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Inhalation of hydrogen gas protects against myocardial stunning and infarction in swine

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Abstract

Objectives: The present study was carried out to determine whether inhalation of hydrogen (H(2)) gas protects myocardium against ischemia-reperfusion (I/R) injury in swine.

Design: In anesthetized open-chest swine, myocardial stunning was produced by 12-minute occlusion of left anterior descending coronary artery (LAD) followed by 90-minute reperfusion in the first study. Group A inhaled 100% oxygen, and group B inhaled 2% H(2) plus 98% oxygen during ischemia and reperfusion. In the second study, myocardial infarction was produced by 40-minute occlusion of LAD followed by 120-minute reperfusion. Group C inhaled 100% oxygen during ischemia and reperfusion. Group D inhaled 2% H(2) plus 98% oxygen. Group E inhaled 4% H(2) plus 96% oxygen.

Results: The change of segment shortening (%SS) from baseline at 90 minutes after reperfusion in group B was 74 ± 13 (mean ± SD) %, which was significantly higher than that in group A (48 ± 15%). Myocardial infarct size in group E (32 ± 10%), but not in group D (40 ± 9%) was smaller than that in group C (46 ± 6%).

Conclusions: Inhalation of 2% H(2) gas improves myocardial stunning, and inhalation of 4% but not 2% H(2) gas reduces myocardial infarct size in swine.

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