2017, 38(12): 1352-1356
- [27] Huh JW, Park MJ, Lee WM, et al. Effectiveness of Ultrasound-guided Single-injection Triple Nerve Block Before Cementless Bipolar Hip Hemiarthroplasty in Femoral Neck Fractures [J]. *Hip Pelvis*, 2020, 32(3): 142-147
- [28] Akhondzadeh R, Rashidi M, Gousheh M, et al. Comparison of the Ketamine-Lidocaine and Fentanyl-Lidocaine in Postoperative Analgesia in Axillary Block in Upper Limb Fractures By Ultrasound Guidance[J]. *Anesth Pain Med*, 2019, 9(6): e92695
- [29] Aprato A, Audisio A, Santoro A, et al. Fascia-iliaca compartment block vs intra-articular hip injection for preoperative pain management in intracapsular hip fractures: A blind, randomized, controlled trial[J]. *Injury*, 2018, 49(12): 2203-2208