

## MEDICATIONS USED IN ADULT CODE BLUE EMERGENCIES



Source: ACLS Provider Manual. American Heart Association. 2001, 2002. Updated 2003.

## ET Administration

### Atropine



<p><b>Use:</b></p>	<ul style="list-style-type: none"> <li>○ First drug for symptomatic sinus bradycardia</li> <li>○ May be beneficial in presence of AV block at the nodal level or ventricular asystole; will not be effective when infranodal block is suspected</li> <li>○ Second drug (after epinephrine or vasopressin) for asystole or bradycardic pulseless electrical activity</li> </ul>
<p><b>Pharmacology:</b></p>	<ul style="list-style-type: none"> <li>○ Parasympathetic agent</li> <li>○ Enhances both sinus node automaticity and AV conduction by direct vagolytic action</li> </ul>
<p><b>Precautions:</b></p>	<ul style="list-style-type: none"> <li>○ Use with caution in presence of myocardial ischemia and hypoxia; increases myocardial oxygen demand</li> <li>○ Avoid in hypothermic bradycardia</li> <li>○ Not effective for infranodal AV block and new third-degree block with wide QRS complexes</li> </ul>
<p><b>Dose:</b></p>	<p><i>Asystole or pulseless electrical activity</i></p> <ul style="list-style-type: none"> <li>○ 1mg IVP</li> <li>○ Repeat every 3-5 minutes as needed to a maximum dose of 0.03-0.04mg/kg</li> </ul> <p><i>Bradycardia</i></p> <ul style="list-style-type: none"> <li>○ 0.5-1mg IV every 3-5 minutes as needed; not to exceed total dose of 0.04mg/kg</li> <li>○ Use shorter dosing interval (3 minutes) and higher doses (0.04mg/kg) in severe clinical conditions</li> </ul> <p><i>Tracheal administration</i></p> <ul style="list-style-type: none"> <li>○ 2-3mg diluted in 10ml NS</li> </ul>

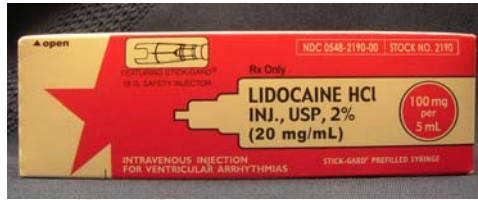
# Epinephrine



<p><b>Use:</b></p>	<ul style="list-style-type: none"> <li>○ Cardiac arrest: VF, pulseless, VT, asystole, PEA</li> <li>○ Symptomatic bradycardia after atropine, dopamine, and transcutaneous pacing</li> <li>○ Severe hypotension</li> <li>○ Anaphylaxis or severe allergic reactions in combination with large fluid volumes, corticosteroids, antihistamines</li> </ul>
<p><b>Pharmacology:</b></p>	<ul style="list-style-type: none"> <li>○ Natural catecholamine with <math>\alpha</math>- and <math>\beta</math>-adrenergic agonist activity which results in (a) increased blood flow to heart and brain, (b) increased SVR, SBP, DBP, and (c) increased myocardial oxygen requirements. Its primary benefit is <math>\alpha</math>-vasoconstriction</li> </ul>
<p><b>Precautions:</b></p>	<ul style="list-style-type: none"> <li>○ Myocardial ischemia, angina, and increased myocardial oxygen demand may result from raising blood pressure and increasing heart rate</li> <li>○ High doses may contribute to postresuscitation myocardial dysfunction</li> <li>○ Higher doses may be required to treat poison/drug-induced shock</li> </ul>
<p><b>Dose:</b></p>	<p><i>Cardiac arrest</i></p> <ul style="list-style-type: none"> <li>○ IV dose: 1mg (10ml of 1:10,000 solution) every 3-5 minutes during resuscitation with each dose followed by 20ml IV flush</li> <li>○ Higher dose: Up to 0.2mg/kg may be use if 1mg dose fails</li> <li>○ Continuous infusion: Add 30mg epinephrine (30ml of 1:1000 solution) to 250ml NS or D<sub>5</sub>W to run at 100ml/hr and titrate to response</li> <li>○ Tracheal Route: 2-2.5mg diluted in 10ml NS</li> </ul> <p><i>Profound bradycardia or hypotension</i></p> <p>2-10 mcg/min infusion; add 1mg of 1:1000 to 500ml NS and infuse at 1-5ml/min</p>



## Lidocaine

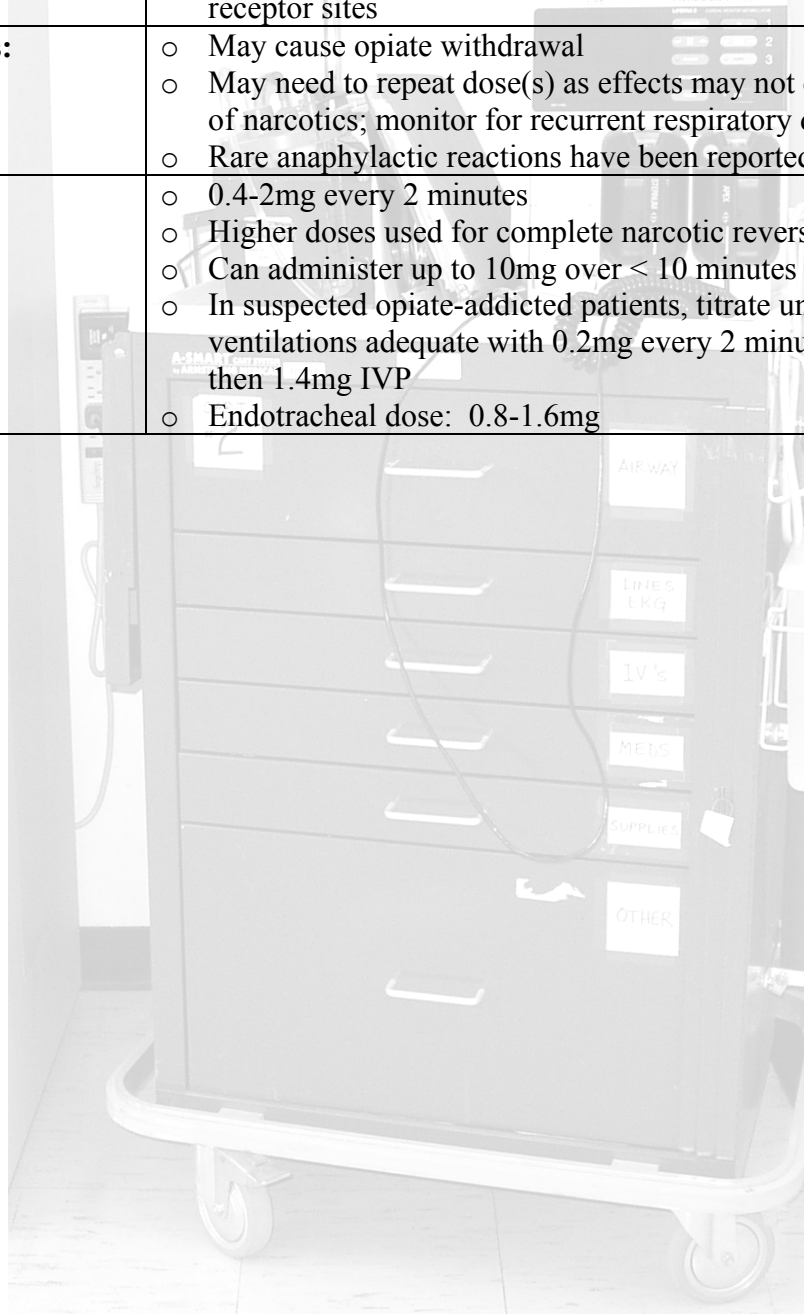


<b>Use:</b>	<ul style="list-style-type: none"> <li>○ Cardiac arrest from VF/VT</li> <li>○ Stable VT, wide-complex tachycardias of uncertain type, wide complex PSVT</li> </ul>
<b>Pharmacology:</b>	<ul style="list-style-type: none"> <li>○ Affects fast sodium channels, shortens refractory periods, and suppresses spontaneous depolarization</li> <li>○ Local anesthetic which increases the fibrillation threshold.</li> <li>○ Causes suppression of ventricular ectopy post MI.</li> </ul>
<b>Precautions:</b>	<ul style="list-style-type: none"> <li>○ Not recommended for prophylactic use in AMI</li> <li>○ Reduce maintenance dose but not loading dose in presence of impaired liver function or left ventricular dysfunction</li> <li>○ If signs of toxicity develop, discontinue infusion immediately</li> </ul>
<b>Dose:</b>	<p><i>Cardiac arrest from VF/VT</i></p> <ul style="list-style-type: none"> <li>○ Initial dose of 1-1.5mg/kg IV</li> <li>○ For refractory VF may give additional 0.5-0.75mg/kg IVP; can repeat in 5-10 minutes for a maximum total dose of 3mg/kg</li> <li>○ A single dose of 1.5mg/kg IV in cardiac arrest is acceptable</li> <li>○ Tracheal administration: 2-4mg/kg</li> </ul> <p><i>Perfusing arrhythmia: stable VT, wide complex tachycardia of uncertain type, significant ectopy</i></p> <ul style="list-style-type: none"> <li>○ 1-1.5mg/kg IVP</li> <li>○ Repeat 0.5-0.75mg/kg every 5-10 minutes for a maximum total dose of 3mg/kg</li> </ul> <p><i>Maintenance infusion</i></p> <ul style="list-style-type: none"> <li>○ Use premixed bag of 2grams/250ml D<sub>5</sub>W</li> <li>○ 1-4mg/minute (30-50 mcg/kg/minute).</li> </ul>

# Naloxone



<b>Use:</b>	<ul style="list-style-type: none"><li>○ Respiratory and neurologic depression due to opiate intoxication unresponsive to oxygen and hyperventilation</li></ul>
<b>Pharmacology:</b>	<ul style="list-style-type: none"><li>○ Competes with and replaces narcotic agonists at the narcotic receptor sites</li></ul>
<b>Precautions:</b>	<ul style="list-style-type: none"><li>○ May cause opiate withdrawal</li><li>○ May need to repeat dose(s) as effects may not outlast effects of narcotics; monitor for recurrent respiratory depression</li><li>○ Rare anaphylactic reactions have been reported</li></ul>
<b>Dose:</b>	<ul style="list-style-type: none"><li>○ 0.4-2mg every 2 minutes</li><li>○ Higher doses used for complete narcotic reversal</li><li>○ Can administer up to 10mg over &lt; 10 minutes</li><li>○ In suspected opiate-addicted patients, titrate until ventilations adequate with 0.2mg every 2 minutes X3 doses, then 1.4mg IVP</li><li>○ Endotracheal dose: 0.8-1.6mg</li></ul>



## IVPB Administration

### Amiodarone

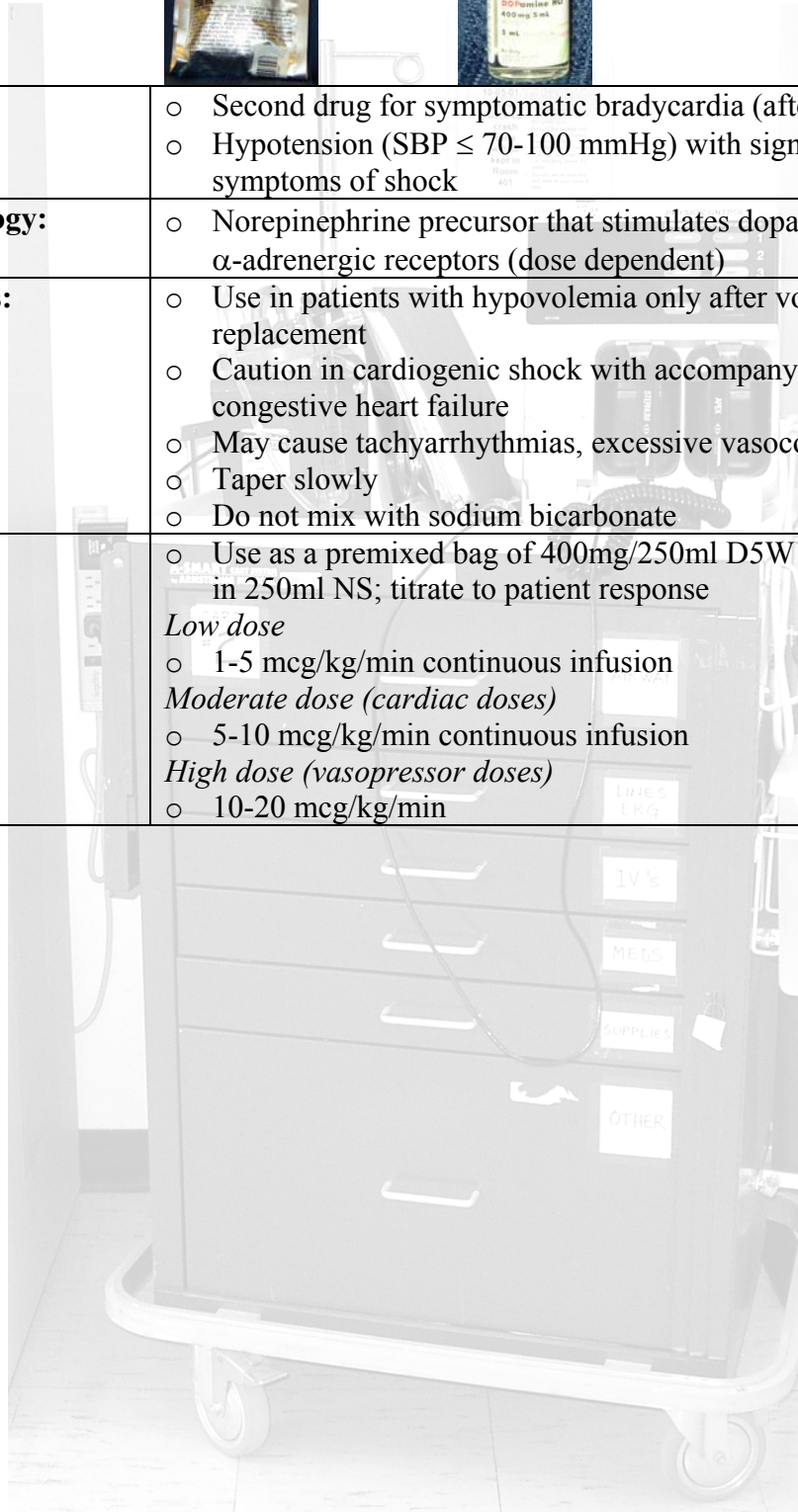


<b>Use:</b>	<ul style="list-style-type: none"> <li>○ A wide variety of atrial and ventricular tachyarrhythmias</li> <li>○ For rate control of rapid atrial arrhythmias in patients with impaired LV function when digoxin ineffective</li> </ul>
<b>Pharmacology:</b>	<ul style="list-style-type: none"> <li>○ Class III antiarrhythmic agent which inhibits adrenergic stimulation and prolongs the action potential and refractory period in myocardial tissue</li> <li>○ Decreases AV conduction and sinus node function</li> </ul>
<b>Precautions:</b>	<ul style="list-style-type: none"> <li>○ May produce vasodilation and hypotension</li> <li>○ May have negative inotropic effects</li> <li>○ May prolong QT interval</li> </ul>
<b>Dose:</b>	<p><i>Cardiac arrest</i></p> <ul style="list-style-type: none"> <li>○ 300mg IVP diluted in 20-30ml D<sub>5</sub>W</li> <li>○ Consider additional 150mg IVP in 3-5 minutes</li> <li>○ Maximum cumulative dose 2.2gm/24 hours IV</li> </ul> <p><i>Wide-complex tachycardia (stable)</i></p> <ul style="list-style-type: none"> <li>○ Rapid infusion: 150mg IV over first 10 minutes (15mg/min); may repeat rapid infusion (150mg IV) every 10 minutes as needed</li> <li>○ Slow infusion: 360mg IV over 6 hours (1mg/min)</li> <li>○ Maintenance infusion: 540mg IV over 18 hours (0.5mg/min)</li> <li>○ Preparation: 150mg amiodarone in 150ml D<sub>5</sub>W; expires 2 hours from time of preparation</li> <li>○ Maximum cumulative dose 2.2gm/24 hours IV</li> </ul>

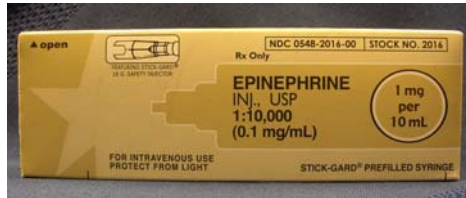
## Dopamine



<b>Use:</b>	<ul style="list-style-type: none"> <li>○ Second drug for symptomatic bradycardia (after atropine)</li> <li>○ Hypotension (SBP <math>\leq</math> 70-100 mmHg) with signs and symptoms of shock</li> </ul>
<b>Pharmacology:</b>	<ul style="list-style-type: none"> <li>○ Norepinephrine precursor that stimulates dopamine, <math>\beta</math>-, and <math>\alpha</math>-adrenergic receptors (dose dependent)</li> </ul>
<b>Precautions:</b>	<ul style="list-style-type: none"> <li>○ Use in patients with hypovolemia only after volume replacement</li> <li>○ Caution in cardiogenic shock with accompanying congestive heart failure</li> <li>○ May cause tachyarrhythmias, excessive vasoconstriction</li> <li>○ Taper slowly</li> <li>○ Do not mix with sodium bicarbonate</li> </ul>
<b>Dose:</b>	<ul style="list-style-type: none"> <li>○ Use as a premixed bag of 400mg/250ml D5W or put 400mg in 250ml NS; titrate to patient response</li> <li><i>Low dose</i> <ul style="list-style-type: none"> <li>○ 1-5 mcg/kg/min continuous infusion</li> </ul> </li> <li><i>Moderate dose (cardiac doses)</i> <ul style="list-style-type: none"> <li>○ 5-10 mcg/kg/min continuous infusion</li> </ul> </li> <li><i>High dose (vasopressor doses)</i> <ul style="list-style-type: none"> <li>○ 10-20 mcg/kg/min</li> </ul> </li> </ul>



# Epinephrine



<p><b>Use:</b></p>	<ul style="list-style-type: none"> <li>○ Cardiac arrest: VF, pulseless, VT, asystole, PEA</li> <li>○ Symptomatic bradycardia after atropine, dopamine, and transcutaneous pacing</li> <li>○ Severe hypotension</li> <li>○ Anaphylaxis or severe allergic reactions in combination with large fluid volumes, corticosteroids, antihistamines</li> </ul>
<p><b>Pharmacology:</b></p>	<ul style="list-style-type: none"> <li>○ Natural catecholamine with <math>\alpha</math>- and <math>\beta</math>-adrenergic agonist activity which results in (a) increased blood flow to heart and brain, (b) increased SVR, SBP, DBP, and (c) increased myocardial oxygen requirements</li> <li>○ Primary benefit is <math>\alpha</math>-vasoconstriction</li> </ul>
<p><b>Precautions:</b></p>	<ul style="list-style-type: none"> <li>○ Myocardial ischemia, angina, and increased myocardial oxygen demand may result from raising blood pressure and increasing heart rate</li> <li>○ High doses may contribute to postresuscitation myocardial dysfunction</li> <li>○ Higher doses may be required to treat poison/drug-induced shock</li> </ul>
<p><b>Dose:</b></p>	<p><i>Cardiac arrest</i></p> <ul style="list-style-type: none"> <li>○ IV dose: 1mg (10ml of 1:10,000 solution) every 3-5 minutes during resuscitation with each dose followed by 20ml IV flush</li> <li>○ Higher dose: Up to 0.2mg/kg may be use if 1mg dose fails</li> <li>○ Continuous infusion: Add 30mg epinephrine (30ml of 1:1000 solution) to 250ml NS or D<sub>5</sub>W to run at 100ml/hr and titrate to response</li> <li>○ Tracheal Route: 2-2.5mg diluted in 10ml NS</li> </ul> <p><i>Profound bradycardia or hypotension</i></p> <ul style="list-style-type: none"> <li>○ 2-10 mcg/min infusion; add 1mg of 1:1000 to 500ml NS and infuse at 1-5ml/min</li> </ul>

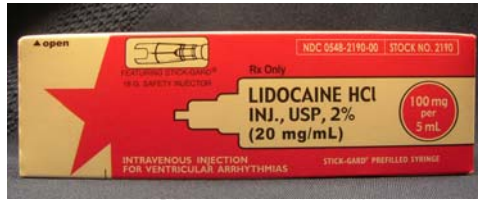


## Isoproterenol



<b>Use:</b>	<ul style="list-style-type: none"><li>○ Use with caution as temporizing measure if external pacer is not available for treatment of symptomatic bradycardia</li><li>○ Refractory torsades de pointes unresponsive to magnesium sulfate</li><li>○ Temporary control of bradycardia in heart transplant patients when denervated heart unresponsive to atropine</li><li>○ Poisoning from beta-adrenergic blockers</li></ul>
<b>Pharmacology:</b>	<ul style="list-style-type: none"><li>○ Synthetic sympathomimetic amine with pure <math>\beta</math>-adrenergic activity plus inotropic and chronotropic activity which can (a) increase HR/CO, contractility and (b) decrease MAP secondary to vasodilation</li></ul>
<b>Precautions:</b>	<ul style="list-style-type: none"><li>○ Do not use for treatment of cardiac arrest</li><li>○ Can increase myocardial oxygen requirements which may increase myocardial ischemia</li><li>○ Do not give with epinephrine (can cause VF/VT)</li><li>○ Do not administer to patients with poison/drug induced shock except for beta-adrenergic blocker poisoning</li></ul>
<b>Dose:</b>	<ul style="list-style-type: none"><li>○ Mix 1mg in 250ml NS, LR, or D<sub>5</sub>W</li><li>○ Infuse at 2-10 mcg/min</li><li>○ Titrate to adequate heart rate</li><li>○ In torsades de pointes, titrate to increase heart rate until VT is suppressed</li></ul>

## Lidocaine



<b>Use:</b>	<ul style="list-style-type: none"> <li>○ Cardiac arrest from VF/VT</li> <li>○ Stable VT, wide-complex tachycardias of uncertain type, wide complex PSVT</li> </ul>
<b>Pharmacology:</b>	<ul style="list-style-type: none"> <li>○ Affects fast sodium channels, shortens refractory periods, and suppresses spontaneous depolarization</li> <li>○ Local anesthetic which increases the fibrillation threshold</li> <li>○ Causes suppression of ventricular ectopy post MI</li> </ul>
<b>Precautions:</b>	<ul style="list-style-type: none"> <li>○ Not recommended for prophylactic use in AMI</li> <li>○ Reduce maintenance dose but not loading dose in presence of impaired liver function or left ventricular dysfunction</li> <li>○ If signs of toxicity develop, discontinue infusion immediately</li> </ul>
<b>Dose:</b>	<p><i>Cardiac arrest from VF/VT</i></p> <ul style="list-style-type: none"> <li>○ Initial dose of 1-1.5mg/kg IV</li> <li>○ For refractory VF may give additional 0.5-0.75mg/kg IVP; can repeat in 5-10 minutes for a maximum total dose of 3mg/kg</li> <li>○ A single dose of 1.5mg/kg IV in cardiac arrest is acceptable</li> <li>○ Tracheal administration: 2-4mg/kg</li> </ul> <p><i>Perfusing arrhythmia: stable VT, wide complex tachycardia of uncertain type, significant ectopy</i></p> <ul style="list-style-type: none"> <li>○ 1-1.5mg/kg IVP</li> <li>○ Repeat 0.5-0.75mg/kg every 5-10 minutes for a maximum total dose of 3mg/kg</li> </ul> <p><i>Maintenance infusion</i></p> <ul style="list-style-type: none"> <li>○ Use premixed bag of 2grams/250ml D<sub>5</sub>W</li> <li>○ 1-4mg/minute (30-50 mcg/kg/minute)</li> </ul>

## Norepinephrine



<b>Use:</b>	<ul style="list-style-type: none"><li>○ Severe cardiogenic shock and hemodynamically significant hypotension (SBP &lt;70 mmHg) with low total peripheral resistance</li><li>○ Agent of last resort for management of ischemic heart disease and shock</li></ul>
<b>Pharmacology:</b>	<ul style="list-style-type: none"><li>○ Causes <math>\alpha</math>- and <math>\beta</math>-adrenergic stimulation to increase contractility, HR, and vasoconstriction which improves coronary blood flow</li></ul>
<b>Precautions:</b>	<ul style="list-style-type: none"><li>○ Increases myocardial oxygen requirements because it raises blood pressure and heart rate</li><li>○ Use with caution in patients with acute ischemia as may induce arrhythmias; monitor cardiac output</li><li>○ Extravasation causes tissue necrosis</li><li>○ If extravasation occurs, administer phentolamine 5-10mg in 10-15ml saline solution and infiltrate into area</li></ul>
<b>Dose:</b>	<ul style="list-style-type: none"><li>○ Dilute 4mg in 250ml D<sub>5</sub>W or D<sub>5</sub>NS; avoid dilution in NS alone</li><li>○ 0.5-1 mcg/minute titrated up to a maximum dose of 30 mcg/min to improve blood pressure</li><li>○ Do not administer in same IV line as alkaline solutions</li><li>○ Poison/drug induced hypotension may require higher doses to achieve adequate perfusion</li></ul>

## Procainamide



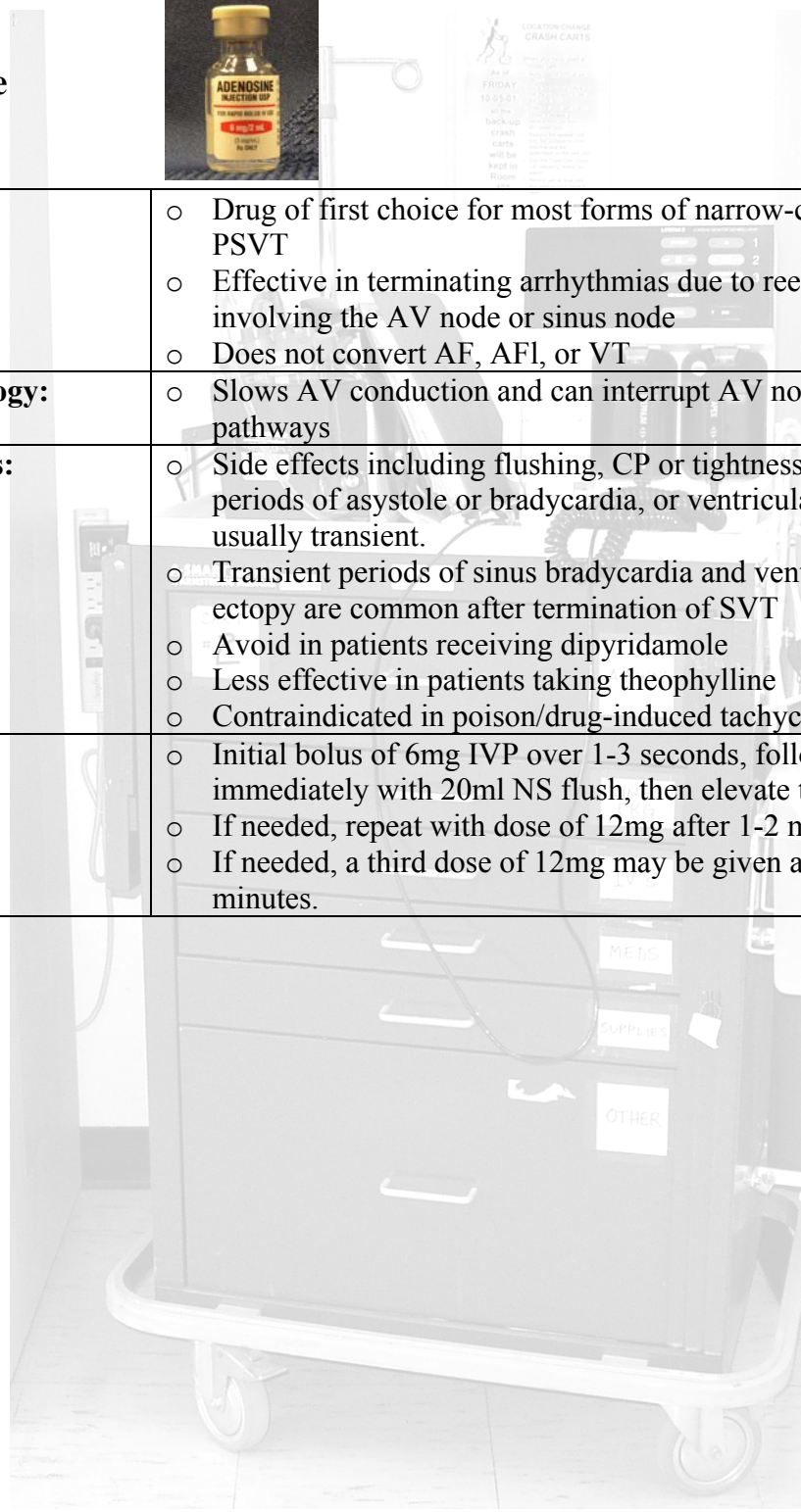
<b>Use:</b>	<ul style="list-style-type: none"> <li>○ PSVT uncontrolled by adenosine and vagal maneuvers as long as blood pressure stable</li> <li>○ Stable wide-complex tachycardia of unknown origin</li> <li>○ AF with rapid rate in Wolff-Parkinson-White syndrome</li> </ul>
<b>Pharmacology:</b>	<ul style="list-style-type: none"> <li>○ Decreases myocardial excitability and conduction velocity</li> <li>○ May depress myocardial contractility by increasing the electrical stimulation threshold of ventricle, HIS-Purkinje system, and through direct cardiac effects</li> </ul>
<b>Precautions:</b>	<ul style="list-style-type: none"> <li>○ Reduce maximum total dose to 12mg/kg and maintenance infusion to 1-2mg/min if cardiac or renal dysfunction</li> <li>○ Proarrhythmic especially if AMI, hypokalemia, or hypomagnesemia</li> <li>○ If impaired LV function, may induce hypotension</li> <li>○ Use with caution with other drugs that prolong QT interval such as amiodarone or sotalol</li> </ul>
<b>Dose:</b>	<p><i>Recurrent VF/VT</i></p> <ul style="list-style-type: none"> <li>○ 20mg/min IV infusion; maximum total dose 17mg/kg</li> <li>○ Up to 50mg/min may be administered to total dose of 17mg/kg in urgent situations</li> </ul> <p><i>Other indications</i></p> <ul style="list-style-type: none"> <li>○ 20mg/min IV infusion until one of the following occur: arrhythmia suppression, hypotension, QRS widens by &gt;50%, or total dose of 17mg/kg is given</li> </ul> <p><i>Maintenance Infusion</i></p> <ul style="list-style-type: none"> <li>○ Make infusion as 1 gram in 250ml D5W for concentration of 4mg/ml</li> <li>○ 1-4mg/min</li> </ul>

## IVP Administration

### Adenosine



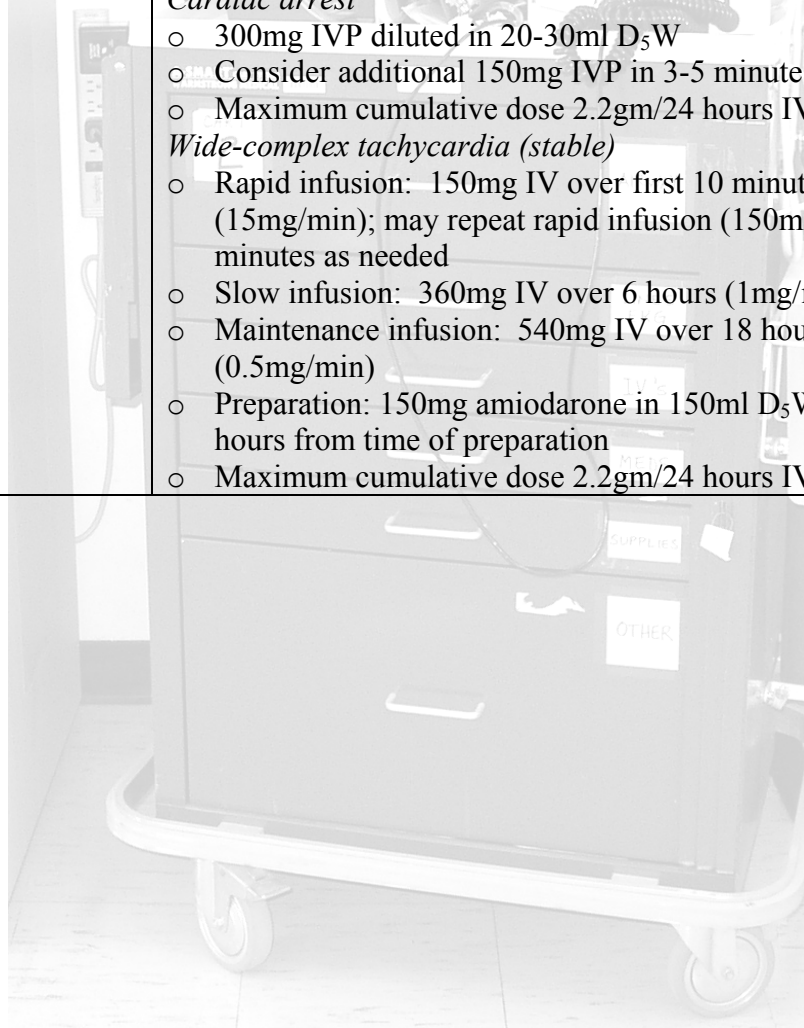
<b>Use:</b>	<ul style="list-style-type: none"> <li>○ Drug of first choice for most forms of narrow-complex PSVT</li> <li>○ Effective in terminating arrhythmias due to reentry involving the AV node or sinus node</li> <li>○ Does not convert AF, AFl, or VT</li> </ul>
<b>Pharmacology:</b>	<ul style="list-style-type: none"> <li>○ Slows AV conduction and can interrupt AV nodal reentry pathways</li> </ul>
<b>Precautions:</b>	<ul style="list-style-type: none"> <li>○ Side effects including flushing, CP or tightness, brief periods of asystole or bradycardia, or ventricular ectopy usually transient.</li> <li>○ Transient periods of sinus bradycardia and ventricular ectopy are common after termination of SVT</li> <li>○ Avoid in patients receiving dipyridamole</li> <li>○ Less effective in patients taking theophylline</li> <li>○ Contraindicated in poison/drug-induced tachycardia</li> </ul>
<b>Dose:</b>	<ul style="list-style-type: none"> <li>○ Initial bolus of 6mg IVP over 1-3 seconds, followed immediately with 20ml NS flush, then elevate the extremity</li> <li>○ If needed, repeat with dose of 12mg after 1-2 minutes</li> <li>○ If needed, a third dose of 12mg may be given after 1-2 minutes.</li> </ul>



## Amiodarone



<b>Use:</b>	<ul style="list-style-type: none"> <li>○ A wide variety of atrial and ventricular tachyarrhythmias</li> <li>○ For rate control of rapid atrial arrhythmias in patients with impaired LV function when digoxin ineffective</li> </ul>
<b>Pharmacology:</b>	<ul style="list-style-type: none"> <li>○ Class III antiarrhythmic agent which inhibits adrenergic stimulation and prolongs the action potential and refractory period in myocardial tissue</li> <li>○ Decreases AV conduction and sinus node function</li> </ul>
<b>Precautions:</b>	<ul style="list-style-type: none"> <li>○ May produce vasodilation and hypotension</li> <li>○ May have negative inotropic effects</li> <li>○ May prolong QT interval</li> </ul>
<b>Dose:</b>	<p><i>Cardiac arrest</i></p> <ul style="list-style-type: none"> <li>○ 300mg IVP diluted in 20-30ml D<sub>5</sub>W</li> <li>○ Consider additional 150mg IVP in 3-5 minutes</li> <li>○ Maximum cumulative dose 2.2gm/24 hours IV</li> </ul> <p><i>Wide-complex tachycardia (stable)</i></p> <ul style="list-style-type: none"> <li>○ Rapid infusion: 150mg IV over first 10 minutes (15mg/min); may repeat rapid infusion (150mg IV) every 10 minutes as needed</li> <li>○ Slow infusion: 360mg IV over 6 hours (1mg/min)</li> <li>○ Maintenance infusion: 540mg IV over 18 hours (0.5mg/min)</li> <li>○ Preparation: 150mg amiodarone in 150ml D<sub>5</sub>W; expires 2 hours from time of preparation</li> <li>○ Maximum cumulative dose 2.2gm/24 hours IV</li> </ul>



# Atropine

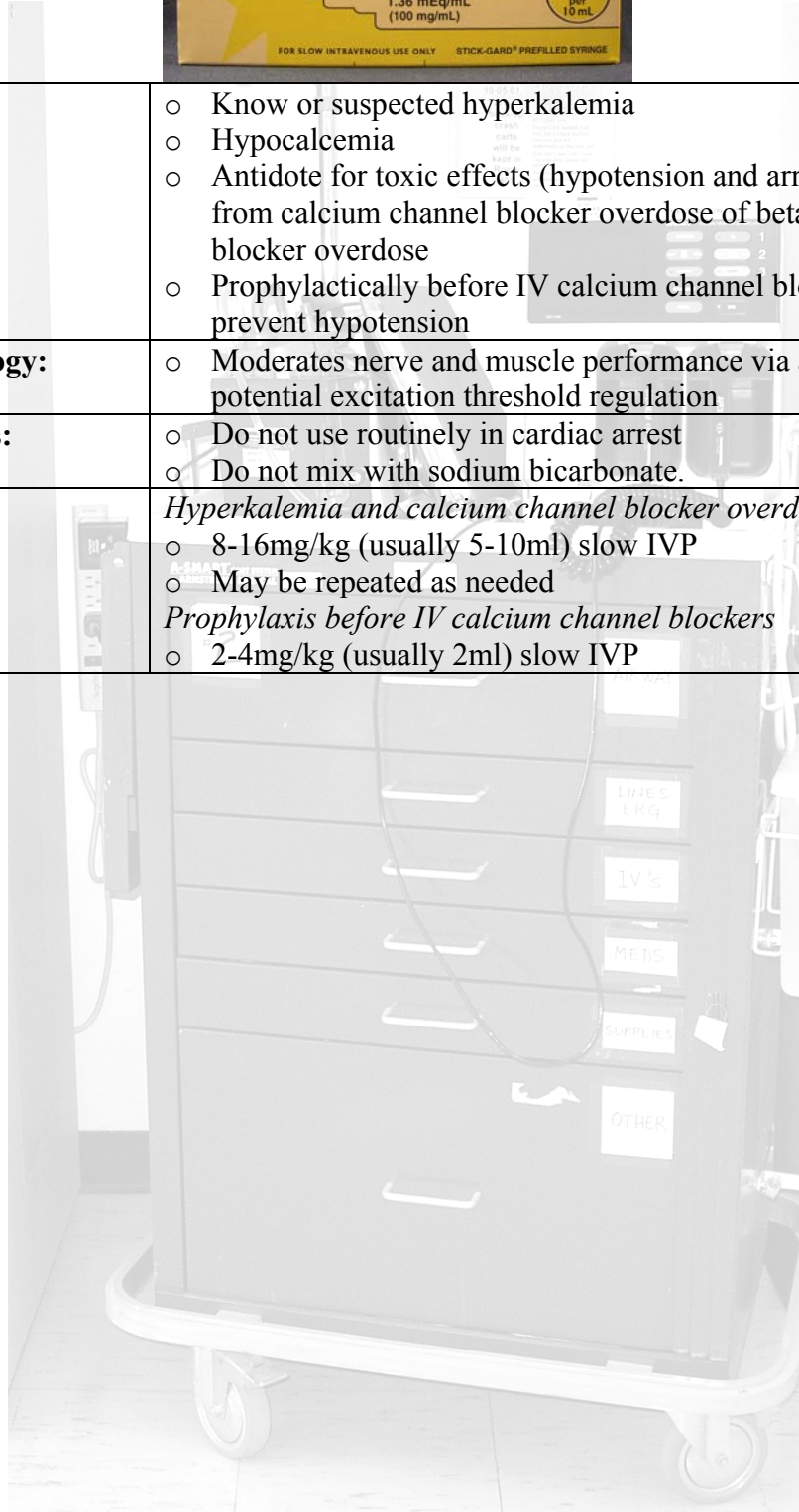


<p><b>Use:</b></p>	<ul style="list-style-type: none"> <li>○ First drug for symptomatic sinus bradycardia</li> <li>○ May be beneficial in presence of AV block at the nodal level or ventricular asystole; will not be effective when infranodal block is suspected</li> <li>○ Second drug (after epinephrine or vasopressin) for asystole or bradycardic pulseless electrical activity</li> </ul>
<p><b>Pharmacology:</b></p>	<ul style="list-style-type: none"> <li>○ Parasympathetic agent</li> <li>○ Enhances both sinus node automaticity and AV conduction by direct vagolytic action</li> </ul>
<p><b>Precautions:</b></p>	<ul style="list-style-type: none"> <li>○ Use with caution in presence of myocardial ischemia and hypoxia; increases myocardial oxygen demand</li> <li>○ Avoid in hypothermic bradycardia</li> <li>○ Not effective for infranodal AV block and new third-degree block with wide QRS complexes</li> </ul>
<p><b>Dose:</b></p>	<p><i>Asystole or pulseless electrical activity</i></p> <ul style="list-style-type: none"> <li>○ 1mg IVP</li> <li>○ Repeat every 3-5 minutes as needed to a maximum dose of 0.03-0.04mg/kg</li> </ul> <p><i>Bradycardia</i></p> <ul style="list-style-type: none"> <li>○ 0.5-1mg IV every 3-5 minutes as needed; not to exceed total dose of 0.04mg/kg</li> <li>○ Use shorter dosing interval (3 minutes) and higher doses (0.04mg/kg) in severe clinical conditions</li> </ul> <p><i>Tracheal administration</i></p> <ul style="list-style-type: none"> <li>○ 2-3mg diluted in 10ml NS</li> </ul>

## Calcium Chloride

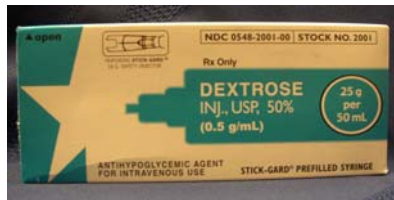


<b>Use:</b>	<ul style="list-style-type: none"> <li>○ Know or suspected hyperkalemia</li> <li>○ Hypocalcemia</li> <li>○ Antidote for toxic effects (hypotension and arrhythmias) from calcium channel blocker overdose of beta-adrenergic blocker overdose</li> <li>○ Prophylactically before IV calcium channel blockers to prevent hypotension</li> </ul>
<b>Pharmacology:</b>	<ul style="list-style-type: none"> <li>○ Moderates nerve and muscle performance via action potential excitation threshold regulation</li> </ul>
<b>Precautions:</b>	<ul style="list-style-type: none"> <li>○ Do not use routinely in cardiac arrest</li> <li>○ Do not mix with sodium bicarbonate.</li> </ul>
<b>Dose:</b>	<p><i>Hyperkalemia and calcium channel blocker overdose</i></p> <ul style="list-style-type: none"> <li>○ 8-16mg/kg (usually 5-10ml) slow IVP</li> <li>○ May be repeated as needed</li> </ul> <p><i>Prophylaxis before IV calcium channel blockers</i></p> <ul style="list-style-type: none"> <li>○ 2-4mg/kg (usually 2ml) slow IVP</li> </ul>





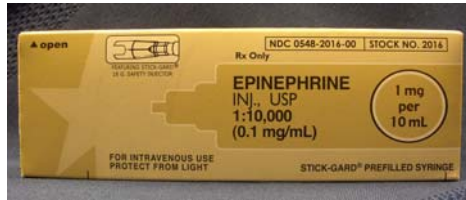
## Dextrose



<b>Use:</b>	<ul style="list-style-type: none"><li>○ Reverse severe hypoglycemia; symptomatically may manifest as nausea, hunger, headache, irritability, lethargy, ataxia, mental confusion</li></ul>
<b>Pharmacology:</b>	<ul style="list-style-type: none"><li>○ Helps reverse the effect of too much insulin or insufficient food intake while on antidiabetic medications.</li></ul>
<b>Precautions:</b>	<ul style="list-style-type: none"><li>○ None in an acute emergency.</li></ul>
<b>Dose:</b>	<ul style="list-style-type: none"><li>○ 10-50ml of Dextrose 50%.</li></ul>



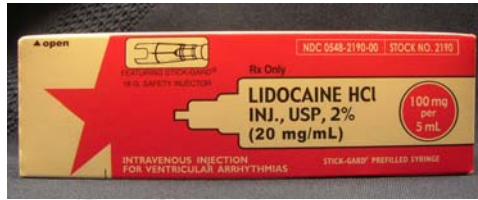
# Epinephrine



<p><b>Use:</b></p>	<ul style="list-style-type: none"> <li>○ Cardiac arrest: VF, pulseless, VT, asystole, PEA</li> <li>○ Symptomatic bradycardia after atropine, dopamine, and transcutaneous pacing</li> <li>○ Severe hypotension</li> <li>○ Anaphylaxis or severe allergic reactions in combination with large fluid volumes, corticosteroids, antihistamines</li> </ul>
<p><b>Pharmacology:</b></p>	<ul style="list-style-type: none"> <li>○ Natural catecholamine with <math>\alpha</math>- and <math>\beta</math>-adrenergic agonist activity which results in (a) increased blood flow to heart and brain, (b) increased SVR, SBP, DBP, and (c) increased myocardial oxygen requirements. Its primary benefit is <math>\alpha</math>-vasoconstriction</li> </ul>
<p><b>Precautions:</b></p>	<ul style="list-style-type: none"> <li>○ Myocardial ischemia, angina, and increased myocardial oxygen demand may result from raising blood pressure and increasing heart rate</li> <li>○ High doses may contribute to postresuscitation myocardial dysfunction</li> <li>○ Higher doses may be required to treat poison/drug-induced shock</li> </ul>
<p><b>Dose:</b></p>	<p><i>Cardiac arrest</i></p> <ul style="list-style-type: none"> <li>○ IV dose: 1mg (10ml of 1:10,000 solution) every 3-5 minutes during resuscitation with each dose followed by 20ml IV flush</li> <li>○ Higher dose: Up to 0.2mg/kg may be use if 1mg dose fails</li> <li>○ Continuous infusion: Add 30mg epinephrine (30ml of 1:10,000 solution) to 250ml NS or D5W to run at 100ml/hr and titrate to response</li> <li>○ Tracheal Route: 2-2.5mg diluted in 10ml NS</li> </ul> <p><i>Profound bradycardia or hypotension</i></p> <ul style="list-style-type: none"> <li>○ 2-10 mcg/min infusion; add 1mg of 1:1000 to 400ml NS and infuse at 1-5ml/min</li> </ul>



## Lidocaine



<b>Use:</b>	<ul style="list-style-type: none"> <li>○ Cardiac arrest from VF/VT</li> <li>○ Stable VT, wide-complex tachycardias of uncertain type, wide complex PSVT</li> </ul>
<b>Pharmacology:</b>	<ul style="list-style-type: none"> <li>○ Affects fast sodium channels, shortens refractory periods, and suppresses spontaneous depolarization</li> <li>○ A local anesthetic which increases the fibrillation threshold.</li> <li>○ Causes suppression of ventricular ectopy post MI</li> </ul>
<b>Precautions:</b>	<ul style="list-style-type: none"> <li>○ Not recommended for prophylactic use in AMI</li> <li>○ Reduce maintenance dose but not loading dose in presence of impaired liver function or left ventricular dysfunction</li> <li>○ If signs of toxicity develop, discontinue infusion immediately</li> </ul>
<b>Dose:</b>	<p><i>Cardiac arrest from VF/VT</i></p> <ul style="list-style-type: none"> <li>○ Initial dose of 1-1.5mg/kg IV</li> <li>○ For refractory VF may give additional 0.5-0.75mg/kg IVP; can repeat in 5-10 minutes for a maximum total dose of 3mg/kg</li> <li>○ A single dose of 1.5mg/kg IV in cardiac arrest is acceptable</li> <li>○ Tracheal administration: 2-4mg/kg</li> </ul> <p><i>Perfusing arrhythmia: stable VT, wide complex tachycardia of uncertain type, significant ectopy</i></p> <ul style="list-style-type: none"> <li>○ 1-1.5mg/kg IVP</li> <li>○ Repeat 0.5-0.75mg/kg every 5-10 minutes for a maximum total dose of 3mg/kg</li> </ul> <p><i>Maintenance infusion</i></p> <ul style="list-style-type: none"> <li>○ Use premixed bag of 2grams/250ml D<sub>5</sub>W</li> <li>○ 1-4mg/minute (30-50 mcg/kg/minute)</li> </ul>

## Magnesium Sulfate

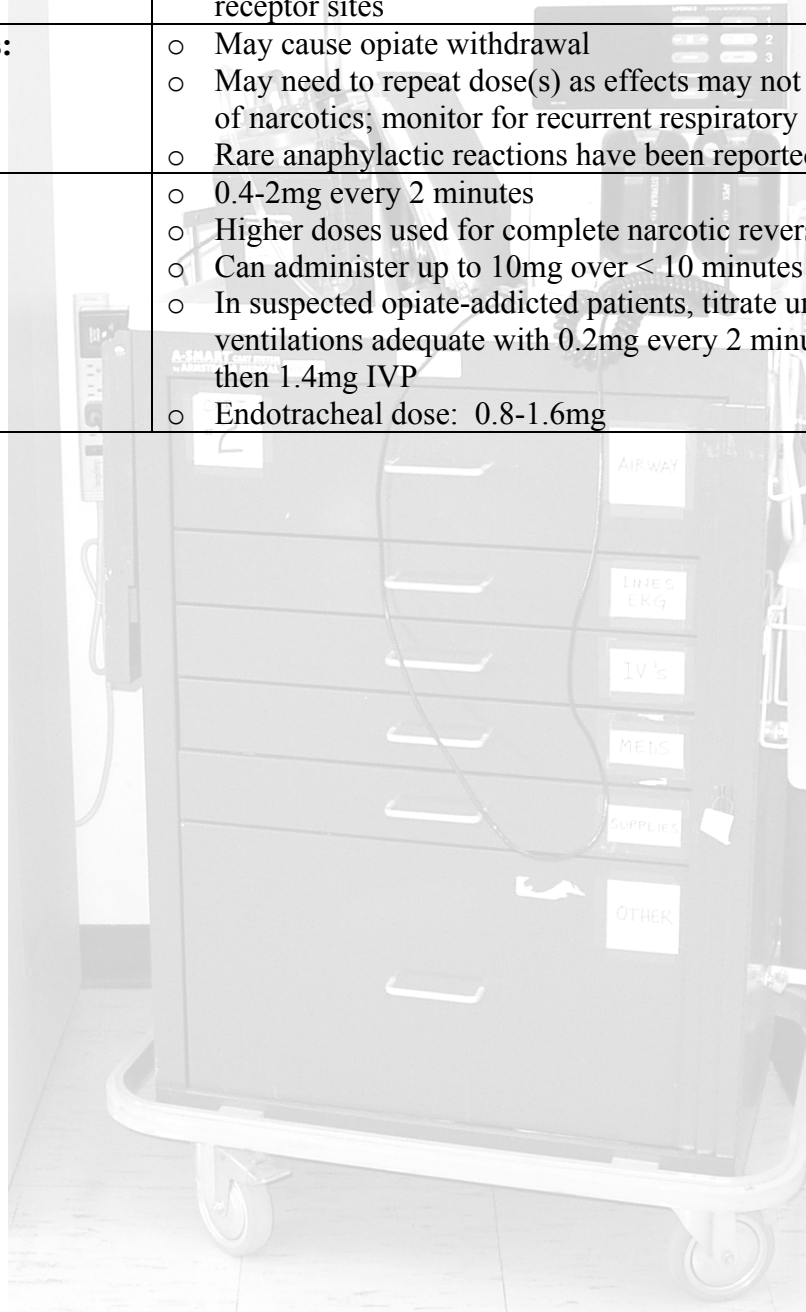


<b>Use:</b>	<ul style="list-style-type: none"> <li>○ Cardiac arrest only if torsades de pointes or suspected hypomagnesemia</li> <li>○ Refractory VF after lidocaine</li> <li>○ Torsades de pointes with a pulse</li> <li>○ Life-threatening ventricular arrhythmias due to digitalis toxicity</li> <li>○ Not recommended for prophylactic administration in hospitalized patients with AMI.</li> </ul>
<b>Pharmacology:</b>	<ul style="list-style-type: none"> <li>○ Magnesium deficiency causes arrhythmias</li> <li>○ Magnesium facilitates repolarization by enhancing the intracellular potassium influx and dilating coronary arteries</li> </ul>
<b>Precautions:</b>	<ul style="list-style-type: none"> <li>○ Rapid administration may cause a fall in blood pressure</li> <li>○ Use with caution if renal failure is present</li> </ul>
<b>Dose:</b>	<p><i>Cardiac arrest for hypomagnesemia or torsades de pointes</i></p> <ul style="list-style-type: none"> <li>○ 1-2 grams (2-4ml of a 50% solution) diluted in 10ml of D<sub>5</sub>W IVP</li> </ul> <p><i>Torsades de pointes when not in cardiac arrest</i></p> <ul style="list-style-type: none"> <li>○ Loading dose of 1-2 grams mixed in 50-100ml of D<sub>5</sub>W over 5-60 minutes IV</li> <li>○ Follow with 0.5-1 gm/hour IV titrating to control the torsades</li> </ul> <p><i>Acute myocardial infarction</i></p> <ul style="list-style-type: none"> <li>○ Loading dose of 1-2 grams mixed in 50-100ml D<sub>5</sub>W over 5-60 minutes IV</li> <li>○ Follow with 0.5-1 gm/hr IV for up to 24 hours</li> </ul>

# Naloxone



<b>Use:</b>	<ul style="list-style-type: none"> <li>○ Respiratory and neurologic depression due to opiate intoxication unresponsive to oxygen and hyperventilation</li> </ul>
<b>Pharmacology:</b>	<ul style="list-style-type: none"> <li>○ Competes with and replaces narcotic agonists at the narcotic receptor sites</li> </ul>
<b>Precautions:</b>	<ul style="list-style-type: none"> <li>○ May cause opiate withdrawal</li> <li>○ May need to repeat dose(s) as effects may not outlast effects of narcotics; monitor for recurrent respiratory depression</li> <li>○ Rare anaphylactic reactions have been reported</li> </ul>
<b>Dose:</b>	<ul style="list-style-type: none"> <li>○ 0.4-2mg every 2 minutes</li> <li>○ Higher doses used for complete narcotic reversal</li> <li>○ Can administer up to 10mg over &lt; 10 minutes</li> <li>○ In suspected opiate-addicted patients, titrate until ventilations adequate with 0.2mg every 2 minutes X3 doses, then 1.4mg IVP</li> <li>○ Endotracheal dose: 0.8-1.6mg</li> </ul>



## Sodium Bicarbonate



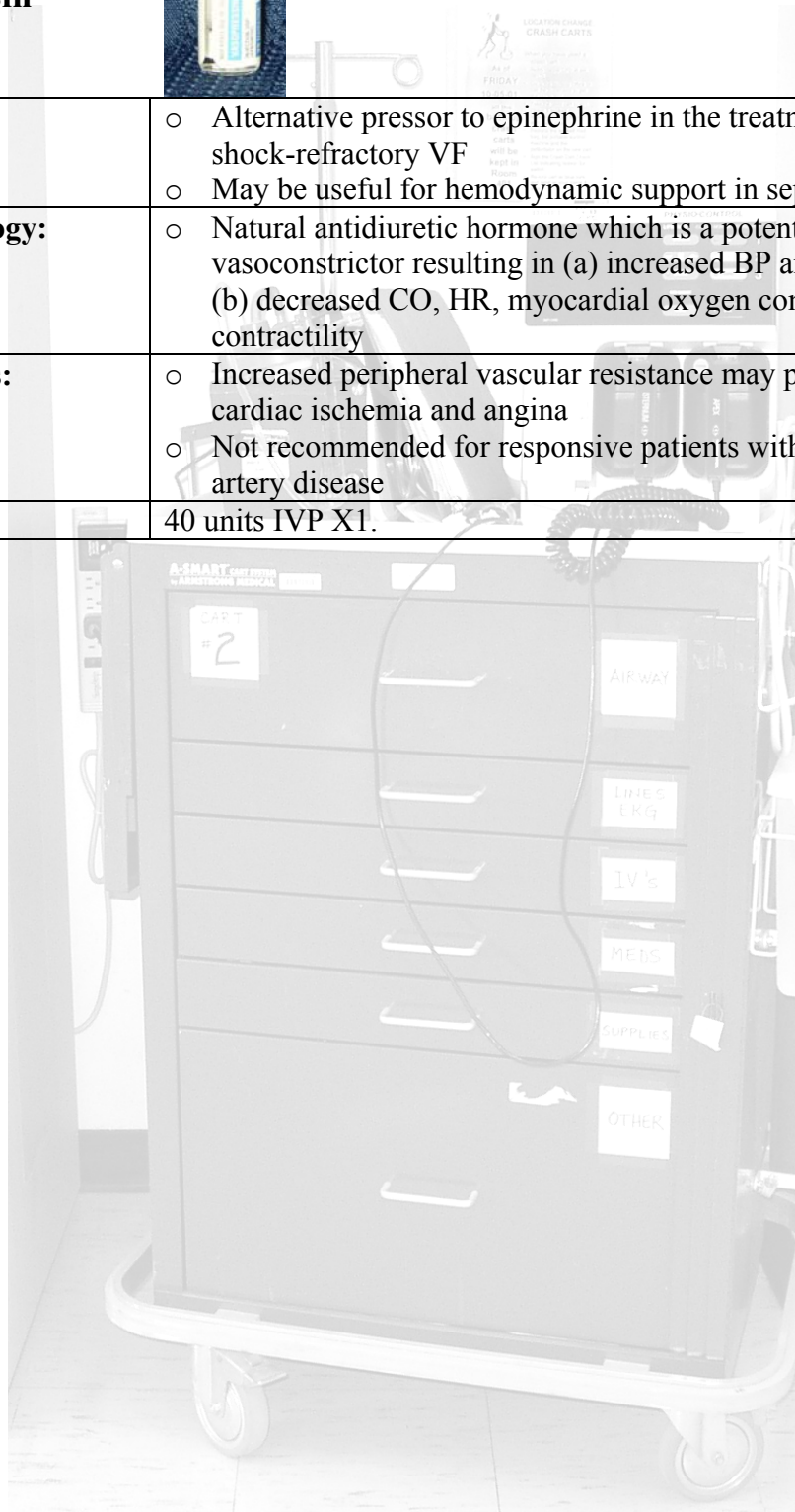
<b>Use:</b>	<ul style="list-style-type: none"> <li>○ Known preexisting hyperkalemia</li> <li>○ If known preexisting bicarbonate-responsive acidosis such as diabetic ketoacidosis</li> <li>○ To alkalinize urine in case of aspirin, tricyclic antidepressant, cocaine, or diphenhydramine overdose</li> <li>○ If prolonged resuscitation with effective ventilation or upon return of spontaneous circulation after long arrest interval</li> </ul>
<b>Pharmacology:</b>	<ul style="list-style-type: none"> <li>○ Enhances a sodium shift intracellularly, buffers acidosis, decreases toxicity of tricyclic antidepressants, increases the clearance of acidic drugs</li> </ul>
<b>Precautions:</b>	<ul style="list-style-type: none"> <li>○ Adequate ventilation and CPR, not bicarbonate, are the major “buffer agents” in cardiac arrest</li> <li>○ Not recommended for routine use in cardiac arrest patients</li> </ul>
<b>Dose:</b>	<ul style="list-style-type: none"> <li>○ 1mEq/kg IV bolus</li> <li>○ Repeat half this dose every 10 minutes</li> <li>○ Use arterial blood gas analysis to guide bicarbonate therapy; an acute change in PaCO<sub>2</sub> of 1 mmHg is associated with an increase or decrease in pH of 0.008 U</li> </ul>



## Vasopressin



<b>Use:</b>	<ul style="list-style-type: none"><li>○ Alternative pressor to epinephrine in the treatment of adult shock-refractory VF</li><li>○ May be useful for hemodynamic support in septic shock</li></ul>
<b>Pharmacology:</b>	<ul style="list-style-type: none"><li>○ Natural antidiuretic hormone which is a potent vasoconstrictor resulting in (a) increased BP and SVR and (b) decreased CO, HR, myocardial oxygen consumption and contractility</li></ul>
<b>Precautions:</b>	<ul style="list-style-type: none"><li>○ Increased peripheral vascular resistance may provoke cardiac ischemia and angina</li><li>○ Not recommended for responsive patients with coronary artery disease</li></ul>
<b>Dose:</b>	40 units IVP X1.



## Verapamil



<b>Use:</b>	<ul style="list-style-type: none"><li>○ Alternative drug, after adenosine, used to terminate PSVT with narrow QRS complex and adequate blood pressure and preserved LV function</li><li>○ May control ventricular response in patients with AF, AFl, or multifocal atrial tachycardia.</li></ul>
<b>Pharmacology:</b>	<ul style="list-style-type: none"><li>○ Blocks the flow of calcium and sodium and slows conduction</li><li>○ Terminates reentrant arrhythmias</li><li>○ Controls the ventricular response in AF/Afl; causes coronary vasodilation.</li></ul>
<b>Precautions:</b>	<ul style="list-style-type: none"><li>○ Give only to patients with narrow-complex PSVT or arrhythmias known to be of supraventricular origin</li><li>○ Avoid in patients with WPW and AF, SSS, or second- or third-degree AV block without pacemaker</li><li>○ May decrease myocardial contractility and may exacerbate CHF in patients with LV dysfunction</li><li>○ Use with extreme caution in patients receiving oral beta-blockers</li></ul>
<b>Dose:</b>	<ul style="list-style-type: none"><li>○ 2.5-5mg IVP over 2 minutes</li><li>○ Second dose: 5-10mg, if needed, in 15-30 minutes for maximum dose of 20mg</li><li>○ Alternative: 5mg IVP every 15 minutes to total dose of 30mg</li><li>○ Administer over 3 minutes in older patients</li></ul>