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Protective effects of hydrogen saline on diabetic retinopathy in a streptozotocin-induced diabetic rat model

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Abstract

Purpose: Diabetic retinopathy is the leading cause of blindness in the working population of the developed countries and also a significant cause of blindness in the elderly. This study aimed at examining the protective effect of H(2) saline on diabetic retinopathy in a streptozotocin-induced diabetic rat model.

Methods: Sprague-Dawley male rats were divided into 3 groups as follows: (1) nondiabetic control group (non-DM control); (2) diabetic control group (DM control); and (3) diabetic rats receiving H(2) saline therapy (DM H(2) saline). Rats in DM H(2) saline group were intraperitoneally injected with H(2) saturated saline (5 mL/kg) every day for 4 weeks. Retinal vascular permeability was assessed by measuring Evans blue leakage into the retina. Retinal apoptosis was evaluated by terminal deoxynucleotidyl transferase-mediated dUTP nick end labeling (TUNEL) staining and measuring caspase-3 activity. Retinal thickness was observed by hematoxylin and eosin staining.

Results: Our results showed that H(2) saline treatment could depress the caspase activity, reduce the retinal apoptosis, and vascular permeability. The H(2) saline could also prominently attenuate the retinal parenchyma thickening that resulted from diabetic retinopathy.

Conclusions: Our preliminary studies indicated that H(2) saline may have potentials in the clinical treatment of diabetic retinopathy.

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