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

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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.

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

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