Effectiveness of 6-shogaol in potentiating sevoflurane mediated neuroprotection against ischemia/reperfusion-induced brain injury via regulating apoptotic proteins and PI3K/Akt/mTOR/s6K signalling and HIF-1α/HO-1 expression

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Abstract

Purpose: The current research has been intended to evaluate the impacts of 6-shogaol in rodent model of ischemic-reperfusion induced- brain injury and also assessed whether 6-shogaol enhanced sevoflurane's neuroprotective effects. Methods: Ischemic-Reperfusion (I/R) injury was induced by middle cerebral artery occlusion (MCAO) method in Sprague-Dawley rats. A separate group of animals was exposed to sevoflurane (2.5%) post-conditioning for 1 h immediately after reperfusion. 6-shogaol (25 mg or 50 mg/kg body weight) was orally administered to treatment group rats for 14 days and then subjected to I/R. Results: 6-shogaol treatment along with/without sevoflurane post-conditioning reduced the number of apoptotic cell counts, brain edema and cerebral infarct volume. The western blotting analysis revealed a significant stimulation of the PI3K/Akt/mTOR signal pathway. RT-PCR and western blotting studies revealed improved expressions of HIF-1α and HO-1were also noticed at both gene level and protein levels as determined by. I/R induced neurological deficits were also alleviated on sevoflurane post-conditioning with/without 6-shogaol treatment. Conclusion: The study's findings reveal that pre-treatment with 6-shogoal enhanced the neuroprotective properties of sevoflurane post-conditioning, illustrating the efficacy of the compound against I/R injury. 6-Shogaol thus could be investigated further for cerebral protection following I/R.

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