

ICU SEDATION

DOSING

NOTES

OPIOIDS		
Fentanyl	Bolus: 25-50 mcg Infusion: 50-300 mcg/hr	Accumulates in adipose; No renally excreted metabolites Generally first-line opioid in ICU
Hydromorphone Dilaudid	Bolus: 0.25-1 mg Infusion: 0.5-5 mg/hr	Accumulates in renal/liver failure Can also be dosed PO
Morphine	Bolus: 2-4 mg Infusion: 2-3 mg/hr	Accumulates in renal failure Slower onset/offset Can also be dosed PO
SEDATIVES		
Lorazepam Ativan	Bolus: 0.5-2 mg Infusion: 1-10 mg/hr	MOA (benzodiazepine): ↑ chloride ion conductance → hyperpolarization (promotion of inhibition) t _{1/2} ≈ 15 hrs Preferred in renal and/or liver failure over Midazolam SE: Propylene glycol (solvent) toxicity occurs at high doses (ie, 20 mg/hr x >6 hrs) → lactic acidosis
Midazolam Versed	Bolus: 1-2 mg Infusion: 1-10 mg/hr* <small>*ULN may be increased depending on clinical scenario (eg, status epilepticus)</small>	MOA (benzodiazepine): ↑ chloride ion conductance → hyperpolarization (promotion of inhibition) t _{1/2} ≈ 2 hrs Accumulates in adipose; Metabolites accumulate in renal/liver failure CYP3A4 metabolism (possible med interactions)
Propofol Diprivan	Infusion: 10-100 mg/hr	MOA: ↓ rate of dissociation of GABA and its receptor → hyperpolarization (promotion of inhibition) Metabolism unaltered by renal/liver failure; accumulates in adipose 1st line non-benzo sedative; fast onset/offset SE: HoTN, Bradycardia, ↑ TAGs, Propofol infusion syndrome (PRIS) PRIS: Metabolic acidosis, Rhabdomyolysis, ↑ K ⁺ , AKI, Arrhythmia, Cardiac failure (↓ HR & HoTN)
Dexmedetomidine Precedex	Infusion: 0.2-1.5 mcg/kg/hr	MOA: α-2 agonist → inhibition of NE release → CNS inhibition via the locus coeruleus Metabolized in the liver Does <u>not</u> cause respiratory depression - good to use peri-intubation/extubation
Ketamine	Infusion: 5-30 mcg/kg/hr	MOA: uncompetitive NMDA receptor antagonist Dissociative drug that causes amnesia & analgesia <u>without</u> causing respiratory depression SE: Hallucinations, ↑ secretions
ANTI-PSYCHOTICS		
Quetiapine Seroquel	25-100 mg PO BID/TID Max: 300 mg/day	No dosing adjustment needed in renal or liver failure Often used QHS for insomnia/sleep-wake cycles SE: Prolonged QTc, Insomnia
Haloperidol Haldol	2-5 mg IV q4h PRN Max: 20 mg/day	No dosing adjustment needed in renal or liver failure SE: Prolonged QTc

SE = side effect MOA = mechanism of action t_{1/2} = half-life ULN = upper limit of normal TAG = Triglyceride
HoTN = hypotension BID = twice daily TID = three times daily HR = heart rate QHS = every night at bedtime PRN = taken as needed PO = by mouth

RASS - Richmond Agitation Sedation Scale

Validated tool to assess level of sedation

4	Combative	Overtly combative, violent, immediate danger to staff/self
3	Very Agitated	Pulls or removes tube(s) or catheter(s); Agressive
2	Agitated	Frequent non-purposeful movements; Fights ventilator
1	Restless	Anxious; Movement not aggressive or vigorous
0	Alert & Calm	Spontaneous attention to care giver
-1	Drowsy	Voice → Sustained awakening (eye contact ≥10 seconds)
-2	Light Sedation	Voice → Briefly awakens (eye contact <10 seconds)
-3	Moderate Sedation	Voice → Movement or eye opening; no eye contact
-4	Heavy Sedation	No response to voice Physical stimulation → Movement or eye opening
-5	Cannot be aroused	Physical stimulation (noxious stimuli) → No response

BPS - Behavioral Pain Scale

Tool to assess pain control in critically ill patients
Total score >3 indicates inadequate analgesia

Facial Expression	Relaxed	1
	Partially tightened (eg, brow lowering)	2
	Fully tightened (eg, eyelid closing)	3
	Grimacing	4
Upper Limbs	No movement	1
	Partially bent	2
	Fully bent with finger flexion	3
	Permanently retracted	4
Ventilation Compliance	Tolerating movement	1
	Coughing but tolerating ventilation	2
	Fighting ventilator	3
	Unable to control ventilation	4

CPOT - Critical Care Pain Observation Tool

Tool to assess pain control in critically ill patients
Total score >2 indicates inadequate analgesia

Facial Expression	Relaxed	0
	Tense	1
	Grimacing	2
Body Movements	Absence of movements <i>Does not always mean no pain</i>	0
	Protection <i>Slow movements, rubbing sites, seeking attention</i>	1
	Restlessness <i>Pulling tube, sitting up, thrashing/striking</i>	2
Muscle Tension	Relaxed <i>No resistance</i>	0
	Tense, rigid <i>Some resistance</i>	1
	Very tense or rigid <i>Strong resistance</i>	2
Ventilation Compliance	Tolerating ventilator or movement <i>No alarms</i>	0
	Coughing but tolerating <i>Alarms stop spontaneously</i>	1
	Fighting ventilator <i>Asynchrony; frequent alarms</i>	2
OR		
Vocalization if extubated	Talking in normal tone or no sound	0
	Sighing, moaning	1
	Crying out, sobbing	2