EDITORIAL

Am I Sedated or in Pain? Please Monitor by Brain

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Critically ill patients on ventilators experience pain, anxiety, or agitation either due to their disease states or due to the presence of invasive lines and catheters. This disturbs their sleep-wake cycle and hence worsens the clinical condition.[1] Hence, sedation and analgesia form a necessary aspect of the management of ventilated patients.[2] Many sedatives and analgesics are being used in intensive care units to achieve optimum levels of sedation. Various methods like Ramsay sedation scale (RSS) or Richmond agitation sedation scale (RASS) have been employed to measure the level of sedation and analgesia in ventilated patients. These scales become useless in the event of oversedation or muscle relaxation.

The quantum consciousness index (qCON) is a technique for measuring the depth of sedation from dynamic EEG.[3] It uses a neural network to calculate a value between 0 and 99 which is independent of autonomic activity.[4] From various studies, it has been reported that qCON between 40 and 60 suggests adequate depth of sedation. Quantium nociception index (qNOX) suggests appropriate analgesia depth and a value between 30 and 50 suggests adequate analgesia.[5] The majority of literature available is about intraoperative sedation and analgesia but its extrapolation in intensive care unit is not very easy and straightforward.

In the current issue of the Indian Journal of Critical Care Medicine, Masharto et al.[6] evaluated qCON and qNOX in postoperative patients by either administering them a subdose of ketamine or midazolam and fentanyl. Forty-four postoperative patients were enrolled for the study and were divided into two groups. The patients were evaluated at 0 hour, 12 hours, and 24 hours after administration of the medicines. They did not find any significant difference in hemodynamic variables between the groups ($p > 0.05$). The qCON and qNOX were also similar between the groups with increasing values over time ($p > 0.05$). They concluded that ketamine administration is non-inferior to the combination of midazolam and fentanyl. But this being a single-center study and being performed only in postoperative patients, the exact comparison cannot be made in a medical subset of ventilated patients. Secondly, the CONOX tool availability is not easy at most of the centers and hence following the protocol will be difficult.

Ketamine is a dissociative anesthetic agent and is a potent analgesic when used at subanesthetic doses.[7] At this dose, ketamine improves pain perception and eliminates the need for any opioid administration.[8] Also, it does not have any detrimental effect on hemodynamics and hence has been used by emergency physicians. Jahanian et al.[9] concluded that low-dose ketamine had similar pain relief to morphine. A similar study comparing ketamine and fentanyl in trauma patients with severe pain also had similar results.[10] However, all these studies have been done either in postoperative patients or during anesthesia. None of the studies have utilized ketamine as a sedative and analgesic option as a continuous infusion for ICU-ventilated patients.

Conceptually, avoiding opioid derivates with non-opioid alternatives should be practiced whenever feasible as the side effects of opioids can be prevented. Combining ketamine with haloperidol may be a better alternative as it prevents the dissociative side effects of ketamine. Measuring qCON and qNOX is probably the most sensitive and objective way of assessing sedation and nociception in ICU patients as there is an array of stimuli that are being given to them on a daily basis. Measuring RASS or visual analog scale (VAS) is not possible in many patients and hence anglo-sedation goes unnoticed.

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