1. INTRODUCTION

About one third of the patients admitted in Intensive Care Services (ICS) worldwide are intubated and mechanically ventilated. Pain, anxiety and delirium are common among these critically ill patients on mechanical ventilation. These patients frequently experience pain and discomfort due to their pre-existing disease, invasive procedure and trauma. But it can also be caused by:

1.1 Monitoring and therapeutic devices such as catheters, drains and endotracheal tubes.

1.2 Performing routine nursing care like airway suctioning, physical therapy, dressing changes and patient mobilization.

1.3 Prolonged immobilization.

Inadequate pain relief may result in sleep deprivation, disorientation and trigger stress response. If a critically ill patient remains in this state for prolonged period, he might experience delirium. Delirium itself is associated with increased length of hospital stay, increased health care cost and higher mortality. These ICU patients have increased chance of getting Post Traumatic Stress Disorder (PTSD) and long-term cognitive dysfunction. Safe and effective management of patient's pain and discomfort demands a delicate balance of sedation and analgesia protocols while managing delirium.

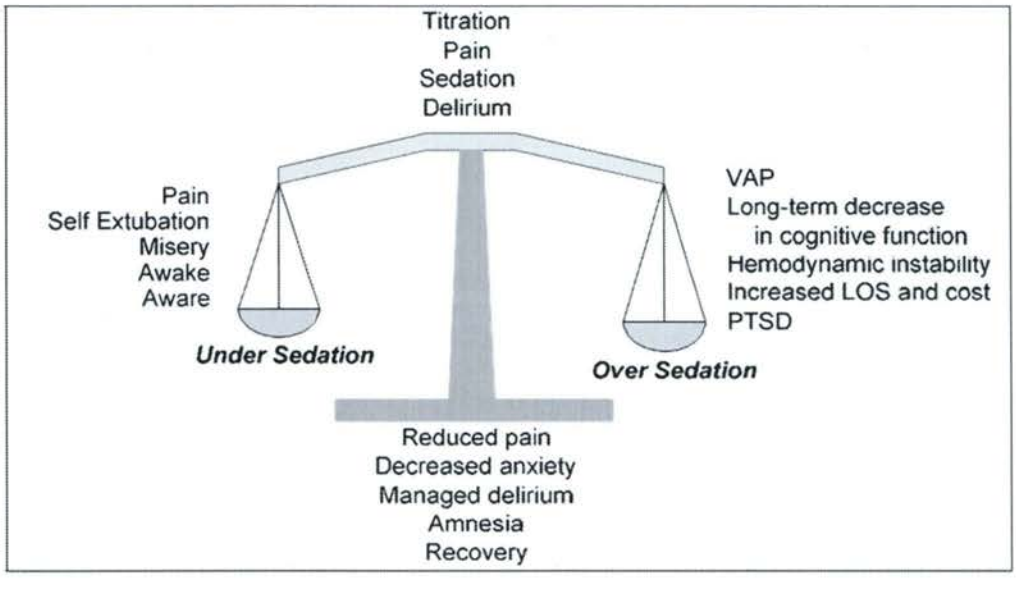


Figure 1: Balancing Pain and Anxiety Treatment

2. PURPOSE

The objective of this policy is to establish a standardized process for appropriate assessment and management of pain, agitation and delirium in all ICU patients to:

2.1 Decrease pain.

2.2 Decrease anxiety.

2.3 Decreased ventilator days.

2.4 Decrease ICU length of stay.

2.5 Reduce long-term cognitive decline.

2.6 Avoid respiratory, cardiovascular, hepatic and renal complications.

2.7 Reduce the incidence of PTSD.

2.8 Decrease the incidence of self / spontaneous extubation.

2.9 Decrease cost of care.

2.10 Reduce the incidence of delirium and or improve its management.

2.11 Decrease the chances of over sedation.

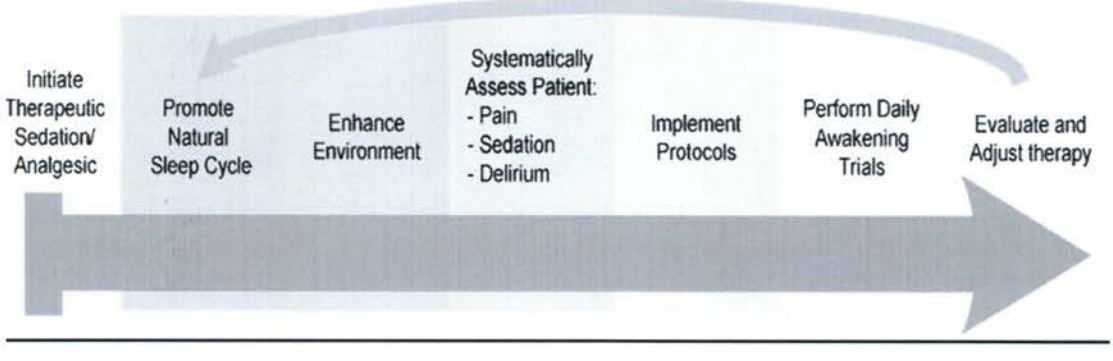


Figure 2: ICU Adult Sedated Patient Care Process Map

3. POLICY

3.1 It is the basic human right of the patient to have his pain assessed and appropriate intervention to be instituted whenever pain is present or anticipated.

3.2 This policy applies to all the patients admitted to the Department of Intensive Care Services (ICS) in Prince Sultan Military Medical City (PSMMC).

3.3 All health care providers are responsible and accountable for ensuring effective pain management and anxiety control.

3.4 To promote sleep in ICS patients by optimizing patients environment using strategies to control light and noise, clustering patient care activities and decreasing patient care activities at night to protect patient sleep cycle. This will be implemented by enforcing sleep hours in ICS.

3.5 Analgesia first sedation must be used for mechanically vented Intensive Care Services patients.

3.6 Pain should be routinely monitored in the Intensive Care Services Department.

3.7 The Behavioural Pain Scale (BPS) and critical care pain observation tool will be used in Intensive Care Services for the assessment and treatment of pain.

3.8 Pre emptive analgesia and / or non-Pharmacological intervention (e.g. relaxation) are administrated to alleviate pain in ICS for invasive and potentially painful procedures, like chest tube removal or CVL insertion etc.

3.9 Intravenous opioids should be considered as a first line drug class of choice to treat non neuropathic pain in Intensive Care Services.

3.10 Non opioids analgesia should be considered to decrease the amount of opioids or to eliminate the need for intravenous opioids altogether and to decrease opioid related side effects.

3.11 Gabapentin or carbamazepine should be used in addition to intravenous opioids for the treatment of neuropathic pain.

3.12 Thoracic epidural should be considered for post operative analgesia in abdominal vascular aneurysmal surgery.

3.13 The use of Patient Control Analgesia (PCA) should be encouraged in all post operative cases.

3.14 Thoracic epidural analgesia can be used for traumatic rib fractures.

3.15 The depth of Sedation in Intensive Care Services patients is monitored by Richmond Agitation Sedation Scale (RASS).

3.16 Light level of sedation should be maintained in ICS Patients unless contraindicated.

3.17 There should be daily interruption of sedation for all the ICS patients unless contraindicated.

3.18 Objective measures of brain function e.g. Bispectral index (BIS) & Patient State Index (PSI) using Masimo SedLine etc. can be used as an adjunct to subjective sedation assessment in ICS patients receiving neuro muscular blocking drugs.

3.19 Continuous EEG monitoring must be used to monitor non convulsive seizure activity in ICS with either known or suspected seizures or to titrate electro suppressive medication to achieve burst suppression.

3.20 Non benzodiazepines sedatives (Propofol and Dexmedetomidine) should be preferred over sedation with Benzodiazepine (Midazolam or Lorazepam).

3.21 Delirium monitoring and assessment should be done using confusion assessment method for ICU (CAM-ICU).

3.22 Early mobilization should be considered for all ICS Patients.

4. RESPONSIBILITIES

All Intensive Care Services Healthcare Staff (Physicians, RT's and Nurses)

5. PROCEDURES

5.1 **Promote natural sleep cycle.**

Sleep Cycle.

"A sequence of sleep stages that usually begins with a period of about 80 minutes of non rapid eye movement (NREM) sleep followed by about 10 minutes of rapid eye

movement (REM) sleep." This cycle of approximately of 90 minutes is repeated 4-6 times in a night.

If this cycle is interrupted by noise, sleep disorder or any cause, the quality of sleep will suffer. It will adversely affect the health, well-being and quality of life. Incorporate the healing power of sleep in the management of critically ill patients. This can be achieved by promoting sleep hygiene by establishing and restoring natural sleep cycle and creating a therapeutic environment conducive for sleep. This can be done in the following way:

5.1.1 Allow natural sleep at night. Adjust protocols and activities to provide a respite that nurtures relaxation and lead to natural sleep. Conduct patient activities and mobility during the day such as physical therapy.

5.1.2 Stick to the schedule of sleep. A specific sleep time must be established early in the patient's care and consistently followed throughout the treatment.

5.1.3 Avoid frequent waking tasks and prevent interruption. A minimum 90 minutes of sleep is required; therefore, care provider must work to prevent frequent (i.e., every 15 or 30 minutes) waking activities during the sleep period.

5.1.4 Allow uninterrupted naps for the patient during the day. Regular 60 to 90 minutes naps should be allowed and encouraged.

5.1.5 Use back massage to relax the patient for sleep. Approximately 5-10 minutes massage initiates the relaxation response.

5.1.6 Create a quiet, dark environment conducive to sleep. As much as possible, lessen outside light, turn off lights including flashing indicators and reduce human and mechanical noise.

5.1.7 Use natural sleep cues. When establishing the patient's sleep at night, use natural cues, such as lighting, noise and smells. If possible provide a room with a window or provide lighting that mimic the 24 hour day to help patients regulate to daylight /darkness.

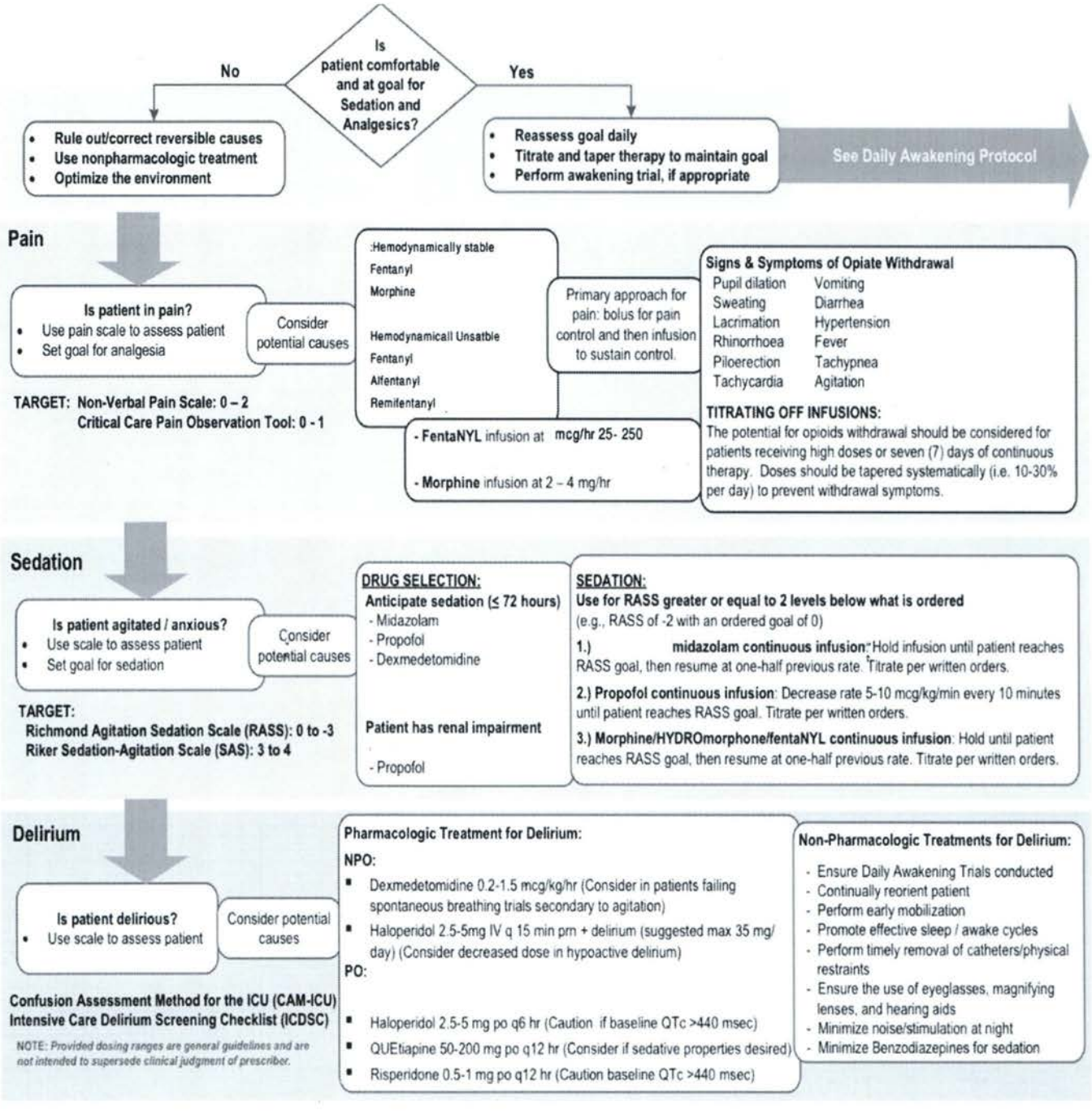


Fig. 3 Assessment Algorithm for Sedated Adult ICU Patients

5.2 **Pain Assessment.**

"Pain is an unpleasant sensory or emotional experience that is associated with tissue damage or described in terms of tissue damage."

Pain relief is considered as one of the basic human right. Patients admitted to ICS have the right to have adequate analgesia for the management of his pain. The pain experienced in ICS is not memorable. Every effort should be done to minimize it.

Self-assessment of pain is not a good tool in critically ill patients, as many factors affect the ability of the patient to communicate verbally. These include mechanical ventilation, use of sedative drugs and fluctuation in the level of consciousness. Both self-reporting and non-verbal reporting of pain scales should be used in pain assessment. Following steps should be followed while assessing the patient for pain:

5.2.1 Evaluate the patient's sedation and pain together. A patient's level of comfort is impacted by these two variables. An assessment should be conducted systematically on both.

5.2.2 Conduct pain assessment using an appropriate pain scale. Effective pain assessment and response to therapy must be performed regularly (every 6 hourly) using a validated scale appropriate to the patient population.

5.2.3 Look for presence of pain. A sedated patient's pain assessment must include further investigation and observation to better determine the presence of pain. Care providers should consider painful lines/tubes, injuries, procedures and pain history in their assessment.

5.2.4 Determine the time since the patient's last analgesic. A patient's pathology and analgesic history, specifically the time since the last analgesic agent was administered, as well as the dose and the effectiveness of the dose, need to be included when evaluating a patient's pain intensity.

5.2.5 Ensure consistent analgesic therapy. A therapy plan and goal of analgesia should be established for each patient and communicated to all caregivers. The goal of

analgesia therapy should be re-evaluated and communicated to all caregivers as the patient's clinical condition changes.

5.2.6 Bolus of analgesia. Provide bolus of analgesia to get ahead of the pain, especially before doing a patient procedure (e.g., turning, dressing changes, suction), and then infuse analgesia to sustain control.

5.2.7 Regular doses. Scheduled opioid doses or a continuous infusion are preferred over an "as needed" regimen to ensure consistent analgesia.

5.2.8 Analgesia first. Start sedation therapy of agitated, critically ill patients only AFTER providing adequate analgesia and treating reversible physiological causes (e.g., hypoxemia, hypoglycemia, hypotension, and withdrawal from alcohol or other drugs).

5.2.9 Adjunct to opioids. A Non-Steroidal Anti-Inflammatory (NSAID) or paracetamol is recommended as an adjunct to opioids unless contraindicated.

5.2.10 Anticipate pain. Preventing pain is more effective than treating established pain. Effective pain management requires care providers to anticipate a patient's pain and adjust therapy as needed.

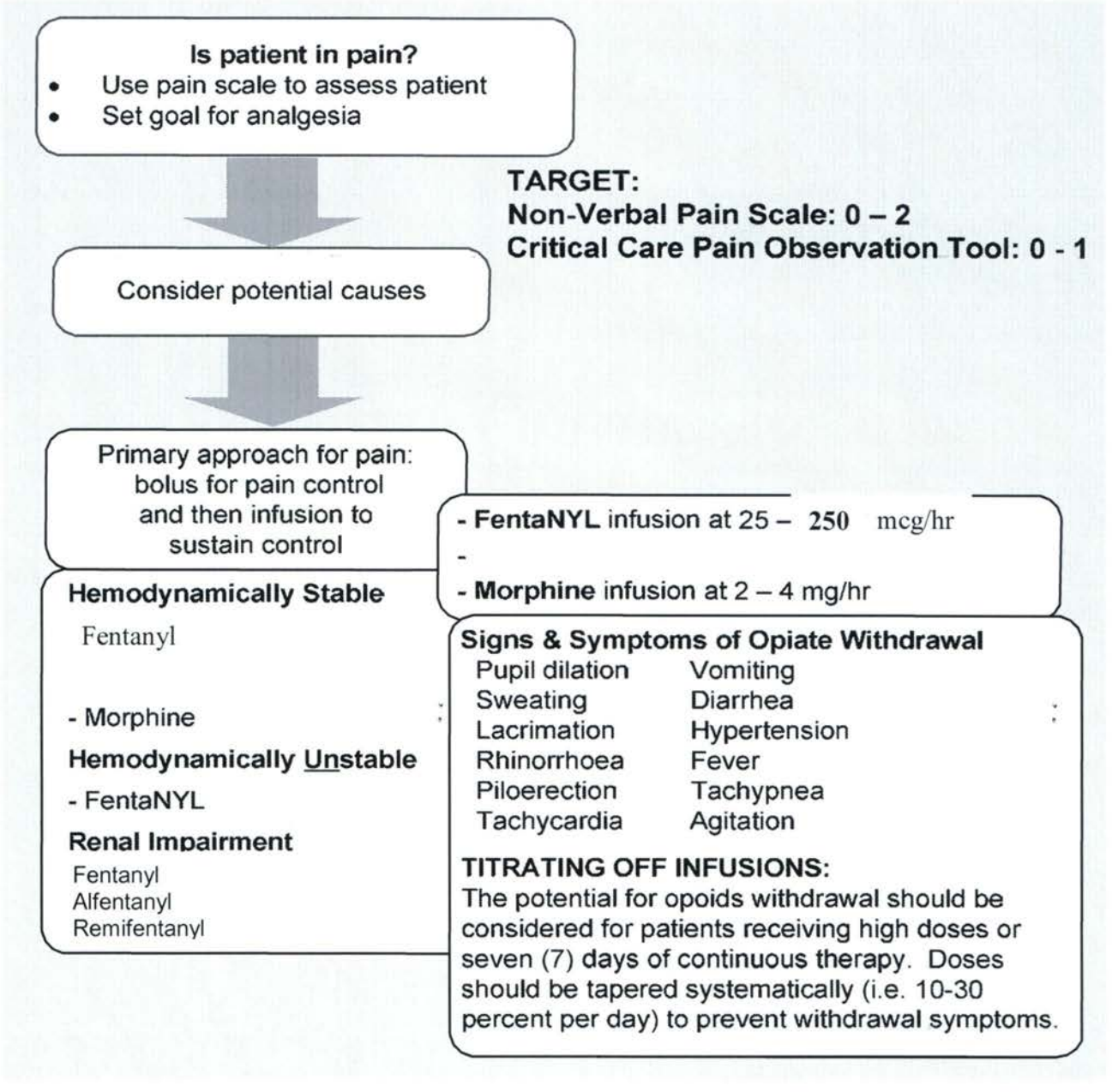


Fig. 4 Pain Management Algorithm

5.2.11 Pain Scales

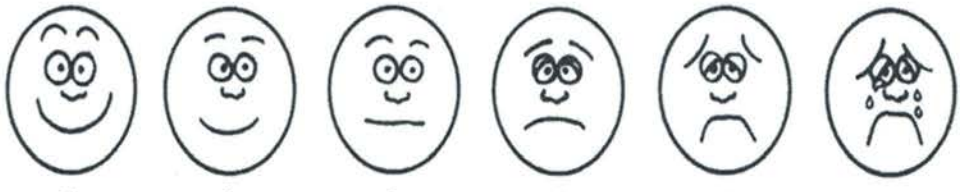
ICU PAIN MANAGEMENT PROTOCOL

SELF-REPORTING PAIN ASSESSMENT SCALE

Wong-Baker FACES Pain Rating Scale*

Directions: When the patient is awake, show this card with the faces. Explain to the person that each face is for a person who feels happy because he has no pain (hurt) or sad because he has some or a lot of pain. Point to each face and ask the person to choose the face that best describes how he is feeling. Based on his response, circle the appropriate scale number.

NOTE: Although the numbers associated with this scale are 0-5, the scale number should be doubled to a scale of 0-10 in order to apply the standard order set.



0	1	2	3	4	5
No Hurt	Hurts Little Bit	Hurts Little More	Hurts Even More	Hurts Whole Lot	Hurts Worst
Alert Smiling	No humor Serious Face	Furrowed brow Pursed lips Breath holding	Wrinkled nose Raised upper lip Rapid breathing	Slow blink Open mouth	Eyes closed Moaning Crying
No Pain	Can be ignored	Interferes with tasks	Interferes with concentration	Interferes with basic needs	Bed rest required

Activity Tolerance Scale

0-10 Numeric Pain Scales** (circle one)

Fig. 5. Wong Baker FACES Rating Scale

In these pain scales, patient is unable to self-report pain level, the critical care clinician should use a validated, non-self-reporting pain scale. The most validated one is Critical Care Pain Observation Tool (CPOT)

Figure 6: 10 Point Non-Verbal Pain Scale

Directions: Observe patient per category and, based on your findings, circle the appropriate scale number.

FACIAL EXPRESSION

Score	Description
0	No particular smile or expression
1	Occasional grimace, tearing, frowning, and/or wrinkled forehead
2	Frequent grimacing, tearing, frowning, and/or wrinkled forehead

ACTIVITY

Score	Description
0	Lying quietly, normal position
1	Seeking attention through movement or slow cautious movement
2	Restless excessive activity and/or withdrawal reflexes

GUARDING

Score	Description
0	Lying quietly, no positioning of hands over area of body
1	Splitting areas of the body, tense
2	Rigid, stiff

PHYSIOLOGIC PARAMETER

Score	Description
0	Stable vital signs
1	Change over past 4 hours in any of the following SBP > 20mmHg or heart rate > 20 bpm
2	Change over past 4 hours in any of the following SBP > 30mmHg or heart rate > 26 bpm

RESPIRATORY

Score	Description
0	Baseline respiratory rate/oxygen saturation, compliant with ventilator
1	RR > 10 above baseline or 5% decrease in oxygen saturation, mild ventilator asynchrony
2	RR > 20 above baseline or 10% decrease in oxygen saturation, mild ventilator asynchrony

SCORE: _____ Target Pain: 0 - 1

Fig. 6.Non-Verbal Reporting of Pain

CPOT is an easy to use and teach scale that may be used on all patients regardless of their level of consciousness and intubation status. This pain scale is less demanding of the provider, because it can be smoothly integrated into daily care delivery and clinical assessment. The CPOT is a relatively new scale, which will require an education plan for implementation.

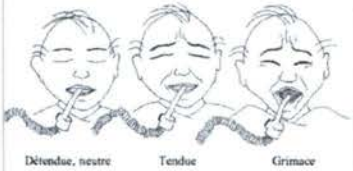
Indicator	Score		Description
Facial expression  Caroline Arbour, RN, B.Sc., M.Sc.A(c) School of Nursing, McGill University	Relaxed, neutral	0	No muscle tension observed
	Tense	1	Presence of frowning, brow lowering, orbit tightening and levator contraction or any other change (e.g., opening eyes or tearing during nociceptive procedures)
	Grimacing	2	All previous facial movements plus eyelid tightly closed (the patient may present with mouth open or biting the endotracheal tube)
Body movements (Puntillo et al., 1997 ; Devlin et al., 1999)	Absence of movements or normal position	0	Does not move at all (doesn't necessarily mean absence of pain) or normal position (movements not aimed toward the pain site or not made for the purpose of protection)
	Protection	1	Slow, cautious movements, touching or rubbing the pain site, seeking attention through movements
	Restlessness	2	Pulling tube, attempting to sit up, moving limbs/thrashing, not following commands, striking at staff, trying to climb out of bed
Compliance with the ventilator (intubated patients) (Harris et al. 1991. Payen et al., 2001) **OR** **Vocalization (extubated patients)** (Mateo et Krenzischek, 1992)	Tolerating ventilator or movement	0	Alarms not activated, easy ventilation
	Coughing but tolerating	1	Coughing, alarms may be activated but stop spontaneously
	Fighting ventilator	2	Asynchrony: blocking ventilation, alarms frequently activated
	Talking in normal tone or no sound	0	Talking in normal tone or no sound
	Sighing, moaning	1	Sighing, moaning
	Crying out, sobbing	2	Crying out, sobbing
Muscle tension Evaluation by passive flexion and extension of upper limbs when patient is at rest (Ambuel et al., 1992) or when patient is being turned	Relaxed	0	No resistance to passive movements
	Tense, rigid	1	Resistance to passive movements
	Very tense or rigid	2	Strong resistance to passive movements, incapacity to complete them
SCORE: __ Target Pain: 0 - 1			

Fig. 7. Critical Care Pain Observation Tool

5.3 **Sedation**

"Sedative agents are the drugs that calm a patient down, easing agitation and permitting sleep." They generally work by modulating signals within CNS.

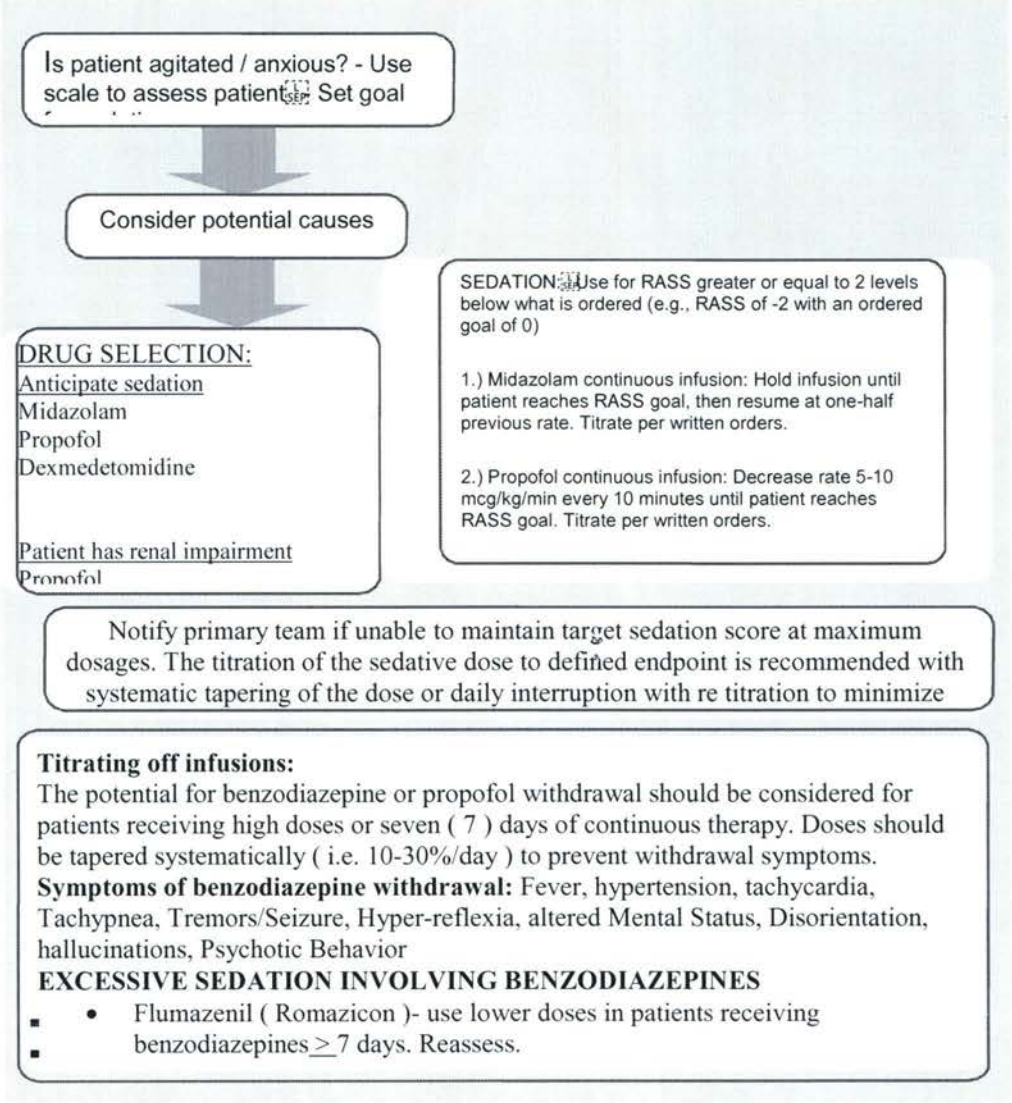


Fig 8. Sedation Algorithm

Robinson et al (2008) found continuous sedative infusions for critically ill patients have been shown to increase the duration of mechanical ventilation and length of intensive care stay, despite perceived advantages. The weaning of patients from mechanical ventilation is often hampered by the sedation they receive. Additionally, coordinated daily interruption of

sedative infusions with objective re-titration in critically ill patients has been shown to decrease the durations of mechanical ventilation and length of ICU stay.

It is recommended to regularly assess the response of the patient to the sedative therapy. The appropriate target level of sedation is a calm patient that can be easily aroused with maintenance of the normal sleep wake cycle. Some patients may require deep levels of sedation to facilitate mechanical ventilation.

Richmond Agitation Sedation Scale (RASS) is the most valid and reliable sedation assessment tools for measuring quality and depth of sedation in adult ICU patients. We use RASS in our clinical practice.

RASS is a 10-point scale, with four levels of anxiety or agitation (+1 to +4 [combative]), one level to denote a calm and alert state (0), and 5 levels of sedation (-1 to - 5) culminating in unarousable (-5).

Score	Description
RASS Target Sedation = 0 to -3	
+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* ***(>10 seconds)*** *(eye-opening/eye contact) to voice*
-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 Unarousable	*No response to voice or physical stimulation*

Fig 9. Richmond Agitation Sedation Scale (RASS)

5.4 **Non-Pharmacologic Sedation Strategies.**

If the patient is anxious or agitated, consider non- medication or environmental strategies to assist with management, such as environment modification, relaxation, back massage, and music therapy when appropriate.

5.5 **Delirium.**

5.5.1 **"Delirium, characterized by fluctuations in mental status such as inattention, disorganized thinking, hallucinations, disorientation, and an altered level of consciousness."**

5.5.1.1 **Hyperactive delirium**: previously referred to as ICU psychosis, hyperactive delirium includes such symptoms as hyper vigilance, restlessness, anger, irritability, and uncooperativeness and is associated with better overall outcomes.

5.5.1.2 **Hypoactive delirium**: the more common and deleterious form, is characterized by lack of awareness, decreased alertness, sparse or slow speech, lethargy, decreased motor activity, and apathy.

5.5.1.3 **Mixed delirium**: is apparent in those patients with a mixed clinical picture and may occur in up to 54 percent of patients.

5.5.2 Delirium occurs in up to 65 percent of hospitalized patients, and up to 87percent of patients admitted to the ICS. The outcomes of delirium can be serious for the patient and should be considered as another organ failure that affects patient outcome. Delirium is associated with higher mortality and increased length of hospital stay and health care costs. Delirium must be considered when assessing pain based on ICS sedation.

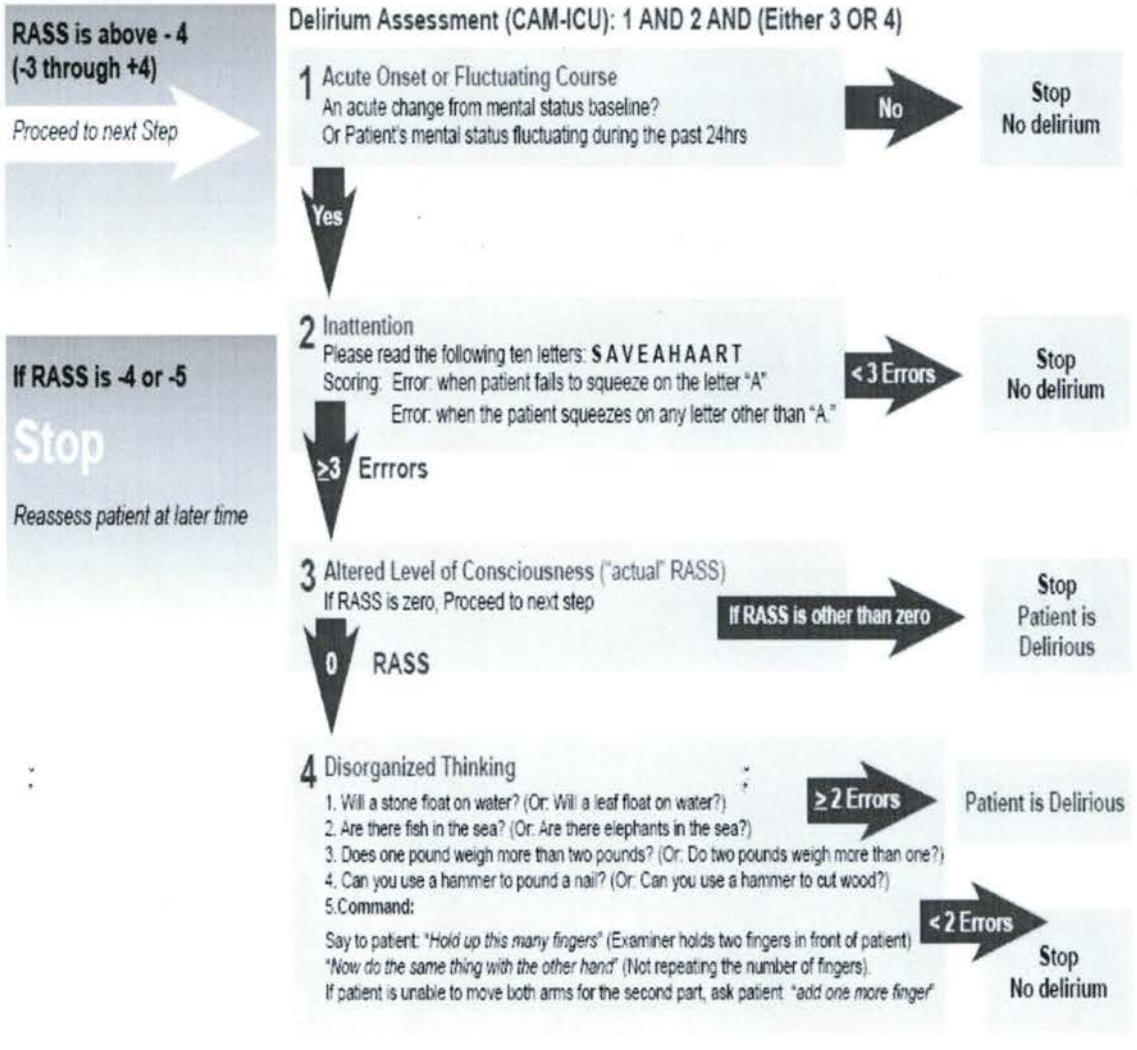


Figure 10: Delirium Assessment (CAM-ICU) Algorithm

5.5.3 **Risk Factor for Delirium.**

Delirium in patients usually develops between 24 and 72 hours after admission to ICU. Factors placing patients at risk for delirium before or during hospitalization exist and must be considered in assessing and treating delirium. Known risk factors for delirium include:

5.5.3.1 Risk factors before hospitalization: cognitive impairment, chronic illness (including hypertension), advanced age (over 65 years), depression, smoking, alcoholism, and severity of illness.

5.5.3.2 Risk factors during hospitalization: Congestive heart failure, sepsis, prolonged restraint use and immobility, withdrawal, seizures, dehydration, hyperthermia, head trauma, intracranial space-occupying lesions, and the use of specific medications: Lorazepam/ Midazolam, Morphine/Fentanyl, and Propofol.

5.5.4 **Assessment of Delirium.**

Delirium is categorized according to level of alertness and level of psychomotor activity. Careful evaluation, accurate identification, and prompt treatment of delirium can successfully minimize or prevent adverse patient outcomes.

We use the CAM-ICU for the assessment of delirium.

5.5.5 **Treatment of Delirium.**

5.5.5.1 The treatment of a patient's delirium should include both pharmacologic and non-pharmacologic therapy. For pharmacologic therapy, see the table 7.4.

5.5.5.2 Suggested non-pharmacologic treatments of delirium include:

5.5.5.2.1 Ensure Daily Awakening Trials performed

5.5.5.2.2 Continually reorient patient to environment/surroundings

5.5.5.2.3 Perform early mobilization

5.5.5.2.4 Promote effective sleep/awake cycles

5.5.5.2.5 Perform timely removal of catheters/physical restraints

5.5.5.2.6 Ensure the use of eyeglasses, magnifying lenses, hearing aids

5.5.5.2.7 Minimize continuous noise/stimulation at night

5.5.5.2.8 Minimize Benzodiazepine for sedation

6. REFERENCES

6.1 Girard, T. D., Kress, J. P., Fuchs, B.D., Thomason, J. W. W., Schweickert, W. D., Pun, B. T., et al. (2008). Efficacy and safety of a paired sedation and ventilator weaning protocol fo mechanically ventilated patients in intensive care (Awakening and Breathing Controlled trial): a randomised controlled trial. The Lancet, 371, 126.

6.2 Robinson, B. R. H., Mueller, E. W., Henson, K., Branson, R. D., Barsoum, S., & Tsuei, B. J. (2008). An Analgesia– Delirium–Sedation Protocol for Critically Ill Trauma Patients

6.3 Reduces Ventilator Days and Hospital Length of Stay. The Journal of Trauma Injury, Infection, and Critical Care. 65, 3, 517.

6.4 Jacobi, J., Fraser, G. L., Coursin, D. B., Riker, R. R., Fontaine, D., Wittbrodt, E. T., et al. (2002). Clinical practice guidelines for the sustained use of sedatives and analgesics in the critically ill adult. Crit Care Med. 30, 1, 119-141.

6.5 Kress, J. P., Pohlman, A. S., O'Connor, M. F., & Hall, J. B. (2000). Daily interruption of sedative infusions in critically ill patients undergoing mechanical ventilation. New Engl JMed, 342, 1471–1477.

6.6 San Diego Patient Safety Council, (December 2009). ICU Sedation Guidelines of Care. http://www.patientsafetycouncil.org/uploads/ICU_Sedation_Tool_Kit_FINAL_18feb2010 .pdf

6.7 Sessler, C. N., Gosnell, M., Grap, M. J., Brophy, G. T., O'Neal, P. V., Keane, K. A., et al. (2002). The Richmond Agitation-Sedation Scale: validity and reliability in adult intensive care patients. Am J Respir Crit Care Med, 166,1338-1344.

7. APPENDICES

7.1 Daily Awakening Trial

7.2 Management Pathway

7.3 Agents for Pain

7.4 Agents for Delirium, Agitation & Sleep

8. CONTRIBUTING DEPARTMENTS

Intensive Care Services

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Reviewed by: **Nursing Policies, Procedures and Guidelines Committee (NPPGC)**	**Signature:**	**Date:** 10/4/2024
Reviewed by: **Dr. Turki Al Mutairi** **Executive Director of Nursing Affairs** عبدالله بن مساعد الحربي مساعد المدير التنفيذي لشؤون التمريض	**Signature:**	**Date:** 11/4/2024
Reviewed by: **Brig. Gen. Dr. Abdulelah Mohammed Hummadi** **Director, Continuous Quality Improvement & Patient Safety (CQI&PS)**	**Signature:**	**Date:** 15/4/2024
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Authorized by: **Brig. Gen. Dr. Abdulrahman Al Robayyan** **Director of Medical Administration**	**Signature:**	**Date:** 18/4/2024
Authorized by: **Brig. Gen Dr. Rashed Al Otaibi** **Executive Director for Health Affairs, Chairman Senior Medical Management Team (SMMT)**	**Signature:**	**Date:** 21/4/2024
Approved by: **Maj. Gen. Khalid Abdullah Al Hudaithi** **General Executive Director of Prince Sultan Military Medical City**	**Signature:** Brig. Gen. Dr. Abdulelah Hummadi Director of CQI&PS Department P.P.	**Date:** 23/4/2024

Appendix I
Daily Awakening Trial.

Daily Awakening Algorithm

The following algorithm contains recommendations from the San Diego Patient Safety Council. Elements may vary based on your patient population and unit needs.

Assess for Daily Awakening

Exclusions:
- Increased Intracranial pressure issues
- Neuromuscular blockade
- Significant ventilation support required, such as very high PEEP, FiO2
- CABG immediate post-op
- *And other site specific exclusionary criteria*

Perform Daily Awakening
- Wean / Stop sedation
- Consider decreasing narcotics infusion by 25-50%

Is patient awake and calm?
Use sedation scale
(SAS 3-4 or RASS 0 to -1)

No → Restart Sedation at ½ previous dose (No Rapid Shallow Breathing Index)

Proceed to SBT

Spontaneous Breathing Trial

- Take opportunity to assess patient's pain
- Titrate narcotics as needed for pain

Assess for Spontaneous Breathing Trial (SBT)
(RN and RCP)

*** Must meet all criteria to proceed***
- Calm and co-operative
  (SAS score of 3 to 4; RASS 0 to -1)
- Hemodynamically stable
- PEEP < 8
- FiO2 ≤ 0.60
- PH > 7.34
- SpO2 > 90%

No → Do not proceed with SBT

Conduct SBT for 1 Minute
- Mode CPAP
- PEEP = 5
- Pressure support vent. at least 5 - 10
- FIO2 unchanged

After 1 minute, calculate Rapid Shallow Breathing Index (RSBI):
RSBI = Respiratory Rate/Tidal Volume in liters
<105 = 80% success
>105 = 95% failure

No → Return to previous ventilator settings

SBT Termination Criteria:
- Respiration Rate >35/minute for > 5 minutes
- SpO2 < 90% for > 2 minutes
- New Ectopy
- Heart Rate change 20% from baseline
- Blood Pressure change 20% from baseline
- Accessory muscle use
- Increased anxiety/diaphoresis

***Return patients who fail a SBT to their previous ventilator settings and re-screen in 24 hours

***Discuss with MD prn vs. continuous sedation/pain

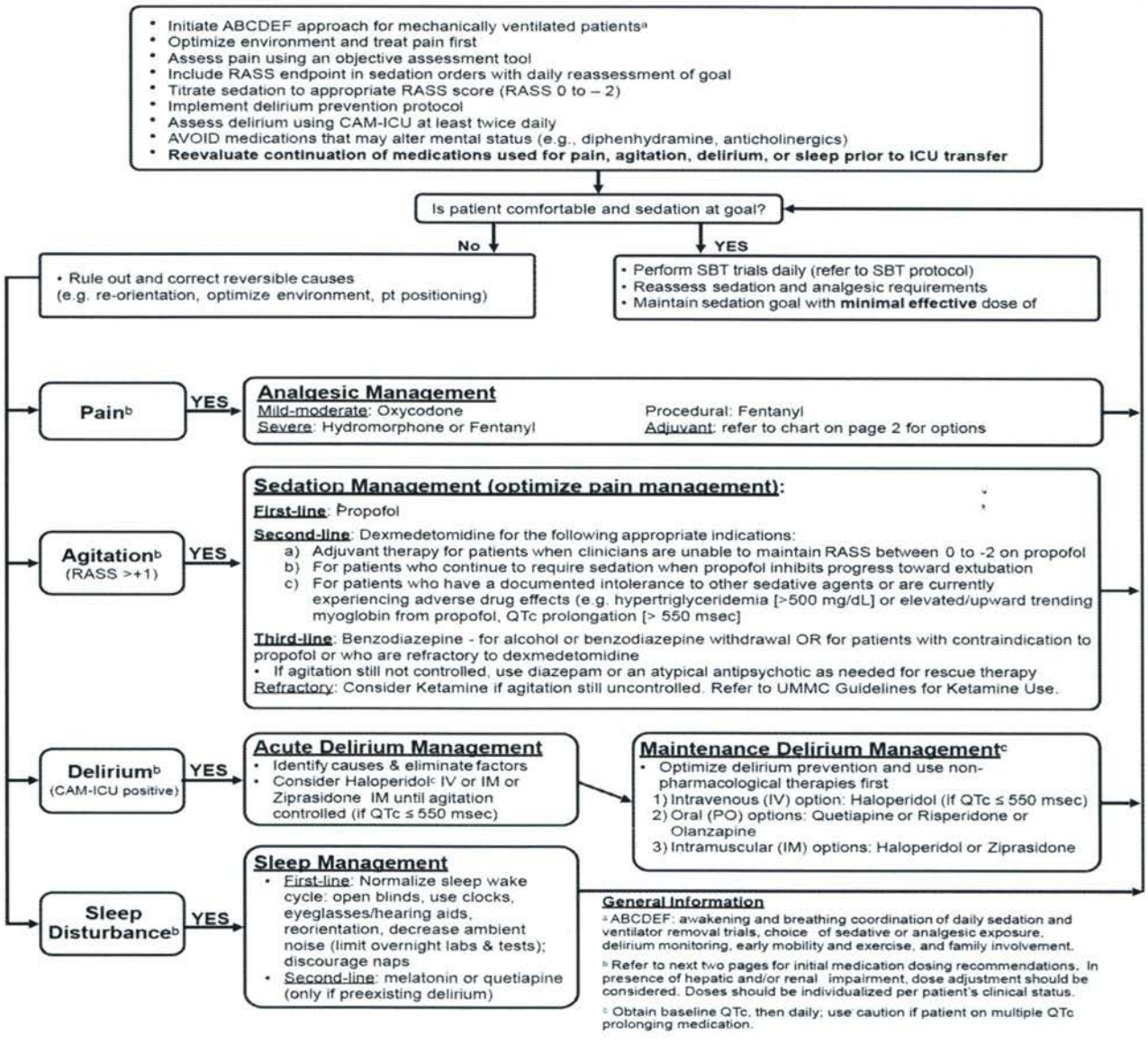
- **Conduct SBT for up to 2 hours**
- **Continuously Reassess**

Successful Completion SBT
Discuss Arterial Blood Gases and Extubation Plan with Physician

Appendix II

Management Pathway

PAIN, AGITATION, DELIRIUM, IMMOBILITY, and SLEEP GUIDELINES FOR VENTILATED PATIENTS
Excludes Traumatic Brain Injury



Appendix III
Initial Dosage Recommendation for Pain

	Adults (18 -65 years) Dosing	Adults (> 65 years) Dosing*	Comments
PAIN THERAPY			
Fentanyl	• Continuous infusion 25 – 200 mcg/hr or • 25 – 50 mcg q1 hr PRN procedure / breakthrough	• Continuous infusion 25 – 100 mcg/hr or • 12.5 – 25 mcg q1 hr PRN procedural pain	• PRN to be used for procedural breakthrough pain only
Morphine	• Continuous infusion 2 – 10 mg/hr or • 3 – 10 mg q 8 hr (0.1 mg/kg)	• Continuous infusion 1 – 5 mg/hr or • 2 – 8 mg q 8 hr (0.1 mg/kg)	• Avoid in hypotension. • May cause itching due to histamine release. • Active metabolite accumulates in renal dysfunction. • Decrease Preload, which is beneficial in pulmonary edema.
Pethidine	• 50 - 100 mg IV q 6 - 8 hr or 1 mg/kg	• 50 - 100 mg IV q 6 - 8 hr or 1 mg/kg • Lower doses recommended	
Hydromorphone	• 0.5 – 1 mg IV q 2 hr PRN or scheduled • 2 – 4 mg PO q 3 to 4 hr PRN or scheduled	0.2 – 0.5 mg IV q2 hr PRN	
Oxycodone	5 – 10 mg PO q 3 to 6 hr PRN or scheduled	2.5 – 5 mg PO q 4 to 6 hr PRN or scheduled	
Adjunctive / Alternate			
Acetaminophen	650 – 1000 mg PO q 4 to 6 hr PRN or scheduled	650 – 1000 mg q 6 hr PRN or scheduled	• Consider as adjunct or as an alternative to an opioid analgesic • Maximum 4000 mg/day • Monitor hepatic function
Tramadol	50 – 100 mg PO q6 hr	25 – 50 mg PO q 6 hr	• Consider as alternative first line therapy in geriatric patients or known intolerance to other oral opioids • Avoid in patients with seizure disorder • Requires adjustment in renal failure • Max 400 mg/day
Methadone	5 – 10 mg PO q8 – 12 hr scheduled 2.5 – 5 mg IV q8 – 12 hr scheduled	Not recommended	• Consider for opioid-sparing effects as an adjunct
Ketamine	Continuous infusion 0.1 – 0.5 mg/kg/hr	Not recommended	• Consider if refractory to other analgesic therapies or as opioid sparing agent in those with opioid dependency or extensive orthopedic injuries
Gabapentin	• 300 mg – 1200 mg three times daily (CrCl ≥ 60 mL/min) • 200-700 mg twice daily (CrCl > 30 to 59 mL/min) • 200 -700 mg once daily (CrCl > 15 to 29 mL/min) • 100-300 mg once daily (CrCl ≤ 15 mL/min)	• 300 mg – 1200 mg three times daily (CrCl ≥ 60 mL/min) • 200-700 mg twice daily (CrCl > 30 to 59 mL/min) • 200 -700 mg once daily (CrCl > 15 to 29 mL/min) • 100-300 mg once daily (CrCl ≤ 15 mL/min)	• Preferred therapeutic option for neuropathic pain only • Monitor renal function

Appendix IV

Initial Dosing Recommendation Agitation, Delirium & Sleep

	Adults (18-65 years) Dosing	Adults (> 65 years) Dosing*	Comments
AGITATION/DELIRIUM/SLEEP THERAPY			
Propofol	5 – 50 mcg/kg/min		• No loading dose or bolus • Need baseline triglyceride level and then recheck every 72 hours • Consider discontinuing if > 500 mg/dL
Dexmedetomidine	0.2 – 1.5 mcg/kg/hr		• No loading dose or bolus due to concern for hypotension or bradycardia • Should not be used for deep sedation or severe agitation • Consider as option to promote sleep
Diazepam	2 – 10 mg IV q15 minutes until controlled for acute agitation	Not recommended/Use with caution	If no response to propofol or dexmedetomidine
Midazolam	2 – 5 mg IV q15 minutes until controlled for acute agitation	Not recommended/Use with caution	If no response to propofol or dexmedetomidine
Lorazepam	1 – 4 mg IV q 2 to 4 hr PRN for acute agitation	Not recommended/Use with caution	If no response to propofol or dexmedetomidine
Ketamine	Continuous infusion 0.5 mg/kg/hr (see UMMC ketamine continuous infusion guidelines)	Not recommended/Use with caution	If refractory despite propofol, dexmedetomidine, and/or benzodiazepines
Haloperidol**	1 – 10 mg IV q 2 to 6 hr 2.5 – 10 mg PO q 4 to 6 hr		• More EPS and less QTc prolongation with PO haloperidol • May be scheduled or PRN for breakthrough agitation
Olanzapine**	2.5 – 5 mg PO q 6 to 12 hr		• Increased metabolic side effects and EPS compared to quetiapine • Consider in patients with **hyperactive delirium**
Risperidone**	0.5 – 3 mg PO q 12 hr		Less sedating and less likely to cause hypotension due to lack of histamine receptor activity
Quetiapine**	50 – 100 mg PO q 6 to 12 hr 25 – 50 mg PO PRN qhs (for sleep if preexisting delirium)		• Consider for **hyperactive delirium** or **agitated mixed delirium** • Larger PM vs AM doses may be beneficial for healthy sleep cycle • If used for sleep, avoid standing doses and schedule at 2000 (no later than 2100)

***Consider starting at lower end of dosing range**

****Dosing considerations for antipsychotics:**

- Consider use of PRN antipsychotics instead of standing orders to guide dose increases and limit use of benzodiazepines
- When appropriate, consider tapering and discontinuing antipsychotic therapy once delirium has resolved
- EKG should be obtained at baseline and at least once weekly – more frequent monitoring may be necessary initially or when patient is on additional QTc prolonging medications or has an underlying arrhythmia