

儿童临床检验采血中奖赏缓解疼痛和焦虑的性别差异性研究

张奕^{1a}, 任锋^{1b}, 黄彩玲², 李飞^{1a}, 曹科^{1a}, 杨方华^{1a}, 陈洪谋², 马东礼^{1a}, 陈运生^{1a}

(1. 深圳市儿童医院 a. 检验科; b. 普外一科, 广东深圳 518038; 2. 嘉应医学院, 广东梅州 514031)

摘要: **目的** 探讨在儿童临床检验末梢采血中奖赏缓解焦虑和疼痛的性别差异。**方法** 选取160例在门诊检验科采血的患儿, 随机分为男童对照组、女童对照组、男童奖赏组和女童奖赏组。对照组采用常规采血流程, 无任何干预手段。奖赏组在采血前被告知进行采血可被奖励卡通贴纸。观察者使用儿童焦虑和疼痛评估量表(children's anxiety and pain scales, CAPS)和面部疼痛修订评估量表(faces pain scale-revised, FPS)评估患儿采血前及采血时的焦虑水平以及采血时的疼痛水平。**结果** 男童对照组采血前和采血时的CAPS评分高于女童对照组(2.475 ± 1.28 , 95%CI=2.07~2.89 vs 1.93 ± 1.12 , 95%CI=1.57~2.28; 2.65 ± 1.21 , 95%CI=2.26~3.04 vs 2.08 ± 0.94 , 95%CI=1.77~2.38), 差异具有统计学意义($P < 0.05$)。男童对照组采血时的FPS评分也高于女童对照组(7.18 ± 1.95 , 95%CI=6.55~7.80 vs 6.28 ± 1.64 , 95%CI=5.76~6.81), 差异具有统计学意义($P < 0.05$)。与对照组相比, 卡通贴纸的奖赏显著降低了男童采血时的CAPS评分(2.65 ± 1.21 , 95%CI=2.26~3.04 vs 1.58 ± 0.96 , 95%CI=1.27~1.88)和FPS评分(7.18 ± 1.95 , 95%CI=6.55~7.80 vs 5.77 ± 1.71 , 95%CI=5.22~6.32), 差异具有统计学意义($P < 0.05$)。但是奖赏不能降低女童的CAPS评分(2.08 ± 0.94 , 95%CI=1.77~2.38 vs 2.13 ± 1.18 , 95%CI=1.75~2.50)和FPS评分(6.28 ± 1.64 , 95%CI=5.76~6.81 vs 6.07 ± 1.90 , 95%CI=5.46~6.68), 差异无统计学意义($P > 0.05$)。**结论** 卡通贴纸作为奖赏对缓解不同性别的儿童采血时的疼痛和焦虑的效果存在差异。

关键词: 末梢采血; 奖赏; 疼痛; 焦虑; 性别差异

中图分类号: R446.11 文献标识码: A 文章编号: 1671-7414(2020)05-151-03

doi:10.3969/j.issn.1671-7414.2020.05.039

Gender Differences of Modulation of Pain and Anxiety by Cartoon Sticker Rewards in the Blood Collection of Children's Clinical Examination

ZHANG Yi^{1a}, REN Feng^{1b}, HUANG Cai-ling², LI Fei^{1a}, CAO Ke^{1a}, YANG Fang-hua^{1a},
CHEN Hong-mou², MA Dong-li^{1a}, CHEN Yun-sheng^{1a}

(1a. Department of Clinical Laboratory; 1b. Department of General Surgery, Shenzhen Children's Hospital, Guangdong Shenzhen 518038, China; 2. Medical College of Jiaying University, Guangdong Meizhou 514031, China)

Abstract: Objective To study whether modulation of pain and anxiety by the cartoon sticker rewards after capillary blood collection depending on gender in children. **Methods** 160 children with blood sample in outpatient were selected from Department of Clinical Laboratory of Shenzhen Children's Hospital. They were randomly divided into boy control group, girl control group, boy reward group and girl reward group. In the control group, routine blood sampling was used without any intervention. Before blood collection, the reward group was told that blood collection could be rewarded with cartoon stickers. Pre-procedural and procedural anxieties were evaluated using the Children's Anxiety and Pain Scales (CAPS) by observers. Procedural pain level was assessed using Faces Pain Scale-Revised (FPS) by observers. **Results** Pre-procedural and procedural CAPS scores in male control group were higher than those in female control group (2.475 ± 1.28 , 95%CI=2.07~2.89 vs 1.93 ± 1.12 , 95%CI=1.57~2.28; 2.65 ± 1.21 , 95%CI=2.26~3.04 vs 2.08 ± 0.94 , 95%CI=1.77~2.38), the difference were statistically significant ($P < 0.05$). Also procedural FPS scores in male control group were higher than those in female control group (7.18 ± 1.95 , 95%CI=6.55~7.80 vs 6.28 ± 1.64 , 95%CI=5.76~6.81), the difference were statistically significant ($P < 0.05$). Compared with male control group, the cartoon sticker rewards effectively decreased procedural CAPS and FPS scores among boys (2.65 ± 1.21 , 95%CI=2.26~3.04 vs 1.58 ± 0.96 , 95%CI=1.27~1.88; 7.18 ± 1.95 , 95%CI=6.55~7.80 vs 5.77 ± 1.71 , 95%CI=5.22~6.32), the difference were statistically significant ($P < 0.05$). But with or without rewards, there was no significant difference in the change in the anxiety and pain during the procedure among girls (2.08 ± 0.94 , 95%CI=1.77~2.38 vs 2.13 ± 1.18 , 95%CI=1.75~2.50; 6.28 ± 1.64 , 95%CI=5.76~6.81 vs 6.07 ± 1.90 , 95%CI=5.46~6.68), the difference

基金项目: 深圳市卫计委临床研究项目(NO.SZLY2017016)。

作者简介: 张奕(1978-), 女, 硕士, 主管技师, 主要从事临床检验研究, E-mail: 2444533214@qq.com。

was not statistically significant ($P > 0.05$). **Conclusion** As a reward, cartoon stickers had different effects on relieving pain and anxiety of children of different genders.

Keywords: capillary blood collection; rewards; pain; anxiety; gender differences

儿童在医院就诊过程中经常遇到针刺类的诊疗操作,如末梢采血、动静脉穿刺和免疫注射等。其中,末梢采血是儿童医院最常用的实验室检查方法之一。尽管采血引起的疼痛是短暂的,但是由此产生的压力、焦虑和恐惧却可能对机体造成长远的影响^[1]。

人们日益认识到采取有效方法缓解儿童在诊疗过程中的疼痛的重要性^[2]。目前,研究已知多种方法可以干预疼痛和焦虑,其中包括奖赏^[3-4]。根据动机-奖赏假设学说,当奖赏和疼痛同时出现时,如果机体获得奖赏的动机高于对引起疼痛的行为的回避,那么奖赏可以降低机体对疼痛的感知,缓解其焦虑水平^[5]。借助影像学等技术,人们发现大脑的奖赏/动机回路(Reward/Motivational Circuitry)参与机体对疼痛的体验和调节,给予物质奖赏(如金钱)或精神奖赏可以降低疼痛水平^[5-6]。

近年来,研究发现性别影响机体对奖赏的加工处理方式^[7]。在成人和儿童的研究中发现,大脑对奖赏的加工处理方式因性别不同而异:如在面临压力时,女性大脑中奖赏性神经回路的活性降低,对奖赏的敏感性和反应性减少;而男性则相反^[8-11]。卡通贴纸是一种奖赏物,对于儿童来讲,它既是一种物质奖励,也是一种精神奖励。近些年,卡通贴纸作为奖赏缓解患儿的疼痛,已在我院门诊检验科的血液采集工作中广泛应用。针对不同性别的儿童,卡通贴纸的奖赏对疼痛和焦虑所起到调节作用是否存在差异,目前还未见国内外有报道。

因此,本研究组设计该实验,在采血过程中以卡通贴纸作为奖赏,研究缓解焦虑和疼痛的效果对不同性别的儿童是否存在差异,以及对临床工作的指导意义。

1 材料与方法

1.1 研究对象 选取2018~2019年来我院采血的儿童160例,年龄4~6岁。其中男生80例,女生80例。患儿入组条件:①无发育障碍;②无语言表达、视力和听力障碍;③无感觉(疼痛感觉)障碍;④6 h内未服用过镇静或镇痛药,神志意识清醒;⑤非危重症患儿;⑥患儿及家属愿意参加本实验

者。随机将患儿均分为男童对照组(Male control, MC)、女童对照组(female control, FC)、男童奖赏组(male reward, MR)和女童奖赏组(female control, FC)。各组患儿年龄比较差异无统计学意义($P > 0.05$),具有可比性。

1.2 材料 一次性采血针(型号25G)、卡通贴纸、常规采血器材及消毒用品等。

1.3 方法 采血前,患儿被解释整个采血的流程。对照组实施常规皮肤碘酒消毒,穿刺。实验组在穿刺的同时被奖赏卡通贴纸,实验全程录像。

1.3.1 焦虑评估方法:录像由另外2名有丰富的量表评估经验的工作人员作为观察者分析患儿的焦虑水平。评估方法采用儿童焦虑和疼痛评估量表(Children's Anxiety and Pain Scales, CAPS),这是一种较好的评估儿童焦虑的方法,评分分为0~5级,0级代表没有焦虑,5级代表极度焦虑^[12]。

1.3.2 疼痛评估方法:采血完成后,由观察者采用面部疼痛修订评估量表(Faces Pain Scale-Revised, FPS)评估采血的疼痛水平。FPS由6个水平排列的面部表情组成,0表示无痛,10表示剧烈疼痛^[12]。

1.4 统计学分析 数据采用prism统计软件处理,采用 t 检验分析各组患儿的一般特征,采用Mann-Whitney U test的方法评估组间两两比较的焦虑和疼痛水平。以 $P < 0.05$ 为差异有统计学意义。

2 结果

各组儿童采血不同时间焦虑水平和疼痛水平比较见表1。各组儿童采血前,MC组和MR组之间,以及FC组和FR之间相比较,CAPS评分差异均无统计学意义($P > 0.05$)。MC和FC组比较,男童CAPS评分高于女童,差异具有统计学意义($P < 0.05$)。采血时,卡通贴纸的奖赏缓解了男童采血时的焦虑水平,与MC组相比,MR组的CAPS评分显著下降,差异具有统计学意义($P < 0.05$)。与此对应,MR组的FPS评分也显著下降,差异具有统计学意义($P < 0.05$)。卡通贴纸的奖赏对女童采血时的焦虑和缓解作用均不明显,FC组和FR组相比,差异无统计学意义($P > 0.05$)。

表1 各组儿童采血不同时间疼痛和焦虑水平的差异比较 [$\bar{x} \pm s$ (95%CI)]

类别	MC组	FC组	MR组	FR组	P		
					MC vs FC	MC vs MR	FC vs FR
采血前 CAPS 评分	2.48 ± 1.28(2.07~2.89)	1.93 ± 1.12(1.57~2.28)	2.32 ± 0.97(2.01~2.64)	1.85 ± 1.19(1.47~2.23)	0.047	0.735	0.964
采血时 CAPS 评分	2.65 ± 1.21(2.26~3.04)	2.08 ± 0.94(1.77~2.38)	1.58 ± 0.96(1.27~1.88)	2.13 ± 1.18(1.75~2.50)	0.031	0.001	0.928
采血时 FPS 评分	7.18 ± 1.95(6.55~7.80)	6.28 ± 1.64(5.76~6.81)	5.77 ± 1.71(5.22~6.32)	6.07 ± 1.90(5.46~6.68)	0.021	0.001	0.261

3 讨论

现代医学是强调人文关怀的医学,儿科更是体现人文关怀的重要领域。随着时代的进步,人们日益认识到采取有效方法缓解儿童在有创性诊疗过程中的疼痛刺激是非常重要的^[2],这是医务人员临床工作的重要组成部分。本实验研究针对不同性别的儿童,卡通贴纸奖赏物对疼痛和焦虑所起到调节作用是否存在差异。本实验选择的研究对象为4~6岁的学龄前儿童,该年龄阶段的儿童是儿童医院主要的门诊就诊人群。研究表明该年龄阶段的儿童更容易产生焦虑及对疼痛的恐惧^[13]。

首先,本研究发现在对照组中,男童和女童在采血不同时间表现的焦虑和疼痛水平存在差异。本实验采取观察者评估的方法对焦虑和疼痛的水平进行评分。与自我评估的方法相比,该方法可以减少个体差异(如社会、文化等)对结果的影响^[14]。本研究发现在对照组中男童采血前和采血时表现的焦虑水平高于女童。与此对应,男童采血时的疼痛水平也高于女童。该结果和文献报道的一致^[15]。表现为在采血过程中,男童更易出现哭闹、逃避等抗拒行为,导致采血受到很大的影响,严重者可导致采血失败。

其次,本研究发现在儿童采血时卡通贴纸作为奖赏对疼痛和焦虑的缓解效果存在性别差异。研究已知性别影响机体对奖赏加工处理。男性关注奖赏的获得,而女性则更关注奖赏获得可能带来的负面事物,比如风险、惩罚和疼痛等。这种性别的差异在儿童时期就存在^[8-11]。在本研究中,我们发现卡通贴纸有效的缓解男童的焦虑和疼痛,但是对女童的作用并不明显。这可能是由于采血对机体造成一种压力,在面对采血这种压力时,不同性别的儿童对卡通贴纸这种奖赏物的反应不同,从而导致了疼痛和焦虑的干预作用不同。在今后的实验中,我们将利用电生理等实验技术进一步证实这种差异存在的可能的神经回路基础。

综上所述,在儿童临床检验采血过程中,以卡通贴纸作为奖赏缓解焦虑和疼痛的效果存在性别差异。男童在卡通贴纸的奖赏干预过程中,表现出良好的缓解效果;而女童则可能需要通过其他的干预手段(如注意力分散等)来有效的缓解焦虑和疼痛。

参考文献:

- [1] HARTLING L, NEWTON A S, LIANG Yuanyuan, et al. Music to reduce pain and distress in the pediatric emergency department: a randomized clinical trial[J]. JAMA Pediatrics, 2013, 167(9): 826-835.
- [2] BIRNIE K A, NOEL M, CHAMBERS C T, et al. Psychological interventions for needle-related procedural pain and distress in children and adolescents[J]. Co-

- chrane Database Syst Rev, 2018, 10(10): CD005179.
- [3] PORRECA F, NAVRATILOVA E. Reward, motivation, and emotion of pain and its relief[J]. Pain, 2017, 158(Suppl 1): S43-S49.
- [4] MITSI V, ZACHARIOU V. Modulation of pain, nociception, and analgesia by the brain reward center[J]. Neuroscience, 2016, 338: 81-92.
- [5] NAVRATILOVA E, PORRECA F. Reward and motivation in pain and pain relief[J]. Nature Neuroscience, 2014, 17(10): 1304-1312.
- [6] BECKER S, GANDHI W, POMARES F, et al. Orbitofrontal cortex mediates pain inhibition by monetary reward[J]. Social Cognitive and Affective Neuroscience, 2017, 12(4): 651-661.
- [7] DING Ying, WANG Encong, ZOU Yuchen, et al. Gender differences in reward and punishment for monetary and social feedback in children: An ERP study[J]. PLoS One, 2017, 12(3): e0174100.
- [8] GREIMEL E, BAKOS S, LANDES I, et al. Sex differences in the neural underpinnings of social and monetary incentive processing during adolescence[J]. Cognitive Affective & Behavioral Neuroscience, 2018, 18(2): 296-312.
- [9] GOLDFARB E V, SEO D, SINHA R. Sex differences in neural stress responses and correlation with subjective stress and stress regulation[J]. Neurobiology of Stress, 2019, 11: 100177.
- [10] ALARCÓN G, CSERVENKA A, NAGEL B J. Adolescent neural response to reward is related to participant sex and task motivation[J]. Brain and Cognition, 2017, 111: 51-62.
- [11] DORFMAN J, ROSEN D, PINE D, et al. Anxiety and gender influence reward-related processes in children and adolescents[J]. Journal of Child and Adolescent Psychopharmacology, 2016, 26(4): 380-390.
- [12] INAL S, KELLECI M. Distracting children during blood draw: looking through distraction cards is effective in pain relief of children during blood draw[J]. International Journal of Nursing Practice, 2012, 18(2): 210-219.
- [13] MCLENON J, ROGERS M A M. The fear of needles: A systematic review and meta-analysis[J]. Journal of Advanced Nursing, 2019, 75(1): 30-42.
- [14] GOODENOUGH B, THOMAS W, CHAMPION D G, et al. Unravelling age effects and sex differences in needle pain: ratings of sensory intensity and unpleasantness of venipuncture pain by children and their parents[J]. Pain, 1999, 80(1): 179-190.
- [15] DIXEY P, SEILER J, WOODIE J A, et al. Do cartoon stickers given after a hemoglobin finger stick influence preschoolers' pain perception[J]. Journal of Pediatric Health Care, 2008, 22(6): 378-382.

收稿日期: 2020-03-18

修回日期: 2020-04-22