

عنوان مقاله:

The Effect of Exercise, Ozone, and Mesenchymal Stem Cells Therapy on CB-1 and GABA Gene Expression in the Cartilage Tissue of Rats With Knee Osteoarthritis

محل انتشار:

مجله تحقیقات دارویی و بیومدیک، دوره 6، شماره 1 (سال: 1399)

تعداد صفحات اصل مقاله: 8

نویسندگان:

.Maryam Rezaie - Department of Sport Physiology, Central Tehran Branch, Islamic Azad University, Tehran, Iran

Mohammad Ali Azarbayjani - Department of Sport Physiology, Central Tehran Branch, Islamic Azad University, Tehran, Iran

.Maghsoud Peeri - Department of Sport Physiology, Central Tehran Branch, Islamic Azad University, Tehran, Iran

.Seyed Ali Hosseini - Department of Sport Physiology, Marvdasht Branch, Islamic Azad University, Marvdasht, Iran

خلاصه مقاله:

Background: Studies have reported the beneficial effects of exercise, ozone therapy, and stem cell therapy for the treatment of knee osteoarthritis. Objectives: To reduce the duration of the treatment, we decided to investigate the synergistic effects of Endurance Training (ET), ozone therapy, and mesenchymal stem cell (MSCs) therapy separately or in combination on the cannabinoid receptors 1 (CB-1) and Gamma-Aminobutyric Acid (GABA) gene expression, as anti-nociceptive pathways in the cartilage tissue of rats with osteoarthritis. Methods: In this experimental study, 40 rats with knee osteoarthritis were divided into eight groups of 5 rats each: 1. Osteoarthritis; 2. MSCs; 3. Ozone therapy; 4. ET; 5. ozone therapy+MSCs, 6. ET+ozone therapy; 7. ET+MSCs, and 8. ET+MSCs+ozone therapy. Knee osteoarthritis was induced through the partial cutting of internal meniscus. The endurance training program was initiated with a 30-min run on a 0-degree slope treadmill at a speed of 16 m/min in the first week that gradually reached to 50 minutes after the 8 weeks. Rats in the MSCs groups received an intra-articular injection of 1×10^6 cells/kg into the right knee joints. Also, ozone therapy groups were injected at a concentration of $20 \mu\text{g/mL}$ once a week for three weeks. Rats were then anesthetized 48 h after their last treatment. The Independent t test and 3-way ANOVA were used to analyze the findings ($P \leq 0.05$). Results: ET, ozone therapy, and MSCs alone increased CB-1 and GABA gene expression in the cartilage tissue of rats with knee osteoarthritis ($P \leq 0.05$ for all). A combination of ozone therapy and ET ($P \leq 0.05$) and combination of ozone therapy and MSCs ($P \leq 0.05$) were significant in increasing CB-1 and GABA gene expression. However, the combination of ET and MSCs ($P \geq 0.05$) and combination of ET, MSCs, and ozone therapy ($P \leq 0.05$) significantly increased CB-1 gene expression. Conclusion: It seems that ET, ozone therapy, and MSCs alone can have favorable effects on CB-1 and GABA variables. Also, the combination of ET and ozone therapy and also ozone therapy and MSCs have favorable effects on the anti-nociceptive pathway in the animal model of osteoarthritis. But further studies are needed on the combination of ET and MSCs and also the combination of ET, ozone therapy, and MSCs.

کلمات کلیدی:

Osteoarthritis, Mesenchymal stem cells, Ozone, Training, Anti-nociceptive

