

## Effects of Sedatives and Opioids on Patient Ventilator Asynchrony



Patient-ventilator asynchrony is frequent during invasive mechanical ventilation. If patient-ventilator interaction is poor, it can prolong the duration of mechanical ventilation and can also result in longer ICU and hospital stay as well as increased mortality. It is thus important to optimise patient-ventilator interaction.

There are many factors that could affect patient-ventilator interaction. These include ventilator settings, and the use of sedatives. Deep sedation is particularly associated with worse short- and long-term outcomes. Therefore, minimising the use of sedation during mechanical ventilation is highly recommended.

There is still a lack of clarity with respect to the use of sedatives and opioids and how they affect asynchronies. Different studies report different findings. For example, one study suggested that light sedation with propofol does not affect the rate of asynchronies, but deep sedation with the same drug increased it. Another study shows that deep sedation and the use of benzodiazepines is associated with higher mortality. Yet another study reported that dexmedetomidine had fewer asynchronies compared to propofol. None of these studies took opioid administration into account.

In this study, the researchers hypothesised that opioids alone would improve trigger and cycling asynchronies and result in more wakeful patients compared to sedatives alone or sedatives-plus-opioids. The study included patients from four ICUs in Spain who were intubated for mechanical ventilation that was expected to last >24 hours.

Level of consciousness was assessed every 4 hours using the Riker-Sedation-Agitation Scale (SAS), and a daily average was computed based on these values. Severity of illness was assessed using the Sequential Organ Failure Assessment (SOFA). All patients were managed with similar care protocols and lung-protective ventilation strategies. The administered doses of opioids (morphine and fentanyl) and sedatives (midazolam, propofol, and lorazepam) were recorded every day and were converted to morphine and midazolam equivalents. Each day of mechanical ventilation was classified as follows: no drugs; sedatives only; opioids only; or sedatives plus opioids. Asynchronies were detected using the BetterCare™ software, which recorded airflow, airway pressure, and tidal volume from admission to extubation or death. All asynchronies were averaged per day, and the rates of inspiratory efforts during expiration (IEE), double cycling, and the overall asynchrony index (AI) were computed.

Results showed that the overall rate of asynchronies did not differ between opioids-only, sedatives-only, and sedatives-plus-opioids. Patients who received sedatives had a lower level of consciousness compared to those who received opioids alone. The sedatives-plus-opioids protocol decreased the level of consciousness but did not decrease asynchronies. In the sedative-plus-opioids days, the sedative dose was directly associated with the rate of asynchronies and resulted in a lower level of consciousness. Higher opioid doses were associated with a lower AI without worsening level of consciousness. Overall, the opioid administration approach seemed most clinically sound and was found to improve patient-ventilator synchrony while preserving consciousness. Optimal titration of opioids could thus improve patient-ventilator interaction and help avoid the deleterious effects of sedatives.

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