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加速康复外科理念联合腹腔镜技术对穿孔性阑尾炎患儿肠道功能恢复及外周血 WBC、CRP、IL-6 的影响 *

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摘要 目的:探讨腹腔镜技术联合加速康复外科理念(ERAS)对穿孔性阑尾炎患儿肠道功能恢复及外周血白细胞计数(WBC)、C反应蛋白(CRP)、白介素-6(IL-6)的影响。**方法:**选取2017年8月~2019年8月期间我院收治的行腹腔镜下阑尾切除术的患儿120例,上述患儿根据随机数字表法分为对照组(n=60)和研究组(n=60),两组均给予腹腔镜下阑尾切除术治疗,对照组给予常规围手术期处理,研究组给予ERAS,比较两组围术期指标、WBC、CRP、IL-6水平,比较两组术后疼痛状况及满意度情况,记录两组治疗期间并发症发生情况。**结果:**研究组住院时间、首次排气时间、下床活动时间、首次进食时间较对照组短,住院费用少于对照组($P<0.05$)。研究组术后3d、术后5d血清WBC、CRP、IL-6水平呈先升高后降低趋势($P<0.05$);研究组术后3d、术后5d血清WBC、CRP、IL-6水平低于对照组($P<0.05$)。研究组视觉疼痛模拟评分(VAS)评分低于对照组,而满意度则高于对照组($P<0.05$)。术后并发症总发生率研究组低于对照组($P<0.05$)。**结论:**ERAS联合腹腔镜技术治疗穿孔性阑尾炎患儿安全有效,可减轻患儿疼痛及炎症应激,促进其术后肠道功能恢复,减轻患儿家庭经济负担。

关键词:加速康复外科理念;腹腔镜技术;穿孔性阑尾炎;肠道功能;白细胞计数;C-反应蛋白;白细胞介素-6

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Effect of Concept of Accelerated Rehabilitation Surgery Combined with Laparoscopy on Intestinal Function Recovery and Peripheral Blood WBC, CRP, IL-6 in Children with Perforated Appendicitis*

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ABSTRACT Objective: To investigate the effect of concept of accelerated rehabilitation surgery (ERAS) combined with laparoscopy on intestinal function recovery and peripheral blood leukocyte count (WBC), C-reactive protein (CRP), interleukin-6 (IL-6) in children with perforated appendicitis. **Methods:** From August 2017 to August 2019, 120 children who underwent laparoscopic appendectomy in our hospital were selected, they were divided into two groups: control group (n=60) and study group (n=60). The two groups were treated with laparoscopic appendectomy, the control group was treated with routine perioperative treatment, the study group was treated with ERAS, and the operation indexes, WBC, CRP and IL-6 of the two groups were compared. The postoperative pain and satisfaction of the two groups were compared, and the complications during the treatment were recorded. **Results:** The hospitalization time, first exhaust time, getting out of bed activity time and first eating time of the study group were shorter than those of the control group, and the hospitalization cost was less than that of the control group ($P<0.05$). The levels of WBC, CRP and IL-6 of the study group increased first and then decreased at 3 d after operation and 5 d day after operation ($P<0.05$). The levels of WBC, CRP and IL-6 of the study group were lower than those of the control group ($P<0.05$). The visual pain simulation score (VAS) score of the study group was lower than that of the control group, while the satisfaction rate was higher than that of the control group ($P<0.05$). The total incidence rate of postoperative complications of the study group was lower than that of the control group ($P<0.05$). **Conclusion:** ERAS combined with laparoscopy is safe and effective in the treatment of children with perforated appendicitis, which can reduce pain and inflammatory stress, promote the recovery of intestinal function, and reduce the economic burden of children's families.

Key words: Concept of accelerated rehabilitation surgery; Laparoscopic technology; Perforated appendicitis; Intestinal function; Leukocyte count; C-reactive protein; Interleukin-6

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前言

穿孔性阑尾炎是指阑尾发生坏死并穿孔的急性阑尾炎,属于重型阑尾炎,多见于儿童,由于儿童群体阑尾壁层较薄,阑尾穿孔过程快,加上腹膜吸收能力强,阑尾腔内的积脓可以自由进入腹腔,形成弥漫性腹膜炎,诱发各种感染性并发症,手术是治疗穿孔性阑尾炎的主要方案^[1]。腹腔镜下阑尾切除术已成为临床治疗穿孔性阑尾炎的常用术式,但手术切除阑尾期间处理不当可引发多种并发症,影响患儿预后,尚存在一定的缺陷^[2-4]。加速康复外科理念(Enhanced recovery after surgery, ERAS)是指围术期依据循证医学证据提出的理念,尽可能减少患儿身心创伤应激的一种理念^[5-7]。本研究通过穿孔性阑尾炎患儿围术期给予 ERAS 后,探讨其对肠道功能恢复及外周血 C 反应蛋白(C-reactive protein, CRP)、白细胞计数(White blood cell count, WBC)、白介素-6(Interleukin-6, IL-6)的影响,以期为临床治疗提供数据支持。

1 资料与方法

1.1 一般资料

选取 2017 年 8 月~2019 年 8 月期间我院收治的行腹腔镜下阑尾切除术的患儿 120 例,本次研究已通过我院伦理学委员会批准进行。纳入标准:(1)具备手术指征者,术后病理证实为穿孔性阑尾炎;(2)患儿家属知情本研究且签署了同意书;(3)发病时间≤72 h。排除标准:(1)合并凝血功能障碍者;(2)术中有并发畸形如梅克尔憩室等;(3)阑尾周围脓肿及坏疽性阑尾炎并广泛性腹膜炎者;(4)既往有腹部手术者;(5)合并心肝肺等重要脏器功能障碍者;(6)病史长,已有明确阑尾周围脓肿包裹者。上述患儿根据随机数字表法分为对照组(n=60)和研究组(n=60),其中对照组女 28 例,男 32 例,年龄 4~12 岁,平均(7.69±1.35)岁;发病时间 4~72 h,平均(31.27±4.62)h;体质量指数 12.4~17.3 kg/m²,平均(14.28±0.93)kg/m²。研究组女 26 例,男 34 例,年龄 3~12 岁,平均(7.39±1.26)岁;发病时间 6~69 h,平均(30.94±3.81)h;体质量指数 11.8~17.5 kg/m²,平均(14.09±0.87)kg/m²。一般资料两组对比无差异(P>0.05),具有可比性。

1.2 方法

两组均给予腹腔镜下阑尾切除术,在此基础上,对照组给予常规围手术期处理,术前常规禁饮禁食,放置尿管及胃管,术前 30 min 静脉输注抗生素,阿托品肌注,气管插管麻醉,手术方法为腹腔镜阑尾切除术,术中未采取保暖措施,术后 24 h 常规下床活动,术后根据患儿疼痛程度,选用适当非甾体镇痛药进行镇痛。研究组患儿则给予 ERAS 处理,具体如下:术前给予患儿及其家属充分的心理辅导,同时告知 ERAS 具体流程,获取家长理解。术前 2 h 禁水,6 h 禁食,无胃肠道反应者在术前 2 h 口服 10% 葡萄糖水适量。术末未放置尿管、胃管,嘱患儿排尿,术前 30 min 静脉输注抗生素。术中麻醉为腹横平面阻滞联合气管插管麻醉。术中注意保暖,手术方法为腹腔镜阑尾切除术,术后 9 h 鼓励患儿下床活动,术后 12 h 视患儿具体情况予以少量流质饮食、半流质并逐步过渡至普食。

1.3 观察指标

(1)记录两组患儿围术期指标,包括住院时间、首次排气时间、住院费用、下床活动时间、首次进食时间。(2)抽取患儿术前、术后 3 d、术后 5 d 的外周血 6 mL,经 4500 r/min 离心 12 min,离心半径 11 cm,分离上清液,置于 -30℃ 冰箱中待测。选用武汉华美生物科技有限公司的试剂盒,遵守试剂盒说明书操作,采用酶联免疫吸附试验检测血清 WBC、CRP、IL-6 水平。(3)记录两组术后并发症发生情况。(4)术后采用视觉疼痛模拟评分(Visual pain simulation score, VAS)^[8]评价患儿疼痛状况,其中 VAS 评分 0~10 分,其中 0 分表示无痛,10 分表示难以忍受的痛,分数越高,疼痛感越强烈。两组患儿出院时根据患儿对工作人员工作进行评价,分为不满意、满意、比较满意、非常满意,其中非常满意率+满意率+比较满意率=满意率。

1.4 统计学方法

使用 SPSS25.0 软件进行分析,计量资料以($\bar{x} \pm s$)示,行 t 检验,计数资料以率示,行卡方检验,检验水准为 $\alpha=0.05$ 。

2 结果

2.1 围术期指标比较

研究组住院费用少于对照组,下床活动时间、首次排气时间、住院时间、首次进食时间较对照组短(P<0.05);详见表 1。

表 1 两组围术期指标比较($\bar{x} \pm s$)

Table 1 Comparison of perioperative indexes between the two groups($\bar{x} \pm s$)

Groups	First exhaust time(d)	Hospitalization time(d)	Hospitalization cost(yuan)	First eating time(h)	Getting out of bed activity time(d)
Control group(n=60)	1.68±0.22	7.71±1.06	9115.68±112.71	24.02±1.57	4.23±0.67
Study group(n=60)	1.16±0.20	5.91±0.87	8324.62±96.74	13.11±1.47	2.18±0.56
t	13.547	9.505	41.254	39.292	18.185
P	0.000	0.000	0.000	0.000	0.000

2.2 两组血清 WBC、CRP、IL-6 水平比较

两组患儿术前血清 WBC、CRP、IL-6 水平比较差异无统计学意义(P>0.05);研究组术后 3 d、术后 5 d 血清 WBC、CRP、IL-6 水平呈先升高后降低趋势(P<0.05);研究组术后 3 d、术后 5 d 血清 WBC、CRP、IL-6 水平低于对照组(P<0.05);详见表 2。

2.3 两组疼痛状况及满意度比较

研究组 VAS 评分为(1.54±0.28)分,低于对照组的(3.31±0.37)分(P<0.05);研究组满意率高于对照组(P<0.05);详见表 3。

表 2 两组血清 WBC、CRP、IL-6 水平比较($\bar{x} \pm s$)Table 2 Comparison of serum WBC, CRP and IL-6 levels between the two groups($\bar{x} \pm s$)

Groups	WBC($10^9/L$)			CRP(mg/L)			IL-6(ng/L)		
	Before operation	3 d after operation	5 d day after operation	Before operation	3 d after operation	5 d day after operation	Before operation	3 d after operation	5 d day after operation
Control group (n=60)	10.82 $\pm$ 1.78	28.34 $\pm$ 2.54 ^a	21.18 $\pm$ 2.55 ^{ab}	32.95 $\pm$ 4.86	47.86 $\pm$ 5.74 ^a	42.78 $\pm$ 4.68 ^{ab}	12.01 $\pm$ 1.53	29.82 $\pm$ 2.62 ^a	21.24 $\pm$ 2.38 ^{ab}
Study group (n=60)	10.74 $\pm$ 1.65	23.38 $\pm$ 2.27 ^a	15.45 $\pm$ 1.26 ^{ab}	32.86 $\pm$ 3.61	43.93 $\pm$ 5.52 ^a	38.06 $\pm$ 4.39 ^{ab}	11.93 $\pm$ 1.69	23.91 $\pm$ 1.68 ^a	16.19 $\pm$ 1.53 ^{ab}
t	0.255	11.278	15.605	0.115	3.823	5.633	0.272	14.709	13.825
P	0.799	0.000	0.000	0.909	0.000	0.000	0.786	0.000	0.000

Notes: Compared with before operation, ^a $P<0.05$; compared with 3 d after operation, ^b $P<0.05$.

表 3 两组疼痛状况及满意度比较 [n(%)]

Table 3 Comparison of pain status and satisfaction between the two groups [n(%)]

Groups	Very satisfaction	Satisfaction	More satisfaction	Dissatisfaction	Satisfaction rate
Control group(n=60)	8(13.33)	15(25.00)	19(31.67)	18(30.00)	42(70.00)
Study group(n=60)	14(23.33)	20(33.33)	21(35.00)	5(8.33)	55(91.67)
χ^2					9.090
P					0.003

2.4 并发症发生情况比较

的 20.00%(12/60)($P<0.05$);详见表 4。

术后并发症总发生率研究组为 6.67%(4/60), 低于对照组

表 4 两组并发症发生情况比较 [n(%)]

Table 4 Comparison of complications between the two groups [n(%)]

Groups	Nausea and vomiting	Pain of urethra	Infection of incision	Adhesive ileus	Postoperative hemorrhage	Total incidence rate
Control group(n=60)	3(5.00)	1(1.67)	5(8.33)	2(3.33)	1(1.67)	12(20.00)
Study group(n=60)	1(1.67)	0(0.00)	1(1.67)	1(1.67)	1(1.67)	4(6.67)
χ^2						4.615
P						0.032

3 讨论

小儿阑尾炎症状不典型, 查体不合作, 询问病史困难, 易误诊, 并且儿童阑尾壁薄腔小, 易导致阑尾穿孔、坏疽, 脓肿形成^[9,10]。穿孔性阑尾炎发病后会有大量细菌从阑尾处流入血液循环, 引发全身炎症反应综合征甚至败血症, 危及患儿生命, 故早期确诊及实施阑尾切除术可有效提高患儿治愈率^[11-13]。腹腔镜下阑尾切除术是治疗穿孔性阑尾炎的有效术式, 近年来已获得了广泛的应用。尽管腹腔镜下阑尾切除术属于微创手术, 但仍属于有创操作, 手术创伤的过度应激及炎症反应可导致器官功能不全及并发症, 以上这些因素均可对患儿的康复情况造成影响^[14,15]。以往研究报道显示^[16], 患者的术后康复速度不仅依赖于外科医生的手术操作, 还依赖于围术期产生的各种应激程度。ERAS 是近年来新兴的康复外科理念, 利用多学科技术, 将护理人员、麻醉师、家属、外科医生及患者组成一个团队, 将围手术期措施优化, 运用微创技术, 降低围术期产生的各种刺激和副损伤, 最终达到加速术后康复、减少医疗费用的目的^[17-19]。

近年来, 国内亦有文献报道将其用于儿童相关类手术中, 并取得了较好的治疗效果^[20,21], 但有关其应用于儿童穿孔性阑尾炎等急腹症方面的报道尚需进一步的样本量证实。

本次研究结果显示, 研究组患儿的各项围术期指标、肠道功能恢复情况、炎性应激、术后疼痛、满意率及并发症发生率等方面的改善均优于对照组, 体现了 ERAS 联合腹腔镜技术治疗穿孔性阑尾炎患儿的有效性。分析原因, 可能与 ERAS 具备以下几点优势有关: (1) ERAS 术前已经向患儿家属明确灌输了围手术期相关知识, 让家长清晰明确的了解整个手术流程, 提升其对手术成功率的信心度, 同时还可提升其对医务工作的理解与配合^[22]。(2) 传统术前的常规禁食是为保证麻醉前患儿处于胃排空状态, 而 ERAS 术前 2 h 给予患儿少量 10% 葡萄糖溶液, 可提高患儿对手术的耐受性, 为患儿术后康复提供充足的能量储备^[23,24]。(3) 常规的围术期处理时即放置胃管、尿管, 刺激性强, 不少患儿会产生恐惧心理, 增加应激反应, 而 ERAS 术前不放置胃管、尿管, 可避免置管加重应激反应^[25]。(4) 鼓励患儿术后早期下床活动, 肠功能恢复较快, 提前进食时间, 患儿饥饿

感缓解^[26]。(5)ERAS 在气管插管麻醉的基础上联合腹横平面阻滞,可减轻手术引起的神经及内分泌代谢应激反应^[27]。(6)ERAS 维持术中体温稳定,可有效避免患儿因低体温或高热引起心率失常、应激反应等发生风险^[28]。(7)术后早期活动有助于减少肺部并发症及组织氧供、增加肌肉强度,促进机体合成代谢和胃肠功能恢复,利于快速恢复及营养的及时补充^[29]。(8)由于长时间的禁食可导致胃和小肠的蠕动缓慢,收缩波不规律,ERAS 提倡患儿术后早期进食,进食不仅可促进胃和小肠蠕动,同时还可提供修复手术创伤所需的营养物质,维护胃肠道黏膜屏障功能,减少并发症发生风险^[30]。

综上所述,ERAS 联合腹腔镜手术治疗穿孔性阑尾炎患儿,可减轻患儿疼痛及家庭经济负担,促进其术后肠道功能恢复,同时还可改善血清 WBC、CRP、IL-6 水平,减少并发症发生率。

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