Pain and Agitation Management in Critically Ill Patients

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KEYWORDS

• Agitation • Sedation • Pharmacotherapy • Pain • Analgosedation • Opioid

KEY POINTS

- Vital signs alone should not be used to assess pain; well-validated behavioral pain scales are most appropriate for pain assessment in the intensive care unit.
- Opiate selection should be based on the patient's opiate tolerance and the pharmacokinetic properties of the medication.
- All sedation should be titrated to light sedation or patients should receive a daily spontaneous awakening trial.
- Analgosedation is recommended for the treatment of agitation. If patients require further sedation, it is recommended to add a nonbenzodiazepine sedative, such as propofol or dexmedetomidine.

INTRODUCTION

Since 1995, groups such as the American College of Critical Care Medicine, the Society of Critical Care Medicine, the American Society of Health-System Pharmacists, and others have been dedicated to improving the treatment of pain and agitation in intensive care unit (ICU) patients.[1–3] The most recent set of guidelines, developed by a multidisciplinary panel, focused on the prevention and treatment of pain, agitation, and delirium in critically ill patients. The guidelines contain evidence-based recommendations published through December 2010, as an update to the guidelines published in 2002. These guidelines are referenced frequently as they provide the standard of care for critically ill patients.[1,2]

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PAIN IN THE INTENSIVE CARE UNIT

It is common for critically ill patients to experience pain at some point during their ICU stay. This pain could be related to invasive procedures, external lines and tubes, extensive surgery, trauma, or chronic underlying conditions. Most patients who have been intubated recall some pain associated with the endotracheal tube.[4] Most cardiac surgery patients state pain as a common traumatic memory of their ICU visit.[5] In medical and surgical ICUs, the incidence of pain is 50% or higher.[6,7]

The subjective nature of pain is a significant obstacle in the development of quality pain assessment tools. It is recommended that vital signs alone not be used to assess pain in ICU patients.[8–11] However, vital signs could be used as impetus for further assessment. Patient self-reporting of pain has been considered the gold standard pain assessment, but this may not be feasible in all ICU patients. In patients who are unable to self-report pain, one should consider looking at the patients' behaviors as an indicator of pain. Several behavioral pain scales have been created over the past few years. However, it is difficult to determine their applicability to the ICU population. Studies have demonstrated that implementation of a behavioral pain scale in the ICU improves clinical outcomes, such as decreasing length of stay and days of mechanical ventilation.[12,13] The most suitable behavioral pain scales for use in ICU patients are the Critical-Care Pain Observation Tool and the Behavioral Pain Scale.[8,11,14,15] These pain scales are most appropriate for adult patients with intact motor function who are unable to self-report pain.

TREATMENT OF PAIN

The optimal agent for the treatment of pain in the ICU should be based on individual patient characteristics and response. When selecting an analgesic, careful consideration should be given to the pharmacokinetic and pharmacodynamic properties of all available agents. The mainstays of therapy in the ICU are fentanyl, hydromorphone, morphine, and methadone. These agents belong to a class of medications called opioids and primarily exert their mechanism of action by agonizing μ receptor subtypes, which, in turn, blunts the emotional response to pain. Respiratory depression and decreased gastrointestinal motility are common adverse effects of opioid analgesics.[16–18] With the exception of ketamine, nonopiate analgesics have limited efficacy data for non-neuropathic pain in the ICU setting, so their use is limited (**Table 1**).

Fentanyl

Fentanyl is a potent μ receptor agonist used for the management of pain in acute care and outpatient settings. It has poor enteral bioavailability, so it is typically administered via transmucosal, intravenous (IV), and transdermal routes. The onset of IV fentanyl is approximately 1 to 2 minutes, and the elimination half-life is around 2 to 4 hours. However, fentanyl has a short duration of action lasting approximately 0.5 to 1.0 hour after IV administration. The short duration of action is due to fentanyl being very lipophilic and redistributing rapidly after administration. Fentanyl is entirely eliminated via hepatic metabolism, specifically cytochrome P450 (CYP) 3A4, 3A5, and N-dealkylation, producing no active metabolites. The typical infusion dosage is 0.7 to 10.0 mcg/kg/h for mechanically ventilated patients. Fentanyl is less likely than morphine to induce histamine release, making it a more desirable agent in patients exhibiting hemodynamic instability.[3,19,20] Fentanyl's short duration of action, rapid onset, and lack of active metabolites make it an excellent analgesic for a wide range of critically ill patients.