Sedation in ICU

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Anxiety

is a feeling of apprehension or fear. The source of this uneasiness is not always known or recognized, which can add to the distress you feel. Anxiety disorders are a group of psychiatric conditions that involve excessive anxiety.

Agitation

is a psychomotor disturbance characterized by a marked increase in both motor and psychological activities, often accompanied by a loss of control of action and a disorganization of thought.


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Delirium هذيان

is a syndrome including disturbances in attention, consciousness, and cognition.
It may also involve other neurological deficits, such as psychomotor disturbances (e.g. hyperactive, hypoactive, or mixed), impaired sleep-wake cycle, emotional disturbances, and perceptual disturbances (e.g. hallucinations and delusions), although these features are not required for diagnosis.

- Delirium subtypes are as follows:
  - hypoactive patient: lethargic, apathetic, or may even be unresponsive
  - hyperactive patient—extremely agitated, emotionally labile, exhibiting disruptive behaviours such as refusing care, shouting, violence, removing cannulae, and attempting to self-discharge.

Dementia

is **the loss of cognitive functioning — thinking, remembering, and reasoning** — to such an extent that it interferes with a person's daily life and activities. Some people with dementia cannot control their emotions, and their personalities may change.

- Sedatives are used in the critical care to treat **anxiety** and agitation and to provide amnesia.
- Although the use of sedatives can reduce the stress response and improve the patient's tolerance to interventions, sedatives should be used only after "providing adequate analgesia and treating reversible physiologic cause.

- Reversible physiologic causes of anxiety and agitation include:

- Pain
- Hypoxia
- Hypoglycemia
  - drug Withdrawal
  - Sleep deprivation

  Immobility
  - Fear

Sedation monitoring

One of the most commonly used tools for sedation monitoring is the Bispectral Index (BIS).

keep sedation levels to a minimum to prevent complications associated with **oversedation**.

Traditionally, EEGs have been used in specialist areas to determine brain function

Sedation monitoring was originally used in operating theaters, to ensure that effective levels of sedation were maintained throughout surgical procedures.

many critical care units now utilize this technology to asses sedation levels in critically ill patients.

Sedation monitoring provides a non-invasive method of assessing objective criteria for the effectiveness of sedation based on the EEG trace.

TABLE 17.3 SEDATION MONITORING

– Pulse oximetry
– Blood pressure and heart rate at 5-minute intervals
– Electrocardiograph (EKG) for patients with cardiovascular disease and for all deep sedation procedures
– Response to verbal commands if applicable
– Adequacy of pulmonary ventilation (observation, auscultation)
– Exhaled carbon dioxide monitoring when patients are at a distance from the sedation provider and for all deep sedation procedures (via nasal canula port or an angiocath inserted into a face mask)

Box 8.1 BIS numerical values for sedation

100: Awake

80: Light or moderate sedation. May respond to loud commands or mild prodding/shaking

60: General anaesthesia. Unresponsive to verbal stimulus

40: Deep hypnotic state

20: Burst suppression

0: Flat line EEG

DEPTH AND LEVELS OF SEDATION

Minimal Sedation (Anxiolysis): Cognitive function may be impaired, but there is a normal response to verbal stimuli with unaffected airway, ventilation, or cardiovascular function.

Moderate Sedation/Anesthesia: Purposeful response to verbal or tactile stimuli with airway, ventilation, and cardiovascular functions that are adequate and should require no intervention.

Deep Sedation/Analgesia: Purposeful response only following repeated or painful stimulation where the airway and ventilation often need support and the cardiovascular function is usually maintained.

General Anesthesia: Unresponsive even to painful stimuli where the airway and ventilation are generally inadequate without intervention and the cardiac function may need intervention

SEDATION AGENTS

- **Propofol**: Sedation dosing at 25-75 μg/kg/min
- **Thiopental** A sedation dose is 50-100 mg IV.
- **midazolam**: sedation dose is 0.015-0.03 mg/kg in increments to achieve desired sedation
- **Ketamine**:The sedation dose for ketamine is typically 0.2-0.8 mg/kg IV over 2-3 minutes although other routes such as intra- muscular (IM) and PO are available.
- **Dexmedetomidine**: If a bolus is given, it is typically 0.5-1 μg/kg and an infusion is run at 0.2-0.7 μg/kg/h.
- **Fentanyl** is typically used in increment doses of 25-100 μg IV for pain control.
- **Alfentanil** is even shorter acting and is commonly used in increments of 100-250 μg IV.
- **Remifentanil** is the shortest acting and is typi- cally given as an infusion of 0.05-0.1 μg/kg/min.

Reversal Agents

-**Naloxone** is an opioid antagonist and reverses the adverse effects of opioids, which is useful in the case of unintended respiratory depression. The onset of action is rapid and the duration of action is short at approximately 30-60 minutes. Typical starting doses of naloxone are 0.4-0.8 mg IV.

-**flumazenil**, a benzodiazepine antagonist. The dose is 0.2 mg repeated to a maximum dose of 3 mg. The duration of action is also short (between 3 and 30 minutes).