Transcript Details

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Awareness During Intubation: Exploring Risks and Monitoring in ICU Settings

Announcer:
You're listening to *Clinician's Roundtable* on ReachMD. On this episode, Dr. Yana Zemkova will discuss her research on awareness during endotracheal intubation, which she presented at CHEST 2025. Dr. Zemkova is Clinical Assistant Professor of Internal Medicine specializing in Pulmonary, Critical Care and Occupational Medicine at the University of Iowa. Let's hear from her now.

Dr. Zemkova:
We structured this as an observational study and tried to model it on something pragmatic to see how we could integrate and incorporate the investigation of awareness into our daily practice. So we built this out in several of our ICUs in our institution and were able to utilize our critical care fellows as well as our bedside nurses to help investigate some of these components.

We tried to use a real-time method to measure the depths of sedation, so we elected to investigate the use of a BIS monitor, which is a modified EEG system that is currently used in various OR settings to measure the depths of sedation. We used a BIS of greater than 60 as our cutoff. Historically, a level of 40 to 60 can represent general anesthesia for surgery, and that cutoff has been used to prevent awareness in OR populations.

So at the bedside, we used two devices for data collection, one of which being the BIS monitor, and we also used the train-of-four peripheral nerve stimulator to help us gauge when the patient was actually paralyzed. Ideally, we asked our fellows to apply these devices during the preoxygenation period when the patient was selected for intubation. Once the devices were applied, the clinical team then proceeded with intubation as planned. The devices remained in place, and our nursing staff collected train of four measurements every five to 10 minutes until the patient demonstrated twitches or a predetermined time had elapsed. Once we reached that endpoint, all of the devices were removed. Our research team obtained delayed consent for study participation.

And as a secondary outcome, once a patient was able to be extubated and able to participate in an interview, we would conduct a survey and ask them about their experiences modeled on the Modified Brice Questionnaire to help us gauge if there was an awareness with paralysis experience. Those interviews were reviewed by blinded reviewers to determine if it could be an awareness with paralysis event.

In terms of our findings, I think we were pretty surprised by the results. At the time of the submission of this abstract, we had enrolled 41 participants, and 29 of those were extubated and able to proceed to the interview portion of the study.

So in terms of our actual results, we found that 24% of the patients we enrolled actually did have a BIS greater than 60, which was our cutoff point, and we did separate this out based on the induction agents that were used. At our institution, we found that ketamine and etomidate were the most commonly used. There is some data that shows that ketamine may actually increase the value of the BIS, which does not necessarily correlate with a lower level of sedation, but we did separate that out to determine if there was an effect of those.

We did find that both ketamine and etomidate and various combinations of other agents that were infrequently used—all of those had at least 20 patients who had an elevated BIS of greater than 60 for more than four minutes while they were still paralyzed, which to us signals that there is a potential and a risk for awareness with paralysis.

When we reviewed the interviews, we did see that there were three patients who had a definite or possible awareness with paralysis event based on the adjudicated responses by our interviewers, which puts us at a seven to 10 percent rate of awareness with paralysis.

When you compare that to OR literature, the rate of awareness with paralysis is 0.1 to 0.2 percent, and so this was much higher than OR populations but does approximate what had been seen in the emergency department populations.

We had a small number of patients, so we can't exactly correlate that the BIS greater than 60 is associated with awareness with paralysis, but it does raise our concern that there is some more research to be done and that these are patients that are going to be at risk.

Announcer:
That was Dr. Yana Zemkova discussing a pilot study on awareness during endotracheal intubation, which she presented at CHEST 2025. To access this and other episodes in our series, visit *Clinician's Roundtable* on ReachMD.com, where you can Be Part of the Knowledge. Thanks for listening!