



Ochsner Health

Critical Care & Emergency Drug Guide

\*Includes COVID-19 Emergency Shortage Medications\*

**Adult Emergency/Critical Care Medication Reference**  
**\*\* Please Note: Not all medications are available at each institution\*\***

## Antihypertensives Page 1

Name	Concentrations	Dose	Onset of Action	Duration of Action	Comments
<b>clevidipine</b> (Clevisprex)	25 mg/50 mL 50 mg/100 mL (0.5 mg/mL)	<b>Initial:</b> 1-2 mg/hr <b>Titrate up:</b> Double the dose Q 2 minutes <b>Max:</b> 16 mg/hr (can use doses up to 32 mg/hr short term) <b>Titrate down:</b> 1-2mg/hr Q 5 minutes	2-4 minutes	5-15 minutes	<ul style="list-style-type: none"> <li>• Look alike medication with propofol (Diprivan)</li> <li>• Max dose over 24 hrs. is 1,000 mL due to lipid content</li> <li>• Use or discard within 12 hours of puncturing stopper</li> <li>• <b>Change IV tubing q 12 hours</b></li> <li>• Check compatibility before administering anything in the same line – <b>most meds not compatible.</b></li> <li>• Contraindicated for patients with soy or egg allergies</li> <li>• Monitor for rebound HTN after stopping the infusion</li> </ul>
<b>enalapril</b> (Vasotec)	n/a	1.25-5 mg IVP Q 6 hours	15-30 minutes	6-12 hours	<ul style="list-style-type: none"> <li>• Response may vary</li> <li>• Avoid in acute MI</li> </ul>
<b>hydrALAZINE</b> (Apresoline)	n/a	10-20 mg IVP Q 1-4 hours <b>Max:</b> 20 mg per dose	10-20 minutes	1-4 hours	<ul style="list-style-type: none"> <li>• Preferred agent for eclampsia</li> <li>• Causes headache, tachycardia, flushing</li> </ul>
<b>labetalol</b> (Normodyne, Trandate)	500 mg/100 mL (5 mg/mL) <b>D5W or NS</b>	10-80 mg IVP Q 10-15 minutes <b>Usual:</b> 10-20 mg IVP Q 10 minutes <b>IV infusion:</b> 0.5-2 mg/minute <b>Titrate:</b> 0.1 mg/min Q 15 minutes <b>Max:</b> 3 mg/min	5-10 minutes	3-6 hours	<ul style="list-style-type: none"> <li>• Long duration – if HR/BP too low can take hours to wear off</li> <li>• May cause bronchospasm</li> <li>• <b>Contraindicated in severe asthma, bradycardia, heart blocks, decompensated heart failure</b></li> </ul>
<b>metoprolol</b> (Lopressor)	n/a	2.5-10 mg IVP over 3 minutes Q 5 minutes <b>Max cumulative dose:</b> 15 mg	5 minutes	Varies Few minutes – 6 hours	<ul style="list-style-type: none"> <li>• Will decrease BP &amp; HR (<math>\beta</math>1 selective)</li> <li>• Some risk of heart block</li> <li>• 5 mg IV Q 6H = 25 mg PO Q 12H</li> </ul>

## Antihypertensives Page 2

Name	Concentrations	Dose	Onset of Action	Duration of Action	Comments
<b>niCARDipine</b> (Cardene)	<b>Standard</b> 40 mg/200 mL 50 mg/250 mL (0.2 mg/mL) <b>High</b> 125 mg/250 mL (0.5 mg/mL) <b>NS</b>	<b>Initial:</b> 2.5-5 mg/hr IV infusion <b>Titrate:</b> 2.5 mg/hr Q 5-15 minutes <b>Max:</b> 15 mg/hr	5-10 minutes	15-30 minutes	<ul style="list-style-type: none"> <li>• Can cause a reflex tachycardia</li> <li>• Caution with cardiac ischemia</li> <li>• Pure arterial vasodilator</li> <li>• Central line preferred</li> </ul>
<b>nitroGLYcerin</b> (Tridil) Screen patient for use of erectile dysfunction or pulmonary HTN meds	50 mg/250 mL (200 mcg/mL)  100 mg/250mL (400mcg/mL) <b>D5W</b> Must go in Low-Sorb (blue) tubing	<b>Initial IV Infusion:</b> 5-20 mcg/minute <b>Titrate:</b> 5-20 mcg/minute Q 3-5 minutes <b>Max:</b> 400 mcg/minute	2-5 minutes	5-10 minutes	<ul style="list-style-type: none"> <li>• Preferred agent for coronary ischemia and flash pulmonary edema</li> <li>• Can cause headache</li> <li>• Tolerance with prolonged use</li> <li>• Pure venous vasodilator</li> <li>• <b>Caution with high ICP</b></li> </ul>
<b>nitroPRUSSide</b> (Nipride)	<b>High:</b> 50 mg/100 mL (0.5 mg/mL) <b>D5W only</b> Protect from light  Must go in Low-Sorb (blue) tubing	<b>Initial:</b> 0.3 mcg/kg/minute <b>Titrate:</b> 0.2 mcg/kg/min Q3-5 minutes <b>Max:</b> 10 mcg/kg/min	immediate	1-2 minutes	<ul style="list-style-type: none"> <li>• Cyanide toxicity with doses &gt; 3 mcg/kg/minute for prolonged periods</li> <li>• Blood thiocyanate levels daily if dose &gt; 3 mcg/kg/min (1 mcg/kg/min if anuric)</li> <li>• Caution with high ICP</li> <li>• Avoid in renal impairment</li> </ul>

**Adult Emergency/Critical Care Medication Reference**  
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## Anti-Arrhythmics – Page 1

Name	Concentrations	Dose	Onset of Action	Duration of Action	Comments
<b>adenosine</b> (Adenocard)	6 mg/2 mL 12 mg/4 mL	6 mg <b>RAPID</b> IVP  If not effective within 1-2 minutes, may give 12 mg <b>RAPID</b> IVP  May repeat 12 mg IVP if needed	Immediate  Interrupts re-entry pathway through AV node	<10 seconds	<ul style="list-style-type: none"> <li>• <b>Use 2 syringes</b> (one med/one NS flush) connected to a T-connector or stopcock using most proximal site</li> <li>• Follow each IVP with <b>RAPID</b> 20 ml NS flush</li> <li>• Not for WPW syndrome patients</li> <li>• EKG monitoring and defibrillator with pads placed required for administration</li> <li>• Central Line Administration: Use half the dose</li> </ul>
<b>AMIODArone</b> (Cordarone)  <b>Use 0.22 micron in-line filter during administration</b>	<b>Standard</b> 360 mg/200 mL (1.8 mg/mL) <b>High</b> 900 mg/250 mL (3.6 mg/mL- Central Line only) <b>D5W Premix</b>	<b>Loading Dose:</b> <b>Stable patient:</b> 150 mg/100 mL infusion over 10 minutes (can repeat x 1) <b>Unstable patient:</b> 300 mg IVP  <b>Infusion:</b> 1 mg/minute x 6 hours then 0.5 mg/minute x 18 hrs OR until PO conversion	IV: rapid  Oral: days	several days	<ul style="list-style-type: none"> <li>• Central line administration preferred</li> <li>• Short-term – large gauge peripheral okay</li> <li>• After 24-hour infusion, convert to oral <b>OR</b> continue at 0.5 mg/minute (total loading dose of 10 g)</li> <li>• IV formulation may lower HR and BP</li> <li>• Many drug interactions</li> <li>• Can cause pulmonary, thyroid, dermatologic, and hepatic toxicity</li> </ul>
<b>digoxin</b> (Lanoxin)	n/a	<b>Load:</b> 500 mcg IVP followed by 250 mcg IVP Q6 hours x 2 ( <b>total:</b> 1 mg) <b>Low weight patient:</b> 8-12 mcg/kg – give 50% x 1 dose then 25% Q 6 hours x 2 doses	5-60 minutes	1-2 days	<ul style="list-style-type: none"> <li>• Lower loading dose by 50% in ESRD</li> <li>• Renal function will determine maintenance</li> <li>• Used for heart rate control</li> <li>• Goal level 0.5 – 2 ng/mL (lower goal for HF, higher goal for atrial fibrillation)</li> </ul>
<b>diltIAZem</b> (Cardizem)	100 mg/100 mL 125 mg/125 mL (1 mg/mL) <b>D5W</b>	<b>IVP</b> 10-20 mg -may repeat x 1 <b>IV infusion:</b> Initial: 2.5-5 mg/hr <b>Titrate:</b> 2.5 mg/hr Q15 minutes <b>Max:</b> 15 mg/hr	2-7 minutes	30 minutes – 2 hours	<ul style="list-style-type: none"> <li>• Will decrease HR and BP</li> <li>• Should D/C infusion 2-3 hours after first PO dose</li> </ul>

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## Anti-Arrhythmics – Page 2

Name	Concentrations	Dose	Onset of Action	Duration of Action	Comments
<b>esmolol</b> (Brevibloc)	2000 mg/100 mL (20 mg/mL) <b>NS Premix</b>	<b>Initial:</b> 50 mcg/kg/minute  <b>Titrate:</b> 25 mcg/kg/minute Q 5 minutes  <b>Max:</b> 300 mcg/kg/minute	1-2 minutes	10-30 minutes	<ul style="list-style-type: none"> <li>• Preferred agent in aortic dissection</li> <li>• Not great at BP control, better as heart <b>rate control</b> drug</li> <li>• Do not discontinue abruptly</li> <li>• Central line preferred</li> <li>• Transfer to oral agent ASAP – decrease infusion by 50% 30 minutes after first oral agent</li> </ul>
<b>LIDOcaine</b>	2000 mg/250 mL (8 mg/mL) <b>D5W Premix</b>	<b>Load:</b> 1-1.5 mg/kg IVP over 2-3 min (usual 100 mg) may repeat x 1  <b>Max cumulative bolus:</b> 3 mg/kg <b>Infusion:</b> <b>Initial:</b> 1 mg/min <b>Titrate:</b> 0.5 mg/min Q 10 minutes  <b>Max:</b> 4 mg/min	45-90 seconds	1 hour	<ul style="list-style-type: none"> <li>• May cause seizures (especially rapid administration), respiratory arrest, cardiac toxicity</li> <li>• If arrhythmias occur during infusion, give 0.5 mg/kg bolus to increase plasma concentration of the drug</li> <li>• Convert to oral agent after 24 hours if able</li> <li>• Recommend level if infusion &gt;12-24 hours or if patient has hepatic dysfunction</li> </ul>
<b>procainamide</b> (Pronestyl)	2000 mg/250 mL (8 mg/mL) <b>D5W</b>	<b>Load:</b> 20-50 mg/minute IV infusion until arrhythmia controlled or max dose (1000 mg) reached <b>Max Bolus Dose:</b> 1000 mg  <b>Maintenance Infusion:</b> <b>Initial:</b> 1 mg/min <b>Max:</b> 4 mg/min	10-30 minutes	6-48 hours	<ul style="list-style-type: none"> <li>• If rhythm converts, decrease to maintenance infusion</li> <li>• If QRS widens by &gt;50% OR hypotension → decrease rate; may need to stop the drip</li> <li>• Drug of choice in Wolfe-Parkinson White Syndrome (WPW)</li> <li>• Recommend monitoring for patients with renal dysfunction and infusions &gt; 24 hours</li> <li>• Caution on initial dose/titrations in renal dysfunction</li> </ul>

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**Vasopressors \*Central Line Preferred for all\***

Name	Concentrations	Dose	Onset of Action	Duration of Action	Comments
<b>DOPamine</b>	<b>Standard</b> 400 mg/250 mL (1.6 mg/mL) <b>High</b> 800 mg/250 mL (3.2 mg/mL) <b>D5W</b>	<b>Initial:</b> 2.5-10 mcg/kg/min <b>Titrate:</b> 2.5-5 mcg/kg/min Q 5 min <b>Max:</b> 20 mcg/kg/minute	5 minutes	10 minutes	<ul style="list-style-type: none"> <li>Used for refractory bradycardia</li> <li>Increases HR, contractility, and cardiac output</li> <li><b>Low/Intermediate Dose (1-9 mcg/kg/min)</b></li> <li><b>High doses (≥10 mcg/kg/min):</b> Increase BP &amp; SVR</li> <li>May cause tachycardia &amp;/or arrhythmias</li> </ul>
<b>EPINEPHrine</b>	<b>Standard</b> 5 mg/250 mL (20 mcg/mL) <b>High</b> 10 mg/250 mL (40 mcg/mL) 30 mg/250 mL (120 mcg/mL) <b>NS</b>	<b>Initial:</b> 0.02-0.2 mcg/kg/minute <b>Titration:</b> 0.02 mcg/kg/min Q 5 min <b>Max:</b> 2 mcg/kg/minute	immediate	5 minutes	<ul style="list-style-type: none"> <li>Increases HR, SVR, &amp; CO</li> <li>May cause tachycardia, arrhythmias, myocardial ischemia</li> </ul>
<b>NORepinephrine (Levophed)</b>	<b>Standard</b> 4 mg/250 mL (16 mcg/mL) 8 mg/250 mL (32 mcg/mL) <b>High:</b> 32 mg/250 mL (128 mcg/mL) <b>D5W</b>	<b>Initial:</b> 0.02-0.2 mcg/kg/min <b>Titration:</b> 0.02 mcg/kg/minute Q 5 min <b>Max:</b> 3 mcg/kg/minute	immediate	2 minutes	<ul style="list-style-type: none"> <li>Increases SVR, HR, CO, &amp; contractility</li> <li>Drug of choice for sepsis: Goal MAP ≥ 65</li> <li>Any concentration &gt; 4 mg/250 mL must be infused via central line</li> </ul>
<b>PHENYLephrine (NeoSynephrine)</b>	<b>Standard</b> 20 mg/250 mL (80 mcg/mL) <b>High</b> 100 mg/250 mL (400 mcg/mL) <b>NS</b>	<b>Initial:</b> 0.5 mcg/kg/minute <b>Titration:</b> 0.5 mcg/kg/minute Q 5 min <b>Max:</b> 5 mcg/kg/minute	immediate	15 minutes	<ul style="list-style-type: none"> <li>Increases SVR without increased HR or contractility changes</li> <li>Can cause reflex bradycardia</li> <li><b>Neo-Bump: (for emergent hypotension)</b> <ul style="list-style-type: none"> <li>➢ Initial dose is 0.05-0.1 mg (50-100 mcg)</li> <li>➢ May repeat Q 5-15 minutes</li> </ul> </li> </ul>
<b>vasopressin</b>	<b>Standard:</b> 20 units/100 mL (0.2 units/mL) <b>High:</b> 100 units/100 mL (1 unit/mL) <b>D5W</b>	0.04 units/minute  <b>No titration</b>	3-5 minutes	10-20 minutes	<ul style="list-style-type: none"> <li>Increases SVR</li> <li>Second line pressor for sepsis</li> <li>Direct vasoconstrictor</li> <li>Non-weight-based dosing</li> </ul>
<b>angiotension II (Giapreza)</b>	<b>2.5 ng/250 mL</b> (10,000 ng/mL) <b>NS</b>	<b>Initial:</b> 10 ng/kg/min <b>Titration:</b> 5-15 ng/kg/min Q 5 min <b>Max:</b> In first 3 hours – 80 ng/kg/min After 3 hours – 40 ng/kg/min	immediate	<1 minute	<ul style="list-style-type: none"> <li>3<sup>rd</sup> line pressor for distributive shock in adults after norepinephrine dose ≥ 0.2mcg/kg/min + vasopressin at 0.04 units/min with MAP &lt; 65</li> <li>S/E: increased risk for blood clots – VTE prophylaxis required</li> <li><b>Restricted use in certain clinical areas/specialties</b></li> </ul>

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# Inotropes

Name	Concentrations	Dose	Onset of Action	Duration of Action	Comments
<b>DOBUTamine</b> (Dobutrex)	1000 mg/ 250 mL (4 mg/mL)  <b>D5W Premix</b>	2-10 mcg/kg/minute IV infusion  <b>Titration:</b> 2.5 mcg/kg/minute Q 15 minutes  <b>Max:</b> 20 mcg/kg/minute	2 minutes	10 minutes	<ul style="list-style-type: none"> <li>Increases CO, contractility, and HR</li> <li>May decrease SVR (afterload)</li> <li>May cause hypotension</li> <li>Can cause new or worsening arrhythmias, angina, tachycardia</li> <li>Low, non-titrating doses used for cardiac decompensation in heart failure</li> </ul>
<b>isoproterenol</b> (Isuprel)	1 mg/250 mL (0.004 mg/mL)  <b>D5W</b>	2 mcg/minute IV infusion <b>Titration:</b> 0.5-1 mcg/min Q 5 minutes  <b>Max:</b> 10 mcg/min IV infusion	Immediate	10 -15 minutes	<ul style="list-style-type: none"> <li>2<sup>nd</sup> line agent for sustained bradycardia unresponsive to dopamine</li> <li>Increases HR and contractility</li> <li>Decreases SVR</li> <li>\$\$\$</li> </ul>
<b>milrinone</b> (Primacor)	<b>Standard</b> 20 mg/100 mL (0.2 mg/mL)  <b>High</b> 40 mg/100 mL (0.4 mg/mL)  <b>D5W</b>	0.25-0.75 mcg/kg/minute IV infusion	30-45 minutes	4 hours	<ul style="list-style-type: none"> <li>Increases CO without increasing HR</li> <li>Decreases SVR</li> <li>May cause hypotension</li> <li>Long duration: if BP lowers; hrs to wear off</li> <li>Accumulates in renal impairment</li> <li>Used for inotropic support in acute decompensated heart failure</li> <li>Can cause SVT, VT and dysrhythmias</li> </ul>

**Adult Emergency/Critical Care Medication Reference**  
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# Analgesics

**Different Dosing Acceptable in Palliative Care Patients**

Name	Concentrations	Intermittent	Infusion	Onset of Action	Duration of Action	Comments
fentaNYL	2500 mcg/250 mL (10 mcg/mL) <b>D5W</b>	25-100 mcg IVP Over 3-5 minutes  Q 0.5-1hour PRN	<b>Initial:</b> 25-100 mcg/hour  <b>Titrate:</b> 12.5 mcg/hr Q 30 minutes  <b>Max:</b> 500 mcg/hr	immediate	1-2 hours	<ul style="list-style-type: none"> <li>• Very little hemodynamic effect</li> <li>• <b>Drug of Choice</b> if patient unstable or intubated, especially burns or trauma</li> <li>• Side effects: respiratory depression &amp; constipation</li> <li>• Rapid bolus may cause apnea</li> <li>• <b>Reversal agent: Naloxone (Narcan)</b></li> </ul>
<b>HYDRO</b> morphine (Dilaudid)	20 mg/100 mL (0.2 mg/mL) <b>D5W</b>	0.5-2 mg IVP Over 2-3 minutes Q2 hours PRN  Administer slow IVP to avoid hypotension and respiratory depression	<b>Initial:</b> 0.25-0.5 mg/hr  <b>Titrate:</b> 0.25 mg/hr Q 30 minutes  <b>Max:</b> 2 mg/hr	5 minutes	3-5 hours	<ul style="list-style-type: none"> <li>• Side effects: respiratory depression, constipation, and hypotension</li> <li>• Reduce dose by 25-50% in renal patients</li> <li>• Infusion primarily used in palliative care</li> <li>• Preferred over morphine for patients with renal impairment</li> <li>• <b>Reversal agent: Naloxone (Narcan)</b></li> </ul>
<b>morphine</b>	100 mg/100 mL (1 mg/mL) <b>D5W</b>	0.5-10 mg IVP Dilute in ≥5 mL NS and give over 2-5 minutes  Q 1-6 hours PRN	<b>Initial:</b> 0.5-2 mg/hr  <b>Titrate:</b> 0.5 mg/hr Q 30 minutes  <b>Max:</b> 10 mg/hour	5-10 minutes	3-5 hours	<ul style="list-style-type: none"> <li>• May cause hypotension and itching due to histamine release</li> <li>• Side effects: respiratory depression &amp; constipation</li> <li>• Reduce dose in renal impairment (active metabolite accumulation)</li> <li>• Infusion primarily used in palliative care</li> <li>• <b>Reversal agent: Naloxone (Narcan)</b></li> </ul>
<b>REMI</b> fentanil (Ultiva)	5000 mcg/ 100 mL (50 mcg/mL)	n/a	<b>Initial:</b> 0.05 mcg/kg/min <b>Titrate:</b> 0.025 mcg/kg/min Q 5 minutes <b>Max:</b> 0.2 mcg/kg/min	1-3 minutes	Short 3-10 minute half life	<ul style="list-style-type: none"> <li>• Common S/E: hypotension, arrhythmias, N/V, muscle rigidity, headache</li> <li>• Renal excretion – monitor effects in patients with decreased renal function or on dialysis</li> </ul>



## Adult Emergency/Critical Care Medication Reference

**\*\* Please Note: Not all medications are available at each institution\*\***

# Sedatives

**\*\*Administration of sedation should follow your hospital policy on Procedural Sedation/Analgesia for Non-Anesthesiology Providers\*\***

Name	Concentrations	Intermittent	Infusion	Pharmacokinetics	Comments
dextmedeTOMline (Precedex)	200 mcg/50 mL 400 mcg/100 mL 1000 mcg/250 mL (4 mcg/mL) <b>D5W or NS</b>	n/a <b>Do not bolus</b>	<b>Initial:</b> 0.2-0.5 mcg/kg/hr  <b>Titration:</b> 0.1 mcg/kg/hr Q 30 minutes <b>Max:</b> 1.4 mcg/kg/hr	<b>Onset:</b> 15-30 minutes  <b>Duration:</b> 15-120 min dose dependent	<ul style="list-style-type: none"> <li>• May cause hypotension or bradycardia</li> <li>• Does not cause respiratory depression – okay to use in non-intubated patients</li> </ul>
etomidate (Amidate)	n/a	0.15-0.3 mg/kg  <b>IVP by RN for emergent RSI</b> <b>One-time dose only</b>	n/a	<b>Onset:</b> 0.5-1 minutes  <b>Duration:</b> 4-10 min	<ul style="list-style-type: none"> <li>• Drug of Choice in RSI (Rapid Sequence Intubation) due to less hemodynamic effects than benzodiazepines</li> </ul>
ketamine (Ketalar)	<b>Sedation Standard</b> 500 mg/100 mL (5 mg/mL) <b>High</b> 500 mg/50 mL (10 mg/mL) <b>NS</b>	<b>IV:</b> <b>Sub-anesthetic/adjunctive:</b> 0.25-0.5 mg/kg IVP  <b>Sedation:</b> 1-2 mg/kg IV Push  <b>Intranasal:</b> <b>sub-anesthetic/adjunctive:</b> 0.5-1 mg/kg	<b>Initial:</b> 2.5 mcg/kg/min  <b>Titration:</b> 2.5 mcg/kg/min Q 15 minutes  <b>Max:</b> 20 mcg/kg/min	<b>IV:</b> Onset: 30 seconds Duration: 5-10 minutes  <b>Intranasal:</b> Onset: 10 minutes Duration: 60 minutes	<ul style="list-style-type: none"> <li>• Adjunctive dose used for conscious sedation with propofol</li> <li>• <b>Patient MUST be intubated or have permanent protected airway (trach) with mechanical ventilation on a controlled rate of breathing (not pressure support only)</b></li> <li>• Sub-anesthetic doses for pain control can reduce opioid requirement</li> <li>• S/E: tachyarrhythmias, hallucinations and agitation, increased oral secretions, lacrimation (crying), dilated pupils, increased muscle tone (rigidity)</li> <li>• Use for pain management or in patients with an unsecured airway requires initiation, titration, and discontinuation by a provider and is not in the RN's scope of practice in Louisiana.</li> </ul>

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# Sedatives

**\*\*Administration of sedation should follow your hospital policy on Procedural Sedation/Analgesia for Non-Anesthesiology Providers\*\***

Name	Concentrations	Intermittent	Infusion	Pharmacokinetics	Comments
<b>LORazepam</b> (Ativan)	50 mg/50 mL 100 mg/100 mL (1 mg/mL)  <b>D5W</b>	1-4 mg IVP diluted in equal volume of diluent and given over 2-5 minutes Q 1-6 hours PRN May repeat dosing Q 5-10 min for seizure control	<b>Initial:</b> 0.5-2 mg/hour  <b>Titration:</b> 0.5 mg/hr Q 30 minutes  <b>Max:</b> 5 mg/hr	<b>Onset:</b> 5-20 minutes  <b>Duration:</b> 4-6 hours	<ul style="list-style-type: none"> <li>Solvent can induce <b>acidosis (propylene glycol)</b></li> <li>May see higher dosing in difficult to control seizures</li> </ul>
<b>midazolam</b> (Versed)	<b>Standard</b> 50 mg/50 mL 100 mg/100 mL (1 mg/mL) <b>High</b> 250 mg/50 mL 500 mg/100 mL (5 mg/mL) <b>D5W</b>	1-6 mg IVP Over 2 minutes <b>OR</b> 2.5-5 mg IM	<b>Initial:</b> 0.5-2 mg/hour  <b>Titration:</b> 0.5 mg/hr Q 30 minutes  <b>Max:</b> 5 mg/hr	<b>Onset:</b> 2-5 minutes  <b>Duration:</b> 2-4 hours	<ul style="list-style-type: none"> <li>Active metabolite can cause prolonged sedation</li> <li>Patients should be continuously monitored for hypoventilation, airway obstruction, or apnea</li> <li>May see higher dosing in status epilepticus</li> </ul>
<b>propofol</b> (Diprivan)	1000 mg/100 mL (10 mg/mL)  <b>lipid emulsion</b>  <b>Bolus or IVP by RN if mechanically ventilated with a controlled rate of breathing (not pressure support only)</b>	1-2 mg/kg IVP titrated to effect by MD	<b>Initial:</b> 5-10 mcg/kg/min <b>Titrate:</b> 5 mcg/kg/minute Q 5 minutes <b>Max:</b> 50 mcg/kg/min	<b>Onset:</b> 1-2 minutes  <b>Duration:</b> 8 minutes	<ul style="list-style-type: none"> <li>Can cause hypotension</li> <li>High dose can cause increased triglycerides, pancreatitis, propofol infusion syndrome</li> <li><b>Change IV tubing q 12h</b></li> <li>May see higher dosing if used for deep sedation or seizure control – dose should be ordered as <b>non-titrating</b></li> </ul>

# Neuromuscular Blocking Agents **\*Must Protect Airway\***

**Do not administer without sedation!**

**Do not allow sedation vacations on paralyzed patients**

Name	Concentrations	Intermittent	Infusion	Pharmacokinetics	Comments
<b>CSatracurium</b> (Nimbex)	200 mg/100 mL 400 mg/200 mL (2 mg/mL) D5W	0.15-0.2 mg/kg from bag  <b>Bolus or IVP by RN if mechanically ventilated with a controlled rate of breathing (not pressure support only)</b>	<b>Initial:</b> 1-3 mcg/kg/minute  <b>Titrate:</b> 0.5 mcg/kg/minute Q 15 minutes  <b>Max:</b> 10 mcg/kg/minute	<b>Onset:</b> 5-10 minutes  <b>Duration:</b> 35-45 minutes	<ul style="list-style-type: none"> <li>• Drug of choice in organ dysfunction</li> <li>• Must get baseline peripheral nerve stimulation (train of four (TOF)) before initiating bolus or infusion if TOF monitoring appropriate for the patient while paralyzed</li> </ul>
<b>ROCuronium</b> (Zemuron)	n/a	0.6-1.2 mg/kg IVP  <b>IVP by RN for emergent RSI or if mechanically ventilated with a controlled rate of breathing (not pressure support only)</b>		<b>Onset:</b> 1-2 minutes <b>Duration:</b> 30 minutes	<ul style="list-style-type: none"> <li>• Second line agent for RSI</li> <li>• Long duration of action, additional sedation may be required</li> </ul>
<b>succinylcholine</b>	n/a	1-1.5 mg/kg IVP  <b>IVP for emergent RSI by RN</b>	n/a	<b>Onset:</b> 1-2 minutes  <b>Duration:</b> 10 minutes	<ul style="list-style-type: none"> <li>• <b>Drug of Choice</b> in RSI</li> <li>• <b>Contraindicated</b> in hyperkalemia</li> <li>• <b>Avoid in patients with burns/crush trauma &amp; patients found down for unknown duration</b></li> <li>• Can induce <b>malignant hyperthermia</b></li> </ul>
<b>VECuronium</b> (Norcuron)	100 mg/100 mL (1 mg/mL) D5W	0.08-0.1 mg/kg  <b>Bolus or IVP by RN for emergent RSI or if mechanically ventilated with a controlled rate of breathing (not pressure support only)</b>	<b>Initial:</b> 0.5-1 mcg/kg/min  <b>Titrate:</b> 0.5 mcg/kg/min Q 30 min  <b>Max:</b> 2 mcg/kg/min	<b>Onset:</b> 5-10 minutes  <b>Duration:</b> 30-45 minutes	<ul style="list-style-type: none"> <li>• 50% parent drug and most active metabolite cleared by kidney</li> <li>• Must get baseline peripheral nerve stimulation (train of four) before initiating bolus or infusion if TOF monitoring appropriate for the patient while paralyzed</li> </ul>

**Adult Emergency/Critical Care Medication Reference**  
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## IV Anticoagulants

Name	Concentrations	Dose	Infusion	Pharmacokinetics	Comments
<b>argatroban</b>	50 mg/50 mL 125 mg/125 mL (1 mg/mL)  <b>NS</b>		<b>Initial:</b> 0.5 mcg/kg/min (organ dysfunction, post op critically ill)  1-2 mcg/kg/min for stable patients  <b>Titrate:</b> based on nomogram in orderset  <b>Max:</b> 10 mcg/kg/min	<b>Onset:</b> Immediate  <b>Duration:</b> 1-3 hours	<ul style="list-style-type: none"> <li>Commonly used for HIT+ patients (Heparin Induced Thrombocytopenia)</li> <li><b>Use caution with hepatically impaired patients</b></li> <li>Monitor for bleeding</li> <li>Max dosing weight 150 kg</li> </ul>
<b>bivalirudin</b> (Angiomax)	250 mg/50 mL <b>D5W</b>	Bolus 0.75 mg/kg immediately before PCI  Check ACT in 5 minutes  May give additional 0.3 mg/kg to achieve desired ACT	1.75 mg/kg/hr during procedure and up to 4 hours post  then decrease to 0.2 mg/kg/hr for up to 20 hours	<b>Onset:</b> immediate  <b>Duration:</b> 1 hour	<ul style="list-style-type: none"> <li>Decrease dose for ESRD or dialysis patient</li> <li>Monitor for bleeding</li> </ul>
<b>heparin</b>	25,000 units/250 mL <b>D5W Premix</b>	<b>Refer to nomogram Must have separate order for bolus – Administer bolus doses from bag via IV pump</b>	<b>Weight-based Initial:</b> <b>12-18 units/kg/hour</b> <b>Titrate:</b> based on nomogram	<b>Onset:</b> Immediate  <b>Duration:</b> 1-2 hours	<ul style="list-style-type: none"> <li>Dosage regulated by frequent labs (aPTT) Q6 hours during infusion</li> <li>Dosing changes take 4-6 hours to affect labs</li> <li>Dosing based on adjusted body weight</li> <li><b>Ensure correct nomogram is used based on indication (High, Low, Minimum)</b></li> <li>Monitor for bleeding</li> <li><b>Reversal agent: Protamine Sulfate</b></li> </ul>

# Hyperosmolar Therapy for ICP Management

Name	Concentrations	Dose	Onset/Duration	Comments
<b>2% and 3% sodium chloride</b> <small>(2% only at Jeff Hwy)</small>	3% sodium chloride commercially available  2% and buffered solutions must be mixed in pharmacy	Infusion titrated to goal sodium range 3% may be bolused 200-350 mL over 5-20 minutes	Onset: Rapid  <b>Duration:</b> 1.5 – 4 hours	<ul style="list-style-type: none"> <li>• <b>Central Line Preferred for 3% solutions</b></li> <li>• Infusion is titrated to goal Na<sup>+</sup> set by primary team (typically higher values ~145-155 mEq/L)</li> <li>• Avoid rapid fluctuations in serum sodium (10-12 mEq/L over 24 hours)</li> <li>• Caution if severe hyponatremia &gt;160 mEq/L</li> <li>• Monitor serum sodium q4-6 hours                             <ul style="list-style-type: none"> <li>❖ Abrupt changes can cause iatrogenic osmotic demyelination syndrome</li> </ul> </li> </ul>
<b>23.4% sodium chloride</b>  <b>Administered by Neuro Critical Care provider only</b>	Premixed vial from pharmacy	120 mEq (30 mL) via SLOW IV push (over 10 minutes)  <b>High concentration</b>	Onset: Rapid  <b>Duration:</b> 1.5 – 6 hours	<ul style="list-style-type: none"> <li>• <b>Central line administration ONLY – NO EXCEPTIONS</b></li> <li>• Closely monitor serum sodium (q 6h)</li> </ul>
<b>mannitol</b> (Osmitrol)  <b>Use in-line filter during administration</b>	20 % solution (500 mL bag) = 100 grams  25% solution (50 mL vial) = 12.5 grams	0.25-2 gram/kg over 15-30 minutes  Repeat q 6 hours PRN or until ICP <20	10-15 minutes Reduces ICP in 15-30 minutes  <b>Duration:</b> 1.5-6 hours	<ul style="list-style-type: none"> <li>• Use with caution in severe renal impairment</li> <li>• Inspect for crystals prior to administration: if present dissolve by warming solution under warm water</li> <li>• Increased UOP expected, monitor electrolytes</li> <li>• Do not administer in same line with blood products</li> <li>• Goal – serum osmolality 300-320 mOsm/kg</li> </ul>

**Adult Emergency/Critical Care Medication Reference**  
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## IV Antiepileptics

Name	Concentrations	Dose	Onset/Duration of Action	Comments
<b>FOSphenytoin</b> (Cerebyx)	Variable dosing- mixed in pharmacy <b>D5W</b>	<b>Loading Dose:</b> 20-25 mg/PE per kg x1  <b>Maintenance Dose:</b> 4-6 mg PE/kg/day in divided doses (Q8- 12H)  <b>Max Infusion Rate:</b> 150mg PE/min	Onset: 15 minutes  Duration: dose- dependent	<ul style="list-style-type: none"> <li>Monitor for hypotension and cardiac arrhythmias during and after IV infusion. Patient should be on telemetry.</li> <li>Monitor for purple glove syndrome and extravasation</li> <li>Many drug interactions</li> <li>Goal total phenytoin level 10-20 mcg/mL (free level 1-2 mcg/mL)</li> </ul>
<b>lacosamide</b> (Vimpat)	Variable dosing mixed in pharmacy <b>NS</b>	<b>Loading Dose:</b> up to 10 mg/kg x 1 (typically max at 600 mg)  <b>Maintenance Dose:</b> 200-400 mg/day in divided doses (q 12h) infused over 30 minutes	Onset: 1-4 hours  Duration: 13 hours	<ul style="list-style-type: none"> <li>Renal dose adjustment required</li> <li>Removed by dialysis; Supplemental dose recommended after HD</li> <li>Contraindicated in patients with severe hepatic impairment</li> <li>Caution in patients with cardiac conduction issues: Prolongs PR interval, may cause 1<sup>st</sup> and 2<sup>nd</sup> degree heart blocks and bradycardia</li> <li>Cardiac monitoring recommended with higher doses</li> <li>IV:PO conversion is 1:1</li> <li>Must waste as a narcotic</li> </ul>
lev <b>ETIR</b> acetam (Keppra)	<b>Doses ≤ 2000 mg IVP over 5 minutes</b> 500 mg/ 5 mL (100 mg/mL) Doses > 2000 mg will be IVPB	<b>Loading Dose:</b> 1000-4000 mg x 1  <b>Maintenance Dose:</b> 1000-3000 mg/day in divided doses Q 12 hours	Duration: 6-8 hours	<ul style="list-style-type: none"> <li>Draw up doses in 10 mL increments for IVP administration</li> <li>Renal dose adjustment required</li> <li>Removed by dialysis; supplemental dose recommended after HD</li> <li>IV:PO conversion is 1:1</li> <li>Side Effects: Behavioral changes &amp; somnolence</li> </ul>
<b>valproate sodium</b> (Depacon)	Variable dosing mixed in pharmacy <b>D5W</b>	<b>Loading Dose:</b> 20-60 mg/kg x1  <b>Maintenance Dose:</b> up to 60 mg/kg/day in divided doses (Q6-12)	Onset: 15 minutes  Duration: 9-19 hours	<ul style="list-style-type: none"> <li>Avoid use in patients with hepatic impairment</li> <li>Adverse reactions include hepatotoxicity, pancreatitis, hyperammonemia, and thrombocytopenia</li> <li>Goal serum valproic acid level for seizures 50-100 mcg/mL</li> <li>Pregnancy category X</li> </ul>

**Adult Emergency/Critical Care Medication Reference**  
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# Antipsychotics

Name	Concentrations	Dose	Onset of Action	Duration of Action	Comments
<b>haloperidol</b> (Haldol)	n/a	2.5-5 mg PO, IM, or IV (may repeat Q 30-60 minutes)  <b>Patient Dependent Max:</b> 10-20 mg	3-20 minutes	varies: Few minutes to 50 hours	<ul style="list-style-type: none"> <li>• Can cause QT prolongation</li> <li>• EPS side effects (rare with IV formulation)</li> <li>• For acute, non-redirectable psychotic agitation</li> <li>• <b>IM</b> with lorazepam (compatible)</li> <li>• <b>Not compatible with diphenhydramine</b></li> </ul>
<b>OLANZapine</b> (Zyprexa, Zyprexa Zydis)	n/a	5-20 mg PO or IM  <b>Initial:</b> 2.5-5 mg May repeat in 30 min if not effective.  <b>Max Total Dose:</b> 30 mg/day	<b>PO:</b> 6 hours (peak)  <b>IM:</b> 30 minutes	24-54 hours	<ul style="list-style-type: none"> <li>• Can cause QT prolongation</li> <li>• Hypotension associated with IM formulation</li> <li>• <b>Avoid administration within 2 hours of benzodiazepines (IV or IM); may cause excessive sedation and cardiorespiratory depression</b></li> </ul>
<b>ziprasidone</b> (Geodon)	n/a	20-40 mg PO Q 12 hours  5-10 mg IM Q 2-4 hours  <b>Max:</b> 40 mg/day	<b>PO:</b> 4 hours (peak)  <b>IM:</b> <60 minutes	<b>PO:</b> 7 hours  <b>IM:</b> 2.5 hours	<ul style="list-style-type: none"> <li>• Can cause QT prolongation</li> </ul>

**Adult Emergency/Critical Care Medication Reference**  
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## Adult Drug Titration Reference

ATTENTION: This table is a guideline only and any titrations listed below should not supersede provider orders in Epic.

If you need to titrate differently for an individual patient, you must obtain a provider order to change the titration dose/rate.

Drug	Starting Dose	Up Titration Dose	Up Titration Time	Suggested Maximum Dose	Down Titration Dose	Down Titration Time
angiotensin II (Giapreza)	10 ng/kg/min	5-15 ng/kg/min	5 minutes	40 - 80 ng/kg/min	5-15 ng/kg/min	5-15 minutes
CISatracurium (Nimbex)	1-3 mcg/kg/min	0.5 mcg/kg/min	15 minutes	10 mcg/kg/min	0.25 mcg/kg/min	30 minutes
clevidipine (Cleviprex)	1-2 mg/hr	Double the dose	2 minutes	16 mg/hr (*32mg/hr)	1-2 mg/hr	5 minutes
dexmedetomidine (Precedex)	0.2 - 0.5 mcg/kg/hr	0.1 mcg/kg/hr	30 minutes	1.4 mcg/kg/hr	0.1 mcg/kg/hr	15 minutes
diltiazem (Cardizem)	2.5 - 5 mg/hr	2.5 mg/hr	15 minutes	15 mg/hr	1 mg/hr	30 minutes
DOBUTamine (DOButrex)	2.5 - 10 mcg/kg/min	2.5 mcg/kg/min	15 minutes	20 mcg/kg/min	2.5 mcg/kg/min	15 minutes
DOPamine	2.5-10 mcg/kg/min	2.5 - 5 mcg/kg/min	5 minutes	20 mcg/kg/min	1 mcg/kg/min	30 minutes
EPINEPHrine	0.02 - 0.2 mcg/kg/min	0.02 mcg/kg/min	5 minutes	2 mcg/kg/min	0.01 mcg/kg/min	15 minutes
esmolol	50 mcg/kg/min	25 mcg/kg/min	5 minutes	300 mcg/kg/min	25 mcg/kg/min	15 minutes
fentanyl	25 - 100 mcg/hr	12.5 mcg/hr	30 minutes	500 mcg/hr	12.5 mcg/hr	1 hour
isoproterenol (Isuprel)	2 mcg/min	0.5 - 1 mcg/min	5 minutes	10 mcg/min	1 mcg/min	30 minutes
ketamine (Ketalar)	2.5 mcg/kg/min	2.5 mcg/kg/min	15 minutes	20 mcg/kg/min	2.5 mcg/kg/min	15 minutes
labetalol	0.5 - 2 mg/min	0.1 mg/min	15 minutes	3 mg/min	0.1 mg/min	30 minutes
LIDOCaine	1 mg/min	0.5 mg/min	10 minutes	4 mg/min	0.25 mg/min	30 minutes
LORazepam (Ativan)	0.5 - 2 mg/hr	0.5 mg/hr	30 minutes	5 mg/hr	0.25 mg/hr	30 minutes
midazolam (Versed)	0.5 - 2 mg/hr	0.5 mg/hr	30 minutes	5 mg/hr	0.5 mg/hr	30 minutes
morphine	0.5 - 2 mg/hr	0.5 mg/hr	30 minutes	10 mg/hr	0.25 mg/hr	30 minutes
nicardipine (Cardene)	2.5 - 5 mg/hr	2.5 mg/hr	5 - 15 minutes	15 mg/hr	1 mg/hr	10 minutes
nitroglycerin (Tridil)	5 - 20 mcg/min	5 - 20 mcg/min	3 - 5 minutes	400 mcg/min	5 - 20 mcg/min	15 minutes
nitropruside (Nipride)	0.3 mcg/kg/min	0.2 mcg/kg/min	3 - 5 minutes	10 mcg/kg/min	0.1 mcg/kg/min	15 minutes
NOREpinephrine (Levophed)	0.02 - 0.2 mcg/kg/min	0.02 mcg/kg/min	5 minutes	3 mcg/kg/min	0.02 mcg/kg/min	15 minutes
PHENYLEphrine (NeoSynephrine)	0.5 mcg/kg/min	0.5 mcg/kg/min	5 minutes	5 mcg/kg/min	0.1 mcg/kg/min	15 minutes
propofol	5-10 mcg/kg/min	5 mcg/kg/min	5 minutes	50 mcg/kg/min	2.5 mcg/kg/min	15 minutes
REMifentanyl (Ultiva)	0.05 mcg/kg/min	0.025 mcg/kg/min	5 minutes	0.2 mcg/kg/min	0.025 mcg/kg/min	5 minutes
VECuronium (Norcuron)	0.5-1 mcg/kg/min	0.5 mcg/kg/min	15 minutes	2 mcg/kg/min	0.5 mcg/kg/min	15 minutes



## Adult Emergency/Critical Care Medication Reference

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Notes: