

Management of Pain and Sedation



The evolution of critical care medicine has greatly advanced understanding and practices in pain and sedation management. Historically, deep sedation was believed to aid recovery, but it is now recognised to delay recovery and increase harm. Current strategies emphasise carefully titrated analgesia and sedation to ensure patient comfort, safety, and procedural facilitation, while minimising risks like muscle weakness, delirium, prolonged ventilation, and mortality. Key practices include multimodal pain management, frequent assessments, daily sedation interruptions, and light sedation with short-acting agents, as informed by large trials and the ABCDEF care bundle framework.

Pain is a complex sensory and emotional experience influenced by physiological and psychological factors. Effective pain assessment and treatment are critical, particularly for patients unable to express their experiences, and rely on validated scoring methods. Despite its priority in ICU care bundles, there is a lack of robust evidence, high-quality trials, and standardised tools to identify or optimise pain management strategies.

Pain is subjective and varies among individuals, with different perceptions, expectations, and tolerance levels, so it should not be assumed to correlate directly with injury severity. Self-reported pain scales, such as the numerical rating scale (1-10), are commonly used but only for patients who can communicate. For non-communicative patients, tools like the Critical Care Pain Observation Tool and Behavioral Pain Scale are used to assess pain objectively. While these tools are valuable, they still have limitations regarding subjectivity, sensitivity, and reliability.

Opioids are the primary choice for pain management in the ICU due to their safety, efficacy, and short half-lives, allowing for rapid titration based on clinical assessments. However, few studies directly compare opioid regimens in the ICU. Prolonged opioid use, particularly in ICU survivors, is linked to persistent opioid use, with 73% of prescriptions at discharge being deemed inappropriate, posing a public health concern. Reducing opioid use, especially among ICU survivors, is crucial for long-term health outcomes.

Opioids have well-known adverse effects, including respiratory depression, sedation, histamine release (causing hypotension, especially with meperidine and morphine), nausea, vomiting, and ileus. A dose-dependent link between opioid use and delirium has also been observed. Prolonged opioid use can lead to tolerance, withdrawal, and hyperalgesia, often due to extended outpatient use or long hospital stays.

Opioid use in pain management is part of a broader multimodal approach that includes non-opioid options such as NSAIDs, gabapentinoids, acetaminophen, regional analgesic techniques, and non-pharmacological methods like massage, relaxation, and meditation. Other interventions to reduce opioid use include optimising ventilator settings, repositioning patients, and promoting sleep hygiene. Ketamine is gaining popularity for its opioid-sparing effects and safety profile, although concerns about side effects like delirium and nightmares remain, which may be mitigated with lower doses. Additional non-drug techniques, such as distraction, music therapy, and environmental improvements, can also support pain management.

Early ICU studies highlighted the role of sedatives in reducing patient anxiety, decreasing oxygen consumption, and aiding nursing care, leading to widespread use in mechanically ventilated patients. Patient agitation often prompts the need for sedation, but before starting sedation, efforts should be made to address potential causes of anxiety, such as constipation, urinary retention, or pain. Sedation and agitation can be hard to distinguish, so validated tools should be used to assess both throughout treatment. Desired sedation levels should be reassessed daily, as individual responses to sedatives vary.

Validated sedation and agitation assessment scales, like the Richmond Agitation-Sedation Scale and Sedation Agitation Scale, remain the gold standard in ICU sedation monitoring. Processed electroencephalogram monitoring systems, used to assess anaesthetic depth, are being introduced in ICUs, especially for patients unable to provide subjective assessments, such as those on neuromuscular blockers. However, these systems face limitations, including interpatient variability, decreased reliability in older patients, and cost, making them adjuncts to subjective

© For personal and private use only. Reproduction must be permitted by the copyright holder. Email to copyright@mindbyte.eu.

assessments.

Concerns over deep sedation led to the development of protocol-driven titration strategies aimed at light sedation to reduce sedative use and improve outcomes. Studies showed that nurse and respiratory therapist-guided weaning protocols were more effective than physician-guided titrations, leading to shorter extubation times and similar complication rates. Similar protocols for pain management also improved outcomes by reducing pain, shortening mechanical ventilation duration, and preventing infections. Combined pain and sedation protocols further reduced sedative use, mechanical ventilation time, ICU stay, and overall costs, resulting in better patient outcomes, including lower mortality rates. This approach, known as analgosedation, emphasises analgesia and minimising sedation to improve patient care.

A key approach is to use analgesic drugs as the first-line treatment to manage both pain and sedation with a single agent. This strategy potentially reduces the need for additional drugs, minimising adverse effects, lowering costs, and simplifying administration. Sedation is further optimised by adding sedative drugs as necessary to achieve the desired sedation target.

Short-acting sedatives like propofol, dexmedetomidine, and inhaled volatile anaesthetics have shown similar efficacy and improved patient outcomes—such as reduced mechanical ventilation duration, delirium, length of stay, and mortality—when compared to longer-acting sedatives like benzodiazepines. Benzodiazepine use is a significant risk factor for delirium, which is strongly linked to poor ICU and post-discharge outcomes, regardless of illness severity. As a result, benzodiazepines are not recommended for routine sedation in the ICU.

Growing evidence suggests that non-benzodiazepine sedation improves outcomes, particularly in reducing mechanical ventilation duration and delirium. Guidelines recommend dexmedetomidine or propofol as first-line sedatives for mechanically ventilated patients, given that both drugs maintain light sedation without significant differences in long-term outcomes.

In the early 2000s, it was recognised that deeper sedation and higher doses of sedatives led to worse patient outcomes, but strategies to reduce sedation were not clear. Kress and colleagues pioneered the spontaneous awakening trial (SAT) in 2000, where sedatives were paused daily to allow patients to awaken. This approach resulted in shorter mechanical ventilation duration and ICU stay compared to other weaning strategies. Further studies, including one with over 500 patients, also demonstrated that daily spontaneous breathing trials (SBT) helped reduce mechanical ventilation time. A combined strategy of SAT and SBT showed even better outcomes, including fewer ventilator days, shorter ICU discharge times, and reduced mortality.

Studies on the impact of no sedation in critically ill patients, especially those requiring mechanical ventilation, have shown safety and feasibility, with improved outcomes in some cases. The no sedation approach often uses analgesics for pain management, with sedatives only added as needed. Overall, the trend toward lighter sedation has been associated with improved patient outcomes.

Emerging evidence suggests that short-acting sedatives like inhaled volatile anaesthetics (e.g., isoflurane, sevoflurane) may offer benefits in the ICU. These agents have limited metabolism, a short duration of action, and cause less respiratory depression. Their use is associated with improved outcomes such as reduced time on mechanical ventilation, less delirium, and shorter extubation times. However, there are unique considerations for their delivery, including the risk of complications like malignant hyperthermia. Currently, no formal recommendations exist to favour these anaesthetics over other short-acting sedatives.

Light sedation in ICU patients has been associated with improved mental health outcomes, including fewer post-traumatic stress symptoms, anxiety, and depression compared to deep sedation. A patient-centred approach to sedation, combining non-pharmacological interventions and targeted pharmacological treatments, contributes to better mental health outcomes and long-term recovery.

The link between sedation and mobility in the ICU has become increasingly important. Deep sedation has been a barrier to patient mobility, but reducing sedation allows for early mobilisation, which improves functional status and hospital outcomes. Light sedation enables patients to engage in early rehabilitation, contributing to better long-term recovery. These findings have shifted ICU practices from deep sedation to strategies focusing on pain management, light sedation, and early mobilisation.

Guidelines for pain and sedation management in ICUs vary across regions due to factors like drug availability, cost, and ICU infrastructure. However, common recommendations include:

1. Use validated pain scales to assess patient pain regularly.
2. Use validated agitation-sedation scales to assess sedation depth.
3. Aim for light sedation whenever possible.
4. Avoid benzodiazepines for sedation.
5. Routinely screen for delirium using validated tools.
6. Prioritise analgesia or analgosedation strategies.
7. Implement daily spontaneous awakening trials alongside spontaneous breathing trials when appropriate.

Barriers to implementing evidence-based pain and sedation protocols in ICUs include lack of knowledge, misperceptions, organisational constraints, and high workload. These issues impact guideline adherence, with factors such as poor communication, patient instability, and inadequate training contributing to challenges in implementation. Strategies to improve compliance include extended training, continuous support, feedback systems, and collaborative networks. Additionally, care bundles that include pain and sedation guidelines have shown to improve patient outcomes, with adherence linked to better nursing satisfaction and perceived quality of care.

Source: [BMJ](#)

Image Credit: iStock

Published on : Tue, 7 Jan 2025