

The 1st International Neuroinflammation Congress and 1st Student Festival of Neuroscience



Shefa Neuroscience Research Center, Tehran, Iran, 11-13 April, 2017

The Neuroscience Journal of Shefaye Khatam

Volume 5, No. 2, Suppl 2

Poster Presentation

Forced Exercise Attenuates Neuropathic Pain in Chronic Constriction Injury Male Rat: An Approach to Oxidative Stress and Inflammation

Nasroallah Moradi-kor^{1,3}, Hossein Ali Safakhah², Atiyeh Bazargani³, Ahmad Reza Bandegi⁴, Hamid Gholami Pourbadie⁵, Baharak Khoshkholgh Sima⁵, Ali Ghanbari^{1*}

¹Research Center of Physiology, Faculty of Medicine, Semnan University of Medical Sciences, Semnan, Iran

²Laboratory of Pain Research, Research Center and Department of Physiology, Faculty of Medicine, Semnan University of Medical Sciences, Semnan, Iran

³Student Research Committee, Faculty of Medicine, Semnan University of Medical Sciences, Semnan, Iran

⁴Department of Biochemistry, Faculty of Medicine, Semnan University of Medical Sciences, Semnan, Iran

⁵Department of Physiology and Pharmacology, Pasteur Institute of Iran, Tehran, Iran

Published: 11 April, 2017

Abstract

Introduction: Peripheral and central nerve injuries cause chronic neuropathic pain in many injured people besides motor disability. Exercise, as a behavioral and non-pharmacological treatment, has beneficial effects on people's general health both for healthy and sick people. Therefore, this study was conducted to examine the effects of exercise on neuropathic pain induced by chronic constriction injury (CCI) of the sciatic nerve. **Materials and Methods:** Wistar male rats weighing 200 ± 20 g were randomly divided into five groups (normal, sham, CCI, pre-CCI exercise, and post-CCI exercise group). Once the rats were anesthetized, their sciatic nerve was ligated to induce CCI, and they were then housed in separate cages. The rats ran on treadmill at a moderate speed for 3 weeks. Mechanical allodynia and thermal hyperalgesia were determined using von Frey Filament and plantar test, respectively. TNF- α , malondialdehyde, and total antioxidant capacity were measured using Western blot test, thiobarbituric acid, and ferric reducing ability of plasma (FRAP) respectively. **Results:** The mechanical allodynia ($P < 0.05$) and thermal hyperalgesia ($P < 0.01$) in the CCI group were significantly higher than those in the sham group. Exercise after CCI significantly reduced ($P < 0.01$) mechanical allodynia and thermal hyperalgesia ($P < 0.05$) against those in the CCI group. Moreover, the level of FRAP in the CCI group was significantly ($P < 0.01$) lower than that in the sham group, and the level of FRAP in the post-CCI group increased significantly ($P < 0.05$) against that in the CCI group. The level of MDA did not differ significantly between groups. Level of TNF- α increased significantly in the CCI group ($P < 0.001$) compared to sham group and decreased significantly in the post-CCI group ($P < 0.01$) against that in the CCI group. **Conclusion:** Exercise reduces mechanical allodynia and thermal hyperalgesia induced by CCI. These effects probably mediated by increasing the total antioxidant capacity and reducing the TNF- α inflammation factor.

Keywords: CCI, TNF- α , Treadmill exercise, Neuropathic pain, Oxidative stress

***Corresponding Author:** Ali Ghanbari

Email: aligh88@gmail.com