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腰硬联合麻醉在下肢骨折手术对 WBC、CRP、ALB、PCT 的影响 *

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摘要 目的:通过腰硬联合麻醉在下肢骨折手术中对白细胞(white blood cell, WBC)、白蛋白(albumin, ALB)、C-反应蛋白(C-reactive protein, CRP)、降钙素原(procalcitonin, PCT)的影响分析,探讨腰硬联合麻醉在下肢骨折手术中的应用价值。**方法:**选取本院 2018 年 12 月到 2019 年 10 月择期髋部骨折手术的老年患者 88 例,按不同麻醉方法分为观察组(n=48)与对照组(n=40);对照组为全身麻醉,观察组为腰硬联合麻醉,以 WBC、CRP、ALB、PCT 为观察指标,结合术后疼痛及术中麻醉效果对腰硬联合麻醉在下肢骨折手术中的应用进行分析评价。**结果:**观察组术后 4 h、24 h、48 h 的静息疼痛评分都显著低于对照组($P<0.05$)。观察组的感觉阻滞时间、阻滞完善时间、痛觉恢复时间都显著短于对照组($P<0.05$)。观察组术后 1 d、7 d 的 WBC、ALB 值与对照组对比差异无统计学意义($P>0.05$),观察组术后 1 d、7 d 的血清 CRP、PCT 含量都显著低于对照组($P<0.05$)。**结论:**腰硬联合麻醉在下肢骨折手术中的应用并不会影响 WBC、ALB 的表达,但可减轻 CRP、PCT 的血浓度,能更好的提高麻醉效果,发挥镇痛作用,延长术后无痛时间,从而促进患者的康复。

关键词:腰硬联合麻醉;下肢骨折;白细胞;C-反应蛋白;降钙素原;白蛋白

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Effect of Combined Spinal and Epidural Anesthesia on WBC, CRP, ALB and PCT in Lower Extremity Fracture Surgery*

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ABSTRACT Objective: Through the analysis of the effect of combined spinal and epidural anesthesia on white blood cell (WBC), albumin (ALB), C-reactive protein (CRP), procalcitonin (PCT) in lower extremity fracture surgery, to explore the application value of combined spinal and epidural anesthesia in the operation of lower limb fracture. **Methods:** From December 2018 to October 2019, 88 elderly patients with hip fracture operation were selected and divided into observation group (n=48) and control group (n=40) according to different anesthesia methods. The control group received general anesthesia, while the observation group received combined spinal and epidural anesthesia. WBC, CRP, ALB and PCT were used as observation indicators, combined with postoperative pain and intraoperative anesthesia to the response of combined spinal and epidural anesthesia in lower limb fracture operation. **Results:** The resting pain scores of the observation group at 4 h, 24 h and 48 h after operation in the observation group were significantly lower than those of the control group ($P<0.05$). The sensory block time, block time and pain recovery time of the observation group were significantly lower than those of the control group ($P<0.05$). There were no significant differences in WBC and ALB compared between the observation group and the control group at 1 and 7 d after operation ($P>0.05$). The serum CRP and PCT levels in the observation group were significantly lower than those in the control group at 1 and 7 d after operation ($P<0.05$). **Conclusion:** The application of combined spinal-epidural anesthesia in lower limb fracture surgery does not affect the expression of WBC and ALB, but can reduce the blood concentration of CRP and PCT, it can improve the anesthetic effect, play a analgesic role, prolong the postoperative painless time, so that promoting the recovery of patients.

Key words: Combined spinal-epidural anesthesia; Lower limb fracture; White blood cell; C-reactive protein; Procalcitonin; Albumin

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前言

在下肢骨折中,髋部骨折并不少见,特别是老年人。随着医

学技术的提高,老年人下肢骨折手术率及成功率越来越高^[1,2]。但很多患者合并有多种内科疾病,特别是术后剧烈疼痛更容易导致患者发生严重并发症,为此对于麻醉的要求比较高^[3,4]。疼

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痛可激活交感神经系统增加机体氧耗量,抑制膈神经兴奋性使肺功能降低,增加心肌缺血程度及心血管并发症,也容易发生后肺部并发症^[5,6]。下肢骨折手术的麻醉要求是术中生命体征平稳、无痛、肌肉松弛与术后恢复快^[7]。全麻曾为下肢骨折手术的主流麻醉方法,可控制患者呼吸和循环系统,消除患者意识,但对患者的负面影响比较大^[8,9]。腰硬联合麻醉具有起效迅速、肌松完全、对患者心肺干扰小等优势,近年来在临床上备受欢迎,特别是呼吸循环功能异常的老年患者^[10]。白细胞(white blood cell, WBC)和白蛋白(albumin, ALB)是评价机体炎症反应及恢复状况的常规指标,但缺乏判断的灵敏性^[11]。C-反应蛋白(C-reactive protein, CRP)在健康人血清中以微量的形式存在,而当机体受到炎症刺激时,体内CRP分泌增加,从而可反映机体炎症状况^[12,13]。降钙素原(procalcitonin, PCT)是由116个氨基酸组成的多肽,为降钙素的前体,当机体出现显著病变,PCT可呈现较高表达水平,可较灵敏的反应机体的炎症反应和身体恢

复情况^[14,15]。本文以WBC、CRP、ALB、PCT为观察指标的影响,探讨腰硬联合麻醉在下肢骨折手术中的应用价值,总结如下。

1 资料与方法

1.1 研究对象

本项目经本院伦理委员会批准,患者知情同意。选择2018年12月到2019年10月择期髋部骨折手术的老年患者88例,纳入标准:择期髋部手术;年龄30-75岁;ASA分级为I级-III级;临床资料齐全。排除标准:药物成瘾史;药物过敏史;严重慢性呼吸循环系统疾病患者;中枢神经系统疾病患者;严重肝肾功能异常患者。

根据麻醉方法的分为观察组(n=48)与对照组(n=40),两组患者的手术类型、ASA分级、年龄、体重指数、性别等对比无显著差异($P>0.05$)。见表1。

表1 两组一般资料对比

Table 1 Comparison of general data between the two groups

Groups	n	Type of surgery (hip replacement / closed reduction and internal fixation)	ASA classification (I/II)	Age (years)	BMI (kg/m ²)	Gender (Male/ Female)
Observation group	48	28/20	40/8	67.44±4.52	22.47±2.18	28/20
Control group	40	24/16	34/6	67.10±2.13	22.19±2.98	22/18

1.2 麻醉方法

所有患者入室后常规监测生命体征,动脉有创监测,开放静脉通路,吸氧。

对照组:给予全身麻醉,静脉诱导注射咪唑达唑仑 0.02 mg/kg、舒芬太尼 0.3 μ g/kg、丙泊酚 1.0-1.5 mg/kg、维库溴铵 0.1 mg/kg,气管插管后机控呼吸;呼吸参数:设定 VT8 mL/kg,RR12 次/min, I:E 1:2。术中静脉泵入瑞芬太尼、丙泊酚,吸入七氟烷维持麻醉。

观察组:给予腰硬联合麻醉,患肢在下,侧卧位进行麻醉穿刺,穿刺间隙选择 L3-4,腰麻给予盐酸罗哌卡因 10-20 mg,脑脊液稀释到 3 mL 注入;硬膜外导管置管 3-4 cm,手术中,腰麻达 2.5 小时,硬膜外注入 0.5 %盐酸罗哌卡因 /1%盐酸利多卡因混合液 7-10 mL 维持麻醉,静脉泵入盐酸右美托咪定 0.3-0.5 μ g/kg·h 持续镇静,保持浅睡眠状态至术毕。

所有患者术后未接受自控镇痛治疗。

1.3 观察指标

(1)在术后 4 h、24 h、48 h 进行静息状态的疼痛评分,运用 VAS 评分(0 为无痛,10 为剧痛)方式进行评分。(2)麻醉效果:记录两组的感受阻滞时间、阻滞完善时间、痛觉恢复时间。(3)在术后 1 d 与 7 d 抽取患者的静脉血 7 mL 两管,一管采用全自动生化分析仪检测 WBC;另外一管高速离心抽取血浆检测 ALB,并 ELISA 法检测血清 CRP、PCT 含量。

1.4 统计方法

采用 SPSS 22.00 软件对计量资料数据与计数数据进行分析,采用均数±标准差、百分比等表示,采用 t 检验、卡方 χ^2 检验进行对比分析,检验水准为 $\alpha=0.05$ 。

2 结果

2.1 疼痛评分对比

观察组术后 4 h、24 h、48 h 的静息疼痛评分都显著低于对照组($P<0.05$)。见表 2。

表2 两组术后不同时间点疼痛 VAS 评分对比(分, $\bar{x}\pm s$)

Table 2 Comparison of pain VAS scores at different time points between the two groups (score, $\bar{x}\pm s$)

Groups	n	Postoperative 4 h	Postoperative 24 h	Postoperative 48 h
Observation group	48	3.02±0.22*	1.22±0.26*	0.89±0.11*
Control group	40	4.78±0.39	2.09±0.29	1.67±0.15

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

2.2 麻醉效果对比

观察组的感受阻滞时间、阻滞完善时间、痛觉恢复时间都显著短于对照组($P<0.05$)。见表 3。

2.3 WBC、ALB 含量对比

观察组术后 1 d、7 d 的 WBC、ALB 值与对照组对比差异无统计学意义($P>0.05$)。见表 4。

2.4 CRP、PCT 含量对比

观察组术后 1 d、7 d 的血清 CRP、PCT 含量都显著低于对

照组($P<0.05$)。见表 5。

表 3 两组麻醉效果对比(min, $\bar{x}\pm s$)

Table 3 Comparison of anesthetic effects between the two groups (min, $\bar{x}\pm s$)

Groups	n	Sensory block time	Blocking perfect time	Pain recovery time
Observation group	48	2.08±0.26*	8.09±0.41*	70.38±5.49*
Control group	40	5.08±0.29	15.56±0.29	150.98±4.41

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

表 4 两组术后不同时间点的 WBC、ALB 含量对比 ($\bar{x}\pm s$)

Table 4 Comparison of WBC and ALB levels at different time points after operation in both groups ($\bar{x}\pm s$)

Groups	n	WBC($\times 10^9/L$)		ALB(g/L)	
		Postoperative 1 d	Postoperative 7 d	Postoperative 1 d	Postoperative 7 d
Observation group	48	11.03±0.49	11.21±0.45	31.01±1.49	31.98±2.91
Control group	40	11.39±0.19	11.14±0.32	31.87±1.33	31.76±1.47

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

表 5 两组术后不同时间点的血清 CRP、PCT 含量对比 ($\bar{x}\pm s$)

Table 5 Comparison of serum CRP and PCT levels at different time points after operation($\bar{x}\pm s$)

Groups	n	CRP (mg/L)		PCT(ng/mL)	
		Postoperative 1 d	Postoperative 7 d	Postoperative 1 d	Postoperative 7 d
Observation group	48	13.82±1.24*	5.29±0.22*	11.48±0.84*	4.98±0.13*
Control group	40	33.78±2.44	15.14±1.38	26.37±0.22	19.47±0.59

3 讨论

在下肢手术中,麻醉期间不仅要保障患者安全、无痛,提供最佳手术条件,更要考虑患者术后早日康复,减少不良反应的发生^[16]。全身麻醉曾为下肢手术的主流麻醉方法,能有效控制呼吸,保证有效通气量^[17,18],但是在麻醉拔管期、诱导期对心血管系统的干扰较大,可导致苏醒延迟,术后呼吸功能减退,不利于患者康复。腰硬联合麻醉感觉阻滞起效快,可获得良好的肌肉松弛,镇痛效果确切、阻滞完善等优点,也便于手术操作^[19,20],因此,近年来腰硬联合麻醉在下肢手术中的应用备受关注,特别是呼吸循环功能异常的中老年患者。本研究观察组术后 4 h、24 h、48 h 的静息疼痛评分都显著低于对照组;观察组的感觉阻滞时间、阻滞完善时间、痛觉恢复时间都显著短于对照组,表明腰硬联合麻醉不仅能满足手术要求,更能发挥术后镇痛作用,从而有利于患者早期活动,促进康复。从机制上分析,疼痛主要由手术创伤刺激引起,也可是炎症反应引发的外周和中枢敏化^[21,22]。腰硬联合麻醉直接阻滞脊神经根镇痛,可实现不同作用机制药物或镇痛方法的累加或协同,有利于作用于局部痛觉感受器,从而发挥更加有效的麻醉作用与术后镇痛^[23,24]。

术后患者的常规复查指标如 WBC、ALB 等,对康复的预测特异性差,并且这些指标并不是评价患者恢复的独立性指标,很难确切反映患者的康复状况^[25]。本研究显示观察组术后 1 d、7 d 的 WBC、ALB 值与对照组对比差异无统计学意义,主要在于腰硬联合麻醉对患者的呼吸、循环、代谢及肝肾等重要器官功能的干扰较小,术后痛觉恢复延迟,从而最大限度的避免了应激反应的发生而引发的炎症反应等;也能避免单药过量

所致不良反应,且术后能早期活动,极大地促进患者康复^[26,27]。

CRP 是一种非特异性的炎症因子,可促进单核细胞表面的组织因子表达、诱导细胞黏附分子的产生、促进巨噬细胞的吞噬等作用,其也可直接作用于动脉血管内膜,损伤血管内皮功能,激活内膜的补体系统,导致血管内皮增生,引发免疫性炎症反应^[28,29]。并且 CRP 的激活加快了三磷酸鸟苷在酶作用下的转化,增加了血浆中的炎症介质,诱发动脉血管壁过激的炎症反应。PCT 的基因定位于 11 号染色体上,编码 116 个氨基酸,由降钙蛋白、N 端残基、降钙素等片段组成^[30]。正常情况下 PCT 主要由甲状腺组织释放,在病理情况下 PCT 可由肝、肾、睾丸、肺产生。而当机体发生全身性感染性疾病或者创伤时,可在内毒素的刺激下,导致血清 PCT 值显著升高^[31]。本研究显示观察组术后 1 d、7 d 的血清 CRP、PCT 含量都显著低于对照组,表明腰硬联合麻醉能抑制患者术后 CRP、PCT 的释放。本研究也存在一定的问题,没有长期动态监测 CRP、PCT 的表达变化,且没有进行随访,将在后续研究中深入分析。

综上所述,腰硬联合麻醉在下肢骨折手术中的应用并不会影响 WBC、ALB 的表达,但是可抑制 CRP、PCT 的释放,能更好的提高麻醉质量,发挥镇痛作用,延长术后无痛时间,从而促进患者的康复。

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