doi: 10.13241/j.cnki.pmb.2020.23.029

较深麻醉下拔管对脑瘫患儿行选择性脊神经后根切断术后躁动的影响 *

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摘要 目的：探讨较深麻醉下拔管对脑瘫患儿行选择性脊神经后根切断术后躁动的影响。**方法**：2017 年 8 月到 2019 年 2 月在本院进行诊治的脑瘫患儿 89 例，根据麻醉方法的不同把患儿分为观察组 49 例与对照组 40 例。所有患儿都给予选择性脊神经后根切断术治疗与全身麻醉。观察组在麻醉维持中静脉持续泵注丙泊酚进行较深麻醉下拔管，对照组吸入七氟烷进行较深麻醉下拔管，观察两组患儿术后躁动情况。**结果**：两组的麻醉时间、睁眼时间与拔管时间等对比差异无统计学意义(P>0.05)。观察组术后躁动发生率为 2.0 %，显著低于对照组的 15.0 % (P<0.05)。两组术后 1 个月的适应与语言行为评分都显著高于术前 1 d (P<0.05)，且观察组也显著高于对照组 (P<0.05)。两组术后 1 个月的大脑中动脉收缩期峰值流速(Peak systolic flow velocity, Vs)、舒张末血流速度(End-diastolic blood flow velocity,Vd)都显著高于术前 1 d (P<0.05)，且观察组也显著高于对照组(P<0.05)。**结论**：较深麻醉下拔管在脑瘫患儿行选择性脊神经后根切断术的应用能减少术后躁动的发生，且不影响麻醉效果，从而提高治疗效果，改善大脑血流动力学状况。

关键词：丙泊酚；七氟烷；脑瘫；选择性脊神经后根切断术；躁动

中图分类号：R742.3；R682.2 **文献标识码**：A **文章编号**：1673-6273(2020)23-4534-04

Effects of Extubation under Deep Anesthesia on Agitation after Selective Posterior Rhizotomy in Children with Cerebral Palsy*

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ABSTRACT Objective: To investigate the effects of extubation under deep anesthesia on agitation in children with cerebral palsy after selective posterior rhizotomy. **Methods:** From August 2017 to February 2019, 89 cases of children with cerebral palsy who were diagnosed and treated in our hospital were selected and were divided into observation group of 49 cases and control group of 40 cases accorded to different anesthesia methods. All children were treated with selective posterior rhizotomy and general anesthesia. The observation group were continuously pumped with propofol intravenously during deep anesthesia during anesthesia maintenance, and the control group were extubated under deep anesthesia with sevoflurane. **Results:** There were no significant difference in anesthesia time, eye opening time and extubation time compared between the two groups (P>0.05). The incidence of postoperative restlessness in the observation group were 2.0 %, which were significantly lower than 15.0 % in the control group (P<0.05). The postoperative 1 month of adaptation and speech behavior scores in the two groups were significantly higher than in the preoperative 1 d (P<0.05), and the observation group were significantly higher than the control group (P<0.05). The postoperative 1 month of Vs and Vd of the middle cerebral arteries in the two groups were significantly higher in the two groups than preoperative 1 d (P<0.05), and the observation group were significantly higher than the control group (P<0.05). **Conclusion:** The application of extubation under selective posterior rhizotomy in children with cerebral palsy undergoing selective spinal nerve root resection can reduce the occurrence of postoperative restlessness without affecting the effect of anesthesia, thereby improve the treatment effect and improving cerebral hemodynamics.

Key words: Propofol; Sevoflurane; Cerebral palsy; Selective posterior rhizotomy; Agitation

Chinese Library Classification(CLC): R742.3; R682.2 Document code: A

Article ID:1673-6273(2020)23-4534-04

前言

脑瘫是小儿的常见疾病，也是指由于各种原因导致的非进行性脑损害综合征[1]。该病的病因比较复杂，涉及到早产、黄疸、难产、窒息等多种因素[2,3]。该病在临床上主要表现为语言障碍、中枢性运动障碍与姿势异常，可伴随有精神发育迟滞、癫痫等[4,5]。脑瘫迄今为止尚无特别有效的疗法，其中手术治疗为主要方法，可目前多采取综合治疗，手术的目的是改善功能，预防畸形的发生与发展，解除痉挛和过高的肌张力，从而改善患儿的预后[6,7]。选择性脊神经后根切断术(selective posterior rhizo-

* 基金项目：新疆维吾尔自治区 2018 年创新环境（人才、基地）建设专项(2018D01C238)

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（收稿日期：2020-02-22 接受日期：2020-03-18）

tomy,SPR)可以有效地解除患儿的肢体痉挛症状,也可缓解患儿的语言障碍、流涎、斜视等症状,不过对于麻醉的要求比较高[8,9]。特别是全麻结束后多数患儿可即刻唤醒,但也有部分患儿可出现术后躁动。虽然多数躁动通常为自限性,但可能发生可诱发高血压、意识模糊、嗜睡等[10]。七氟烷优点是刺激性小、诱导迅速,属于一种较浅的麻醉方式,但是容易发生术后躁动[11,12]。丙泊酚是一种短效的较深静脉全麻方式,患儿苏醒迅速完全,可长时间用药也不会产生任何蓄积作用[13,14]。本文具体探讨了基于丙泊酚的较深麻醉下拔管对脑瘫患儿行选择性脊神经后根切断术后躁动的影响。现总结报告如下。

1 资料与方法

1.1 研究对象

2017 年 8 月到 2019 年 2 月在本院进行诊治的脑瘫患儿 89 例,纳入标准:符合脑性瘫痪的诊断标准(出现运动发育落后或各种运动障碍等各种症状);年龄 2-12 岁;智商正常或接近能配合术后康复训练;临床资料完整;患儿家长知情同意本研究;本院伦理委员会也批准了此次研究。排除标准:存在严重的固定挛缩、骨骼畸形患儿;有心肺肾等疾患不能耐受手术者;临床资料缺乏者;表现为强直的患儿。

根据麻醉方法的不同把患儿分为观察组 49 例与对照组 40 例,两组患儿的性别、年龄、身高、体重、病因等一般资料对比差异无统计学意义(P>0.05)。见表 1。

表 1 两组一般资料对比

Table 1 Comparison of two groups of general information

Groups	n	Gender (male / female)	Age(years)	Stature(cm)	Etiology(hypoxia-ischemic encephalopathy / intracranial hemorrhage / premature delivery / low body weight)	Weight(kg)
Observation group	49	25/24	8.45±0.33	127.10±3.11	20/22/4/3	24.10±10.44
Control group	40	22/18	8.39±0.42	128.01±2.84	17/18/3/2	23.89±8.29

1.2 手术与麻醉方法

所有患儿都给予选择性脊神经后根切断术治疗,也都采用全身麻醉。术前 30 min 肌肉注射阿托品 0.5 mg, 持续心电监护。麻醉诱导采用咪达唑仑 2 mg、芬太尼 3-4 μg·kg^{-1}、维库溴铵 0.1-0.15 μg·kg^{-1}、丙泊酚 2 mg 静脉注射。然后行常规气管插管,氧流量 1 L/min,潮气量 8 mL/kg,呼吸频率 12 次 /min。观察组在麻醉维持中静脉持续泵注丙泊酚(AstraZeneca 药业有限责任公司)4-6 mg·kg^{-1}·h^{-1}, 对照组吸入 0.8 肺泡最低有效浓度七氟烷(AstraZeneca 药业有限责任公司)。待患儿恢复自主呼吸与肌力恢复时拔气管导管。

在手术中,采用腰骶部后正中切口,切开皮肤、腰背筋膜、皮下组织膜,推开两侧骶棘肌,显露棘突与椎板并切除。切开硬膜,寻找神经根穿出硬膜的神经孔,游离神经根。进行电刺激,诱发肢体痉挛,切断阈值低的神经小束,术后按解剖层次依次缝合切口。

1.3 观察指标

(1)记录两组的麻醉时间、睁眼时间与拔管时间。(2)记录两组术后躁动发生情况。(3)在术前 1 d 与术后 1 个月采用盖塞尔儿童发育量表(Gesell developmental scale)进行评定,选择适应行为与语言行为两个子维度进行评定, 能有效反映智力状况,分数越高,智力越好。(4)在术前 1 d 与术后 1 个月采用彩色多普勒超声诊断仪(美国 GE 公司 Logiq 400 型)测定与记录大脑中动脉的脑血流动力学参数, 包括收缩期峰值流速(Peak systolic flow velocity, Vs)、舒张末血流速度(End-diastolic blood flow velocity, Vd)等指标。

1.4 统计方法

计量数据以($\bar{x}\pm s$)表示,t 检验,计数资料以实际发生例数及百分比(%)表示,对比采用 χ^2 检验,应用 SPSS 19.00 统计软件进行分析,检验水准为 α=0.05,P<0.05 有统计学意义。

2 结果

2.1 麻醉情况对比

两组的麻醉时间、睁眼时间与拔管时间对比差异无统计学意义(t=0.859,P=0.393;t=1.081,P=0.283;t=1.585,P=0.117;P>0.05)。见表 2。

表 2 两组麻醉情况对比 (min,$\bar{x}\pm s$)

Table 2 Comparison of anesthesia between the two groups (min,$\bar{x}\pm s$)

Groups	n	Anaesthesia time	Eye opening time	Extubation time
Observation group	49	132.13±11.94	9.08±0.44	9.63±0.51
Control group	40	129.87±12.84	8.99±0.32	9.45±0.46

2.2 躁动情况对比

观察组术后躁动发生率为 2.0 % (1/49),显著低于对照组的 15.0 % (6/40),两组经过对比差异有统计学意义 (χ^2=5.104,P=0.024,P<0.05)。

2.3 智力发育评分对比

两组术前 1 d 适应与语言行为评分经过对比无统计学意义(P>0.05),两组术后 1 个月的适应与语言行为评分都显著高于术前 1 d,经过配对 t 检验差异有统计学意义 (P<0.05),且术后 1 个月观察组也显著高于对照组,两组对比差异有统计学意义 (P<0.05)。见表 3。

表 3 两组手术前后智力发育评分对比(分,$\bar{x}\pm s$)

Table 3 Comparison of mental development scores between the two groups before and after surgery (scoers, $\bar{x}\pm s$)

Groups	n	Adaptive behavior		Language behavior	
		1 day before operation	1 month after operation	1 day before operation	1 month after operation
Observation group	49	54.20±8.24	87.24±4.29*#	56.30±5.39	84.25±3.84*#
Control group	40	53.89±7.14	76.20±5.11*	54.99±5.01	77.02±4.19*

Note: Compared with the same group 1 day before operation, *P<0.05; Compared with the control group at the same time, #P<0.05.

2.4 脑血流参数对比

两组术前 1 d 大脑中动脉 Vs、Vd 经过对比无统计学意义(P>0.05),两组术后 1 个月的大脑中动脉 Vs、Vd 都显著高于术前 1 d,经过配对 t 检验差异有统计学意义 (P<0.05),且观察组也显著高于对照组,两组对比差异有统计学意义 (P<0.05)。见表 4。

表 4 两组手术前后脑血流参数对比(cm/s,$\bar{x}\pm s$)

Table 4 Comparison of cerebral blood flow parameters before and after surgery between the two groups (cm/s, $\bar{x}\pm s$)

Groups	n	Vs		Vd	
		1 day before operation	1 month after operation	1 day before operation	1 month after operation
Observation group	49	73.28±5.11	81.42±6.29*#	33.19±2.48	44.27±3.17*#
Control group	40	73.01±4.82	77.89±5.67*	33.88±3.17	37.00±4.33*

3 讨论

脑瘫在临床上比较多见,产前中的多胎妊娠、胎儿脑发育畸形是引起该病的重要原因[15]。早产和低出生体重出生儿可导致脑室周围组织对缺氧、缺血敏感,诱发脑实质出血多[16]。机体内过量的未结合胆红素可通过血脑屏障, 浸润中枢神经系统, 导致细胞变性坏死。选择性脊神经后根切断术是采用电刺激法检测脊神经后根各神经小束的兴奋性,然后对刺激阈值低的神经纤维行选择性切断[17,18]。该手术方法对机体的感觉影响比较小,不影响肢体的运动功能,且可降低肌张力与解除痉挛。不过该手术的麻醉风险比较大,可诱发呼吸、心跳骤停、麻醉反应等异常情况[19]。特别是术后躁动是一种不恰当行为,表现为兴奋、躁动和定向障碍等情况,导致交感神经系统活动增高与出现意外伤害[20-22]。

七氟烷具有血流动力学稳定、刺激性小、诱导迅速、溶解度低等优点,但是容易出现术后躁动。本研究显示两组的麻醉时间、睁眼时间与拔管时间等对比差异无统计学意义;观察组术后躁动发生率为 2.0 %,显著低于对照组的 15.0 %,表明较深麻醉下拔管并不影响麻醉效果,且能减少术后躁动的发生。从机制上分析,丙泊酚具有较强的抗惊厥作用,可以有效的拮抗电休克和多种化学制剂诱发的癫痫;也可降低兴奋性神经递质的释放,对迷走神经活性的抑制作用比较强[23,24]。

影响全麻术后躁动的因素比较多,包括年龄、术前用药、呼吸循环功能障碍、疼痛、手术部位、肌松药的残留作用、代谢紊乱等,可严重影响脑瘫患儿的手术治疗效果[25,26]。两组术后 1 个月的适应与语言行为评分都显著高于术前 1 d, 且观察组也显著高于对照组, 表明较深麻醉下拔管的应用能提高手术治疗效果。不过在手术中也需要注意以下事项:关闭硬膜前要认真冲洗,尽可能采用显微外科技术,切开硬膜前应认真止血,表面脑脊液丢失过多,不可过度牵拉神经根,术后连续缝合关闭硬膜[27,28]。

本研究显示两组术后 1 个月的大脑中动脉 Vs、Vd 都显著高于术前 1 d,且观察组也显著高于对照组,表明较深麻醉下拔管能改善患儿的血流动力学状况。主要在于丙泊酚可通过中枢 GABA 及其受体发挥作用,抑制突触兴奋,增强发育中的大脑神经组织可塑性,促进神经功能康复[29,30]。本研究也存在一定的不足,没有进行随访分析,且影响术后躁动的因素比较多,将在后续研究中深入探讨。

总之,较深麻醉下拔管在脑瘫患儿行选择性脊神经后根切断术的应用能减少术后躁动的发生,且不影响麻醉效果,从而提高治疗效果,改善大脑血流动力学状况。

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