

Peng Y, Zheng M, Ye Q, Chen X, Yu B, Liu B. Heated and humidified CO₂ prevents hypothermia, peritoneal injury, and intra-abdominal adhesions during prolonged laparoscopic insufflations. *J Surg Res* 2009; 151: 40-47

Abstract

BACKGROUND:

Insufflation with standard cold-dry CO₂ during laparoscopic surgery has been shown to predispose patients to hypothermia and peritoneal injury. This study aimed to compare the effect of prolonged cold-dry CO₂ insufflation with heated-humidified CO₂ insufflation (3-5 h) on hypothermia, peritoneal damage, and intra-abdominal adhesion formation in a rat model.

MATERIALS AND METHODS:

A total of 160 Wistar rats were randomized to undergo no insufflation or insufflation with cold-dry CO₂ (21 degrees C, <1% relative humidity) or heated-humidified CO₂ (37 degrees C, 95% relative humidity) for 3, 4, or 5 h. Core body temperature was measured via rectum before and during insufflations. Peritoneal samples were taken at 6, 24, 48, and 96 h after treatments and analyzed with light microscopy and scanning electron microscopy. Intra-abdominal adhesions were evaluated 2 weeks later.

RESULTS:

Core body temperature significantly decreased in the cold-dry group, whereas it was maintained and increased in the heated-humidified group. Scanning electron microscopy and light microscopy studies showed intense peritoneal injury in the cold-dry CO₂ group but significantly less damages in the heated-humidified group. Increased intra-abdominal adhesion formation was observed in the cold-dry CO₂ group, while no adhesions were found in the rats insufflated with heated-humidified CO₂.

CONCLUSIONS:

Heated-humidified CO₂ insufflation results in significantly less hypothermia, less peritoneal damage, and decreased adhesion formation as compared with cold-dry CO₂ insufflation. Heated-humidified CO₂ may be more suitable for insufflation application in prolonged laparoscopic surgery