Neuroprotective effect of ketamine on acute spinal cord injury in rats

S.H. Tang¹, J.G. Yu¹, J.J. Li¹ and J.Y. Sun²

¹Department of Anesthesiology, Qilu Hospital, Shandong University, Jinan, Shandong Province, China
²Department of Neurology, Shandong Qianfoshan Hospital, Jinan, Shandong Province, China

Corresponding author: J.G. Yu
E-mail: jinguiyucn@163.com

Received May 7, 2014
Accepted December 8, 2014
Published April 17, 2015
DOI http://dx.doi.org/10.4238/2015.April.17.4

ABSTRACT. The aim of this study was to investigate the neuroprotective effects of ketamine during acute spinal cord injury in rats. Sprague Dawley (SD) rats (N = 70) were randomly divided into three groups: sham-operated (N = 10), control (N = 30), and treatment (N = 30) groups. The moderate spinal cord injury model was established. After injury, the sham-operated group received no drug, the treatment group received intraperitoneal ketamine injections, and the control group received intraperitoneal normal saline injections. Serum levels of tumor necrosis factor-α (TNF-α), interleukin-6 (IL-6), and spinal cord malondialdehyde (MDA) were assessed, and nerve cell apoptosis was evaluated in each group at varying time points. After spinal cord injury, TNF-α, IL-6, and MDA levels, and the number of TUNEL-positive cells among 2500 cells significantly increased (P < 0.05). Further, compared with the control group, the treatment group showed significantly lower TNF-α, IL-6, and MDA levels, and fewer TUNEL-positive cells among 2500 cells at each time point (P < 0.05). Our data indicate that ketamine exerts a neuroprotective effect on injured spinal cord.

Key words: Ketamine; Rats; Acute spinal cord injury; Tumor necrosis factor-α; Interleukin-6; Malondialdehyde