



Effects of Anesthesia on Esophageal Sphincters

av

Rebecca Ahlstrand

Akademisk avhandling

Avhandling för medicine doktorsexamen i ämnet
Medicinsk Vetenskap med inriktning Kirurgi,
som enligt beslut av rektor kommer att försvaras offentligt
onsdagen den 1 juni 2011 kl. 09.00,
Wilandersalen, Universitetssjukhuset i Örebro

Opponent: Johan Ullman
Docent Karolinska Institutet,
överläkare Anestesi och Intensivvårdskliniken
Karolinska Universitetssjukhuset, Solna

Örebro universitet
Hälsoakademin
701 82 ÖREBRO

Abstract

Rebecca Ahlstrand (2011): Effects of Anesthesia on Esophageal Sphincters. Örebro Studies in medicine 55.

The esophageal sphincters constitute the anatomical protection against pulmonary aspiration. The aim of this thesis was to study the esophageal sphincters and how they are affected by different components of emergency anesthesia using high-resolution solid-state manometry.

The effect of propofol (0.3 mg/kg) was studied in young and elderly volunteers. Propofol can be given as an anxiolytic agent for manometric studies of the lower esophageal sphincter (LES) without affecting the results. However, propofol is not recommended for studies of the upper esophageal sphincter (UES).

The effects of cricoid pressure (CP) and peripheral pain were studied in awake volunteers, with and without remifentanyl infusion (5 ng/ml). Pain did not affect pressure in the LES, but CP or remifentanyl induced a significant decrease in LES pressure. However, neither CP nor remifentanyl affected the barrier pressure (LES-intra gastric pressure). When CP was applied during ongoing remifentanyl infusion, no further decrease in LES pressure was measured. CP induced high pressures in the area of the UES independent of remifentanyl infusion, indicating that CP is effective in preventing gastroesophageal regurgitation.

Barrier pressure was also studied in anesthetized patients after rocuronium (0.6 mg/kg) administration and no decrease was measured.

In addition, alfentanil (20 µg/kg) added during anesthesia induction with propofol did not decrease the barrier pressure.

In conclusion, CP seems to be effective in preventing regurgitation and does not affect barrier pressure. Muscle relaxation with rocuronium does not risk gastro-esophageal integrity. In addition, opioids can be integrated, even during emergency anesthesia, without increasing the risk for pulmonary aspiration.

Keywords: Lower esophageal shincter, Upper esophageal sphincter, Barrier pressure, Manometry, Propofol, Remifentanyl, Alfentanil, Rocuronium, Cricoid pressure.

Rebecca Ahlstrand, School of Health and Medical Sciences
Örebro University, SE-701 82 Örebro, Sweden,
rebecca.ahlstrand@orebroll.se