J Neurosci Res. 2012 Aug;90(8):1670-80. doi: 10.1002/jnr.22739. Epub 2012 May 15.

Beneficial effect of hydrogen-rich saline on cerebral vasospasm after experimental subarachnoid hemorrhage in rats

Yuan Hong [1], Songxue Guo, Sheng Chen, Chongran Sun, Jianmin Zhang, Xuejun Sun

Affiliations

PMID: 22589232 DOI: 10.1002/jnr.22739

Abstract

Cerebral vasospasm (CV) remains a common and devastating complication in patients with subarachnoid hemorrhage (SAH). Despite its clinical significance and extensive research, the underlying pathogenesis and therapeutic perspectives of CV remain incompletely understood. Recently, it has been suggested that molecular hydrogen (H(2)) can selectively reduce levels of hydroxyl radicals (·OH) and ameliorate oxidative and inflammatory injuries to organs in many models. However, whether H(2) can ameliorate CV after SAH is still unknown. This study was designed to evaluate the efficacy of H(2) in preventing SAH-induced CV. Experimental SAH was induced in Sprague-Dawley rats using cisterna magna blood injection. Hydrogen-rich saline (HS) was injected intraperitoneally (5 ml/kg) immediately and at 24 hr after injury. All rats were sacrificed 48 hr after the neurological examination scores had been recorded following SAH. Levels of oxidative stress and inflammation were evaluated. Basilar artery vasospasm was assessed by histological examination using light and transmission electron microscopy. HS treatment significantly improved neurological outcomes and attenuated morphological vasospasm of the basilar artery after SAH. In addition, we found that the beneficial effects of HS treatment on SAH-induced CV were associated with decreased levels of lipid peroxidation, increased activity of antioxidant enzymes, and reduced levels of proinflammatory cytokines in the basilar artery. These results indicate that H(2) has the potential to be a novel therapeutic strategy for the treatment of CV after SAH, and its neuroprotective effect might be partially mediated via limitation of vascular inflammation and oxidative stress.

Related information

MedGen
PubChem Compound (MeSH Keyword)

LinkOut - more resources

Full Text Sources
Ovid Technologies, Inc.
Wiley

Medical
MedlinePlus Health Information