Research Article

The Changes in Rats with Sciatic Nerve Crush Injury Supplemented with Evening Primrose Oil: Behavioural, Morphologic, and Morphometric Analysis

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Nerve crush injuries are commonly used models for axonotmesis to examine peripheral nerve regeneration. As evening primrose oil (EPO) is rich in omega-6 essential fatty acid component and gamma-linolenic acid, studies have shown the potential role of EPO in myelination. Seventy-two healthy adult Sprague-Dawley rats were classified into three groups: normal group, control group, and experimental group. The result indicates that there was significant difference in toe-spreading reflex between the normal and the control groups (1.9 ± 0.031, p < 0.05) and the normal and the EPO groups (0.4 ± 0.031, p < 0.05) and significant difference between EPO and the control groups (1.5 ± 0.031, p < 0.05). Regeneration of axons and myelin in nerve fibre in the EPO-treated group developed better and faster than in the control group. In the control group, the shape of the axon was irregular with a thinner myelin sheath. In the experimental group, the shape of the axons, the thickness of the myelin sheath, and the diameter of the axons were almost the same as in the normal group. In conclusion, EPO supplementation may be beneficial as a therapeutic option for disturbances of nerve interaction.

1. Introduction

Peripheral nerve encompasses all the nerve trunks and branches which lie outside the central nervous system. When a peripheral nerve is injured, the muscles supplied by that nerve do not receive messages from the brain. Therefore, they become weakened or paralysed [1, 2]. Traffic collisions usually induce traumatic nerve injuries resulting from disruption of the intraneural circulation [3, 4]. This condition consequently induces demyelination, remyelination, axonal degeneration and axonal regeneration, focal, multifocal, or diffuse nerve fibre loss, and endoneurial edema [4, 5]. Nerve regeneration is a complex phenomenon that has been gaining interest among scientists for many years. Many experimental studies have focused on treatment options to enhance the recovery process of injured peripheral nerves in the rat model. This includes the application of an electric field [6], extracts of various natural products, for example, the medicinal mushroom Hericium erinaceus [7], and surgical intervention, for example, nerve grafts and transplanting stem cells [8]. Many experimental studies have focused on treatment options to enhance the recovery process of injured peripheral nerves in the rat model. This includes the application of an electric field [6], surgical intervention, for example, nerve grafts and transplanting stem cells [8]. Furthermore, the transplantation of Schwann cells has also been shown to improve functional recovery and reduce histological deficits resulting from nerve crush injury [9]. Despite being the major producer of myelin in the peripheral nervous system, Schwann cells play an important role in promoting axonal regeneration by producing neurotrophic factors such as nerve growth factor (NGF) and ciliary neurotrophic factor (CNTF) [10]. Commercial drugs such as immunosuppressant and anti-inflammatory drugs may accelerate the rate of nerve regeneration following injury. However, they are associated with severe side effects such as high blood pressure, kidney