

[doi: 10.3969/j.issn.1006-7795.2022.02.014]

· 精神疾病神经调控和康复技术研究 ·

# 经颅交流电刺激联合抗抑郁药对抑郁发作的疗效及安全性

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**【摘要】** **目的** 探讨经颅交流电刺激(transcranial alternating-current stimulation, tACS)联合抗抑郁药对抑郁发作的治疗效果及安全性。**方法** 选择抑郁发作患者62例,分为治疗组和对照组,均服用抗抑郁药物,治疗组加用tACS真刺激治疗,对照组加用tACS伪刺激治疗。治疗次数两组均为20次。治疗部位为前额部、双侧乳部,频率为77.5 Hz,强度为15 mA。用抑郁-17项(Hamilton Depression Scale-17 Item, HAMD-17),焦虑量表(Hamilton Anxiety Scale, HAMA)患者治疗前的临床评分,安全性。治疗4周、8周、随访8周,分别比较两组HAMD-17和HAMA的得分,两组HAMD-17得分均随治疗及随访时间的延长而降低( $P < 0.05$ ),治疗组降低幅度大于对照组( $P_{组} < 0.05$ ),随访8周时治疗组的疗效更大( $P_{交} < 0.05$ )。两组HAMA得分均随治疗及随访时间的延长而降低( $P < 0.05$ ),两组随访8周时得分均无显著差异( $P_{组} > 0.05$ )。治疗组和对照组第4周HAMD-17的得分分别为 $74.29\% \pm 8.40\%$  vs  $32.54\% \pm 13.30\%$ ;第8周HAMD-17的得分分别为 $81.00\% \pm 10.68\%$  vs  $40.27\% \pm 12.92\%$ ,均具有统计学意义( $P < 0.001$ )。两组均未发生严重不良反应。**结论** 经颅交流电刺激联合抗抑郁药物治疗抑郁发作具有良好治疗效果,安全性高,作为抑郁发作联合治疗的新选择。

**【关键词】** 经颅交流电刺激;抑郁发作;疗效;安全性

**【中图分类号】** R749.4 **【文献标识码】** A

## Efficacy and safety of transcranial alternating-current stimulation combined with antidepressants in the treatment of depressive episode

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**【Abstract】** **Objective** To investigate the efficacy and safety of transcranial alternating current stimulation (tACS) combined with antidepressants in the treatment of depression. **Methods** Sixty-two patients with depressive episode were randomly divided into treatment group and control group. Both groups took antidepressants. The patients in the treatment group received real tACS while the patients in the control group were treated with sham tACS. The treatment session was 20 times in both groups. The treatment site was prefrontal and bilateral mastoid, with a frequency of 77.5 Hz and intensity of 15 mA. Hamilton Depression Scale-17 Item (HAMD-17) and Hamilton Anxiety Scale (HAMA) were used to evaluate the clinical symptoms at baseline, the end of treatment (4 weeks), and follow-up (8 weeks). **Results** The scores of HAMD-17 and HAMA in the treatment and control groups at baseline, 4 weeks of treatment, and 8 weeks of follow-up were compared with repeated measurement analysis of variance. The total score of HAMD-17 in the two groups decreased gradually with the extension of treatment and follow-up time ( $P_{time} < 0.05$ ). The decrease in the treatment group was greater

基金项目:北京市科学技术委员会科技重大专项(D171100007017001)。This study was supported by Beijing Municipal Science & Technology Commission (D171100007017001)。

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网络出版时间:2022-04-01 16:57 网络出版地址:https://kns.cnki.net/kcms/detail/11.3662.R.20220401.1504.006.html

than that in the control group ( $P_{\text{group}} < 0.05$ ), and the effect of treatment increased with the extension of observation time ( $P_{\text{interaction}} < 0.05$ ). The total score of HAMA in both groups decreased gradually with the extension of treatment and follow-up time ( $P_{\text{time}} < 0.05$ ). However, there was no significant difference between the two groups ( $P_{\text{group}} > 0.05$ ). The score reduction rates of HAMD-17 in the treatment and control groups at the end of the fourth week were  $74.29\% \pm 8.40\%$  vs  $32.54\% \pm 13.30\%$ , respectively. At the end of the 8th week, the score reduction rates of HAMD-17 were  $81.00\% \pm 10.68\%$  vs  $40.27\% \pm 12.92\%$ , respectively. The difference was statistically significant ( $P < 0.001$ ). **Conclusion** tACS combined with antidepressants is effective and safe in the treatment of depressive episodes. It can be used as a new choice for the combined treatment of depressive episodes.

**【Key words】** transcranial electric stimulation; antidepressants; depressive episodes

疗效评估指标为 HAMD-17 分率, 分率 (基线评分 - 治疗后评分)/基线评分  $\times 100\%$ 。

(2) 安全性评估: 采用副反应量表 (Treatment Emergent Symptom Scale, TESS) 及开放式记录收集反应。记录反应时同时收集与 tACS 治疗的相关性、持续时间。

## 1.5

应用 SPSS 26.0 统计软件对数据进行处理分析。计数资料计算率, 采用  $\chi^2$  检验或 Fisher 精确检验比较组间率差异。符合正态分布的连续变量采用均数  $\pm$  标准差 ( $\bar{x} \pm s$ ) 表示, 采用独立样本  $t$  检验比较两组间均数的差异; 采用重复测量的方差分析比较两组间 HAMD 及 HAMA 治疗前后的差异, 采用 post-hoc 分析进行两两比较, Bonferroni 法校正  $P$  值。检验为双侧, 以  $P < 0.05$  为差异统计学意义。

## 2

### 2.1

纳入 62 例患者, 其中治疗组和对照组各 31 例。治疗组中, 3 例患者自愿放弃未完成治疗, 共 28 例完成治疗; 对照组中, 2 例患者自愿放弃未完成治疗, 共 29 例完成治疗。治疗组和对照组社会人口学

资料和临床特征比较, 差异均无统计学意义 ( $P > 0.05$ ), 详见表 1。

### 2.2 HAMD-17 HAMA

采用重复测量方差分析对治疗组和对照组在基线、治疗 4 周末、随访 8 周末时 HAMD-17 和 HAMA 的评分进行比较。结果显示: 两组 HAMD-17 总分均随治疗及随访时间的延长逐渐降低 ( $P_{\text{时间}} < 0.05$ ), 治疗组降低幅度大于对照组 ( $P_{\text{组间}} < 0.05$ ), 且随观察时间的延长治疗的效应增大 ( $P_{\text{交互}} < 0.05$ )。两组 HAMA 总分均随治疗及随访时间的延长逐渐降低 ( $P_{\text{时间}} < 0.05$ ), 但两组间差异无统计学意义 ( $P_{\text{组间}} > 0.05$ ), 详见表 2。

### 2.3 HAMD-17

治疗组和对照组第 4 周末 HAMD-17 的分率分别为  $74.29\% \pm 8.40\%$  vs  $32.54\% \pm 13.30\%$ , 差异有统计学意义 ( $P < 0.001$ ); 第 8 周末 HAMD-17 的分率分别为  $81.00\% \pm 10.68\%$  vs  $40.27\% \pm 12.92\%$ , 差异有统计学意义 ( $P < 0.001$ ), 详见表 3。

### 2.4

在治疗期间无死亡发生, 无神经系统并发症和其他严重不良反应。生命体征无显著变化。试验组 2 例患者出现心慌, 1 例患者出现耳鸣, 均为轻度, 休息后次日缓解, 继续完成治疗。

## 1

Tab. 1 Comparison of demographic and clinical characteristic between the treatment and control groups

$\bar{x} \pm s$

| actor                                                  | Treatment group<br>(n = 28) | Control group<br>(n = 29) | $\chi^2/t$ | $P$   |
|--------------------------------------------------------|-----------------------------|---------------------------|------------|-------|
| Age/a                                                  | 39.11 $\pm$ 15.73           | 42.97 $\pm$ 13.88         | 0.983      | 0.330 |
| ender                                                  |                             |                           | 2.110      | 0.348 |
| Male                                                   | 3                           | 7                         |            |       |
| emale                                                  | 25                          | 22                        |            |       |
| Diagnosis                                              |                             |                           | 4.472      | 0.941 |
| Depression                                             | 24                          | 25                        |            |       |
| Bipolar disorder                                       | 4                           | 4                         |            |       |
| Course of illness                                      | 67.57 $\pm$ 78.60           | 70.45 $\pm$ 111.58        | 0.112      | 0.911 |
| Dosage of antidepressant/(mg $\cdot$ d <sup>-1</sup> ) |                             |                           |            |       |
| Escitalopram                                           | 16.00 $\pm$ 5.48            | 14.29 $\pm$ 6.07          | 0.501      | 0.627 |
| luoxetine                                              | 20*                         | 20*                       | ↓          | ↓     |
| rooxetine                                              | 20*                         | 20*                       | ↓          | ↓     |
| Sertraline                                             | 78.85 $\pm$ 45.47           | 80.35 $\pm$ 36.92         | 0.095      | 0.925 |
| Citalopram                                             | 16.67 $\pm$ 5.77            | 20*                       | 0.500      | 0.667 |
| HAMD-17                                                | 22.25 $\pm$ 2.73            | 22.21 $\pm$ 2.31          | 0.064      | 0.949 |
| HAMA                                                   | 24.82 $\pm$ 8.07            | 12.54 $\pm$ 6.10          | 0.415      | 0.679 |

\* n = 1; HAMD-17: Hamilton Depression Scale-17 Item; HAMA: Hamilton Anxiety Scale.

表 2 治疗组和对照组治疗前后 HAMD-17 和 HAMA 评分的重复测量方差分析

Tab. 2 Repeated measure analysis of variance of HAMD-17 and HAMA score between the treatment and control groups

( $\bar{x} \pm s$ )

| Item                            | Baseline     | eek 4                     | eek 8                     | F                  |             |             |
|---------------------------------|--------------|---------------------------|---------------------------|--------------------|-------------|-------------|
|                                 |              |                           |                           | Interaction effect | Time effect | roup effect |
| HAMD-17                         |              |                           |                           | 73.983 **          | 574.354 **  | 120.955 **  |
| Treatment group( <i>n</i> = 28) | 22.25 ± 2.73 | 5.68 ± 1.74 <sup>△△</sup> | 4.21 ± 2.30 <sup>△△</sup> |                    |             |             |
| Control group( <i>n</i> = 29)   | 22.21 ± 2.31 | 14.93 ± 3.23              | 13.31 ± 3.42              |                    |             |             |
| HAMA                            |              |                           |                           | 0.451              | 99.456 **   | 0.273       |
| Treatment group( <i>n</i> = 28) | 24.82 ± 8.07 | 12.54 ± 6.1               | 7.71 ± 4.74               |                    |             |             |
| Control group( <i>n</i> = 29)   |              |                           |                           |                    |             |             |

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(收稿日期:2021-11-10)

编辑 孙超渊