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Abstract

Objective:

Oxidative stress is generated during the pathophysiology of endometriosis (EMT). Hydrogen (H_2) has been demonstrated as a gas antioxidant. The aim of the present study is to evaluate the protective effect of H_2 on EMT in rats.

Study Design:

Sprague Dawley rats with surgically induced EMT were randomly received the inhalation of 67% H_2–33% oxygen (O_2) mixture (1 h/d, 4 weeks) immediately after the EMT surgery or 4 weeks after the operation. The mixture of 67% N_2–33% O_2 was also used to exclude the possible influence of the increased O_2. Eight weeks after the operation, the endometrial tissues were weighted and analyzed using histology, immunohistochemistry, and real-time polymerase chain reaction. Several antioxidant enzymes and malondialdehyde were also measured in serum and tissue. The estrous cycles were monitored for H_2 safety.

Results:

The results showed that both profiles of high-dose H_2 breathing reduced the size of the endometrial explants, inhibited cell proliferation, improved superoxide dismutase, glutathione peroxidase, malondialdehyde, and catalase activities, and regulated the expression of matrix metalloproteinase 9 and cyclooxygenase 2. However, inhalation of the same dose of nitrogen failed to show the protection. High-dose H_2 breathing did not change the normal estrous cyclicity.

Conclusion:

These results suggest that 67% H_2–33% O_2 breathing has a beneficial effect on EMT model rats, and inhalation of a high dose of H_2 could be a potential method applied in clinical practice.

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