

针灸经络

针刺对急性脑出血模型大鼠局部脑血流量的影响

郑健刚^{*} 杜元灏^{*} 石学敏^{*}

摘要 目的:动态观察急性脑出血模型大鼠出血半球脑表面血流量的变化规律及针刺效应。方法:应用激光多普勒血流监测仪分别动态观察治疗组、对照组及模型组急性脑出血模型大鼠出血半球脑表面血流量。结果:脑出血后,模型组脑表面血流量大幅下降,与正常组、对照组和治疗组比较,差异有显著性($P < 0.05$ 或 $P < 0.01$)。且治疗组在增加局部脑血流量方面明显优于对照组,差异有显著性($P < 0.05$)。结论:针刺能显著增加急性脑出血后脑局部血流量,一定程度上阻止了因局部脑血流降低而引发的一系列病理现象,对保护脑细胞,避免脑细胞损害均起了积极的作用。

主题词 脑出血/针灸疗法 局部血流/针灸效应

中枢神经系统的功能状态有赖于主要物质的供应,充足的脑血流则是保证足够量的氧及葡萄糖等物质供应的基础。如果由于某种病理因素,导致脑血流量降低,就会严重影响脑功能。若脑血流量进一步降低并维持一段时间,则可能导致不可逆的脑功能损害,组织结构的完整性亦开始遭到破坏。因此,脑血流量的变化在脑血管疾病中占有举足轻重的地位。本实验应用激光多普勒血流监测仪动态观察脑出血模型大鼠出血半球脑表面血流量的变化规律及针刺效应。

1 材料与方法

1.1 动物造模、分组与处理:选用 Wistar 大鼠 55 只,体重 180~220g,雌雄各半,由中国中医研究院动物实验室提供。购回后适应性喂养 1 周,随机分为模型组、治疗组、对照组、假手术组、正常组。前 3 组分 1 天、3 天、7 天 3 个不同时相,每小组 5 只,正常组及假手术组各 5 只。

根据 Nath^[1]报道的分级实验性脑出血造模方法,复制大鼠脑出血模型,Wistar 大鼠予 3%戊巴比妥钠腹腔注射麻醉(30mg/kg),俯卧位固定于立体定位仪上,头顶部剪毛并严格消毒,于头皮正中纵行依次切开头皮及顶部肌肉组织,充分暴露颅骨,于右侧颅骨背侧

前囟后 2mm 及中线旁开 2.4mm 处钻孔,小心钻至硬脑膜为止,用微量注射器取大鼠尾静脉未肝素化新鲜血 30 μ l,沿钻好的颅孔垂直刺入脑内,深度为 7.5mm(相当于尾状核部位)缓慢均匀推注,注血时间不少于 2 分钟,注射完毕,留置 2~3 分钟再缓慢起针,颅孔用止血海绵封固,压迫 2~3 分钟,待完全无渗血时,用牙托粉封闭伤口。假手术组只开颅而不注血,手术后动物单笼饲养。

治疗组选穴:根据动物穴位图谱选取“人中”、“内关”穴位。具体操作:先刺双侧“内关”,在动物前肢桡侧骨内侧,桡骨与尺骨接合部下 1/3 交界处(腕横纹上 3~4mm),直刺穿皮达筋间,用提插捻转泻法,持续 1 分钟;继刺“人中”,在鼻中隔下部向上斜刺约 1 分左右,施雀啄手法强刺激 10 次左右;两穴均留针 15 分钟。对照组选穴:按照《针灸学》教材,根据“动物穴位图谱”选取“曲池”、“合谷”、“足三里”、“阳陵泉”四穴。“曲池”在桡骨近端肘关节外侧前方凹陷中;“合谷”在前肢第一、二掌骨之间;“足三里”在膝关节下侧,腓骨小头下约 5mm 处,“阳陵泉”在腓骨小头前下方凹陷处。四穴均取病侧肢体,采用提插捻转泻法,留针 15 分钟。正常组及假手术组不予针刺处理。

1.2 骨窗观察脑血流实验方法:在规定的时间内将动物腹腔麻醉,俯卧位,头顶纵行 2cm 长的切口,将软组织向两侧翻开,暴露颅骨。将颅骨上的筋膜钝性剥离,用颅骨钻打一直径为 2mm 的圆孔,其圆心位置在距颅骨正中中线 4mm、距造模注血点 3mm 处,将钻起的圆形骨片用细针挑起,再用镊子夹住取出,用微型镊子提起分离硬脑膜,用眼科剪将硬脑膜剪成数瓣,外翻至颅骨上,暴露软脑膜,将激光多普勒血流仪探头通过大鼠脑微循环定位器的机械臂固定在大鼠脑圆孔上,启动激光多普勒血流仪。

1.3 实验仪器系统:本实验采用激光多普勒血流仪(JI-200 型,天津津科公司生产)监测大鼠软脑膜循环状态。血流仪增益使用 1/12kHz 档,时间常数为 0.2s,时间延迟为 500ms。整个实验过程保持室温 $23 \pm 2^\circ\text{C}$ 。

1.4 数据采集与处理:每只动物按规定时向开颅窗后,稳定 10 分钟,然后进行监测,各记录 10 分钟,选取

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其中较为稳定的 5 分钟进行数据采集。

1.5 统计学处理:计量资料采用 t 检验,计数资料采用 χ^2 检验,采用 SPSS 软件包进行统计。

2 结果

各组大鼠软脑膜微循环血流量的比较:附表示,脑出血模型组大鼠软脑膜血流量第 1 天即大幅度下降,与正常组比较,差异具有显著性($P < 0.01$),第 3 天血流量持续下降,降至最低点,最大下降幅度为 66%~72%,呈持续低血流状态,第 7 天血流量略有回升。对照组各时相与模型组相比,血流量均有回升($P < 0.05$ 或 $P < 0.01$),对照组的疗效肯定。治疗组大鼠第 1 天血流量明显回升,第 3 天血流量仍持续升高,到第 7 天血流量继续升高,与对照组相比,差异有显著性($P < 0.01$)。

附表 各组大鼠软脑膜微循环血流量均值比较(%, $\bar{x} \pm s$)

组别	鼠数	1 天	3 天	7 天
模型组	5	16.2 ± 2.1 [△]	11.7 ± 1.6 [△]	19.8 ± 3.5 [△]
对照组	5	19.5 ± 2.1 [△]	22.9 ± 1.4 [△]	29.7 ± 2.7 [△]
治疗组	5	23.7 ± 1.8 [△]	28.1 ± 2.2 [△]	38.6 ± 1.1 [△]

与正常组比较,△ $P < 0.01$;与模型组比较,△ $P < 0.05$,△△ $P < 0.01$;与对照组比较,□ $P < 0.05$,□□ $P < 0.01$;正常组血流量为 18.5 ± 3.6(%) ,假手术组血流量为 17.7 ± 2.4(%)

3 讨论

动物实验证实^[2],脑出血后,在血肿周围区,乳酸含量急剧增加,通过测定血肿周围区局部血流量提示,血肿周围区有一血肿带,血流量下降。此外,在远离出血部位的区域及出血区的对侧相同部位也有脑血流量下降的表现。由于血肿的压迫,迫使血肿周围区脑组织受压、移位、崩解,引起周围脑组织血液循环和代谢障碍。那么脑缺血与脑水肿之间的关系又如何呢? Fujimoto^[3]和 Kogure^[4]的实验证实,缺血 5 分钟后即有脑水分增加,同时能量代谢也被抑制。Levy^[5]详细说明了缺血灶的 ATP 在 5~15 分钟后即下降 50%,乳酸增加 7~8 倍,这就证实了脑在缺血时能量代谢受到直接抑制。在这种明显的代谢障碍情况下,为了保持细胞膜稳定,于是发生了细胞膜内外离子的重新分配,同时也提示这已经引起了细胞膜离子泵(钠泵)障碍。由于细胞内阳离子的增加,水分由细胞外向细胞内移行,产生了细胞中毒性水肿;通过离子浓度重新分配,水分也从血管内移到血管外,产生了血管源性水肿,脑组织水含量也因此增加。Nath^[1]认为,出血灶周围脑组织血流量下降可能是由于局部压迫微循环所致,这种继发性脑缺血会进一步引起脑水肿,使颅压上升。因此,我们认为,在脑出血治疗的过程中,应紧紧抓住局部脑缺

血和脑水肿这两个关键的病理环节,因为脑水肿和脑缺血是临床一系列继发性损害的根源。

研究表明^[6,7],脑血流的改善能促进血肿周围区的供血供氧,促进神经机能的恢复,减轻脑水肿,降低 ICP,加速血肿吸收,对出血性脑卒中的恢复是有利的。但也有资料表明^[8],缺血后局部血管运动麻痹失去了对机体变化的正常反应性因而任何增加脑血流的方法均可使缺血区血流反向流入正常区域,这一现象称为“脑内盗血”,其发生率仍属争论问题。据 Kety 进一步证实,虽然平均脑血流增加,但缺血区并无明显反应,因而认为“脑内盗血”是少见现象。有人^[9]也认为在出血性变化期间增加脑血液灌流可能会加剧这种继发性出血的程度,但 CT 结果证实,在出现出血性脑卒中之后,增加脑血液灌流通常不会导致临床表现及放射图像上的恶化。

本实验动态观察了脑出血模型大鼠软脑膜微循环血流量的变化情况,针刺能显著增加脑出血后脑局部血流量,减轻了进一步发展的脑水肿现象,一定程度上阻止了因局部脑血流降低而引发的一系列病理现象,对保护脑细胞、避免脑细胞损害及本病预后均起了积极的作用。我们认为,针刺增加脑血流量的机制与扩张血管药的作用是不同的。从前面的研究中我们发现,针刺可使脑出血后血肿周围区的微血管形态发生改变,大量细小的分支血管呈网状分布于血肿周围区,有些甚至逆行深入到血肿区,提示针刺能有效地促进侧枝循环,改善微血管的机能状态,决不是简单的扩张效应。

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ABSTRACTS FROM ORIGINAL ARTICLES

Effect of Acupuncture on Cerebral Blood Flow of Acute Cerebral Hemorrhage Model Rats

Zheng Jian'gang, Du Yuanhao, Shi Xuemin

Objective: To investigate dynamically change of cerebral superficial volume of blood flow in the cerebral surface of the hemorrhage hemisphere in the acute cerebral hemorrhage model rat and effects of acupuncture. **Methods:** Blood flow of the cerebral surface in the breeding hemisphere in acute cerebral bleeding model rat were investigated by laser doppler blood flow monitor in treatment group, control group and model group. **Results:** After cerebral hemorrhage, blood flow in cerebral surface decreased largely with a significant difference as compared with the normal group, control group and treatment group. Treatment group was significantly superior to control group in increase of blood flow in the local brain ($P < 0.05$). **Conclusion:** Acupuncture can significantly increase volume of blood flow in the local brain after acute hemorrhage, and arrest a series of pathological phenomena induced by local decrease of cerebral volume of blood flow to a certain extent.

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Key words: Cerebral hemorrhage/acup-mox ther; local volume of blood flow/acup-mox eff

(Original article on page 666)

Effects of Integrated Therapy of TCM and WM on Clinical Symptoms in 318 Cases of SARS

Xie Yanming, Hu Jing'qing, Weng Weiliang, et al.

Objective: To compare effects of integrated treatment of TCM and WM, and simple western medicine on main symptoms in the patient of SARS. **Methods:** 524 inpatients of SARS were divided into TCM-WM integrated treatment group ($n = 318$) and western medicine treatment group ($n = 206$), and differences of improving extents of symptoms in two groups were analyzed by Kaplan-Meier existence analysis method and the Mixed statistical model. **Results:** After treatment, the decrease amplitude of the existence rate for the symptoms of weakness, short breath, dyspnea in the TCM-WM integrated treatment group was significantly lower than that in western medicine group. In the former, the duration of weakness was averagely shortened by 1.5 days, and short breath, dyspnea and muscle aching pain were averagely shortened by 2 days, one day and 2 day, respectively. **Conclusion:** The integrated treatment of TCM and WM can improve such clinical symptoms as weakness, short breath, dyspnea, etc.

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Key words: Severe acute respiratory syndrome (SARS)/integrated therapy of TCM and WM

(Original article on page 671)

Clinical Observation on 729 Cases of AIDS Treated by TCM Syndrome Differentiation

Huang Shijing, Wei Jian'an, Cao Huiyun, et al.

Objective: To summarize clinical characteristics of AIDS and to study therapeutic effect of TCM on AIDS. **Methods:** The medical records of 729 cases of AIDS who have treated by TCM since 1989 in Tanzania are systematized and entered into computer for summarization. **Results:** The symptoms such as weakness, cough, skin rash, fever, lymphadenectasis, diarrhea and chest pain are commonly seen in the patient of AIDS, which is mainly involved in the lung and the spleen, and less in the heart, the liver and the kidney. CD4 count of T-lymphocyte subgroup is lower. **Conclusion:** TCM treatment can improve symptoms, increase immune function, particularly, when CD4 is lower than $200\text{cells}/\text{mm}^3$, the therapeutic effect is obvious.

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Key words: Acquired immunodeficiency syndrome/ diagnosis: Typing of TCM syndromes

(Original article on page 680)

Study on the Correlativity of Yin-Deficiency Pathogenesis with Plasma Endothelin and Nitric Oxide Levels in the Patient of Acute Myocardial Infarction

Li Nanyi, Li Yueyi

Objective: To study correlativity of Yin-deficiency pathogenesis of acute myocardial infarction with plasma nitric oxide (NO) and endothelin (ET) levels. **Methods:** According to differentiation criteria for TCM Yin-deficiency, 98 cases of acute myocardial infarction were divided into non-Yin-deficiency group and Yin-deficiency group. The latter was divided again into typical Yin-deficiency group and atypical Yin-deficiency group. Within 24 ~ 72h after attack, venous blood of fasting in morning was taken and plasma NO and ET levels were determined, with 30 healthy persons used as controls. **Results:** Plasma NO level decreased and ET level increased in the patient of acute myocardial infarction as compared with controls ($P < 0.01$). Plasma ET level increased in the Yin-deficiency group as compared with the atypical Yin-deficiency group ($P < 0.01$). Plasma NO level decreased in the typical Yin-deficiency group compared with the atypical Yin-deficiency group ($P < 0.01$). **Conclusion:** Yin-deficiency pathogenesis of acute myocardial infarction is correlated with plasma ET and NO levels.

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Key words: Myocardial infarction/blood: nitric oxide/blood: endothelins/blood

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