

Danish national sedation strategy. Targeted therapy of discomfort associated with critical illness. Danish Society of Intensive Care Medicine (DSIT) and the Danish Society of Anesthesiology and Intensive Care Medicine (DASAIM)

Lise Fonsmark, Lars Hein, Helle Nibroe, Helle Bundgaard, Inge de Haas, Susanne Iversen & Thomas Strøm

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Correspondence: Lise Fonsmark, Department of Intensive Care, Rigshospitalet, Blegdamsvej 9, 2100 Copenhagen, Denmark.

E-mail: lise.fonsmark@rh.regionh.dk

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Introduction

This revised national guideline aims to consolidate the increasing body of evidence of the adverse effects of a general sedative strategy in critically ill patients. The primary aim of these guidelines is to draw the physicians focus to, and treatment of, the reversible causes of patient agitation and discomfort and summarize these into a clinical recommendation..

The use of sedatives in critically ill patients should be avoided where possible, and in other cases limited with respect to dose and duration of treatment. The golden standard being an awake, communicating, relevant, interacting and early-mobilized patient.

This is the objective for the majority of patients admitted to Danish general intensive care units, however there will still be a category of patients where the use of sedation is still warranted

Description

There is growing evidence that sedation of critically ill patients undergoing mechanical ventilation prolongs time on mechanical ventilation, time in the ICU, total length of Hospital stay, and increases mortality [1-5]. The effect appears to be strategy dependent. Anxiety, pain and delirium are common, underreported, interrelated and multifactorial conditions that individually or in combination can lead to decreased compliance for mechanical ventilation or other lifesaving therapies [6-11]. However, these conditions are fully or partially reversible and can often be effectively treated by targeted therapy or early awareness and elimination of triggers.

We introduce an 8-step strategy comprising seven areas for a systematic and structured screening, which should precede the use of sedatives (8 steps).

- Step 1: Identification and treatment of pain
- Step 2: Identification and treatment of anxiety disorders
- Step 3: Identification and treatment of delirium
- Step 4: Identification and treatment of dyspnea
- Step 5: Identification and treatment of withdrawal symptoms
- Step 6: Identification and treatment of sleep disorders
- Step 7: Identification and treatment of gastrointestinal disorders
- Step 8: Sedation

Purpose

1. To ensure a consistent Danish practice of high quality regarding use of sedatives in critically ill patients in Danish intensive care units.
2. To relieve pain, distress and discomfort with the least amount of side effects.
3. To minimize the total use of sedatives for patients undergoing mechanical ventilation.
4. To minimize the number of ventilator days, length of hospital stay and mortality associated with critical illness.

Step 1: Pain

Pain is common and underreported among critically ill patients in intensive care. Patients should be screened using validated scoring tools [12]. Patient self-reporting using the Visual Analogue Scale (VAS) or Numeric Rating Scale is the most validated method. Behavioral Pain Scale (BPS) or Critical Care Pain Observational Tool (CPOT) can be used in the unconscious patient [13, 14]. Pain treatment must be differentiated and relate to:

Localization

Pain Type / Quality

Intensity

Aggravating or relieving factors

If the pain is spontaneous, present at rest or procedure-related

If the pain is acute or chronic

The goal of analgesia should be pain relief at rest and with treatment / prophylaxis of procedural pain.

The corner stone of analgesia in the ICU is through treatment with opioids and peripherally acting non-opioid analgesics. In the presence of neuropathic pain, treatment with tricyclic antidepressants or anticonvulsants can be considered. Clonidine, peripheral nerve block and / or low dose ketamine are other available options

When prescribing opioids the desired mode of administration should be considered as well as factors such as elimination time and presence of active metabolites.

Regular intravenously administered bolus doses or oral administration of opioids is recommended rather than continuous infusion of opioids.

Step 2: Anxiety

Anxiety is a common and normal reaction in the context of critical illness in the ICU. Anxiety increases the risk of poor compliance to life-saving treatment, including respiratory therapy and left untreated can lead to an inappropriate overuse of sedatives.

A preventative approach to this can be pursued by creating an informative, accommodating, professional and calm environment around the patient.

Treatment is primarily non-pharmacological in the form of verbal reassurance and physical presence. In acute situations treatment with benzodiazepine with short half-lives is recommended. All antipsychotics have anxiety-reducing effect and can be used. In cases where anxiety occurs as concomitant of pain, delirium, withdrawal symptoms, dyspnea, etc., treatment should target to these conditions. Patients treated with benzodiazepines prior to ICU admission should continue this treatment.

Step 3: Delirium

ICU delirium is an acute, fluctuating change in consciousness and cognition during the ICU stay [15]. A distinction is made between hyperactive, hypoactive and mixed delirium [7]. The condition is frequent, often difficult to recognize and extremely unpleasant for the patient [8, 9]. Development of delirium has been associated with increased 6-month mortality, a prolongation of time on mechanical ventilation and a prolongation of the time in the ICU and total hospital length of stay [8, 16-18]. A large number of risk factors for development of delirium have been shown. Some are preexisting factors (age, alcohol, cognitive impairment and hypertension) and others are related to critical illness (high Apache II score, infections, metabolic disturbances, anxiety, coma, sedatives, opioids and number of tubes and infusions) [19, 20]. Screening should be done with a validated screening tool Ex. CAM-ICU [21-23].

The condition could be prevented or reduced by the provision of non-pharmacological interventions including the use of audio-visual aids, clear communication, promoting of natural sleep and early mobilization [19, 24, 25]. Pharmacological treatment may be necessary to ensure comfort and other lifesaving treatment.

However the evidence of pharmacological treatment of delirium in critically ill patients is sparse with no prospective randomized controlled trials.

Step 4: Dyspnea

Dyspnea is defined as a subjective sensation of shortness of breath and is often associated with anxiety or panic with concomitant reduced compliance of mechanical ventilation [26-28]. The condition is common and probably underreported among

critically ill patients. Arterial oxygenation and ventilation can often be adequate despite the presence of dyspnea [28].

Prevention should focus on reassurance from attending staff, sufficient treatment of pain, repeated monitoring of vital signs including blood gases and ensuring optimal settings of the ventilator [11, 29, 30]. Opioids may help to alleviate symptoms and can be well indicated in the treatment of dyspnea. There is probably a role for sedation in the group of patients who present refractory hypoxemia or hypercapnia

Step 5: Withdrawal symptoms

Alcohol, benzodiazepine and opioid withdrawal symptoms are not uncommon among critically ill patients. The symptoms are generally non-specific [31, 32].

Alcohol withdrawal symptoms usually develop within the first 6-24 hours following cessation of consumption of alcohol. Withdrawal seizures may occur together with or independently of other withdrawal symptoms and usually occur within 48 hours after last alcohol consumption.

Screening and monitoring should be performed using a validated withdrawal score [33]. Treatment options include both benzodiazepines and barbiturates. Benzodiazepines are recommended as a first choice due to the existence of a specific antidote. Medication should be provided in regular intervals. Propofol may be used in refractory cases, but may lead to intubation and mechanical ventilation. Clonidine can be used as adjuvant therapy, but has no documented effect on delirium or withdrawal convulsions.

Opioid withdrawal symptoms are nonspecific, unpleasant, but usually harmless. Prevention should be accomplished by a gradual reduction in opioid therapy depending on dose and duration of treatment. Clonidine can be used as an adjuvant in addition to opioid. There are no clinically controlled studies to guide the choice of treatment strategy.

Benzodiazepine withdrawal symptoms can be seen in ICU patients treated with benzodiazepines prior to ICU admission or upon sudden discontinuation of benzodiazepine-based sedation [31]. The highest risk being seen following prolonged administration (> 7 days) [32].

Symptoms are similar to other nonspecific symptoms of withdrawal. Serious complications are generalized seizures and delirium. During hospitalization chronically administered benzodiazepines should be continued. Long-term benzodiazepine therapy requires gradual weaning during dose reduction. Withdrawal symptoms after prolonged sedation with midazolam can be prevented by switching from intravenous administration to oral administration of benzodiazepines with long half time (ex lorazepam) [34].

Nicotine withdrawal symptoms are harmless and usually mild. Routine use of nicotine substitution is not recommended.

Step 6: Sleep

Evidence for the treatment of sleep and circadian rhythm disorders in critically ill patients is sparse. It seems logical to recommend non-pharmacological interventions to create a normal day and night cycle with as much sleep as possible during the night hours. Routine nightly interruptions due to observational or care tasks should be minimized. There is no evidence to recommend nocturnal sedation, use of hypnotic drugs, melatonin or dexmedetomidine to ensure sleep in the critically ill patient.

Step 7: Gastrointestinal disorders

Gastrointestinal disorders are common among critically ill patients [35]. This can cause significant discomfort such as nausea, vomiting, pain, abdominal distension and diarrhea [36]. These conditions could be reduced by early enteral nutrition, early mobilization, reduced administration of opioids, sedatives and by rational use of prophyllactic prokinetics [37].

Step 8: Sedation

If the patient, despite having followed the above-mentioned seven steps, shows signs of distress and discomfort, sedation may be indicated.

Sedation of critically ill mechanically ventilated patients prolongs time on mechanical ventilation, prolongs time in the ICU and total hospital length of stay [1-5]. In addition, uninterrupted sedative administration increase mortality [38].

We therefore recommend no or as little sedation as possible to all critically ill patients receiving mechanical ventilation. The goal is an awake, comfortable, communicating, relevant, interacting and early-mobilized patient [25].

Sedatives vary in metabolism and half-life, but there is no prospective randomized trials showing one sedative to be superior to another. Therefore we make no recommendations to the choice of sedatives to be used in the ICU. The most important aspect is the strategy. The use of deep sedation has a role in specific clinical circumstances (increased intracranial pressure, therapeutic hypothermia, seizures or severe respiratory insufficiency especially with the use of neuromuscular blockade and prone ventilation).

If sedation is used a plan for the following should be made on a daily basis:

1. Re-evaluation of need for continuous sedation
2. If possible turn off the sedatives.
3. After a systematic and structured screening of the 7 steps take a decision to whether sedation should be re-initiated.
4. If sedatives need to be restarted the aim should be as light a level of sedation as possible and
5. A goal for the sedation should be prescribed using repeated assessments with validated sedation scales

Neuromuscular blockade

Evidence for the use of neuromuscular blocking agents (NMBS) in ICU patients is weak. Recent research suggests that NMBS could be indicated in the treatment of early-stage ARDS. Use of NMBS for more than 24 to 48 hours in critically ill ICU patients is associated with many potential complications and should only be used when all other options have been tried without success. In patients undergoing therapeutic hypothermia the use of NMBS to prevent shivering may be indicated [39, 40]. The lowest dose of NMBS, to achieve the predefined clinical goal should be used. The degree of neuromuscular blockade should be continuously monitored using TOF measurement ("Train Of Four"). Deep sedation and analgesia is indicated with the use of neuromuscular blockade.

Conclusion

For most critically ill patients admitted to the ICU and on mechanical ventilation, sedation should be avoided or minimized. There exists few indications where sedation is a standard part of modern intensive care therapy. Instead, focus should be on identifying reversible causes of patient discomfort (pain, delirium anxiety etc.) A daily break from sedation should be considered in all patients in order to establish the actual problem, which may be causing discomfort. It is mandatory that when a patient requires sedation a validated sedation scale should be used.

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Abstract

Sedation of critically ill patients undergoing mechanical ventilation should be minimized or completely avoided. Only in selected situations is sedation indicated as first line therapy (increased intracranial pressure or therapeutic hypothermia). The critical care physicians primary objective should be to focus on the reversible causes of agitation, such as: pain, anxiety, delirium, dyspnea, withdrawal symptoms, sleep or gastrointestinal symptoms. If sedation is used a validated sedation scale is recommended. On a daily basis sedation should be interrupted and only restarted after a thorough search for reversible causes of discomfort and stress.

Litterature

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