ABSTRACT

Effect of Non-Competitive NMDA Receptor Antagonist MK-801 on COX-2 Expression in Neuropathic Pain (A Chronic Pain Study in Mice Induced Ligation Model)

Neuropathic pain is a type of chronic pain that difficult to manage. This pain caused by a primary lesion or dysfunction in the nervous system involved N-Methyl-D-Aspartate (NMDA) receptor. The present study designed to investigate the effects of a novel potent non-competitive NMDA Receptor, MK-801 – toward both hystochemistry and immunohistochemistry – related to the expression of spinal Cyclooxygenase-2 (COX-2). Thirty five mices divide into five groups randomly, which are Sham (normal) group, Ligation (neuropathic) group, and three groups differed by MK-801's doses (0.01; 1.00; or 10.00 nmol). Mices were made in neuropathic pain condition by ligated sciatic nerve tightly with 8-0 suture. Thermal hyperalgesia was measured on day 0, 1, 3, 5, 7, 8, 10, 12, and 14. Neuropathic condition occurred on day 7th after ligation, shown by decreasing thermal hyperalgesia. MK-801 was given once a day started at day 7th to 13th. Spinal Cord was examined following hystochemistry Haematoxyllin-Eosin staining and immunohistochemistry antibody COX-2 reaction with light microscope.

Administration of MK-801 in all dose were significantly increased thermal hyperalgesia [$F_{(4,26)}$= 14.15; $p < 0.005$] compared with Ligation group. MK-801 also decrease expression of spinal COX-2 in cytoplasm and recover injured neuronal cells.

Keywords: neuropathic pain, ligation, NMDA receptor, MK-801, Cyclooxygenase-2 (COX-2), immunohystochemistry, spinal cord.