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Hydrogen-rich saline protects against liver injury in rats with obstructive jaundice

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Abstract

Background: Hydrogen selectively reduces levels of hydroxyl radicals and alleviates acute oxidative stress in many models. Hydrogen-rich saline provides a high concentration of hydrogen that can be easily and safely applied.

Aims: In this study, we investigated the effects of hydrogen-rich saline on the prevention of liver injury induced by obstructive jaundice in rats.

Methods: Male Sprague-Dawley rats (n=56) were divided randomly into four experimental groups: sham operated, bile duct ligation (BDL) plus saline treatment [5 ml/kg, intraperitoneal (i.p.)], BDL plus low-dose hydrogen-rich saline treatment (5 ml/kg, i.p.) and BDL plus high-dose hydrogen-rich saline treatment (10 ml/kg, i.p.).

Results: The liver damage was evaluated microscopically 10 days after BDL. Serum alanine aminotransferase and aspartate aminotransferase levels, tissue malondialdehyde content, myeloperoxidase activity, tumour necrosis factor-alpha, interleukin (IL)-1beta, IL-6 and high-mobility group box 1 levels were all increased significantly by BDL. Hydrogen-rich saline reduced levels of these markers and relieved morphological liver injury. Additionally, hydrogen-rich saline markedly increased the activities of anti-oxidant enzymes superoxide dismutase and catalase and downregulated extracellular signal-regulated protein kinase (ERK)1/2 activation.

Conclusions: Hydrogen-rich saline attenuates BDL-induced liver damage, possibly by the reduction of inflammation and oxidative stress and the inhibition of the ERK1/2 pathway.

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