STC PAIN, SEDATION, AND DELIRIUM GUIDELINES FOR VENTILATED PATIENTS
Excludes Traumatic Brain Injury

- Initiate ABCDEF approach for mechanically ventilated patients[a]
- Optimize environment and treat pain first
- Assess pain using an objective assessment tool
- Include RASS endpoint in sedation orders with daily reassessment of goal
- Titrate sedation to appropriate RASS score (RASS 0 to – 2)
- Implement delirium prevention protocol
- Assess delirium using CAM-ICU at least twice daily
- AVOID medications that may alter mental status (e.g., diphenhydramine, anticholinergics)

Is patient comfortable and sedation at goal?

NO

- Rule out and correct reversible causes
  (e.g. re-orientation, optimize environment, patient positioning)

YES

- Perform SBT trials daily (refer to SBT protocol)
- Reassess sedation and analgesic requirements
- Maintain sedation goal with **minimal effective** dose of medications

Pain[b] — YES →

Analgesic Management

First line: Fentanyl OR Hydromorphone OR Oxycodone (if enteral route available); consider acetaminophen as adjunct if no hepatic dysfunction

Agitation[b] (RASS >+1) — YES →

Sedation Management (optimize pain management):

First-line: Propofol[d]

Second-line: Dexmedetomidine for the following appropriate indications:

a) Adjuvant therapy for patients when clinicians are unable to maintain RASS between 0 to -2 on propofol
b) For patients who continue to require sedation when propofol inhibits progress toward extubation
c) For patients who have a documented intolerance to other sedative agents or are currently experiencing adverse drug effects (e.g. hypertriglyceridemia [>500 mg/dL] or elevated/upward trending myoglobin from propofol, QTc prolongation [> 550 msec]

Third-line: Benzodiazepine - for alcohol or benzodiazepine withdrawal OR for patients with contraindication to propofol or who are refractory to dexmedetomidine

- If agitation still not controlled, use diazepam or an atypical antipsychotic as needed for rescue therapy

Refractory: Consider Ketamine if agitation still uncontrolled. Refer to UMMC Guidelines for Ketamine Use.

Delirium[b] (CAM-ICU positive) — YES →

Acute Delirium Management

- Identify causes & eliminate factors
- Consider Haloperidol[c] IV or IM or Ziprasidone IM until agitation controlled (if QTc ≤ 550 msec)

→ **Maintenance Delirium Management**[c]

- Optimize delirium prevention and use non-pharmacological therapies
  1) Intravenous (IV) option: Haloperidol (if QTc ≤ 550 msec)
  2) Oral (PO) options: Quetiapine or Risperidone or Olanzapine
  3) Intramuscular (IM) options: Haloperidol or Ziprasidone

Sleep Disturbance[b] — YES →

Sleep Management

- Minimize ambient light, noise, and patient interruptions at night time
- If still not controlled, consider initiating one of the following agents: trazodone or quetiapine (consider in preexisting delirium)

General Information

[a] ABCDEF: awakening and breathing coordination of daily sedation and ventilator removal trials, choice of sedative or analgesic exposure, delirium monitoring, early mobility and exercise, and family involvement

[b] Refer to other side for initial medication dosing recommendations. In presence of hepatic and/or renal impairment, dose adjustment should be considered

[c] Obtain baseline QTc, then daily; Use lower doses in patients > 65 years old

[d] Monitor triglyceride levels in patients receiving propofol for > 72 hours; consider discontinuing if > 500 mg/dL

Doses listed on protocol are for initial recommendations. Doses should be individualized per patient's clinical status.

Approved/Developed by: STC ICU Committee (New June 2017) Approved STC Oversight Committee 6/7/17

Initial Dosing Recommendations

	Adults (18 -65 years) Dosing	Adults (> 65 years) Dosing*	Comments
PAIN THERAPY			
First-Line			
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
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	
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
Adjunctive / Alternate			
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
AGITATION THERAPY			
Propofol	5 – 50 mcg/kg/min		• No loading dose or bolus
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
Diazepam	2 – 10 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

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

Initial Dosing Recommendations for Delirium

Medication	Sedation	EPS	QTc prolongation	Adult (18 – 65 yrs) Dosing	Adult (> 65 yrs) Dosing	Comments
Haloperidol	+	++++	+++	1 – 10 mg IV q 2 to 6 hr 2.5 – 10 mg PO q 4 to 6 hr	1 – 5 mg IV q4 to 6 hr 2.5 – 5 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	2.5 – 5 mg PO q 24 hr	• Increased metabolic side effects and EPS compared to quetiapine • Consider in patients with **hyperactive delirium**
Quetiapine	++	+	++	50 – 100 mg PO q 6 to 12 hr	12.5 – 25 mg PO q 12 hr	• Consider for **hyperactive delirium** or **agitated mixed delirium** • Larger PM vs AM doses may be beneficial for healthy sleep cycle
Risperidone	+	++	+	0.5 – 3 mg PO q 12 hr	0.5 – 1 mg PO q 12 hr	• Consider for **hypoactive delirium** • Less sedating and less likely to cause hypotension due to lack of histamine receptor activity
Ziprasidone	++	++	++	10 – 20 mg IM q 2 to 4 hr	Not recommended	• Consider for **hyperactive delirium** or **agitated mixed delirium** • IM ziprasidone may be scheduled or PRN for breakthrough agitation

- **Consider use of both scheduled and PRN antipsychotics 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

Sleep Therapy

- Normalize sleep wake cycle: open blinds, use clocks, eyeglasses/hearing aids, reorientation, decrease ambient noise (limit overnight labs and tests)
- Discourage naps
- Initial Dosing Recommendations:
  - Trazodone 25 – 50 mg PO qhs
  - Quetiapine 25 – 50 mg PO qhs (consider in preexisting delirium)

Richmond Agitation Sedation Scale (RASS)

Score	Term	Description	
+4	Combative	Overtly combative, violent, immediate danger to staff/self	
+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/eye contact) to voice (≥ 10 sec)	Verbal Stimulation
−2	Light sedation	Briefly awakens with eye contact to voice (< 10 seconds)	Verbal Stimulation
−3	Moderate sedation	Movement or eye opening to voice (but no eye contact)	Verbal Stimulation
−4	Deep sedation	No response to voice, but movement or eye opening to physical stimulation	Physical Stimulation
−5	Unarousable	No response to voice or physical stimulation	Physical Stimulation