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Administration of hydrogen-rich saline protects mice from lethal acute graft-versus-host disease (aGVHD)

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Abstract

Background: Allogeneic hematopoietic stem cell transplantation is a potentially curative therapy for many malignant and nonmalignant hematologic diseases. However, acute graft-versus-host disease (aGVHD) is a lethal complication of hematopoietic stem cell transplantation, which limits its application. Cytokines such as tumor necrosis factor- α and interleukin-6 play an extremely important role in the formation and development of aGVHD. Reactive oxygen species, such as hydroxyl radicals, also play an important role in the formation and development of aGVHD. In recent years, hydrogen was reported to have an ability to inhibit the levels of cytokines, such as tumor necrosis factor and interleukin-6 in vivo, and it also has a strong selective free radical-scavenging ability. Therefore, we hypothesized that hydrogen may have therapeutic effects on aGVHD.

Methods: To determine whether hydrogen could protect mice from lethal GVHD in a major histocompatibility complex-incompatible murine bone marrow transplantation (BMT) model, survival rates of mice were calculated and leukocyte counts were also determined after BMT. We also examined serum cytokine levels and scored clinical signs of GVHD mice after BMT.

Results and conclusion: This article demonstrated that the administration of hydrogen-rich saline increased the survival rate and clinical score of aGVHD mice. Administration of hydrogen-rich saline after transplantation also promoted the recovery of white blood cells of aGVHD mice. However, there was no report on the therapeutic effects of hydrogen on aGVHD. It is suggested that hydrogen has a potential as an effective and safe therapeutic agent on aGVHD.

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