



The ED-AWARENESS Study

Key Article

Pappal RD, et al. *The ED-AWARENESS Study: A prospective, observational cohort study of awareness with paralysis in mechanically ventilated patients admitted from the emergency department. Ann Emerg Med. 2021; 77:532-544.*

Background

- Awareness with recall of paralysis is the recollection of sensory perceptions while under the influence of a NMBA.
- Studies in the OR setting have demonstrated that up to 70% of patients who experience awareness with paralysis develop long-term psychological sequelae – PTSD, depression, and phobias.
- Prospective studies in the OR under general anesthesia estimate the prevalence to be 0.1-0.2%.
- Risk factors for awareness with paralysis in the OR include:
 - IV anesthetics compared with inhaled anesthetics
 - Under dosing of anesthesia
 - Longer-acting NMBA
 - Lack of protocolized sedation depth monitoring
- Many ED patients who are intubated and initiated on mechanical ventilation may be at risk for awareness with paralysis.
 - Patients receive IV analgo-sedation that is often under dosed – this includes RSI meds
 - Many patients receive no sedation after RSI
 - For others, there can be significant delay in initiating postintubation sedation and it is often started at lower doses
 - Lack of protocol-driven management of sedation is common

Objective

- Estimate the prevalence of awareness with paralysis in ED patients receiving mechanical ventilation

Study

- Prospective, cohort study
- Single-center, academic, residency-affiliated, tertiary care center in St. Louis, MO
- Patients
 - Included
 - Adults aged 18 years or older
 - Underwent mechanical ventilation through an ETT in the ED
 - Intubation could have been performed either in the ED, prehospital setting, or at a transferring facility
 - Excluded
 - Death before discontinuation of mechanical ventilation

- Presence of neurologic injury with residual deficit that precluded assessment with paralysis
 - Transfer to another facility
- Methods of Measurement
 - All measurements and clinical data were gathered from chart review – all variables extracted from the EMR
 - This included induction agents/NMBAs to facilitate RSI, postintubation analgesedation medications (opiates, benzos, propofol, ketamine, etomidate, haloperidol, quetiapine) and NMBAs.
 - Also recorded sedation depth with the RASS
- Primary Outcome
 - Awareness with paralysis
 - To aid in distinguishing awareness with paralysis from appropriate recall of memories while patients receive sedation with mechanical ventilation, investigators used a combination of questions from the Brice questionnaire, and the ICU Memory Tool.
 - Brice questionnaire is the preferred method for evaluating awareness with paralysis
 - Team assessed for awareness with paralysis after extubation and before hospital DC
 - Awareness with paralysis independently adjudicated by 3 expert reviewers
 - Awareness with paralysis was determined when at least 2 experts were in agreement
- Secondary Outcome
 - Perceived threat (identified as a mediator or causal pathway to PTSD symptoms)
 - Assessed using a validated measurement tool

Results

- 383 patients included in the study
- 27 patients reported memories of wakeful paralysis and were evaluated for the primary outcome
- After adjudication, the **prevalence of possible or definite awareness with paralysis was 2.6%** (95% CI 1.3% to 4.7%)
- Exposure to rocuronium at any time in the ED (RSI and postintubation) was significantly different between patients who experienced awareness with paralysis (70%) versus the rest of the cohort (31%) (OR 5.1; 95% CI 1.3 to 20.1)
- Patients experiencing awareness with paralysis had a higher mean values on the threat perception scale (13.4 versus 8.5)

Limitations

- Overall sample size was small
- Single-center
- Subjective assessment of awareness with paralysis
- Authors excluded a large number of neurologically injured patients – could have inflated the event rate
- Assessed patients before hospital DC – did not assess them later (i.e., 30 days)

Take Home Points

- Clinical Pearls – WATCH OUT for prolonged paralysis and no sedation!
 - RSI Paralytic Pharmacokinetics
 - Rocuronium Onset: Rapid (1-2 min), duration 30-60 minutes
 - Succinylcholine Onset: Rapid (60 sec), duration 5-10 minutes
 - RSI Sedative PKs
 - Etomidate Onset: < 1 min, duration 3-5 minutes
 - Ketamine Onset: 1 min, duration 30-45 minutes
- Awareness with paralysis occurred in 2.6% of this single center cohort of ED patients receiving mechanical ventilation and was associated with rocuronium exposure.
- Given the volume of patients intubated in the ED annually in the US, this could suggest that thousands of patients may have awareness with paralysis.