Worcestershire Acute Hospitals NHS Trust

Analgesia, Sedation and Management of Delirium in Critically Ill Adult Patients

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Key Document Owner:	Dr Nick Fitton
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Key Amendments

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8th October 2019	Document extended with no changes as part of Disease Management section in critical care	Dr Nick Cowley/ Dr Andy Burtenshaw

Introduction

This guideline is largely based on the National Intensive Care Society Guideline and the recommendations of the American Society of Critical Care Medicine. It also seeks to improve recognition and treatment of delirium in critically ill adults.

Some degree of analgesia and sedation is often required to allow patient cooperation with organ support and associated nursing care. The goal is to achieve early spontaneous breathing and an awake, calm and comfortable patient.
While it is clear that patient care is compromised when the patient is agitated or distressed, over sedation is also detrimental:

- accumulation with prolonged infusion, delaying weaning from supportive care increasing complications and consequently morbidity and mortality
- detrimental effects on the circulation leading to increased inotrope requirements
- detrimental effects on the pulmonary vasculature. increasing VQ mismatch leading to increased ventilatory support with the consequent increase in complications
- tolerance during sedation and withdrawal when it is stopped
- reduced intestinal motility impairing establishment of enteral feeding

It is therefore vital that analgesia and sedation are managed as precisely as possible and given the priority attention that they deserve.
In addition, delirium is under recognised and consequently undertreated in many patients.

Competencies Required

The guideline is to be utilised by all qualified nursing and medical staff working in the critical care environment, caring for patients receiving infusions of intravenous sedatives. All staff will have access to the guideline. There will be a copy available on the unit in the standards folder or via the intranet. The sedation score and algorithm will be located on the reverse of the ITU observation charts and / or in the patient's folder. Competent members of the nursing team will give training on accurate use in the clinical setting at the bedside. Assessment will take place in the form of supervised practice.

AIMS

1. **All patients must be comfortable and pain free**. Analgesia is the prime concern.
2. **Anxiety should be minimised.** Anxiety is an appropriate emotion, but good communication and the provision of compassionate and considerate care are essential parts of achieving this goal.

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3. **Patients should be calm, cooperative and able to sleep when undisturbed.** This does NOT mean they need to be asleep all the time.
4. **Patients must be able to tolerate appropriate organ support:** it follows that sedative depth required will vary according to therapies.
5. **Patients must not be paralysed and awake.**
6. **All patients should be assessed for delirium.**

Principles of Management

Before increasing sedation or adding neuromuscular blockade:

- Any avoidable source of physical discomfort should be excluded.
- The need for any uncomfortable or disturbing therapies should be reviewed.
- A perceived need to increase sedatives may be an index of clinical deterioration.
- When sedation has been stopped night sleep is often fitful because of rebound REM sleep. Continued night sedation may prolong this rather than treating it.
- Sleep promotion should include optimization of the environment and non-pharmacological methods to promote relaxation with adjunctive use of hypnotics.
- The patient should be assessed for delirium, and treated if necessary. The CAM-ICU tool is useful in the assessment of delirium (see below).

Administration:

- A drug given by intravenous infusion will take four half-lives to achieve steady state levels. This means that it will take some time for adequate sedation to be achieved by starting an infusion without a loading dose. It also means that changes in sedation infusion rate will take some time to be effective. As a result there is a tendency for infusion rates to be started at a high rate in order to achieve adequate sedation quickly. Unfortunately, this high initial rate is often continued in the mistaken belief that it will continue to be needed. This also applies to increases in infusion rate which tend to be too great.
- The correct way to initiate sedation is thus to administer a loading dose which is titrated to effect and then to start an infusion. Increases in sedative infusion rate should follow the same principle i.e. a bolus, titrated to effect, should be administered and the infusion rate increased by a small increment.

Delirium:

- Delirium is defined as a disturbance of consciousness and cognition that develops over a short period of time (hours to days) and fluctuates over time.
- Many different terms have previously been used to describe this syndrome of cognitive impairment in critically ill patients, including ICU psychosis, ICU syndrome, acute confusional state, encephalopathy, and acute brain failure.
- It is a common manifestation of acute brain dysfunction in critically ill patients, occurring in up to 80% of the sickest intensive care unit patients.
- Critically ill patients are subject to numerous risk factors for delirium. Some of these, such as exposure to sedative and analgesic medications, may be modified to reduce risk.
- Delirium is now recognized to be a significant contributor to morbidity and mortality in the ICU, and it is recommended that all ICU patients be monitored using a validated delirium assessment tool.
- Patients with delirium have longer hospital stays and lower 6-month survival than do patients without delirium, and preliminary research suggests that delirium may be associated with cognitive impairment that persists months to years after discharge.
- Delirium can be categorized into subtypes according to psychomotor behaviour. Hyperactive delirium is characterized by agitation, restlessness, and emotional

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lability; whereas hypoactive delirium is characterized by decreased responsiveness, withdrawal, and apathy. A high index of suspicion is required

Guidelines

Analgesia

- Pain assessment and response to therapy should be performed regularly using the scale and systematically documented.

No pain	**0**
Some pain / discomfort which can be tolerated	**1**
Causing some distress	**2**
Worst pain possible	**3**

- Patients who cannot communicate should be assessed through subjective observation of pain related behaviours (movement, facial expression and posturing) and physiological indicators (heart rate, blood pressure and respiratory rate) and the change in these parameters following administration of analgesics.
- A therapeutic plan and goal of analgesia should be established for each patient and communicated to all caregivers to ensure consistent analgesic therapy.
- When not contraindicated, neuroaxial and other regional techniques may be beneficial. In surgical patients postoperative epidural analgesia reduces time to extubation, ICU stay, incidence of renal failure, morphine consumption during the first 24 hours, and maximal glucose and cortisol blood concentrations, and improves forced vital capacity.
- Paracetamol is a useful adjunct to other analgesics, preferably enteral route, intravenous therapy being reserved for patients with gut failure.
- Whilst NSAIDs are a useful group of analgesics, use in critically ill patients is potentially extremely hazardous and hence their use is very limited.
- It is important to remember that patients on long term opioids will require their normal intake as a background onto which other analgesia should be added. If the oral route cannot be used, careful consideration of how best to achieve this for each individual is required to avoid considerable problems with pain relief. See also WAHNHST Guidelines For Management Of Adult Opiate Dependant Patients In The Acute Hospital Setting.
- Short acting opioids such as alfentanil or remifentanil are useful infusions for cases where rapid assessment of neurological function is required or in renal failure. Rapid offset of analgesia with remifentanil can result in pain, highlighting the need for proactive pain management.
- Remifentanil monograph: http://nww.worcsacute.nhs.uk/EasysiteWeb/getresource.axd?AssetID=28894&type=full&servicetype=Attachment

- In other cases morphine is the most commonly prescribed intravenous infusion of opioid. Great care should be taken in patients with renal failure especially if they are also elderly.
- Fentanyl infusion is a good alternative in patients in renal failure who require a longer acting opioid.
- Literature suggests that adherence to a clear analgesia based sedation protocol is more important than the choice of medication itself

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Sedation

- A sedation goal or endpoint should be established and regularly redefined for each patient.
- Regular assessment and response to therapy should be systematically documented using the **Richmond Agitation Sedation Scale (RASS)**:

Score	Term	Description
+4	Combative	Overtly combative, violent, immediate danger to staff
+3	Very agitated	Pulls or removes tube(s) or catheter(s); aggressive
+2	Agitated	Frequent non-purposeful movement, fights ventilator
+1	Restless	Anxious but movements not aggressive vigorous
0	Alert and Calm	
-1	Drowsy	Not fully alert, but has sustained awakening (eye-opening/contact) to voice **(≥10 seconds)**
-2	Light sedation	Briefly awakens with eye contact to voice **(<10 seconds)**
-3	Moderate sedation	Movement or eye opening to voice **(but no eye contact)**
-4	Deep sedation	No response to voice, but movement or eye opening to physical stimulation
-5	Unrousable	No response to voice or physical stimulation

Procedure for RASS Assessment

1. Observe patient
a. Patient is alert, restless or agitated. (score 0 to +4)

2. If not alert, state patient's name and say to open eyes and look at speaker.
b. Patient awakens with sustained eye opening and eye contact. (score -1)
c. Patient awakens with eye opening and eye contact, but not sustained. (score -2)
d. Patient has any movement in response to voice but no eye contact. (score -3)

3. When no response to verbal stimulation, physically stimulate patient by shaking shoulder.
e. Patient has any movement to physical stimulation. (score -4)
f. Patient has no response to any stimulation. (score -5)

- Any alterations in score requiring adjustment to the rate of drug administration should be recorded additionally
- In general sedation management should be aimed at achieving a score of 0 to -1, or a desired score prescribed by reviewing doctor.
- Daily sedation "holds" (stopping drug infusions) should take place when the score is less than 0 (or less than the prescribed desired score), preferably in the morning at 0800 hours to minimise prolonged sedative effects.
- Research has shown that daily interruption of sedative drug infusions decreases the duration of mechanical ventilation and length of stay in the intensive care unit and enables the performance of daily neurological examinations.
- Local exclusions to sedation holds are:
    - The dying patient.
    - Patients requiring extraordinary respiratory support such as HFOV, prone position or inverse ratio ventilation. Complicated cases should be referred to the doctor in charge for confirmation of sedation hold.

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- Neuromuscular blockade agents should also be stopped daily. Once its effect has reversed the sedation should then be held and agitation assessed.
- Sedation can be recommenced at any time dictated by the patient's level of agitation. REMEMBER when recommencing sedation give a bolus dose followed by the continuous infusion at a rate to achieve a desired score for the individual patient.
- Contact the doctor if the patient is not adequately sedated and haemodynamically unstable.
- Propofol 1% is a popular choice of sedative agent due to its shorter duration of action and certainly is the agent of choice when early extubation is anticipated or when neurological assessment is required. If high volumes are required consideration should be given to the use of the 2% formulation to lower the lipid load.
- Midazolam has historically been used in WAHNHST but although there are some advantages in patients with haemodynamic instability, benzodiazepines are an independent predictor of delirium. Midazolam also has the problem of accumulation

Host factors	Factors linked to critical illness	Iatrogenic factors
Age (older)	Acidosis	Immobilisation
Alcoholism	Anaemia	Medication (eg opioids, benzodiazepines)
Apolipoprotein E4 polymorphism	Fever, Infection, sepsis	Sleep disturbances
Cognitive impairment	Hypotension	
Depression	Metabolic disturbances (eg glucose,	

particularly in the elderly and patients with renal failure. Midazolam should only be used in patients suffering substance withdrawal or patients deemed suitable by the consultant on for the critical care unit. Rigorous attention to sedation scoring, daily sedation holds and titration to effect is required.

- Clonidine is a very useful adjuvant agent in patients on the critical care unit
- Dexmedetomidine has now been added to the formulary. It is a consultant only prescription that should only be used when conventional agents have failed. The flowchart below can be used as guidance for its use.

Failure to achieve target sedation score with conventional agents

↓

Unsuccessful trial of clonidine/clonidine contraindicated

↓

Trial of Dexmedetomidine infusion for up to 24 hours

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	Na^+, Ca^{2+}, urea, bilirubin)	
Hypertension	Respiratory disease (hypoxia, hypercapnia)	
Smoking	High illness severity	
Visual/hearing impairment		

↓

Achievement of target sedation score

↙Yes — No↘

Continue dexmedetomidine for up to 5 days

Discontinue dexmedetomidine

- Dexmedetomidine Monograph: http://nww.worcsacute.nhs.uk/EasysiteWeb/getresource.axd?AssetID=28858&type=full&servicetype=Attachment
- Volatile anaesthetic agents may be useful. There is no scavenging in the unit at AH, but may be achieved at WRH, under the supervision of an anaesthetist.
- Ketamine may be useful in asthmatics, and as a bolus dose in relatively awake patients required to undergo repeated painful procedures, such as dressing changes.

Management Of Delirium

- A validated delirium assessment method should be used to assess patients as part of their daily review. The CAM-ICU tool is useful in this regard (see appendix 1)
- Risk factors for delirium should be assessed and minimised where possible.
  Table modified from Girard *et al. Critical Care* 2008 **12**(Suppl 3):S3
- Non-pharmacological strategies and preventative measures should be routinely practiced where possible (e.g. minimisation of noise pollution, removal of unnecessary lines and catheters)
- After acute, life-threatening complications of critical illness that may lead to delirium have been sought out and addressed, pharmacologic therapy for the prevention and treatment of delirium should be considered
- Any drug intended to improve cognition may have adverse psychoactive effects, paradoxically exacerbating delirium or causing excessive sedation in some patients. Also, evidence proving the efficacy of pharmacologic strategies for delirium is lacking. All psychoactive drugs should therefore be used judiciously in critically ill patients, in the smallest effective dose for the shortest time necessary.
- Haloperidol or atypical antipsychotics are recommended as the drug of choice for the treatment of ICU delirium. Haloperidol blocks D_2 dopamine receptors, resulting in amelioration of hallucinations, delusions, and unstructured thought patterns.
- The optimal dose and regimen have not been defined in clinical trials, but the SCCM guidelines suggest that patients with hyperactive delirium should be treated with 2mg intravenously, followed by repeated doses (doubling the previous dose) every 15 to 20 minutes while agitation persists. Once the agitation subsides, scheduled doses (every 4 to 6 hours) may be continued for a few days, followed by tapered doses for several days. Common doses for ICU patients range from 4 to 20 mg/day, but higher doses are frequently used for the treatment of acute agitation.
- Haloperidol should not be given if significant QT prolongation is present.
- Atypical antipsychotics have gained in popularity over recent years because of the improved side effect profile. They appear to have equal efficacy in the management

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of delirium. Haloperidol may be required in addition for management of breakthrough agitation/delirium while dose escalation occurs.

- Quetiapine PO 25-200mg BD (dose escalation by 50mg/day to effect) or Olanzepine PO 2.5-10mg OD should be considered.

APPENDIX 1

CAM-ICU Tool for assessment of delirium

An example of the CAM-ICU tool in use can be found by following the link below**.**
http://www.youtube.com/watch?v=6WyJ0zL7VkI

Feature 1: Acute onset of mental status changes or fluctuating course

AND

Feature 2: Inattention

AND

Feature 3: Disorganised thinking **OR** **Feature 4: Altered level of consciousness**

Altered mental status

- Has the patient shown any sign of being other than completely "themselves"?

Inattention

- Ask the patient to squeeze your hand. They will need to be responsive to verbal stimulation and keep their eyes open.
- Ask the patient to correctly identify the letter '**A**' in 10 letter sequence by squeezing only when they hear the letter '**A**'. Suggested Sequence: **"SAVE A HAART"**

- They are allowed 2 mistakes - squeezing on a non-A, not squeezing on a A. More than 2 mistakes (however many it does not matter) is inattention.

If they pass the inattention test they are not delirious, the test is now complete. More than 2 mistakes proceed to look for disorganized thinking or decreased level of consciousness.

Disorganized thinking &/or reduced level of consciousness

- 5 elements - 4 simple yes/no questions, one simple command. Use Set A or Set B.

Set A	**Set B**
Will a stone float on water?	Will a leaf float on water?
Are there fish in the sea?	Are there elephants in the sea?
Does 1 pound weigh more than 2?	Does 2 pounds weigh more than 1?
Do you use a hammer to hit a nail?	Do you use a saw to hit a nail?

- Ask the patient to *"raise 2 fingers with one hand"* and then to *"do the same with the other hand"* (do not instruct the patient to "raise 2 fingers" a second time, but instead instruct them to *"do the same with the other hand"*) .
- They are allowed one mistake - one question wrong or unable to do the command. Two mistakes means disorganized thinking. The patient is CAM-ICU positive.

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