

Comparison of Acoustic Respiration Rate, Impedance Pneumography and Capnometry Monitors for Respiration Rate Accuracy and Apnea Detection during GI Endoscopy Anesthesia

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Study Objective

To assess the accuracy of respiration rate measurements and the ability to detect apnea by capnometry, impedance pneumography and a new method, acoustic respiration rate monitoring, in anesthetized patients undergoing gastrointestinal endoscopy procedures.

Methods

Design: Prospective observational study. Setting: Endoscopy procedures laboratory.

Patients: 98 patients scheduled for upper gastrointestinal endoscopy with propofol-based anesthesia.

Interventions: Patients were monitored for respiration rate with acoustic respiration rate monitoring, capnometry and impedance pneumography and values were compared to the manual counting of breaths by observation of chest wall movements. Additionally, when any respiration rate monitor indicated a cessation of breathing for 30 seconds or greater, the presumed apnea was confirmed by direct observation of the patient for absence of chest wall movements.

Measurements and Main Results

Bias and precision for respiration rate measurement was 0 ± 1.0 bpm for acoustic monitoring, 4.8 ± 15.1 bpm for capnometry and 0.4 ± 5.9 bpm for impedance pneumography. Sensitivity and specificity for detection of apnea was 73% and 93% for acoustic monitoring, 73% and 12% for capnometry and 45% and 93% for impedance pneumography.

Conclusions

Acoustic respiration rate monitoring was found to be accurate for assessment of respiration rate and to have similar or better sensitivity and specificity for detection of apnea compared to capnometry and impedance pneumography in the setting of upper GI endoscopy.