Changes in intra-abdominal pressure, hemodynamics, and peak inspiratory pressure during gastroscopy in a porcine model.

BACKGROUND AND STUDY AIMS: The aim of this experimental study was to assess the effect of gastric insufflation on intra-abdominal pressure (IAP) and associated hemodynamic and respiratory changes during upper gastrointestinal endoscopy. METHODS: Measurements were taken from pigs under general anesthesia with controlled ventilation. Gastroscopy was carried out with continuous insufflation of air by a standard endoscopic light source/insufflator. The cardiac index and global end-diastolic volume index (GEDVI; reflecting preload) were measured by transpulmonary thermodilution. IAP, heart rate, mean arterial pressure (MAP), central venous pressure, systemic vascular resistance index (SVRI; reflecting afterload), peak inspiratory pressure (PIP), and oxygenation (SaO₂) were also recorded. RESULTS: A total of 266 paired measurements (at the time of transpulmonary thermodilution) were taken from 14 animals. During air insufflation, we observed a significant rise in IAP in all animals up to intermittent values of 22 mm Hg. IAP and PIP correlated well (r = 0.666, P<0.001), with the latter reaching values as high as 45 mbar in one pig, leading to respiratory compromise. Only marginal changes in heart rate, and a continuous, almost significant rise in MAP (due to a significant increase in SVRI) were recorded. We observed a
slight increase in GEDVI, predominantly during the initial phase of air insufflation. The cardiac index showed no substantial changes. There were no episodes of hemodynamic instability, nor a decline in SaO (2). CONCLUSIONS: Air insufflation during gastroscopy resulted in a significant increase in IAP. The main clinically relevant finding was a steady increase in SVRI. Major increments in PIP suggest a role of intra-abdominal hypertension in otherwise unexplained respiratory compromise during upper gastrointestinal endoscopy.