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腹腔镜与开腹手术治疗穿孔性阑尾炎患儿的临床疗效及对血清 CRP 和 PCT 水平的影响比较 *

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摘要 目的:分析和比较腹腔镜阑尾切除术(LA)与开腹阑尾切除术(OA)治疗穿孔性阑尾炎患儿的临床效果及对患儿血清 C 反应蛋白(CRP)、降钙素原(PCT)水平的影响。**方法:**选取我院 2013 年 1 月~2016 年 12 月收治的 98 例穿孔性阑尾炎患儿,依据随机数字表法均分为两组。对照组行 OA 治疗,观察组行 LA 治疗。记录比较两组患儿切口长度、术中出血量、手术时间、术后排气时间及住院时间等手术情况;术后镇痛药物使用及并发症情况;围术期各时点血清 CRP、PCT 水平。**结果:**两组患儿均成功完成手术,观察组患儿中无中转开腹者。观察组患儿的切口长度、术中出血量、手术时间、术后排气时间及住院时间均显著优于对照组($P<0.01$)。观察组患儿术后镇痛药物使用率及并发症率均为 4.1%,均明显低于对照组的 16.3%、18.4%($P<0.05$)。两组术前 12 h 时血清 CRP、PCT 水平比较差异均无统计学意义($P>0.05$);与术前 12 h 时相比,两组术后 24、48 h 时血清 CRP、PCT 水平均显著升高($P<0.01$);两组术后 48 h 时血清 CRP、PCT 水平较术后 24 h 时均显著降低($P<0.01$);与对照组同期对比,观察组术后 24、48 h 时血清 CRP、PCT 水平均显著降低($P<0.01$)。**结论:**与开腹手术相比,腹腔镜手术治疗穿孔性阑尾炎患儿具有创伤小、手术时间短、术后并发症少等优势,能更有效降低血清 CRP、PCT 水平,促进患儿术后恢复。

关键词:腹腔镜手术;开腹手术;穿孔性阑尾炎;小儿;C 反应蛋白;降钙素原

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Comparison of the Clinical Effect of Laparoscopic Appendectomy and Open Appendectomy on Children with Perforated Appendicitis and the Impact on the Serum CRP and PCT Levels*

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ABSTRACT Objective: To explore the clinical effect of laparoscopic appendectomy (LA) and open appendectomy (OA) on the children with perforated appendicitis and impact on the serum C reactive protein (CRP) and procalcitonin (PCT) levels. **Methods:** 98 cases of children with perforated appendicitis admitted in our hospital from January 2013 to December 2016 were selected and randomly divided into two groups. OA was provided to the control group while LA was provided to the observation group. The surgical conditions including incision length, intraoperative blood loss, operation time, postoperative ventilation time and hospital stay; postoperative analgesic drug use and complications; serum CRP, PCT levels before and after operation were compared between two groups. **Results:** All the children in both groups successfully finished the surgery; no kid in observation group transferred to open appendectomy. The incision length, intraoperative blood loss, operation time, postoperative ventilation time and hospital stay of observation group were significantly better than those of the control group ($P<0.01$). The percentage of postoperative analgesic drug use and incidence of complications were both 4.1% in the observation group, which were significantly lower than those of the control group (16.3%, 18.4%, $P<0.05$). No statistical difference was found in the serum CRP, PCT levels between two groups at 12th preoperation ($P>0.05$). The serum CRP, PCT levels at 24th and 48th postoperation were higher in both groups than those at 12th preoperation ($P<0.01$). The serum CRP, PCT levels at 48th postoperation were significantly lower than those at 24th postoperation ($P<0.01$). The serum CRP, PCT levels of observation group at 24th, 48th postoperation were significantly lower than those of the control group at same time points ($P<0.01$). **Conclusions:** Compared with open appendectomy, laparoscopic appendectomy caused less trauma, shorter operative time, less postoperative complications and other minimally invasive advantages on children with perforated appendicitis. LA could more effectively decrease the serum CRP, PCT levels and promote the postoperative recovery.

Key words: Laparoscopic appendectomy; Open appendectomy; Laparoscopic appendectomy; Children; C reactive protein; Procalcitonin

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前言

急性阑尾炎属小儿常见急腹症,确诊后应尽早采用阑尾切除手术治疗,但患儿往往因症状与体征不典型、查体不配合、病史叙述不清等原因,易导致漏诊或误诊^[1]。同时,小儿易因阑尾壁薄、盲肠相对游离、大网膜发育不良、回盲部淋巴组织丰富、腹膜腔表面积相对较大等因素而引发阑尾穿孔^[2]。穿孔性阑尾炎患儿多数伴随程度不同的腹腔污染,围术期易出现各种感染性或炎性并发症。临床针对此类患儿以外科手术+抗感染为常规治疗方案^[3]。

开腹阑尾切除术(open appendectomy, OA)是阑尾炎临床治疗的经典术式,但对患儿创伤较大,术后并发症较多,不利于患儿术后恢复^[4]。近年来,随着腹腔镜技术的发展与微创理念的日渐深入,腹腔镜阑尾切除术(laparoscopic appendectomy, LA)因其独特的优势已普遍应用于单纯性阑尾炎的临床治疗,但对于其应用于复杂性阑尾炎仍存在一定争议^[5]。术后机体炎症反应可作为评价手术效果的重要内容。有研究证实^[6,7]C反应蛋白(C reactive protein, CRP)和降钙素原(procalcitonin, PCT)能有效反映机体感染与炎症的程度,可作为判断急性阑尾炎患者预后的重要指标。本研究以我院2013年1月~2016年12月收治的穿孔性阑尾炎患儿为研究对象,通过对比分析穿孔性阑尾炎患儿分别行LA与OA治疗的临床效果及对患儿血清CRP、PCT指标的影响,旨在为临床此类患儿手术方案的选择提供参考。现报道如下。

1 资料与方法

1.1 一般资料

选取我院2013年1月~2016年12月收治的98例穿孔性阑尾炎患儿,入选标准:①均具有程度不同的右下腹持续疼痛、恶心呕吐、体温升高、白细胞(WBC)上升、肠鸣音减弱、查体见反跳痛等典型阑尾炎及阑尾穿孔的临床症状与体征;②术前经实验室辅助检查、B超等影像检查确诊为急性阑尾炎,术后病理证实为阑尾穿孔;③年龄1~14岁;④病程<36h;⑤患儿法定监护人自愿参加本研究,签署知情同意书;⑥能接受定期随访,临床资料齐全;⑦体温<40℃。排除标准:①合并慢性免疫性、内分泌性或感染性疾病者;②有腹部手术史、凝血功能障碍、肝肾功能异常者;③患有弥漫性腹膜炎、急性肠梗阻者;④有严重心肺脑等组织或器官病变而无法耐受手术者。依据随机数字表法均分为两组。观察组女20例,男29例;年龄(8.1±1.9)岁;病程(16.4±2.2)h;体温(39.14±0.38)℃;病理类型:化脓性阑尾炎穿孔30例,坏疽性阑尾炎穿孔19例。对照组女18例,男31例;年龄(7.9±2.0)岁;病程(16.2±2.3)h;体温(39.21±0.37)℃;病理类型:化脓性阑尾炎穿孔32例,坏疽性阑尾炎穿孔17例。本研究经我院医学伦理委员会审核通过。两组患儿基线资料对比差异无统计学意义($P>0.05$),临床可比。

1.2 治疗方法

对照组:OA治疗,具体为:①患儿取仰卧位,待麻醉生效后,于右下腹麦氏点(脐与右髂前上棘连线中、外1/3交界处)作一长约4~5cm的麦氏切口;②吸尽腹腔积液,沿结肠带找到阑尾,仔细分离阑尾系膜,并游离至阑尾根部;③于阑尾根部的不

同平面采用4#、7#线对阑尾系膜与动脉进行双重结扎处理,在确认结扎牢靠后,再将阑尾于结扎处远端0.5cm处钳夹切断,并将阑尾残端采用“8”字或荷包缝合包埋处理;④常规生理盐水冲洗腹腔,而后关腹缝合。观察组行LA治疗,具体包括:①患儿取位同对照组,麻醉成功后,采用三孔法,取脐部上缘作一长为5mm的切口,置入5mm Trocar为观察孔,常规建立8~10mmHg的CO₂气腹,并置入30°腹腔镜;再于左下腹麦氏点和耻骨联合上方分别作5mm、10mm的切口,依次置入5mm、10mm Trocar为操作孔,分别引入吸引器和抓钳;②吸除腹腔内游离的脓液,沿着结肠寻找阑尾根部,将阑尾根部及头端用抓钳固定,并将其周围粘连组织仔细分离;③将阑尾系膜用超声刀凝切,用丝线结扎或圈套器套扎阑尾根部,而后切除阑尾,并将切下是阑尾组织装入标本袋,经位于耻骨联合上方的操作孔取出,送检;④常规冲洗腹腔,经左下腹操作孔置入引流管,解除气腹,拔除腹腔镜、套管针等操作器械,缝闭切口,术毕。两组患儿手术操作均由我院同一组护理人员及外科医师完成,术后两组患儿均给予相同的常规引流(于术后2~5d拔除)及抗生素抗感染治疗。

1.3 观察指标

记录比较两组患儿切口长度、术中出血量、手术时间、术后排气时间及住院时间等手术情况;术后镇痛药物使用及并发症情况;围术期各时点血清CRP、PCT水平。

1.4 血清CRP、PCT水平测定

①于术前12h及术后24、48h对每位患儿各抽取1次静脉血,3mL/次,离心分离血清;②CRP采用酶联免疫吸附测定法(ELISA)测定,仪器为全自动酶标仪(美国Rayto,型号RT-6000)及其配套试剂盒;③PCT运用固相免疫色谱法检测,仪器采用电化学发光全自动免疫分析仪(瑞士罗氏,型号Elec-sys 2010)及其配套试剂盒;④各指标检测步骤均严格依照配套说明书执行。

1.5 统计学分析

应用统计软件SPSS21.0分析数据,计量资料以($\bar{x} \pm s$)表示,运用t检验,计数资料以(%)表示,采取 χ^2 检验,以 $P<0.05$ 为差异有统计学意义。

2 结果

2.1 两组手术情况的比较

两组患儿均成功完成手术,观察组患儿中无中转开腹者。观察组患儿的切口长度、术中出血量、手术时间、术后排气时间及住院时间均显著优于对照组($P<0.01$),见表1。

2.2 两组术后镇痛药物使用及并发症发生情况的比较

观察组患儿术后镇痛药物使用率及并发症率均为4.1%(2/49),均明显低于对照组的16.3%(8/49)、18.4%(9/49)($P<0.05$),见表2。

2.3 两组围术期各时点血清CRP、PCT水平的比较

两组术前12h时血清CRP、PCT水平比较差异均无统计学意义($P>0.05$);与术前12h时相比,两组术后24、48h时血清CRP、PCT水平均显著升高($P<0.01$);两组术后48h时血清CRP、PCT水平较术后24h时均显著降低($P<0.01$);与对照组同期对比,观察组术后24、48h时血清CRP、PCT水平均显著更低($P<0.01$)。见表3。

表 1 两组手术情况比较($\bar{x} \pm s$)

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

Groups	N	Length of incision (cm)	Intraoperative blood loss (mL)	Operation time (min)	Postoperative exhaust time (h)	Length of stay (d)
Observation group	49	2.1 $\pm$ 0.3	46.7 $\pm$ 13.8	45.6 $\pm$ 13.1	19.3 $\pm$ 5.1	5.0 $\pm$ 1.3
Control group	49	5.5 $\pm$ 1.1	137.4 $\pm$ 20.9	71.3 $\pm$ 14.9	32.8 $\pm$ 6.4	7.3 $\pm$ 1.6
P		0.000	0.000	0.000	0.000	0.000

表 2 两组术后镇痛药物使用及并发症发生情况的比较

Table 2 Comparison of the percentage of postoperative analgesic drug use and incidence of complications between two groups

Groups	N	Analgesic drug use rate (n/%)	Postoperative complications			Total incidence rate (n/%)
			Abdominal abscess	Intestinal obstruction	Incision infection	
Observation group	49	2/4.1	1	0	1	2/4.1
Control group	49	8/16.3	3	2	4	9/18.4
P		0.045				0.025

表 3 两组围术期各时点血清 CRP、PCT 水平比较($\bar{x} \pm s$)

Table 3 Comparison of the serum CRP and PCT levels in perioperative period between two groups($\bar{x} \pm s$)

Groups	N	CRP (mg/L)			PCT (μ g/L)		
		At 12h	At 24 h	At 48 h	At 12 h	At 24 h	At 48 h
		preoperation	postoperation	postoperation	preoperation	postoperation	postoperation
Observation group	49	5.8 $\pm$ 1.2	32.7 $\pm$ 4.6*	7.5 $\pm$ 1.4**	8.3 $\pm$ 2.2	21.6 $\pm$ 1.9*	10.9 $\pm$ 1.7**
Control group	49	6.1 $\pm$ 1.1	57.9 $\pm$ 6.8*	19.6 $\pm$ 3.7**	8.1 $\pm$ 2.3	29.7 $\pm$ 2.6*	16.5 $\pm$ 2.1**
P		0.200	0.000	0.000	0.661	0.000	0.000

Note: compared with those at 12 h preoperation of this group, *P<0.01; compared with those at 24 h postoperation of this group, **P<0.01.

3 讨论

OA 是临床治疗穿孔性阑尾炎的传统术式,其优势在于简便有效,但术后切口感染率较高,且因其术野相对较为有限,术中的寻找阑尾、松解粘连等操作过程,极易进一步加重腹腔污染,致使感染残留,从而导致术后易发生腹腔感染等并发症,严重影响患儿预后^[8]。近些年,随着腹腔镜设备、器械与技术的不断革新,LA 已逐渐得到临床的广泛认可^[9]。Karakuş 等^[10]研究显示与 OA 组相比,小儿复杂性阑尾炎采取 LA 治疗更能缩短患儿住院时间,减少术后粘连性肠梗阻、切口感染等并发症,且不增加手术费用。Desai 等^[11]研究也显示采用 LA 治疗穿孔性阑尾炎患儿是安全、有效的,术后脓肿的发生率并未增加,并能显著减少患儿术后抗生素的应用。本研究中,穿孔性阑尾炎患儿行 LA 治疗也取得了良好效果。分析 LA 的优势如下:① 切口长度小:本组中行 LA 治疗的患儿切口长度显著小于行 OA 治疗者;这与王勇等^[12]研究结果相似,提示 LA 对患儿机体的损伤较小,同时切口预后美观度较高。② 手术时间短:本研究行 LA 治疗的患儿手术时间显著短于对照组,与侯崇智^[13]等报道一致,分析原因可能与 LA 无须逐层开腹与关腹、腹腔镜视野宽广(使阑尾寻找方便、快捷)、术中利用超声刀直接将阑尾及系膜进行切断与闭合等,从而极大地节约了手术时间有关。③ 创伤小、恢复快、住院时间短:行 LA 治疗的患儿仅于腹壁穿刺 3 个小戳孔,能有效减少术中出血量,而且这也使得腹壁各层组织在术

中受到的损伤远小于行 OA 的患儿,且术中在寻找阑尾时亦无需反复牵拉切口,同时还可避免 OA 对肠管的过多骚扰与牵扯,减轻患儿术后疼痛,便于肠功能的术后快速恢复,改善预后,缩短住院时间。本研究观察组术中出血量、术后排气时间、住院时间及术后镇痛药物使用率,均显著优于对照组,与张广国^[14]研究结果一致。④ 并发症少:本研究观察组患儿术后并发症率为 4.1%明显低于对照组的 18.4%,与 Vahdad 等^[15]研究相似,考虑可能与下列因素有关:腹腔镜下视野清晰,便于脓液的吸尽与腹腔冲洗,降低腹腔术后感染率;LA 术中对肠管的影响较小,有助于减少术后肠梗阻;将坏疽穿孔的阑尾装入标本袋后取出,有效避免对切口的污染,进而使术后切口感染率下降;本组手术医师团队经验丰富,由术中操作不当所致的副损伤小等。此外,对于术后并发症的处理,主要以抗感染为主,绝大部分并发症均可根据术后药敏试验结果,采取针对性抗感染治疗后得到缓解或痊愈,对于个别术后肠梗阻者于保守治疗效果不佳时,一般需另行手术解除梗阻。本研究仅对照组出现 2 例肠梗阻患儿,经胃肠减压与抗感染等保守治疗后缓解。

LA 的微创优势虽明显,但仍属于有创治疗。当机体组织受到损伤时,机体会产生炎症反应,适度的炎症反应有助于增强机体的防御能力,促进局部组织修复,减轻损伤;但过度的炎症反应可引发全身性炎症反应,抑制免疫功能,导致功能障碍,而影响预后恢复情况^[16]。CRP 属急性蛋白,当机体受到组织损伤或感染时其血清或血浆水平会急剧上升。目前,CRP 是评价急

诊手术围术期炎症反应的常用指标^[17]。PCT 亦属于急性蛋白,能反映出机体免疫反应、炎症程度等状况,可用于手术创伤的监测^[18]。有研究已证实^[19]血清 PCT 水平在预测急性阑尾炎患儿病情方面具有一定临床价值。李凤珠等^[20]研究也表明急性阑尾炎患儿早期血清 CRP、PCT 均显著升高,CRP、PCT 可作为鉴别诊断急性阑尾炎的重要参考指标。本研究结果显示与术前 12 h 相比,两组术后 24、48 h 时血清 CRP、PCT 水平,均显著升高;说明无论 LA 还是 OA 均可对患儿机体造成损伤,诱发机体炎症反应。两组术后 48h 时血清 CRP、PCT 水平较术后 24 h 时均显著降低;与对照组同期对比,观察组术后 24、48 h 时血清 CRP、PCT 水平均显著更低,表明 LA 更能有效控制患儿的炎症反应程度、缩短炎症持续的时间。这也可从血清学的角度佐证,LA 对患儿机体的损伤较小,微创手术效果佳。

综上所述,与开腹手术相比,腹腔镜手术治疗穿孔性阑尾炎患儿具有创伤小、手术时间短、术后并发症少等优势,能更有效降低血清 CRP、PCT 水平,促进患儿术后恢复。

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