

doi: 10.13241/j.cnki.pmb.2020.11.028

右美托咪定与氯胺酮在短小手术麻醉后痛觉过敏及苏醒躁动影响*

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摘要 目的:探究右美托咪定与氯胺酮对短小手术麻醉后痛觉过敏及苏醒躁动的影响。**方法:**将2017年2月至2019年2月我院手术治疗的93例骨折患儿设为研究对象,将其随机分为A、B、C三组(每组各31例患儿),A组患儿在手术麻醉前30 min静注0.5 μg/kg的右美托咪定,B组患儿静注0.5 mg/kg的氯胺酮,C组患儿注射与A、B两组相同剂量的生理盐水,分别使用Ramasy镇静程度量表评估三组患儿苏醒躁动情况,使用Ramasy镇静程度评分评估三组患儿术后镇静情况,使用视觉模拟量表(visual analog scale, VAS)记录三组患儿术后从麻醉药停止使用至VAS评分到达4的时间,而后记录三组患儿使用镇痛药VAS疼痛度降至4以下的实践,最后记录三组患儿术后2 h、4 h及6 h的疼痛度;**结果:**(1)C组患儿躁动出现率显著高于A组和B组($P<0.05$),A组和B组对比无差异($P>0.05$);(2)A组Ramasy镇静程度评分高于B组,B组高于C组($P<0.05$);(3)A组VAS到达4的时间显著长于B组和C组,且B组也长于C组($P<0.05$),使用镇痛药后A组VAS评分下降至4的时间显著短于B组和C组,且B组也短于C组($P<0.05$);(4)患儿术后2 h、4 h、6 h时VAS评分均显著降低,且A组显著低于B组和C组,B组显著低于C组($P<0.05$)。**结论:**对实施短小手术患儿应用右美托咪定或氯胺酮能够显著降低患儿术后躁动出现率,同时缓解患儿应用麻醉药后出现的痛觉过敏现象,有助于提高术后安全性。

关键词:右美托咪定;氯胺酮;短小手术;麻醉;痛觉过敏;苏醒躁动

中图分类号:R614;R726 **文献标识码:**A **文章编号:**1673-6273(2020)11-2131-04

Effects of Dexmedetomidine and Ketamine on Hyperalgesia and Wakefulness after Short Anesthesia*

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ABSTRACT Objective: To explore the effects of dexmedetomidine and ketamine on hyperalgesia and restlessness after anesthesia in short-term operation. **Methods:** 93 children with fracture treated in our hospital from February 2017 to February 2019 were randomly divided into three groups: group A, group B and group C (31 children in each group). Group a received 0.5 μg/kg dexmedetomidine 30 min before anesthesia, group B received 0.5 mg/kg ketamine, group C received the same dose of normal saline as group A and group B, and ramasy was used for sedation. The recovery and agitation of the three groups were assessed by the scale, the postoperative sedation of the three groups was assessed by the ramasy sedation degree score, the time from the time when the anesthetics were stopped to the time when the VAS score reached 4 was recorded by the visual analogue scale (VAS), and then the practice of reducing the VAS pain degree of the three groups to less than 4 was recorded. Finally, the time of 2 h, 4 h and 6 h after the operation was recorded by the three groups degree of pain. **Results:** (1) The incidence of agitation in children in group C was significantly higher than that in groups A and B ($P<0.05$), and there was no difference between groups A and B ($P>0.05$). (2) Ramasy sedation score in the group A was higher than the group B, and the group B was higher than the group C ($P<0.05$). (3) The time to reach VAS in the group A was significantly longer than that of the groups B and C, and the group B was longer than the group C ($P<0.05$), the time taken for the VAS score of the group A to decrease to 4 after using analgesics was significantly shorter than that of the groups B and C, and the group B was also shorter than that of the group C ($P<0.05$). (4) At 2 h, 4 h, and 6 h, the VAS scores were significantly reduced, and the A group was significantly lower than the group B and C, and the group B was significantly lower than the group C ($P<0.05$). **Conclusion:** The use of dexmedetomidine or ketamine in children undergoing short-term surgery can significantly reduce the incidence of postoperative restlessness and relieve the hyperalgesia after anesthesia, which is helpful to improve the postoperative safety.

* 基金项目:国家自然科学基金项目(81273902)

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(收稿日期:2019-12-03 接受日期:2019-12-27)

Key words: Dexmedetomidine; Ketamine; Short-term surgery; Anesthesia; Hyperalgesia; Waking restlessness

Chinese Library Classification(CLC): R614; R726 **Document code:** A

Article ID: 1673-6273(2020)11-2131-04

前言

小儿短小手术是指骨科小手术,临床上采用瑞芬太尼、丙泊酚等麻醉,这些药物均为超短效阿片受体激动剂,应用后能够迅速起到麻醉效果,且术后苏醒时间短,安全性较高^[1,2]。然而临床研究发现应用短效麻醉剂后,患儿术后会出现较明显的苏醒躁动及痛觉过敏现象^[3]。苏醒躁动是一种苏醒麻醉期的不恰当行为,个体主要表现为兴奋、躁动和定向力障碍,并出现肢体无意识活动、无理性语言、哭喊等,苏醒躁动在临床上较为常见^[4,5],如处理不当可能会导致患者出现多种并发症。痛觉过敏是一种典型的过度痛觉刺激反应,患儿术后在麻醉药效力退去后常出现急性疼痛,影响手术效果^[6,7]。相较于成人,儿童群体在围麻醉期发生痛觉过敏和苏醒躁动等情况的几率更高^[8],右美托咪定属于高选择性的 α_2 受体激动剂,具有高效镇痛、镇静的功能,氯胺酮属于非竞争性的 NMDA 受体激动剂^[9,10],本文作者通过研究发现,对实施短小手术患儿应用右美托咪定或氯胺酮能够显著降低患儿术后躁动出现率,同时缓解患儿应用麻醉药后出现的痛觉过敏现象,有助于提高术后安全性,现详述如下。

1 资料与方法

1.1 一般资料

选择 2017 年 2 月至 2019 年 2 月我院手术治疗的 93 例骨折患儿,将其随机分为 A、B、C 三组(每组各 31 例患儿),A 组 31 例患儿中男性 14 例,女性 17 例,年龄 5-14 岁,平均年龄(8.6 ± 2.6)岁,体重 25-39 kg,平均体重(31.2 ± 1.8)kg,B 组患儿中男性 15 例,女性 16 例,年龄 6-15 岁,平均年龄(8.9 ± 1.8)岁,体重 24-37 kg,平均体重(30.9 ± 2.1)kg,C 组患儿中男性 16 例,女性 15 例,年龄 6-14 岁,平均年龄(8.9 ± 2.1)岁,体重 23-39 kg,平均体重(29.8 ± 3.1)kg,三组一般临床资料对比无差异。

纳入标准:(1)均为骨折患儿且需手术治疗;(2)年龄位于 5-15 岁之间;(3)入组患儿经检测 ASA 位于 I-II 级;(4)调研报医院伦理学会批准实施;(5)患儿家长对调研方法明白清楚。排除标准:(1)并发精神疾者;(2)并发各类器质性疾病患儿;(3)对调研应用药物过敏者;(4)并发严重肝肾功能障碍者。

1.2 方法

三组患儿术前准备步骤一致,术前平卧 15 min,为其建立

静脉通路并监测患儿的呼吸、心跳等生命体征,同时为三组患儿肌注阿托品,A 组患儿在手术麻醉前 30 min 静注 $0.5 \mu\text{g/kg}$ 的右美托咪定,B 组患儿静注 0.5 mg/kg 的氯胺酮,C 组患儿静注生理盐水 5 mL,而后使用瑞芬太尼进行麻醉诱导和麻醉维持,待患者意识消失后,进行插管,开始手术,手术结束后停止麻醉药的使用,术后选择 Malviya 评分量表评估三组患儿躁动发生率,选择 Ramsay 量表评估三组患者术后镇静程度,选择 VAS 量表评估三组患儿术后由麻醉药停止使用至其 VAS 评分 ≥ 4 的时间,而后对患儿应用镇痛药并记录用药开始至其 VAS 评分降至 4 以下的时间。

1.3 观察指标及评测标准

1.3.1 躁动出现率 使用 Malviya 量表评估三组患儿术后躁动出现率,Malviya 量表将患儿术后意识分为 0-4 分,其中 0 分代表嗜睡,1 分代表清醒且安静,2 分代表哭闹,3 分代表躁动需制动,4 分代表定向力丧失,以评分 2-4 分为躁动阳性^[11]。

1.3.2 麻醉后镇静程度评估 选择 Ramsay 量表对术后患儿的镇静程度进行评估,共有 6 个等级,其中 1 级为患者清醒但焦虑、不安,2-4 级代表镇静程度良好,5-6 级代表镇静过度^[12]。

1.3.3 术后 VAS 评分变化时间 由责任护士记录三组患者于术后麻醉药停止使用至其 VAS 评分 ≥ 4 的时间,并对评分到达 4 使用镇痛药开始至患儿 VAS 评分 <4 的时间进行记录对比。

1.3.4 术后 VAS 评分 分别于术后 2 h、4 h 和 6 h 三个时间点对三组患者的 VAS 评分进行估量,VAS 评分是利用一条 0-10 cm 的量尺,将 1-4 cm 作为轻微疼痛,5-6 cm 作为中度疼痛,7-9 cm 作为重度疼痛,10 cm 作为剧痛,由患者根据自身感觉选择疼痛度的评估方式^[13]。

1.4 统计学方法

应用 SPSS 18.0,计数资料采取(%)表示,用卡方检验,计量资料则采用($\bar{x} \pm s$)表示,应用 t 检验, $P < 0.05$ 有统计学意义。

2 结果

2.1 三组患儿术后躁动出现率

A 组患儿躁动出现率为 6.45%,B 组患儿躁动出现率为 9.68%,C 组患儿躁动出现率为 19.35%,C 组患儿躁动出现率显著高于 A 组和 B 组($P < 0.05$),A 组和 B 组对比无差异($P > 0.05$),如表 1。

表 1 三组术后躁动出现率[例(%)]

Table 1 Incidence of postoperative agitation in three groups[n(%)]

Groups	n	0 points	1 points	2 points	3 points	4 points	Agitation rate
Group A	31	16	13	1	1	0	2(6.45)*
Group B	31	13	15	1	1	1	3(9.68)*
Group C	31	11	14	3	2	1	6(19.35)

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

2.2 三组镇静评分

A 组 Ramasy 镇静程度评分为 (2.39 ± 0.51) 分, B 组为 (1.62 ± 0.41) 分, C 组为 (0.96 ± 0.05) 分, A 组 Ramasy 镇静程度评分显著高于 B 组和 C 组, B 组高于 C 组 ($P < 0.05$)。

2.3 VAS 变化时间

A 组 VAS 到达 4 的时间显著长于 B 组和 C 组, 且 B 组也长于 C 组 ($P < 0.05$), 使用镇痛药后 A 组 VAS 评分下降至 4 的时间显著短于 B 组和 C 组, 且 B 组也短于 C 组 ($P < 0.05$), 如表 2。

表 2 三组 VAS 变化时间
Table 2 Change time of vas in three groups

Groups	n	Time from the end of anesthesia to	Time from analgesic use to VAS <
		VAS $\geq$ 4 (min)	4 (min)
Group A	31	$23.61 \pm 2.15^*$	$2.61 \pm 1.21^*$
Group B	31	$19.15 \pm 1.62^{*#}$	$5.16 \pm 2.06^{*#}$
Group C	31	12.68 ± 3.81	8.16 ± 1.96

Note: compared with group C, $^*P < 0.05$, compared with group A, $^#P < 0.05$.

2.4 术后 VAS 评分

患儿术后 2 h、4 h、6 h 时 VAS 评分均显著降低, A 组显著

低于 B 组和 C 组, B 组显著低于 C 组 ($P < 0.05$), 如表 3。

表 3 三组患者术后 VAS 评分对比
Table 3 Comparison of VAS scores of three groups

Groups	n	VAS score		
		Postoperative 2 h	Postoperative 4 h	Postoperative 6 h
Group A	31	$2.95 \pm 0.81^*$	$1.68 \pm 0.56^*$	$1.32 \pm 0.29^*$
Group B	31	$3.98 \pm 1.06^{*#}$	$2.95 \pm 0.81^{*#}$	$2.01 \pm 0.63^{*#}$
Group C	31	4.86 ± 1.28	3.76 ± 0.61	2.68 ± 0.08

3 讨论

随着近些年儿童出生率的上升, 各类儿童疾患的发病率也有逐渐递增趋势, 骨折是儿童常见骨科疾患之一, 也是临床上较为常见的小儿短小手术^[14,15]。该类型手术时间短、创面小, 患儿往往预后较好, 但有临床实践指出, 麻醉后的苏醒躁动及痛觉过敏现象仍有发生, 有研究认为其原因一方面与麻醉药效力消退后创面刺激相关, 另一方面也与术中应用麻醉药会降低患儿的痛觉阈值, 增加患儿痛觉敏感性有关^[16,17]。苏醒躁动及痛觉过敏会对患儿血流动力学产生影响, 还会增加患儿呛咳、呕吐甚至自行拔管的可能, 因而如何预防小儿短小手术后的痛觉过敏及苏醒躁动成为麻醉医师研究的重点方向^[18,19]。

氯胺酮作用机理为选择性的抑制丘脑内侧核, 来阻滞神经信号传播, 达到镇痛镇静的效果, 有起效快、代谢快、苏醒快等优点^[20,21]。本研究 B 组术前应用氯胺酮, 可以有效降低其术后躁动, 提高镇静评分, 降低术后 VAS 评分。这与学者 Williams GA^[22]的研究结果相一致, 术前应用小剂量的氯胺酮能够一定程度上预防瑞芬太尼引起的痛觉过敏, 同时还能够缓解患者术后疼痛, 减少术后各类不良反应的发生率。学者 Famiglietti F^[23]等的研究结果也提示, 通过应用氯胺酮可以缓解神经外科手术麻醉后的痛觉敏感, 且对患者拔管、苏醒时间等指标不产生影响, 提示安全性较高。本文作者分析认为, 氯胺酮属于非竞争性的 NMDA 拮抗剂, 能够通过降低突触前膜介质产出量来阻断疼痛中枢的敏感化过程, 起到抑制痛觉传导通路的长时间增强效应的效果, 还能够调高痛阈, 进而减少麻醉后痛觉敏感现象。

右美托咪定是一种具有良好镇痛、镇静和抗焦虑效果的麻醉辅助药, 主要用于术前、复合麻醉、ICU 镇静、辅助影像学检查和预防术后躁动中, 多项临床实践指出, 右美托咪定不会对患者的呼吸及血流动力学产生明显的影响, 应用安全性较高^[24,25]。也有研究指出, 右美托咪定具有数倍于可乐定的 α_2 肾上腺素受体结合能力, 与麻醉性镇痛药协同使用时, 能够维持患者良好的血流动力学环境, 且不存在呼吸抑制等相关不良反应^[26,27]。有学者通过将 90 例患儿进行分组干预发现, 术前应用右美托咪定滴鼻干预的患儿术后发生躁动的几率明显低于未使用右美托咪定滴鼻液的患儿, 同时加用右美托咪定还能够缩短患儿术后苏醒时间, 该研究认为右美托咪定能够提高患儿围手术期的麻醉舒适度, 能够显著降低围手术期各类应激反应, 即使术后仍能发挥较好的镇痛作用^[28,29]。学者 Mona Mohamed Mogahd^[30]等的研究也指出, 右美托咪定的使用降低了患者术后 VAS 评分及术后不良反应的发生率, 同时提高了患者术后痛阈, 与氯胺酮类似, 该药的使用可以降低突触兴奋性, 减少患者手术切口的电位传播强度, 达到了提高痛阈的效果。

本结果显示, 右美托咪定和氯胺酮的应用降低了患儿术后躁动出现率及术后 VAS 评分, 同时抑制了术后痛觉过敏现象。分析认为, 氯胺酮与右美托咪定都属于 NMDA 受体的抑制剂, 应用上述两种药物可以抑制术后患儿切口痛觉信号传导, 还能够降低神经中枢对痛觉信号的处理强度, 上述进程都能够显著改善患儿术后痛觉过敏现象, 进而起到较好的防躁动效果。

总之, 右美托咪定与小剂量氯胺酮应用于麻醉后行短小手术患儿后, 能够显著降低麻醉后患儿的躁动及痛觉过敏现象,

值得进行临床推广。

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