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Krauss, BS, et al. Characteristics of and Predictors for Apnea and Clinical Interventions During Procedural Sedation. *Annals of Emergency Medicine*. vol 68, no. 5, 2016.

Objective: Describe the characteristics of and predictors for apnea and clinical interventions during emergency department procedural sedation

Methods: Prospective trial. Convenience sampling of ED patients undergoing propofol or ketofol sedation. End tidal CO_2 ($ETCO_2$), respiratory rate, pulse rate, and SpO_2 were recoded in 1 second intervals. Procedure times, drug delivery, and interventions were annotated. Kaplan-Meier curves were used to describe the onset of clinical interventions as a function of sedation time. Apnea was defined as 15 consecutive seconds of no respirations with carbon dioxide less than or equal to 10 mm Hg. Clinical interventions were estimated with a series of Cox proportional hazards survival models, with time to first apnea or clinical intervention as the dependent variable. The association between apnea and clinical intervention was also tested.

Results: 312 patients were analyzed. 53% were male. Apnea was preceded by $ETCO_2$ less than 30 mm Hg or greater than 50 mm Hg at 30, 60, and 90 seconds before onset. Clinical interventions were predicted by apnea, SO_2, and propofol use. Increasing age predicted both apnea and interventions. Apnea was not predicted by respiratory rate or SpO_2. Apnea occurred in half of the patients and 25% of the patients required clinical interventions. Clinical intervention was not predicted by abnormal respiratory rate or abnormal $ETCO_2$ level. 85% of the clinical interventions were minor. There were no cases of assisted ventilation, intubation, or complications.

Conclusion: $ETCO_2$ predicted apnea along a time course. Alterations in SpO_2, apnea, and propofol use predicted clinical interventions. Increasing age predicted both apnea and clinical intervention