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## Effect of hydrogen-rich water on acute peritonitis of rat models

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### Abstract

**Objective:** To study the effect of hydrogen-rich water (HRW) on acute peritonitis with three different rat models.

**Methods:** Acute peritonitis was induced by three methods including intraperitoneal injection of lipopolysaccharide (LPS), rats' feces or cecal ligation and puncture (CLP) operation. For each model, male Sprague Dawley rats were used and distributed into saline control group, HRW control group, saline plus model group, and HRW plus model group. Saline or HRW (3 ml per rat) was orally administered by gavage for 7 days beforehand and 3 days after modeling. The efficacy was tested by detecting concentrations of white blood cells (WBCs), plasma endotoxin, interleukin (IL)-6 and tumor necrosis factor (TNF)- $\alpha$ . The activities of malondialdehyde (MDA), myeloperoxidase (MPO) and glutathione (GSH) in visceral peritoneum tissues were also evaluated. Meanwhile, histopathology examination of visceral peritoneum was performed using hematoxylin and eosin staining. The expression and location of nuclear factor kappaB (NF- $\kappa$ B) in the visceral peritoneum were detected by immunohistochemistry.

**Results:** Three models showed the same result that hydrogen-rich water had an efficient protective effect on acute peritonitis. HRW could significantly lower the levels of WBCs, plasma endotoxin and cytokines, enhance GSH activity and reduce MPO and MDA activities in the peritoneum tissue when compared with that of groups with only saline treated. Simultaneously, we found that HRW could also decrease the NF- $\kappa$ B expression in the peritoneum tissues.

**Conclusion:** Hydrogen-rich water could alleviate the severity of acute peritonitis, and it might perform this function by its anti-inflammation, anti-oxidation and anti-bacterial effects and reducing NF- $\kappa$ B expression in the peritoneum tissues.

**Keywords:** Hydrogen; Nuclear factor kappaB; Peritonitis; Rat model.

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