OPTIMUM SEDATION

What is Optimum Sedation?

Most critically ill patients require sedation and/or analgesia at some point during their illness, especially if they require mechanical ventilation. The drugs available have differing sedative and analgesic properties, which need to be considered when choosing the best agent or combination of agents for an individual patient (see module 3).

The recognition that excessive sedation may have adverse effects has led to initiatives aimed at keeping patients less sedated. Here are some quotes from ICU nurses about the changes that have occurred in recent years, especially keeping patients more "awake" during their ICU stay.

FACTORS THAT INFLUENCE SEDATION AND ANALGESIA DURING INTENSIVE CARE

MECHANICAL VENTILATION

Endotracheal tubes stimulate airway reflexes and coughing, which may decrease synchronisation with the ventilator.

Poor ventilator synchronisation reduces patient comfort and can worsen gas exchange. Cough reflexes vary widely between individuals, and many older patients may tolerate endotracheal intubation with minimal sedation or analgesia.

Tracheostomy tubes are less stimulating because they bypass the vocal cords, which are highly sensitive.

Some **advanced forms of ventilation**, such as *high frequency oscillation (HFOV)*, *airway pressure release ventilation (APRV)*, or *inverse ratio ventilation* may stimulate lung receptors resulting in coughing, straining and poor synchronisation with the ventilator.

Patients with **expiratory airflow obstruction**, such as *asthma* or *COPD*, may also tolerate ventilation poorly.

In many cases seeking senior advice to adjust the ventilator settings may be equally or more effective than simply increasing sedative and/or analgesic dose.

PAIN

Many patients describe pain and discomfort during intensive care. Pain is difficult to recognise when patients have decreased conscious level due to sedation, confusion or other factors. Importantly, *pain may increase confusion and agitation* in sick patients if it is not recognised and treated. **Sources of pain** can be generally considered under 2 headings:

- *Pain due to the underlying condition*: Higher analgesia requirements are expected for patients who have undergone surgical procedures, have painful injuries (for example *fractures*), or underlying conditions that cause significant pain (for example *pancreatitis*)
- *Procedure related pain*: patients experience pain during uncomfortable procedures (for example tracheal suctioning, drain removal, dressing changes).

In situations where sustained pain is expected increasing analgesic dose may be more effective than increasing sedation. For procedure-related pain, *boluses* of analgesia pre- or during the procedure will reduce pain.

The most effective way to assess pain is for the patient to be capable of communicating with the bedside nurse. When this is not possible using *behavioural pain scales* are useful for assessing pain. These are considered in module 5.

HAEMODYNAMIC INSTABILITY

Hypotension and shock are potentially made worse by sedative drugs, because many cause vasodilation and/or cardiac suppression. These patients are more likely to benefit from *reducing* sedation.

Hypertension has a variety of potential causes including *pain, alcohol or drug withdrawal, agitation, pre-existing hypertension*, or the *acute illness* (for example raised intracranial pressure). In general, *sedation should only be used to manage hypertension after the possible causes have been carefully considered.* In many cases alternative treatments such as increased analgesia or antihypertensive drugs are more appropriate than additional sedation.

ANXIETY

More awake patients may be anxious given the potentially frightening experience of being in intensive care.

Sedative drugs are effective at reducing anxiety. Anxiety may cause agitation, but other causes of agitation should be considered before assuming agitation is a result of anxiety.

When used to reduce anxiety the dose of sedative should be carefully adjusted to avoid unnecessary over-sedation.

AGITATION

Agitated patients are difficult to manage and are potentially a risk to themselves and staff. It is important to consider the potential causes of agitation which include *pain, anxiety, delirium, drug withdrawal, encephalopathy* and a variety of *primary neurological conditions.*

Using sedative drugs to manage agitation without fully considering its cause could mask an underlying cause that needs specific treatment, for example delirium. This could delay recognising the cause of agitation and potentially prolong recovery.

OPTIMUM SEDATION - DEFINITION

In general, an optimally sedated patient has the highest possible conscious level that allows treatment to be received without pain or discomfort, while minimising the risk of complications.

It is important to remember that sedation and analgesia requirements change during the course of a critical illness. It is vital to recognise when requirements decrease in order to avoid unnecessary over sedation.

AVOIDING EXCESSIVE SEDATION

Answer the following questions about managing patients with more versus less sedation during their time in the ICU.

SEDATION, CONFUSION AND DELIRIUM

Lighter sedation is associated with less confusion and delirium.

True

Correct. Sedative drugs, especially benzodiazepines such as midazolam, increase the risk of delirium (this is covered in Module 7). In addition, if sedative drugs that accumulate or have active metabolites they may

delay recovery of consciousness and increase the chance of confusion and delirium. Several randomised trials have shown that using strategies to avoid deeper sedation can decrease the incidence of delirium.

○ False

SEDATION AND PSYCHOLOGICAL PROBLEMS

Deep sedation decreases the risk of patients having psychological problems coming to terms with their time and experience in ICU.

○ True

◉ False

Correct. It is known that some patients suffer problems with anxiety, depression, and traumatic memories during the period after intensive care discharge. Although further research is needed, current evidence suggests that patients who are managed in a less sedated state do not experience more psychological problems during their recovery. Some studies suggest that psychological problems are increased among patients who have longer periods of "lost" or "unformed" memory of their ICU stay. This evidence suggests that psychological problems may be reduced by avoiding excessive sedation.

SEDATION AND ICU STAY

Strategies designed to avoid excessive sedation and maintain lighter levels of sedation decrease the duration of mechanical ventilation and ICU stay

◉ True

Correct. Several well-designed studies have clearly shown that protocols that decrease sedation use and maintain patients in less sedated states reduce the duration of ventilation and ICU stay. There are several mechanisms through which this may occur, including more effective weaning, delayed duration of coma, reduced delirium, and a reduction in complications such as ventilator associated pneumonia.

○ False

SEDATION AND ADVERSE EVENTS

Keeping patients more lightly sedated increases the incidence of unintended extubation, line removal, and other similar adverse events

○ True

◉ False

Correct. Although the nursing workload associated with caring for less sedated patients may be high, published studies do not indicate that more adverse events occur if these patients are carefully managed. Interestingly, some studies that showed less sedated patients were more likely to self-extubate found that many did not require re-intubation suggesting that lighter sedation revealed when patients were ready to wean from the ventilator anyway. Ensuring lighter levels of sedation are safe requires careful management of pain, agitation, and delirium.

SEDATION - ALL PATIENTS?

All patients should be maintained at a light level of sedation.

○ True

False

Correct. There are some conditions where maintaining deep sedation is an important part of therapy at specific times in the illness. The most common reason for maintaining deep sedation is brain injury (for example, haemorrhage, trauma, cerebral oedema) or other conditions in which reducing brain activity is useful to protect it from injury due to inadequate oxygen supply (for example status epilepticus). In these situations the time at which sedation should be withdrawn requires experienced clinical judgement.

THE CHANGING MANAGEMENT OF ICU SEDATION

How has sedation management changed in intensive care in recent years?
Our understanding of the relationship between sedation and patient outcomes has changed in recent years, resulting in re-thinking of what is best for our patients.

15-20 years ago: Widespread use of deep sedation, neuromuscular blocking drugs. Doctor-led sedation management. Patients kept immobile with full mechanical ventilation.

15 years ago: Nurse-led sedation and weaning protocols. Recognition that regular sedation assessment and reduction can decrease ventilation duration.

10-15 years ago: Introduction of daily sedation "breaks". Studies demonstrating reduced ventilation time and length of stay, without increased adverse events.

5-10 years ago: Recognition of the importance of detecting and managing pain, agitation, and delirium in ICU patients, especially when sedation use is reduced.

GENERAL APPROACHES TO MANAGING SEDATION IN ICU

What problems are we trying to avoid in relation to sedation management in intensive care?
We use a range of different types of drugs in ICU to treat various potential problems. It is useful to consider the reasons we administer different drugs under the following headings:

Pain: Drugs to treat pain require *analgesic* properties. The most commonly used drugs are opioids which also suppress cough and other reflexes, helping to facilitate mechanical ventilation.

Agitation: Drugs to manage agitation require *hypnotic* (inducing sleep) and *anxiolytic* (reducing anxiety. **However, agitation may also be due to pain, delirium, and other factors that require careful evaluation**.

Delirium: Drugs to manage delirium generally have *antipsychotic* properties.

DIFFERENT APPROACHES TO MANAGING PAIN, AGITATION AND DELIRIUM IN THE ICU

Several different terms are sometimes used to describe the general approach to sedating an ICU patient.

ANALGO-SEDATION: This term is usually used when the primary drug is an analgesic agent alone, for example remifentanil infusion, alfentanil infusion, or intermittent fentanyl bolus. A hypnotic drug such as propofol or midazolam may be added as a second agent if required. Some trials suggest this approach may allow patients to be maintained in lighter sedation levels, and

might reduce ventilation times. This approach is attractive because it focuses on pain and discomfort, which are known to be very common among ICU patients.

SEDATIVE-HYPNOTIC BASED SEDATION: This term is usually used when the **primary drug is a hypnotic agent** such as propofol, midazolam, or dexmedetomidine. It is more commonly used in "medical" ICU patients, for example pneumonia, where the underlying illness is thought less likely to cause significant pain. Analgesic drugs may be added either by infusion or using boluses. A potential problem with this technique is the variation in analgesic properties between different hypnotic agents when the amount of pain experienced by the patient is uncertain and difficult to assess.

BALANCED SEDATION AND ANALGESIA: This term is sometimes used to describe the **concurrent use of drugs with hypnotic and analgesic properties.**

In practice, these approaches are a continuous spectrum. It is important to consider whether it is thought the patient needs relatively more analgesia or hypnosis.

Studies show that many patients experience pain and discomfort during their ICU stay so ensuring an analgesic drug is always administered, especially early in ICU stay, is recommended.

A SEDATION QUIZ

See how you get on in this Sedation Quiz.

QUESTION 1

All mechanically ventilated patients require sedation.

○ True

◉ False

Correct. If patients can be safely and comfortably managed without sedation, this may decrease their time in intensive care.

QUESTION 2

Tracheostomy decreases the need for sedation

◉ True

Correct. By bypassing the vocal cords and pharynx a tracheostomy tube is associated with much lower cough and gag reflex than endotracheal tubes. Many patients can be managed without sedation after tracheostomy.

○ False

QUESTION 3

Agitated patients should always be sedated to ensure their safety

○ True

◉ False

Correct. The cause of agitation should be considered before using sedation, and appropriate measures taken to manage this. Sedation could delay the appropriate management of the cause of agitation.

QUESTION 4

Analgesic drugs should only be added after a hypnotic drug has been administered

○ True

◉ False

Correct. Pain and discomfort are common in ICU patients. Using a drug with analgesic properties from the outset is recommended for most patients.

QUESTION 5

Strategies to avoid unnecessary deep sedation reduce the duration of ICU stay.

◉ True

Correct. Many studies have shown that protocols and strategies designed to detect and avoid unnecessary deep sedation reduce both duration of ventilation and ICU stay.

○ False

SUMMARY

- Sedative and analgesic drugs are primarily used to manage pain, agitation, and delirium in intensive care patients.
- Although some clinical situations require deeper sedation, there is strong evidence that unnecessarily deep sedation may worsen patients' outcomes.
- An optimally sedated patient has the highest possible conscious level that allows treatment to be received without pain or discomfort, while minimising the risk of complications.
- Getting sedation management right is important to patients, doctors, and nurses. It also probably reduces the cost of looking after critically ill patients.