Advanced Monitoring Is Associated with Fewer Alarm Events During Planned Moderate Procedure-Related Sedation: A 2-Part Pilot Trial.

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BACKGROUND: Diagnostic and interventional procedures are often facilitated by moderate procedure-related sedation. Many studies support the overall safety of this sedation; however, adverse cardiovascular and respiratory events are reported in up to 70% of these procedures, more frequently in very young, very old, or sicker patients. Monitoring with pulse oximetry may underreport hypoventilation during sedation, particularly if supplemental oxygen is provided. Capnometry may result in false alarms during sedation when patients mouth breathe or displace sampling devices. Advanced monitor use during sedation may allow event detection before complications develop. This 2-part pilot study used advanced monitors during planned moderate sedation to (1) determine incidences of desaturation, low respiratory rate, and deeper than intended sedation alarm events; and (2) determine whether advanced monitor use is associated with fewer alarm events.

METHODS: Adult patients undergoing scheduled gastroenterology or interventional radiology procedures with planned moderate sedation given by dedicated sedation nurses under the direction of procedural physicians (procedural sedation team) were monitored per standard protocols (electrocardiography blood pressure, pulse oximetry, and capnometry) and advanced monitors (acoustic respiratory monitoring and processed electroencephalograpy). Data were collected to computers for analysis. Advanced monitor parameters were not visible to teams in part 1 (standard) but were visible to teams in part 2 (advanced). Alarm events were defined as desaturation-SpO2 ≤92%; respiratory depression, acoustic respiratory rate ≤8 breaths per minute, and deeper than intended sedation, indicated by processed electroencephalograpy. The number of alarm events was compared.

RESULTS: Of 100 patients enrolled, 10 were excluded for data collection computer malfunction or consent withdrawal. Data were analyzed from 90 patients (44 standard and 46 advanced). Advanced had fewer total alarms than standard (Wilcoxon-Mann-Whitney = 2.073, P = 0.038; Wilcoxon-Mann-Whitney odds, 1.67; 95% confidence interval [CI], 1.04-2.88). Similar numbers of standard and advanced had ≥1 alarm event (Wald difference, -10.2%; 95% CI, -26.4% to 7.0%; P = 0.237). Fewer advanced patients had ≥1 respiratory depression event (Wald difference, -22.1%; 95% CI, -40.9% to -2.4%; P = 0.036) or ≥1 desaturation event (Wald difference, -24.2%; 95% CI, -42.8% to -3.6%; P = 0.021); but there was no significant difference in deeper than intended sedation events (Wald difference, -1.38%; 95% CI, -20.21% to 17.49%; P = 0.887).

CONCLUSIONS: Use of advanced monitoring parameters during planned moderate sedation was associated with fewer alarm events, patients experiencing desaturation, and patients experiencing respiratory depression alarm events. This pilot study suggests that further study into the safety and outcome impacts of advanced monitoring during procedure-related sedation is warranted.