

CRITICAL CARE INFUSION GUIDELINE

VASOPRESSORS AND INOTROPES

If no titrations are required during the previous 4 hours, attempt to wean down (at specified change rate) every 4 hours to maintain goal titration parameters.

EPIC DEFAULT CONCENTRATIONS DENOTED WITH **BOLD**, UNDERLINE, AND *ITALIC* FONT.

Preferred concentration is not always the default concentration when ordered in EPIC but may be the preferred concentration for most patients.

Drug	Titration Orders	Max Rate	Goal Parameters	Notes
DOBU Tamine (Dobutrex) 250 mg/250 mL D5W (1 mg/mL) <u>500 mg/250 mL D5W (2 mg/mL)</u> 1000 mg/250 mL D5W (4 mg/mL) Preferred Concentration: 500 mg/250 mL D5W (2 mg/mL)	Initiate at 2.5 mcg/kg/min and titrate per MD orders. Contact MD for all dose adjustments for hemodynamic instability, clinical unresponsiveness, or cardiac arrhythmia.	10 mcg/kg/min	Call MD for HR > 120, MAP < 65, or acute onset of SVT. Call MD if HR < 60 while weaning off.	Peripheral IV acceptable for all listed concentrations.
DOP amine (Intropin) 200 mg/250 mL D5W (800 mcg/mL) <u>400 mg/250 mL D5W (1600 mcg/mL)</u> 800 mg/250 mL D5W (3200 mcg/mL) Preferred Concentration: 800 mg/250 mL D5W (3200 mcg/mL)	Initiate at 5 mcg/kg/min. Titrate by 5 mcg/kg/min every 10 minutes.	20 mcg/kg/min	Goal of MAP ≥ 65 and HR < 125. Call MD if HR ≥ 100.	Peripheral IV max concentration of 200 mg/250 mL (800 mcg/mL).
EPINEPH rine (Adrenalin) 1 mg/250 mL NS (4 mcg/mL) 2 mg/250 mL NS (8 mcg/mL) <u>4 mg/250 mL NS (16 mcg/mL)</u> 8 mg/250 mL NS (32 mcg/mL) 16 mg/250 mL NS (64 mcg/mL) Preferred Concentration: 8 mg/250 mL NS (32 mcg/mL)	MAP ≥ 55 mmHg: Initiate at 0.05 mcg/kg/min, and titrate by 0.01 mcg/kg/min every 5 minutes. MAP < 55 mmHg: Initiate at 0.3 mcg/kg/min and titrate by 0.1 mcg/kg/min every 1 minute.	1 mcg/kg/min	Goal of MAP ≥ 65 Call MD if HR > 130 or max rate is reached.	Peripheral IV max concentration of 8 mg/250 mL (32 mcg/mL).

CRITICAL CARE INFUSION GUIDELINE

<p>Milrinone (Primacor)</p> <p><u>40 mg/200 mL D5W (200 mcg/mL)</u> 40 mg/100 mL D5W (400 mcg/mL)</p> <p>Preferred Concentration: 40 mg/200 mL D5W (200 mcg/mL)</p>	<p>Initiate at 0.25 mcg/kg/min and titrate per MD orders.</p> <p>Contact MD for all dose adjustments for hemodynamic instability, clinical unresponsiveness, or cardiac arrhythmia.</p>	<p>0.75 mcg/kg/min</p>	<p>Call MD if urine output drops <0.5 mL/kg/hr.</p>	<p>Peripheral IV max concentration of 40 mg/200 mL (200 mcg/mL).</p>
<p>NOREpinephrine (Levophed)</p> <p>2 mg/250 mL D5W (8 mcg/mL) 4 mg/250 mL D5W (16 mcg/mL) <u>8 mg/250 mL NS pre-mix (32 mcg/mL)</u> 16 mg/250 mL D5W (64 mcg/mL)</p> <p>Preferred Concentration: 8 mg/250 mL NS pre-mix (32 mcg/mL)</p>	<p>MAP ≥ 55 mmHg: Initiate at 0.05 mcg/kg/min and titrate by 0.01 mcg/kg/min every 5 minutes.</p> <p>MAP < 55 mmHg: Initiate at 0.5 mcg/kg/min and titrate by 0.1 mcg/kg/min every 1 minute.</p>	<p>1 mcg/kg/min</p>	<p>Goal of MAP ≥ 65</p> <p>Call MD if HR > 130 or max rate is reached.</p>	<p>Peripheral IV max concentration of 8 mg/250 mL (32 mcg/mL).</p>
<p>Phenylephrine (Neo-synephrine)</p> <p>10 mg/250 mL (40 mcg/mL) <u>20 mg/250 mL NS (80 mcg/mL)</u> 40 mg/250 mL NS (160 mcg/mL)</p> <p>Preferred Concentration: 40 mg/250 mL NS (160 mcg/mL)</p>	<p>Initiate at 0.5 mcg/kg/min and titrate by 0.1 mcg/kg/min every 5 minutes.</p>	<p>2 mcg/kg/min</p>	<p>Goal of MAP ≥65</p>	<p>Peripheral IV acceptable for all listed concentrations.</p>
<p>Vasopressin (Vasopressin/Pitressin)</p> <p>40 units/100 mL NS (0.4 units/mL)</p>	<p>Initiate at a set rate of 0.03 or 0.04 units/min. Do not titrate.</p>	<p>0.04 units/min</p>	<p>Goal of MAP ≥ 65</p>	<p>Central line required.</p>

CRITICAL CARE INFUSION GUIDELINE

VASODILATORS

If no titrations are required during the previous 4 hours, attempt to wean down (at specified change rate) every 4 hours to maintain goal titration parameters

Drug	Titration Orders	Max Rate	Goal Parameters	Notes
<p>Nitroglycerin (Tridil)</p> <p>25 mg/250 mL D5W (100 mcg/mL) <u>50 mg/250 mL D5W (200 mcg/mL)</u> 100 mg/250 mL D5W (400 mcg/mL)</p> <p>Preferred Concentration: 50 mg/250 mL D5W (200 mcg/mL)</p>	<p>Initiate at 5 mcg/min.</p> <p>Increase by 5 mcg/min every 5 minutes. If no response at 20 mcg/min, increase by 10 mcg/min every 3 minutes.</p>	200 mcg/min	Titrate to chest pain relief and/or SBP goal.	Call MD if SBP <100 mmHg.
ANTIARRHYTHMICS				
Drug	Titration Orders	Max Rate	Goal Parameters	Notes
<p>Amiodarone (Cordarone)</p> <p>Bolus: 150 mg/100 mL (1.5 mg/mL) D5W or NS</p> <p>Infusion: 360 mg/200 mL D5W (1.8 mg/mL)</p>	<p>Bolus 150 mg over 10 min.</p> <p>Followed by 360 mg over next 6 hours (1 mg/min or 33.3 mL/hr)</p> <p>Then decrease to 0.5 mg/min (17 mL/hr).</p>	2.1 g/24 hr	Parameters per MD specified orders.	Amiodarone bolus may be mixed in NS.
<p>diltiazem (Cardizem)</p> <p>125 mg/125 mL D5W (1 mg/mL)</p>	<p>Initiate at 5 mg/hr and titrate by 5 mg/hr every 15 minutes.</p>	15 mg/hr	Titrate to HR of 60-110.	
<p>Esmolol (Brevibloc)</p> <p>2500 mg/250 mL NS (10 mg/mL)</p>	<p>Initiate at 50 mcg/kg/min.</p> <p>Increase by 50 mcg/kg/min every 5 minutes.</p>	300 mcg/kg/min	Titrate to target HR.	

CRITICAL CARE INFUSION GUIDELINE

ANTIHYPERTENSIVES

Drug	Titration Orders	Max Rate	Goal Parameters	Notes
<p>NiCARDipine (Cardene)</p> <p>25 mg/250 mL NS (100 mcg/mL) <u>40 mg/200 mL NS (200 mcg/mL)</u></p> <p>Preferred Concentration: 25 mg/250 mL NS (100 mcg/mL)</p>	<p>Initiate at 5 mg/hr and titrate by 2.5 mg/hr every 15 minutes.</p>	<p>15 mg/hr</p>	<p>Titrate to SBP goal.</p>	<p>Peripheral IV preferred concentration is 25 mg/250 mL (100 mcg/mL).</p> <p>If 40 mg/250 mL (200 mcg/mL) concentration used peripherally, must rotate peripheral IV sites every 12 hours.</p>
<p>Clevidipine (Cleviprex)</p> <p>25 mg/50 mL (0.5 mg/mL) 50 mg/100 mL (0.5 mg/mL)</p>	<p>Initiate at 1 mg/hr and titrate by doubling dose every 3 minutes.</p>	<p>21 mg/hr</p>	<p>Titrate to SBP goal.</p>	

ANALGESICS AND SEDATIVES

Consider PAIN medications PRIOR to administration of sedative agents and/or painful procedures.

WEAN pain and sedation infusions according to titration parameter if patient has not required any dose increases or bolus administration in the previous 4 hours.

Drug	Titration Orders	Max Rate	Goal Parameters	Notes
<p>Dexmedetomidine (Precedex)</p> <p>400 mcg/100 mL NS (4 mcg/mL)</p>	<p>Initiate at 0.2 mcg/kg/hr.</p> <p>Titrate by 0.2 mcg/kg/hr every 30 minutes.</p> <p>Wean previous sedative infusions by 25% every 30 min when Precedex is initiated.</p>	<p>1.5 mcg/kg/hr</p>	<p>Titrate to goal RASS: 0 to -1.</p>	<p>NOT to be used for goal RASS of -3 to -5.</p> <p>NOT to be used alone for treatment of alcohol withdrawal.</p> <p>May be continued during SBT and weaned after extubation.</p>

CRITICAL CARE INFUSION GUIDELINE

fentaNYL (Sublimaze) 2500 mcg/250 mL NS (10 mcg/mL)	Initiate at 25 mcg/hr. Titrate by 25 mcg/hr every 15 minutes.	200 mcg/hr	Titrate to goal RASS: Light: 0 to -1 Deep: -4 to -5	
Ketamine (Ketalar) 200 mg/100 mL NS (2 mg/mL)	Initiate at 0.05 mg/kg/hr. Titrate by 0.1 mg/kg/hr every 15 minutes.	Light sedation: 0.4 mg/kg/hr Deep sedation: 2.5 mg/kg/hr	Titrate to goal RASS: Light: 0 to -1 Deep: -4 to -5	Alert MD if patient develops new-onset SVT, an acute rise in HR exceeding 120 bpm, or SBP > 180mmHg. Alert MD if patient develops excessive oral, or airway secretions.
Propofol (Diprivan) 1000mg/100 mL (10 mg/mL)	Initiate at 10 mcg/kg/min. Titrate by 5 mcg/kg/min every 5 minutes	50 mcg/kg/min	Titrate to goal RASS: Light: 0 to -1 Deep: -4 to -5	Hold if triglycerides are > 400
Midazolam (Versed) 50 mg/100 mL NS (0.5 mg/mL) <u>100 mg/100 mL NS (1 mg/mL)</u> 200 mg/100 mL NS (2 mg/mL) 500 mg/100 mL (5 mg/mL) Preferred Concentration: 100 mg/100 mL NS (1 mg/mL)	Initiate at 0.02 mg/kg/hr. Titrate by 0.02 mg/kg/hr every 10 minutes.	0.1 mg/kg/hr	Titrate to goal RASS: Deep: -4 to -5	NOT to be used for goal RASS of 0 to -1.

PARALYTICS

Drug	Titration Orders	Max Rate	Goal Parameters	Notes
Atracurium (Tacrium) 500 mg/500 mL D5W (1 mg/mL)	Initiate at 5 mcg/kg/min. Titrate by 5 mcg/kg/min every 15 minutes.	15 mcg/kg/min	TOF goal: ≤ 2 of 4 on TOF monitor. Titrate to physiologic effect: absence of shivering, full ventilator synchrony, no voluntary movements, no spontaneous breaths	Patients MUST be deeply sedated (RASS of -4 to -5) PRIOR to initiation of paralytic boluses or infusions. Paralytics DO NOT provide analgesia or sedation.

CRITICAL CARE INFUSION GUIDELINE

<p>Cisatracurium (Nimbex)</p> <p>10 mg/100 mL D5W (0.1 mg/mL) 40 mg/100 mL D5W (0.4 mg/mL) <u>100 mg/100 mL D5W (1 mg/mL)</u> 200 mg/100 mL D5W (2 mg/mL)</p> <p>Preferred Concentration: 100 mg/100 mL D5W (1 mg/mL)</p>	<p>Initiate at 3 mcg/kg/min.</p> <p>Titrate by 0.5 mcg/kg/min every 30 minutes.</p>	<p>10 mcg/kg/min</p>	<p>TOF goal: ≤ 2 of 4 on TOF monitor.</p> <p>Titrate to physiologic effect: absence of shivering, full ventilator synchrony, no voluntary movements, no spontaneous breaths</p>	<p>Patients MUST be deeply sedated (RASS of -4 to -5) PRIOR to initiation of paralytic boluses or infusions. Paralytics DO NOT provide analgesia or sedation.</p>
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RASS (Richmond Agitation Sedation Scale)		
+4	COMBATIVE	Violent and immediate danger to staff
+3	VERY AGITATED	Aggressive (ex. Pulls to remove tubes or catheters)
+2	AGITATED	FREQUENT non-purposeful movement (ex. Fights vent)
+1	RESTLESS	Movements not aggressive
0	ALERT AND CALM	Spontaneously pays attention to caregiver
-1	DROWSY (Checked by VOICE only)	Eye opening/contact for >10 sec
-2	LIGHT SEDATION (Check by VOICE only)	Eye opening/contact for <10 sec
-3	MODERATE SEDATION (Check by VOICE only)	Movement and eye opening to voice (NO EYE CONTACT)
-4	DEEP SEDATION (Checked by VOICE but only verified by TOUCH)	NO response to voice, but movement or eye opening to physical stimulation
-5	UNAROUSABLE (Checked by VOICE but only verified by TOUCH)	NO response to VOICE or PHYSICAL stimulation