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不同体质量指数对腹腔镜结直肠癌切除术患者临床疗效和远期预后的影响 *

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摘要 目的:研究不同体质量指数(BMI)对腹腔镜结直肠癌切除术患者临床疗效和远期预后的影响。**方法:**将从2014年1月~2016年1月于我院接受腹腔镜结直肠癌切除术治疗的110例患者纳入研究。将所有受试者根据BMI的差异分作正常组($18.6 \text{ kg/m}^2 \leq \text{BMI} < 23.0 \text{ kg/m}^2$)35例、超重组($23.0 \text{ kg/m}^2 \leq \text{BMI} < 25.0 \text{ kg/m}^2$)53例、肥胖组($\text{BMI} \geq 25.0 \text{ kg/m}^2$)22例。分析三组患者各项基线资料,临床疗效,术后并发症发生情况,远期预后等方面的差异。**结果:**三组患者各项基线资料比较差异均不明显(均 $P > 0.05$)。肥胖组手术时长为(268.01 ± 36.14)min,均明显高于正常组、超重组的(211.73 ± 30.56)min、(224.12 ± 34.87)min(均 $P < 0.05$);三组术中失血量、肛门排气时间以及住院康复时间对比均不明显(均 $P > 0.05$)。三组患者术后肺部感染、下肢静脉血栓、切口感染以及吻合口出血发生率对比均不明显(均 $P > 0.05$)。正常组5年生存率为45.71%(16/35),超重组5年生存率为47.17%(25/53),肥胖组5年生存率为45.45%(10/22),三组比较差异无统计学意义(均 $P > 0.05$)。**结论:**不同BMI对腹腔镜结直肠癌切除术患者的手术时长具有一定影响,但和远期预后无关,值得临床重点关注。

关键词:腹腔镜;结直肠癌切除术;体质量指数;临床疗效;远期预后

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Effects of Different Body Mass Index on Clinical Efficacy and Long-term Prognosis of Patients Undergoing Laparoscopic Colorectal Cancer Resection*

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ABSTRACT Objective: To study the effects of different body mass index (BMI) on the clinical efficacy and long-term prognosis of patients undergoing laparoscopic colorectal cancer resection. **Methods:** From January 2014 to January 2016, 110 patients who underwent laparoscopic colorectal cancer resection in our hospital were included in this study. All the subjects were divided into normal group ($18.6 \text{ kg/m}^2 \leq \text{BMI} < 23.0 \text{ kg/m}^2$) with 35 cases, overweight group ($23.0 \text{ kg/m}^2 \leq \text{BMI} < 25.0 \text{ kg/m}^2$) with 53 cases and obesity group ($\text{BMI} \geq 25.0 \text{ kg/m}^2$) with 22 cases according to the differences in BMI. The differences in baseline data, clinical efficacy, postoperative complications and long-term prognosis of the three groups were analyzed. **Results:** There were no significant differences in baseline data among the three groups (all $P > 0.05$). The operative duration of obesity group was (268.01 ± 36.14) min, which was significantly higher than that of normal group and overweight group of (211.73 ± 30.56) min, (224.12 ± 34.87) min (all $P < 0.05$). There were no significant differences in intraoperative blood loss, anal exhaust time and length of hospital recovery between the three groups (all $P > 0.05$). The incidence of post-operative pulmonary infection, lower limb venous thrombosis, incision infection and anastomotic bleeding were not significantly compared among the three groups (all $P > 0.05$). The 5-year survival rate in the normal group was 45.71% (16/35), the 5-year survival rate in the overweight group was 47.17% (25/53), and the 5-year survival rate in the obesity group was 45.45% (10/22), without statistical significance among the three groups (all $P > 0.05$). **Conclusion:** Different BMI has a certain influence on the operative duration of patients undergoing laparoscopic colorectal cancer resection, but it is not related to the long-term prognosis, which deserves clinical attention.

Key words: Laparoscopy; Colorectal cancer resection; Body mass index; Clinical efficacy; Long-term prognosis

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前言

结直肠癌属于全球范围内较为常见的一种消化系统恶性

肿瘤,全世界范围内每年约有120万新发病例,我国约有13万^[1]。随着人们生活方式的不断改变以及生活环境的日益恶化,结直肠癌的发病率正呈逐年攀升趋势,已成为严重威胁人类生命健

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康安全的重大疾病之一^[2-4]。手术治疗是目前临床上公认的治疗结直肠癌最有效手段之一,其中腹腔镜结直肠癌切除术作为一种微创术式,目前已被广泛应用于结直肠癌的治疗中,且其效果明显,相较于传统的开腹手术而言,具有创伤性较小、术后并发症发生风险小以及预后良好等优势^[5-7]。此外,随着近年来相关研究的日益深入,越来越多的学者发现肥胖是结直肠癌发生、发展的危险因素之一^[8,9]。然而,关于肥胖、超重和结直肠癌患者腹腔镜结直肠癌切除术后临床疗效、预后转归的关系尚未完全阐明。鉴于此,本文通过研究不同体质质量指数(BMI)对腹腔镜结直肠癌切除术患者临床疗效和远期预后的影响,旨在为临床结直肠癌患者的治疗和预后评估提供参考依据,现作以下报道。

1 对象与方法

1.1 一般资料

将从2014年1月~2016年1月,于我院接受腹腔镜结直肠癌切除术治疗的110例患者纳入研究。男性58例,女性52例;年龄31~78岁,平均 (52.33 ± 10.03) 岁;肿瘤大小2.1~7.1 cm,平均 (3.12 ± 0.52) cm;肿瘤位置:直肠49例,远端结肠37例,近端结肠24例;分化程度:低分化27例,中分化50例,高分化33例;淋巴结转移59例;临床分期:I期45例,II期65例;浸润深度:T1+T2有32例,T3+T4有78例。入选标准:(1)所有入选对象均拟行腹腔镜结直肠癌切除术治疗;(2)均经手术病理组织活检确诊为结直肠癌;(3) $BMI \geq 18.6 \text{ kg/m}^2$ 。剔除标准:(1)无法耐受手术治疗者;(2)中转开腹治疗者;(3)神志异常或合并神经系统疾病者;(4)正参与其他研究者;(5)研究过程中因各种原因退出或失访者;(6)心、肝、肾等重要脏器发生严重病变者;(7)合并其他恶性肿瘤者。本研究与《赫尔辛基宣言》相关要求相符,且所有患者均签署知情同意书。

1.2 研究方法

(1)手术方式:所有受试者术前均进行常规肠道准备,行气管插管全身麻醉,按照不同的手术部位选择头高位、头低位、仰卧位或截石位等。建立二氧化碳气腹,维持压力在12~15 mmHg之间,选择脐部穿刺12 mm,Trocar作为观察孔,并在腹腔镜直视条件下完成其它Trocar的穿刺,之后常规探查腹腔脏器转移、腹膜种植、肿瘤部位、浸润深度以及肿瘤和周围组织器官关系。以超声刀打开结直肠系膜,分离肠系膜根部对应血管并进行钳夹离断处理,按照手术要求完成右半结肠、左半结肠、乙状结肠、直肠的游离。(2)基线资料采集:采用我院自制的基线资料调查表完成,主要内容包括下述几点:年龄、性别、BMI、肿瘤大小、肿瘤部位、分化程度、淋巴结转移、临床分期、浸润深度。

1.3 观察指标

根据世界卫生组织对亚太地区人群的分类^[10],将所有受试者根据BMI的差异分作正常组($18.6 \text{ kg/m}^2 \leq BMI < 23.0 \text{ kg/m}^2$)35例、超重组($23.0 \text{ kg/m}^2 \leq BMI < 25.0 \text{ kg/m}^2$)53例、肥胖组($BMI \geq 25.0 \text{ kg/m}^2$)22例,分析三组患者各项基线资料,临床疗效,术后并发症发生情况,远期预后等方面的差异。其中临床疗效的评价主要是通过各项手术相关指标实现,包括手术时长、术中失血量、肛门排气时间、住院康复时间。术后并发症包括肺部感染、下肢静脉血栓、切口感染以及吻合口出血。远期预后主

要指标为5年生存率。对所有受试者均进行为期5年的随访,随访方式为电话随访或上门随访,随访截止时间为出院后5年或死亡。

1.4 统计学处理

数据处理软件为SPSS 22.0,计数资料以%表示,开展 χ^2 检验;计量资料以 $(\bar{x} \pm s)$ 表示,两组比较开展t检验,多组比较开展单因素方差分析;5年生存率分析通过Kaplan-Meier法检验。 $P < 0.05$ 预示差异有统计学意义。

2 结果

2.1 三组患者各项基线资料评价

超重组、肥胖组的BMI均明显高于正常组,且肥胖组BMI高于超重组(均 $P < 0.05$);三组患者其余各项基线资料比较差异均不明显(均 $P > 0.05$),见表1。

2.2 三组患者各项手术指标以及术后恢复指标水平评价

肥胖组手术时长为 (268.01 ± 36.14) min,均明显高于正常组、超重组的 (211.73 ± 30.56) min、 (224.12 ± 34.87) min(均 $P < 0.05$);三组术中失血量、肛门排气时间以及住院康复时间对比均不明显(均 $P > 0.05$),见表2。

2.3 三组术后并发症发生情况评价

三组患者术后肺部感染、下肢静脉血栓、切口感染以及吻合口出血发生率对比均不明显(均 $P > 0.05$),见表3。

2.4 三组5年生存率评价

正常组5年生存率为45.71%(16/35),超重组5年生存率为47.17%(25/53),肥胖组5年生存率为45.45%(10/22),三组比较差异均无统计学意义($\chi^2=1.376, P=0.202$)。三组5年生存率如图1所示。

3 讨论

迄今为止,关于结直肠癌的具体病因以及发病机制尚且存在一定的争议,目前普遍认为结直肠癌的发生可能是癌基因、抑癌基因以及环境因素相互作用的结果,其中饮食结构的变化,特别是高脂肪高蛋白低纤维素食物的过量摄入引发的超重或肥胖和结直肠癌密切相关^[11-13]。众所周知,肥胖作为一种全球性疾病,其发病率正呈逐年攀升趋势,且有相关研究报道指出:英国的肥胖率已突破26%,美国则在35%左右^[14]。我国由于经济的飞速发展,饮食结构的不断改变,加之国民劳动强度的大幅度降低,国内的超重率达22.4%,肥胖率则为3.01%^[15]。目前,欧美不少发达国家均开展了肥胖和结直肠癌预后相关性的研究,但研究结果存在一定的分歧^[16-18],而国内有关肥胖对结直肠癌临床疗效及远期预后的影响研究较为少见,具有一定的研究价值。

本研究结果发现:不同BMI对腹腔镜结直肠癌切除术患者的手术时长具有一定影响,即随着BMI的增加,结直肠癌患者的手术时长明显延长,提示了患者的BMI水平可能与其手术时长具有一定的关联。这在祁飞等人的研究报道中得以佐证^[19]:肥胖结直肠癌患者接受腹腔镜切除术治疗的手术时间明显长于非肥胖患者。考虑原因可能在于:肥胖患者的腹壁以及腹腔内脂肪组织堆积情况明显,从而可能导致术中的视野暴露不良,促使解剖层次不清,从而增加了手术的难度,导致分离过程

表 1 三组患者各项基线资料评价
Table 1 Baseline data evaluation of patients in the three groups

Items		Normal group (n=35)	Overweight group (n=53)	Obesity group (n=22)	χ^2/F	P
Gender	Male	18(51.43%)	28(52.83%)	12(54.55%)	1.789	0.146
	Female	17(48.57%)	25(47.17%)	10(45.45%)		
Age(years)	≤ 50	16(45.71%)	23(43.40%)	9(40.91%)	0.724	0.623
	>50	19(54.29%)	30(56.60%)	13(59.09%)		
Tumor size(cm)	≤ 4	20(57.14%)	30(56.60%)	14(63.64%)	1.405	0.219
	>4	15(42.86%)	23(43.40%)	8(36.36%)		
Tumor location	Rectum	14(40.00%)	25(47.17%)	10(45.45%)	0.675	0.573
	Distal colon	12(34.29%)	18(33.96%)	7(31.82%)		
	Proximal colon	9(25.71%)	10(18.87%)	5(22.73%)		
Differentiation degree	Low differentiation	8(22.86%)	14(26.42%)	5(22.73%)	0.765	0.669
	Medium differentiation	17(48.57%)	25(47.17%)	11(50.00%)		
	High differentiation	10(28.57%)	14(26.42%)	6(27.27%)		
Lymph node metastasis	Yes	18(51.43%)	29(54.72%)	12(54.55%)	0.495	0.815
	No	17(48.57%)	24(45.28%)	10(45.45%)		
Clinical stages	I stage	15(42.86%)	22(41.51%)	8(36.36%)	1.055	0.346
	II stage	20(57.14%)	31(58.49%)	14(63.64%)		
Infiltration depth	T1+T2	10(28.57%)	15(28.30%)	7(31.82%)	1.012	0.370
	T3+T4	25(71.43%)	38(71.70%)	15(28.30%)		
BMI(kg/m ²)		21.13± 1.05	24.10± 0.75	27.25± 1.66	15.398	0.000

表 2 三组患者各项手术指标以及术后恢复指标水平评价($\bar{x} \pm s$)

Table 2 Evaluation of operation indexes and postoperative recovery indexes in three groups($\bar{x} \pm s$)

Groups	n	Operative duration (min)	Intraoperative blood loss(mL)	Exhaust time(d)	Length of hospital recovery(d)
Normal group	35	211.73± 30.56*	107.28± 31.30	2.75± 1.12	13.25± 6.11
Overweight group	53	224.12± 34.87*	110.72± 29.52	2.85± 1.04	13.49± 6.20
Obesity group	22	268.01± 36.14	112.06± 27.59	2.91± 1.02	14.12± 6.48
F	-	15.671	1.571	1.339	1.508
P	-	0.000	0.160	0.234	0.172

Note: compared with the obesity group, * $P < 0.05$.

表 3 三组术后并发症发生情况评价(n, %)

Table 3 Evaluation of postoperative complications in three groups(n, %)

Groups	n	Pulmonary infection	Lower limb venous thrombosis	Incision infection	Anastomotic bleeding
Normal group	35	2(5.71)	1(2.86)	1(2.86)	1(2.86)
Overweight group	53	3(5.66)	3(5.66)	2(3.77)	2(3.77)
Obesity group	22	1(4.55)	1(4.55)	1(4.55)	0(0.00)
χ^2	-	1.403	1.339	0.796	0.784
P	-	0.157	0.213	0.569	0.572

中患者易出血,加之要求术者操作时的动作轻柔,最终导致手术时长增加^[20-22]。另有相关研究报道指出^[23]:肥胖不仅会增加结

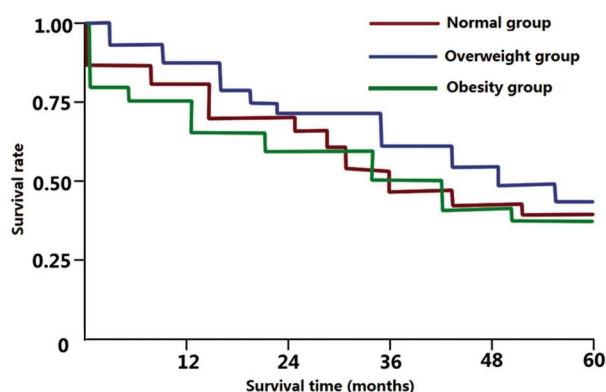


图1 三组5年生存率

Fig.1 5-year survival rate of three groups

直肠癌手术时间,同时会增加术后直肠癌手术时间,同时会增加术后出血量,这和本研究结果存在一定的差异,而导致该差异发生的主要原因可能和研究纳入对象的年龄跨度较大或样本量不同有关,值得临床重点关注。此外,本研究发现:三组患者术后肺部感染、下肢静脉血栓、切口感染以及吻合口出血发生率对比均不明显,提示了BMI对腹腔镜结直肠癌切除术患者的术后并发症发生风险影响不大,其中主要原因可能在于:腹腔镜具有一定的放大效果,可较为清晰地显示脉管、神经以及筋膜等结果,从而为术者的手术操作提供积极作用,可更为细致的处理血管,减少对患者造成的不必要损伤,加之超声刀的应用可获得较好的切割、止血作用,从而有利于降低腹腔镜结直肠癌切除术中患者的出血风险,减少术后并发症的发生^[24-26]。另外,三组患者5年生存率对比不明显,提示了不同BMI对腹腔镜结直肠癌切除术患者的远期预后影响相当。腹腔镜手术切口较小,且无需广泛分离组织,从而在一定程度上减少了对腹腔脏器造成损伤,而超声刀对周围组织的损伤较轻,有利于减轻手术应激导致的术后机体代谢紊乱,促进患者胃肠功能的恢复,从而促使不同BMI患者获得相同的创伤小、康复快的优势^[27,28]。然而,本研究尚且存在一定的不足之处,如研究样本量较少,从而可能导致研究结果发生一定的偏颇。因此,在今后的相关研究中应尽量增大样本量,已获取更为准确、可靠的数据。

综上所述,随着BMI的增加,可能导致腹腔镜结直肠癌切除术患者的手术时间延长,但不同BMI对患者远期预后的影响差异并不显著。

参考文献(References)

- [1] 路明亮, 黄华. 体质量指数与结直肠癌相关性的研究现状 [J]. 世界华人消化杂志, 2012, 20(2): 1957-1960
- [2] Okada T, Odagaki T, López-Köstner F, et al. Colorectal cancer risk factors in asymptomatic Chilean population: a survey of international collaboration between Japan and Chile [J]. Eur J Cancer Prev, 2020, 29(2): 127-133
- [3] Charkhchi P, Schabath MB, Carlos RC. Breast, Cervical, and Colorectal Cancer Screening Adherence: Effect of Low Body Mass Index in Women[J]. J Womens Health (Larchmt), 2020, 29(7): 996-1006
- [4] Chang JW, Shin DW, Han KD, et al. Obesity Has a Stronger Relationship with Colorectal Cancer in Postmenopausal Women than Pre-menopausal Women[J]. Cancer Epidemiol Biomarkers Prev, 2020, 29(11): 2277-2288
- [5] 黄贵和, 李国胜, 杨云洪, 等. 腹腔镜手术对结直肠癌根治术患者免疫功能及临床结局的影响 [J]. 现代生物医学进展, 2019, 19(24): 4744-4747
- [6] Pourjafar M, Samadi P, Karami M, et al. Assessment of clinicopathological and prognostic relevance of BMI-1 in patients with colorectal cancer: A meta-analysis [J]. Biotechnol Appl Biochem, 2020, 13(21): 2053-2054
- [7] Cabrera-Mulero A, Crujeiras AB, Izquierdo AG, et al. Novel SFRP2 DNA Methylation Profile Following Neoadjuvant Therapy in Colorectal Cancer Patients with Different Grades of BMI [J]. J Clin Med, 2019, 8(7): 1041-1042
- [8] Bjørge T, Haggström C, Ghaderi S, et al. BMI and weight changes and risk of obesity-related cancers: a pooled European cohort study[J]. Int J Epidemiol, 2019, 48(6): 1872-1885
- [9] Kurk SA, Peeters PHM, Dorresteijn B, et al. Loss of skeletal muscle index and survival in patients with metastatic colorectal cancer: Secondary analysis of the phase 3 CAIRO3 trial [J]. Cancer Med, 2020, 9(3): 1033-1043
- [10] WHO Expert Consultation. Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies [J]. Lancet, 2004, 363(9403): 157-163
- [11] Sugiyama H, Misumi M, Brenner A, et al. Radiation risk of incident colorectal cancer by anatomical site among atomic bomb survivors: 1958-2009[J]. Int J Cancer, 2020, 146(3): 635-645
- [12] Ochs-Balcom HM, Kanth P, Farnham JM, et al. Colorectal cancer risk based on extended family history and body mass index [J]. Genet Epidemiol, 2020, 44(7): 778-784
- [13] Xia Z, Su YR, Petersen P, et al. Functional informed genome-wide interaction analysis of body mass index, diabetes and colorectal cancer risk[J]. Cancer Med, 2020, 9(19): 3563-3573
- [14] Yu Y. Cohort trends in duration of obesity in the United States, 1925-89: Estimates from cross-sectional data [J]. Popul Stud (Camb), 2018, 72(3): 399-410
- [15] 中华人民共和国卫生部疾病控制司. 中国成人超重和肥胖症预防控制指南(试行)[M]. 北京:人民卫生出版社, 2006: 3-4
- [16] Li JB, Luo S, Wong MCS, et al. Longitudinal associations between BMI change and the risks of colorectal cancer incidence, cancer-related and all-cause mortality among 81,388 older adults: BMI change and the risks of colorectal cancer incidence and mortality [J]. BMC Cancer, 2019, 19(1): 1082-1083
- [17] Abdel-Rahman O. Prediagnostic, BMI, and thyroid, cancer, incidence in the PLCO trial[J]. Future Oncol, 2019, 15(30): 3451-3456
- [18] Carr PR, Amitay EL, Jansen L, et al. Association of BMI and major molecular pathological markers of colorectal cancer in men and women [J]. Am J Clin Nutr, 2020, 111(3): 562-569
- [19] 祁飞, 胡志前, 周海洋, 等. 肥胖患者行腹腔镜结直肠癌切除术的近期疗效分析[J]. 腹腔镜外科杂志, 2013, 18(9): 662-665
- [20] 夏天一, 翟宇宵, 吴向欣, 等. 肥胖与结直肠癌的相关性研究[J]. 现代肿瘤医学, 2019, 27(7): 1241-1243
- [21] 朱伟伟, 范文华, 方可, 等. 术前营养预后指数和体质量指数与结直肠癌病人预后关系的研究 [J]. 蚌埠医学院学报, 2019, 44(4): 442-445

(下转第 2930 页)

- [15] Kruger PC, Eikelboom JW, Douketis JD, et al. Deep vein thrombosis: update on diagnosis and management [J]. *Med J Aust*, 2019, 210(11): 516-524
- [16] Bronić A, Coen Herak D, Margetić S, et al. Croatian Society of Medical Biochemistry and Laboratory Medicine: National recommendations for blood collection, processing, performance and reporting of results for coagulation screening assays prothrombin time, activated partial thromboplastin time, thrombin time, fibrinogen and D-dimer [J]. *Biochem Med*, 2019, 29(2): 20503
- [17] Keller K, Beule J, Balzer JO, et al. D-Dimer and thrombus burden in acute pulmonary embolism [J]. *Am J Emerg Med*, 2018, 36 (9): 1613-1618
- [18] Globler N, Tainter CR, Brennan J, et al. Use of the d-dimer for Detecting Pulmonary Embolism in the Emergency Department [J]. *J Emerg Med*, 2018, 54(5): 585-592
- [19] Godier A, Parmar K, Manandhar K, et al. An in vitro study of the effects of t-PA and tranexamic acid on whole blood coagulation and fibrinolysis[J]. *J Clin Pathol*, 2017, 70(2): 154-161
- [20] Favresse J, Lippi G, Roy PM, et al. D-dimer: Preanalytical, analytical, postanalytical variables, and clinical applications [J]. *Crit Rev Clin Lab Sci*, 2018, 55(8): 548-577
- [21] Garabet L, Ghanima W, Monceyron Jonassen C, et al. Effect of thrombopoietin receptor agonists on markers of coagulation and P-selectin in patients with immune thrombocytopenia [J]. *Platelets*, 2019, 30(2): 206-212
- [22] Lou Z, Du K, Wang T, et al. Resveratrol suppresses P-selectin, PS-GL-1, and VWF through SIRT1 signaling pathway [J]. *Acta Biochim Biophys Sin*, 2017, 49(9): 848-850
- [23] Patel MS, Miranda-Nieves D, Chen J, et al. Targeting P-selectin glycoprotein ligand-1/P-selectin interactions as a novel therapy for metabolic syndrome[J]. *Transl Res*, 2017, 183(10): 1-13
- [24] 王国胜, 续斌, 高健, 等. 利伐沙班联合血塞通在预防老年髋部术后深静脉血栓形成中的疗效及对血液高凝状态的影响[J]. *现代生物医学进展*, 2016, 16(15): 2924-2927
- [25] Buczek-Thomas JA, Rich CB, Nugent MA. Hypoxia Induced Heparan Sulfate Primes the Extracellular Matrix for Endothelial Cell Recruitment by Facilitating VEGF-Fibronectin Interactions[J]. *Int J Mol Sci*, 2019, 20(20): 5065
- [26] 王蔚, 李学东, 刘光旭, 等. 两种血管内皮生长因子抑制剂对血管内皮细胞功能的抑制作用比较 [J]. *眼科新进展*, 2019, 39(10): 920-923
- [27] Cheng J, Yang HL, Gu CJ, et al. Melatonin restricts the viability and angiogenesis of vascular endothelial cells by suppressing HIF-1 α /ROS/VEGF[J]. *Int J Mol Med*, 2019, 43(2): 945-955
- [28] 钱淑霞, 沈宇斐, 张晓玲, 等. 2 型糖尿病对脑梗死患者血小板衍生内皮细胞生长因子和血管内皮细胞生长因子的影响[J]. *中国临床药理学杂志*, 2018, 34(7): 783-785
- [29] Ma Q, Zhang W, Zhu C, et al. FUNDC2 regulates platelet activation through AKT/GSK-3 β /cGMP axis[J]. *Cardiovasc Res*, 2019, 115(11): 1672-1679
- [30] 张辉. 血管内皮生长因子对老年骨折病人围手术期下肢深静脉血栓的影响[J]. *安徽医药*, 2019, 23(7): 1396-1399

(上接第 2905 页)

- [22] 李培哲, 吕绪昆, 高恒岭, 等. 体质量指数对直肠癌腹腔镜全直肠系膜切除术患者的影响[J]. *中国医师进修杂志*, 2019, 42(1): 6-9
- [23] Merkow RP, Bilimoria KY, McCarter MD, et al. Effect of body mass index on short-term after colectomy for cancer [J]. *J Am Coll Surg*, 2009, 208(1): 53-61
- [24] Ishii M, Hamabe A, Okita K, et al. Efficacy of indocyanine green fluorescence angiography in preventing anastomotic leakage after laparoscopic colorectal cancer surgery[J]. *Int J Colorectal Dis*, 2020, 35 (2): 269-275
- [25] Higashino N, Matsuda T, Hasegawa H, et al. Outcomes of Laparoscopic Surgery in Colorectal Cancer Patients With Dialysis [J]. *Anticancer Res*, 2020, 40(4): 2165-2170
- [26] Araujo RLC, Figueiredo MN, Sanctis MA, et al. Decision making process in simultaneous laparoscopic resection of colorectal cancer and liver metastases. Review of literature [J]. *Acta Cir Bras*, 2020, 35 (3): 308-309
- [27] Sebastián-Tomás JC, Domingo-Del Pozo C, Gómez-Abril SÁ, et al. Laparoscopic staged colon-first resection for metastatic colorectal cancer: Perioperative and midterm outcomes from a single-center experience[J]. *J Surg Oncol*, 2020, 122(7): 1453-1461
- [28] 王永鹏, 佟昕, 张庆彤, 等. 腹腔镜直肠癌前切除术中转开腹影响因素的多因素分析[J]. *中国微创外科杂志*, 2016, 16(8): 694-697, 719