

● 实验研究 ●

电针对偏头痛大鼠血清炎症因子表达的影响

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[摘要] 观察偏头痛大鼠炎症因子的表达及电针干预对其的影响,探讨电针在偏头痛中发挥镇痛效应的相关机制。方法:24只SD大鼠随机分为假手术组、模型组、模型+电针组,每组8只。采用电刺激右侧三叉神经节制备偏头痛模型,取右侧“风池”“外关”穴进行电针治疗,ELISA法检测各组大鼠血清TNF- α 、IL-1 β 、IL-6浓度。结果:血清TNF- α 、IL-1 β 、IL-6浓度模型组、模型+电针组均明显高于假手术组($P<0.05$),模型+电针组较模型组降低($P<0.05$)。结论:电针干预可降低偏头痛大鼠血清TNF- α 、IL-1 β 、IL-6浓度,这可能是电针在偏头痛中发挥镇痛效应的相关机制之一。

[关键词] 偏头痛;大鼠;电针疗法;炎症因子;实验研究

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Effect of electroacupuncture on the expression of serum inflammatory factors in rats with migraine

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Abstract: Objective: To investigate the expression of inflammatory factors in rats with migraine and the effect of electroacupuncture intervention on their expression, as well as the mechanism of the analgesic effect of electroacupuncture in migraine. Methods: A total of 24 Sprague-Dawley rats were randomly divided into sham-operation group, model group, and model + electroacupuncture group, with 8 rats in each group. A model of migraine was established by electrical stimulation of the right trigeminal ganglion, and electroacupuncture was performed at Fengchi and Waiguan acupoints at the right side. ELISA was used to measure the serum levels of tumor necrosis factor- α (TNF- α), interleukin-1 β (IL-1 β), and interleukin-6 (IL-6). Results: The model group and the model + electroacupuncture group had significantly higher serum levels of TNF- α , IL-1 β , and IL-6 than the sham-operation group ($P<0.05$), and the model + electroacupuncture group had significantly lower levels than the model group ($P<0.05$). Conclusion: Electroacupuncture intervention can reduce the serum levels of TNF- α , IL-1 β , and IL-6, which may be one of the mechanisms of the analgesic effect of electroacupuncture in migraine.

Key words: migraine; rat; electroacupuncture; inflammatory factor; experimental study

偏头痛是一种常见致残性神经系统疾病,电针已被证实可有效减轻偏头痛患者急性发作疼痛程度和减少头痛复发率^[1],但其机制仍不清楚。已有研究^[2]表明,细胞因子在免疫、炎症和疼痛等生理病理过程中发挥着重要作用,偏头痛发作时外周血中促炎因子TNF- α 、IL-1 β 、IL-6水平增高,提示炎症因子可能参与偏头痛发病相关的神经源性炎症。本研究通过动物实验探讨电针是否通过调节TNF- α 、IL-1 β 、IL-6发挥镇痛作用。

1 实验材料

1.1 动物 SPF级SD大鼠24只,雄性,6~8周龄,体质量

200~220g,由简阳市简城动物中心提供。合格证号:0000269,许可证号:SCXK(川)2008-24。实验过程中对动物的处置符合中华人民共和国科学技术部2006年颁布的《关于善待实验动物的指导性意见》。

1.2 试剂和药品 TNF- α ELISA试剂盒:美国Cayman公司,批号:41721;IL-1 β ELISA试剂盒:美国PeproTech公司,批号:900-M91;IL-6 ELISA试剂盒:德国PromoCell公司,批号:PK-EL-61606R。

1.3 仪器 韩氏电针仪:南京济生医疗科技有限公司,型号:LH200。

2 实验方法

2.1 动物分组 将24只实验大鼠随机分为假手术组、模型组、模型+电针组,每组8只。

2.2 偏头痛模型制备 对模型组、模型+电针组大鼠参照Limmroth法^[3]以电刺激三叉神经节制备偏头痛大鼠模型。假手术组进行假手术,方法同上,但不进行电刺激。模型成功标准:电刺激的同时可见右侧咀嚼肌收缩,口鼻分泌物增多^[4]。

2.3 电针干预 模型+电针组大鼠在造模后开始电针治疗,依据前期临床研究^[1],穴位定位依据《实验针灸学》^[5]选取右侧“外关”“风池”穴,直刺2.0~3.0mm,两穴位接电针仪,选择经针模式,疏密波电流强度0.1~1mA,以肌肉出现轻微抖动为度。治疗30min结束。

2.4 观察指标 针刺结束后,采用颈外静脉取血0.5mL,离心后留取上清液-80℃保存。ELISA法检测TNF-α、IL-1β、IL-6浓度,操作方法严格按照说明书进行。

2.5 统计学方法 采用SPSS 17.0统计软件数据包进行统计分析。所有数据经过方差齐性检验和正态性检验,各组数据均以均数±标准差($\bar{x} \pm s$)表示,多组数据之间计量资料用单因素方差分析, $P < 0.05$ 表示差异具有统计学意义。

3 实验结果

各组大鼠血清中TNF-α、IL-1β、IL-6浓度的比较,针刺后模型组、模型+电针组大鼠血清TNF-α、IL-1β、IL-6浓度明显高于假手术组;模型+电针组TNF-α、IL-1β、IL-6浓度明显低于模型组,差异均有统计学意义。(见表1)

表1 各组大鼠血清TNF-α、IL-1β、IL-6浓度比较($\bar{x} \pm s$,pg/mL)

组别	n	TNF-α	IL-1β	IL-6
假手术组	8	17.34 ± 2.89	16.23 ± 3.03	12.98 ± 2.5
模型组	8	23.64 ± 3.07 ^a	21.44 ± 3.26 ^a	19.78 ± 2.33 ^a
模型+电针组	8	19.33 ± 2.98 ^{ab}	19.23 ± 2.99 ^{ab}	15.68 ± 2.24 ^{ab}

注:与假手术组相比,^a $P < 0.05$;与模型组相比,^b $P < 0.05$ 。

4 讨 论

偏头痛发病与三叉神经血管系统激活有关。三叉神经血管系统激活后,产生一系列的神经源性炎症反应。近年来研究发现,除了中枢敏化、痛觉超敏、中枢类阿片系统功能下降等因素可致头痛外,炎症因子TNF-α、IL-1β、IL-6可能是自发性疼痛与痛觉超敏的潜在因素,引发神经源性炎症,参与神经源性疼痛^[6]。大量的研究表明,偏头痛发作时,脑脊液及颈静脉血中的细胞因子明显升高^[7],促炎因子TNF-α、IL-1β、IL-6在痛阈调制中发挥重要作用,可能会导致三叉神经纤维敏化^[8-9]。Perini F等^[10]研究提示偏头痛患者发作时伴随着促炎因子水平升高,可能参与疼痛的发生。动物实验研究证实TNF-α通过激活或敏化神经纤维末梢诱发痛觉过敏,而这种痛觉过敏由IL-1β释放介导^[11-12]。在临床实验中,TNF-α诱发头痛,其抗体可

以减少疼痛^[13]。Sarchielli P等^[14]进行的一项临床研究显示偏头痛发作时患者颈内静脉血清IL-6及TNF-α明显升高,很可能参与偏头痛发作时神经源性炎症反应。

观之本研究结果,电刺激三叉神经节激活三叉神经血管系统,模型组及模型+电针组较假手术组颈外静脉血清TNF-α、IL-1β、IL-6水平明显上调。电针干预偏头痛大鼠模型后,颈静脉血清TNF-α、IL-1β、IL-6浓度降低。因而,笔者推测电针可能通过下调颈外静脉血清TNF-α、IL-1β、IL-6水平发挥镇痛效应。

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