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Improvement of psoriasis-associated arthritis and skin lesions by treatment with molecular hydrogen: A report of three cases

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Abstract

Psoriasis, a chronic inflammatory skin disease, is caused by infiltrating lymphocytes and associated cytokines, including tumor necrosis factor (TNF)α, interleukin (IL)-6, and IL-17. Effective treatments, including pathogenesis-based biological agents against psoriasis, are currently under development. Although the role of reactive oxygen species (ROS) in the pathogenesis of psoriasis has been investigated, it remains to be fully elucidated; ROS-targeted therapeutic strategies are also lacking at present. Therefore, the objective of the present study was to assess whether H2, a ROS scavenger, has a therapeutic effect on psoriasis-associated inflammation by reducing hydroxyl radicals or peroxynitrite in the immunogenic psoriasis cascade. Three methods were used to administer H2: Drop infusion of saline containing 1 ppm H2 (H2-saline), inhalation of 3% H2 gas, and drinking of water containing a high concentration (5-7-ppm) of H2 (high-H2 water). Treatment efficacy was estimated using the disease activity score 28 (DAS28) system, based on C-reactive protein levels, and the psoriasis area and severity index (PASI) score, determined at baseline and following each H2 treatment. Furthermore, levels of TNFα, IL-6, and IL-17 were analyzed. The DAS28 and PASI score of the three patients decreased during H2 treatment, regardless of the administration method. The psoriatic skin lesions almost disappeared at the end of the treatment. IL-6 levels decreased during H2 treatment in Case 1 and 2. IL-17, whose concentration was high in Case 1, was reduced following H2 treatment, and TNFα also decreased in Case 1. In conclusion, H2 administration reduced inflammation associated with psoriasis in the three cases examined and it may therefore be considered as a treatment strategy for psoriasis-associated skin lesions and arthritis.

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