

## Sedation in Intensive Care Unit: Use of Dexmedetomidine– Blessing or Blight?

Dear Editor,

Sedatives are administered to most of the patients admitted in intensive care unit (ICU) as a part of multimodal approach of their care and management. The purpose of using sedative is to reduce anxiety, discomfort, agitation related harm, metabolic demands of the critically ill patients and to improve their synchrony with mechanical ventilation (MV).

Choosing a right sedative agent and using it in right dose to achieve a right level of sedation is crucial as extremes in the level of sedation are associated with worst clinical outcomes. If patients are under sedated, our objectives of using sedatives will not be fulfilled, and if over sedated, that may increase the duration of MV, ICU stay and the incidence of cognitive impairment. Overall, both over and under sedation may be associated with increased cost, morbidity and even mortality of critically ill patients.

Commonly used sedatives in ICU are benzodiazepines (BZDs), propofol, opioids, and dexmedetomidine. Ketamine as a sedative is the new kid on the block, the use of which is increasingly explored and has the potential of being a promising sedative agent in patients who are hemodynamically unstable.

Dexmedetomidine is an alpha-2 adrenoreceptor agonist, approved by the food and drug administration first in 1999 A.D for short term sedation in patients admitted in ICU [1]. Over the years, its acceptance as a sedative and its clinical application has expanded beyond the arena of ICU and is increasingly used in the perioperative period for procedures like awake craniotomy, awake fiberoptic intubation, and fast track extubation. Noninferiority of dexmedetomidine to both propofol and midazolam in maintaining target sedation level and providing clinically relevant benefits by reducing the duration of MV, time to extubation and improving comfort has been reported [2].

Dexmedetomidine has some unique properties

when compared with the commonly used sedatives in ICU. Unlike BZDs and propofol, it has analgesic effects. It causes minimum respiratory depression compared to BZDs, opioids and propofol. The sedation induced by dexmedetomidine is known to resemble natural sleep pattern, where patients remain calm and sedated when not stimulated. When stimulated even with lighter degree of stimulus, they awaken and remain communicative and cooperative, which greatly facilitates their interaction with the caregivers.

Most of the BZDs and opioids have longer half-life, have active metabolites and tend to accumulate proportionately with the dose and duration of administration. Although, both propofol and dexmedetomidine have shorter half-life and their metabolites are inactive, prolonged infusion of propofol may increase its lifetime and be associated with propofol infusion syndrome, which is rare but a potentially fatal complication. Use of BZDs is associated with higher incidence of delirium in patients admitted in ICU, whereas dexmedetomidine is reported to have delirium sparing effects.

Both propofol and dexmedetomidine share common adverse effects, which are hypotension and bradycardia. Studies comparing the hemodynamic effects of these two drugs report similar incidence of hypotension, bradycardia and even cardiac index. Symptomatic bradycardia requiring drug discontinuation was similar in mechanically ventilated patients of sepsis when these two drugs were used for sedation [3]. However, the study had excluded patients with second and third degree heart block and with persistent bradycardia requiring intervention.

Considering most of the critically ill patients are either hemodynamically unstable or are prone to instability, we must be cautious while using dexmedetomidine as sedative. The incidence of hypotension and bradycardia may be reduced by taking some precautions. Making sure that the patient's intravascular volume is okay before the start of dexmedetomidine and avoiding its loading dose and starting with the maintenance dose are some of the measures that can be practiced. We may completely avoid its use in patients with cardiac conduction abnormalities.

High probability of reduced 90-day mortality in patients > 65 years and increased 90-day mortality in

patients < 65 years was observed in a multinational trial conducted in mechanically ventilated patients [4]. The mortality in younger group increased with increasing APACHE II scores. Unlike many other studies, this study included patients requiring deeper level of sedation who are likely to be severely ill with risk of increased mortality.

Protocol suggests the use of sedatives only after the pain of patients has been adequately treated. This strongly applies to patients who are admitted in ICU in the immediate postoperative period and after trauma. For sedation, using either propofol or dexmedetomidine over BZDs is suggested. Use of midazolam sedation is suggested only in a selective group of patients, those with alcohol withdrawal and propofol intolerance [5].

Now, coming to the question, Dexmedetomidine as sedative in ICU- blessing or blight? I go with blessing. First, the effectiveness of dexmedetomidine as a sedative is proven over 20 years and is being increasingly used for sedation in ICU and perioperative period. Second, the beneficial effects of dexmedetomidine outweigh its unwanted effects. Hypotension and bradycardia associated with its use can be treated, and their incidence can be reduced by remaining vigilant. Third, after the launch of dexmedetomidine we do not have any other sedative agent introduced in the market having a better or equal pharmacological profile. In fact, all the drugs that are time tested and are being used for patient management are blessing to the mankind. Nonetheless, we must use clinical judgement while using dexmedetomidine and choosing patients for its use.

To conclude, gone are the days when we used to keep patients under mechanical ventilation deeply sedated. Maintaining a light level of sedation with use of drugs that have shorter half-life and can be easily titrated and going for daily interruption of sedation is the current trend. Dexmedetomidine is an attractive sedative agent having analgesic, anxiolytic, and sympatholytic properties. Lack of respiratory depression, conscious sedation, and improved delirium profile make it unique. It must be used cautiously in patients with depleted intravascular volume and cardiac conduction block.



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#### Declarations

**Conflict of Interest interest:** None

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