The Effects of Aloe Vera Extract on Brain Edema and Blood-Brain Barrier Permeability after Traumatic Brain Injury

Marzieh Shahriari¹, Mohammad Khaksari²*, Bahram Bibak³, Affat Ramshini1, Abbas Shahabi⁴

¹Neuroscience Research Center, Institute of Neuropharmacology, Kerman University of Medical Sciences, Kerman, Iran
²Physiology Research Center, Institute of Neuropharmacology, Afzalipour School of Medicine, Kerman University of Medical Sciences, Kerman, Iran
³Faculty of Medicine, North Khorasan University of Medical Sciences
⁴Department of Biochemistry, Kerman University of Medical Sciences, Kerman, Iran

Abstract

Introduction: Recent studies have reported that the Aloe vera (Aloe barbadensis miller) plant has anti-inflammatory and antioxidant effects. This study evaluated the neuroprotective effects of different doses of Aloe vera extract after traumatic brain injury (TBI) in male rats. Materials and Methods: In this study, 70 male rats were divided into 2 groups; each group consists of 5 of sub-groups as following: sham, TBI, TBI + vehicle, TBI + Aloe vera extract (low dose, 200mg/kg) and TBI + Aloe vera extract (high dose, 400mg/kg) groups. TBI was induced by the Marmarou method, and Aloe vera extract was administrated intra peritoneal (ip) 30 min after TBI. Brain edema was evaluated by measuring brain water content 24 h after the TBI and blood-brain barrier (BBB) permeability was determined by measuring Evans blue dye content 5 h after the TBI. Results: Our results showed that brain water contents was no significant difference in TBI group compared to TBI + vehicle group ($P<0.687$). But Aloe vera extract administration after TBI in different doses (200, 400 mg/kg) significantly reduced brain water content in TBI group compared to TBI + vehicle group ($P<0.005$). Also blood-brain barrier permeability significantly increased after TBI compared to vehicle group ($P<0.001$). In addition there was no significant difference in TBI group compared to TBI + vehicle group ($P<0.742$). But Aloe vera extract administration after TBI in different doses (200, 400 mg/kg) significantly reduced blood-brain barrier permeability in TBI group compared to TBI + vehicle group ($P<0.001$). Of course, high doses of aloe vera could more effectively reduced the brain blood barrier permeability compared to low dose of aloe vera. Conclusion: The current study, show that the Aloe vera extract may be had neuroprotetction effects after TBI. However, the mechanism(s) for this effect have not yet been elucidated.

Keyword: TBI, Brain edema, Aloe vera

*Corresponding Author: Mohammad Khaksari
E-mail: khaksar38@yahoo.co.uk