Carbon dioxide versus room air for natural orifice transluminal endoscopic surgery (NOTES) and comparison with standard laparoscopic pneumoperitoneum.

Abstract:
BACKGROUND: Most studies investigating natural orifice transluminal endoscopic surgery (NOTES) have used room air, whereas carbon dioxide (CO(2)) is traditionally preferred for laparoscopic insufflation. OBJECTIVE: Evaluation of CO(2) versus room air for NOTES and comparison with standard laparoscopic pneumoperitoneum. DESIGN: Prospective experiments in an acute porcine model. INTERVENTIONS: For transgastric peritoneoscopy, either CO(2) or room air were insufflated via the endoscope for a constant intraperitoneal pressure of 12 mm Hg in 16 pigs. Another 8 pigs received laparoscopic insufflation with CO(2). Identification of intra-abdominal organs during NOTES was documented. Additionally, standardized video recordings of peritoneoscopy were evaluated by an independent blinded observer. Complete cardiopulmonary status was assessed every 3 minutes. MAIN OUTCOME MEASUREMENTS: Quality of transgastric peritoneoscopy and cardiopulmonary response. RESULTS: In the NOTES room air group, significantly more target organs (18/64, 28%) were missed than in the NOTES CO(2) group (8/64, 13%; P = .028). However, blinded video analysis showed no difference between the groups. An increase in systemic vascular resistance index during
pneumoperitoneum in the NOTES room air group was less pronounced than in the NOTES CO(2) group, almost reaching the level of significance (P = .050). With respect to hemodynamics, there were no significant differences between the NOTES CO(2) group and the laparoscopy CO(2) group.

LIMITATIONS: Nonsurvival animal experiments. CONCLUSIONS: Pressure-controlled endoscopic insufflation of CO(2) for NOTES showed minor advantages compared with insufflation of room air regarding intra-abdominal visualization, but resulted in an increase in cardiac afterload. However, the cardiorespiratory responses during endoscopic insufflation of CO(2) were similar to the widely accepted standard laparoscopic CO(2) insufflation.