Effects of Anesthesia on Esophageal Sphincters in Obese Patients

av

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Akademisk avhandling

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Abstract


The lower esophageal sphincter (LES) and the upper esophageal sphincter (UES) play a central role in preventing regurgitation and aspiration. The aim of this thesis was to evaluate the UES, LES, esophageal (E) and barrier (Br) pressures (P) using high resolution solid state manometry (HRSM). Comparisons were made between obese and non-obese patients, before and during anesthesia induction, and in obese patients in different body positions and during different respiratory maneuvers.

Methods: The effects of low-dose propofol (0.3 mg/kg iv) were studied in 10 young (ages 18–30 years) and 10 elderly volunteers (ages 60–87 years). The effects of anesthesia induction with remifentanil, propofol and rocuronium were studied in 14 obese patients (BMI >35 kg/m$^2$) and compared with effects in 14 non-obese patients. The effects of different body positions on esophageal sphincters were evaluated in 17 obese patients before and during anesthesia. The effects of different respiratory maneuvers on pressures in the esophagus and esophageal sphincters were studied before and during anesthesia in 17 obese patients. HRSM was used in all studies.

Results: The low propofol dose did not influence LES pressures in either young or elderly volunteers. Anesthesia induction with Remifentanil and Propofol decreased pressures in the esophageal sphincters and the BrP in both obese and non-obese patients. The pressures were significantly lower in obese patients. The BrP remained positive in both obese and non-obese individuals. The LES pressure increased in the Trendelenburg position before but not during anesthesia. During spontaneous breathing the LES pressure was significantly lower during end-expiration compared to end-inspiration. The LES pressure increased during the Valsalva maneuver and forced inspiration. With the patients in supine position the EP was positive during normal spontaneous breathing and during mechanical ventilation but was negative during forced inspiration. The EP increased significantly during PEEP.

Conclusion: High-resolution solid-state manometry is a valuable tool for studying esophageal function. Lower esophageal sphincter pressure and barrier pressure decreased during anesthesia induction and were significantly lower in obese compared to non-obese patients. However, barrier pressure remained positive in all patients. When evaluating the risk for regurgitation, the lowest lower esophageal sphincter pressure and barrier pressure are found during end-expiration. PEEP during anesthesia increased esophageal pressures and may therefore decrease the risk for passive regurgitation.

Keywords: Lower esophageal sphincter, upper esophageal sphincter, barrier pressure, obesity, high-resolution solid-state manometry, anesthesia

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