



ACE Inhibitors

(Captopril, Enalapril, Enalaprilat, Lisinopril, Ramipril)

Action: Increases cardiac output; lowers BP; reduces sodium and water retention (edema).

Indications: To improve left ventricular function; reduce death rate after acute MI; to treat high blood pressure or heart failure.

Adenosine

Action: Decreases HR by depressing SA node and AV junctional activity.

Indications: To treat PAT/PSVT, SVT, or for the diagnosis and treatment of stable wide-complex tachycardia when the rhythm is regular and the QRS complexes look alike (monomorphic).

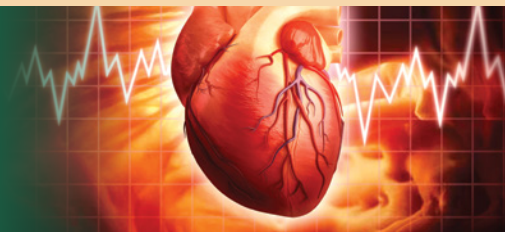


Aspirin

(Acetylsalicylic Acid, ASA)

Action: Decreases platelet formation of clots against the inside of arterial walls.

Indications: Consider using as a preventive measure for acute MI (ACS), stroke, and angina.



Amiodarone

Action: Decreases heart rate; slows conduction; prolongs effective refractory period.

Indications: To treat VT, V fib, pulseless VT, A fib, or atrial flutter.



Adenosine

Dosage: 6 mg rapid IV push followed immediately by a 20 mL IV saline solution flush. If no response in 1 to 2 minutes, repeat adenosine at 12 mg rapid IV push, followed by 20 mL IV saline solution flush.

Precautions: **Side effects:** flushing, dyspnea, hypotension, mild chest pain lasting 1 to 2 minutes; may also have short episodes of bradycardia, asystole, or abnormal beats; PAT/PSVT and SVT may recur due to short-acting effects of this medication.

Use with caution: in the elderly. **Contraindications:** hypersensitivity, atrial flutter, A fib, WPW syndrome. Do not mix with aminophylline, dipyridamole, or carbamazepine.



ACE Inhibitors

Dosage: **Captopril:** Initial dose: 6.25 mg, PO; advance to 25 mg three times daily (TID), then 50 mg TID, as tolerated. **Enalapril:** initial dose: 2.5 mg PO; titrate to 20 mg PO, twice daily (BID). **Enalaprilat:** initial dose: 1.25 mg IV over 5 min, then 1.25 mg to 5 mg IV every 6 hours. **Lisinopril:** 5 mg PO within 24 hours of symptom onset; then 5 mg PO after 24 hours; then 10 mg PO after 48 hours; then 10 mg PO daily. **Ramipril:** initial dose: 2.5 mg PO; titrate to 5 mg PO BID, as tolerated.

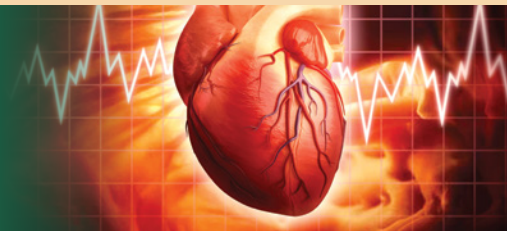
Precautions: **Use with caution:** dialysis, diabetes, and kidney disease. **Contraindications:** pregnancy, hypersensitivity, hypotension, potassium level over 5 mEq/L. Start after BP has stabilized and completion of reperfusion therapy. **IV enalaprilat:** contraindicated in STEMI.



Amiodarone

Dosage: **V fib/pulseless VT:** 300 mg IV/IO push; if no response within 3 to 5 minutes, repeat once at 150 mg. **VT with a pulse:** 150 mg IV over 10 minutes; if no response, repeat 150 mg IV once. If dysrhythmia is controlled, begin a continuous infusion at 1 mg/min for 6 hours, followed by 0.5 mg/min for 18 hours; up to a total dose of 2.2 g in 24 hours. **A fib/atrial flutter:** same as VT with a pulse; indicated in congestive heart failure (CHF).

Precautions: **May cause:** bradycardia, hypotension, prolonged QT intervals. **Use with caution:** CHF, kidney, liver, and lung disease. **Contraindications:** hypersensitivity, pregnancy, or second- and third-degree heart blocks. Use only in D₅W solution, with an in-line filter and in a glass bottle. Do not shake. May cause hypotension for several months; may cause scarring of lung tissue or thyroid problems.



Aspirin

Dosage: Chew 160 to 325 mg PO immediately in acute MI; recommend chewing over swallowing whole tablet.

Precautions: **May cause:** gastrointestinal (GI) bleeding, tinnitus (ringing in the ears), dizziness, wheezing, confusion, and convulsions. **Use with caution:** liver or kidney disease, asthma, Hodgkin's disease, peptic ulcer disease, pregnancy, and patients taking warfarin (Coumadin) or any other anticoagulants. **Contraindications:** hypersensitivity or bleeding disorders. Do not use enteric-coated tablets.



Atropine Sulfate

Action: Increases heart rate and sinus node automaticity; improves AV conduction.

Indications: To correct symptomatic bradycardias; to increase heart rate in a bradycardic rhythm with PVCs to at least 60 beats/min.

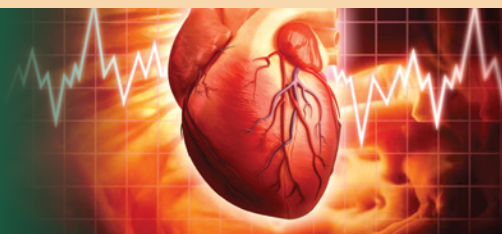


Beta-Adrenergic Blockers

(Atenolol, Esmolol Hydrochloride, Labetalol, Metoprolol Tartrate, and Propranolol Hydrochloride)

Action: May reduce cardiac ischemia in patients receiving fibrinolytic agents; may reduce occurrence of V fib after MI. Labetalol is typically used for treatment of hypertension, not dysrhythmias.

Indications: To treat recurrent VT and V fib; to treat severe hypertension; to decrease ventricular response in patients with narrow complex tachycardias.



Calcium Channel Blockers

(Diltiazem Hydrochloride; Verapamil Hydrochloride)

Action: Decreases heart rate by slowing AV node conduction and by lengthening the refractory periods; relaxes smooth muscle in blood vessels, resulting in decreased systemic blood pressure and improved coronary artery perfusion.

Indications: To treat narrow complex tachycardias, including A fib and atrial flutter, and rapid ventricular response; to treat hypertension.



Calcium Chloride

Action: Increases myocardial contractility.

Indications: To replace and maintain calcium levels; hyperkalemia (increased potassium level); calcium channel blocker toxicity; and beta-blocker overdose.



Beta-Adrenergic Blockers

Dosage: **Atenolol:** 5 mg IV over 5 minutes; wait 10 minutes, repeat dose of 5 mg IV over 5 minutes. **Esmolol:** initial dose: 0.5 mg/kg IV over 1 minute, followed by a 4-minute infusion at 0.05 mg/kg per minute. Titrate to a maximum dose of 0.3 mg/kg per minute, to a total of 200 mcg/kg. **Labetalol:** 10 mg IV push over 1 to 2 minutes. May either repeat or double the dose every 10 minutes to a maximum dose of 150 mg, or follow initial bolus dose with an IV infusion of 2 to 8 mg/min. **Metoprolol:** 5 mg slow IV push, over 2 to 5 minutes, repeated at 5-minute intervals to a total dose of 15 mg. **Propranolol (for SVT):** 0.5 to 1 mg over 1 minute, repeated as needed up to total dose of 0.1mg/kg.

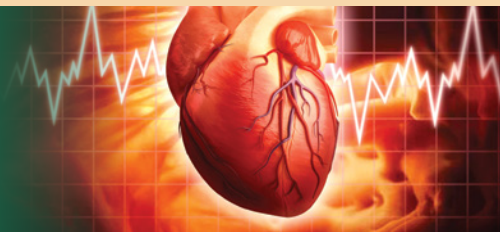
Precautions: **May cause:** bradycardia, AV conduction delays, and hypotension. **Use with caution:** pregnancy and kidney disease. **Contraindications:** hypersensitivity, heart blocks, CHF, cocaine-induced ACS, WPW syndrome, bronchospasm, bradycardia, pulmonary edema, signs of poor circulation to arms and legs, or hypotension. Do not mix with furosemide or sodium bicarbonate; do not use with calcium channel blockers.



Atropine Sulfate

Dosage: **Symptomatic bradycardia:** 0.5–1 mg IV; repeated at 3- to 5-minute intervals to a total dose of 3 mg; may be given via endotracheal (ET) tube.

Precautions: **May cause:** tachycardia; may increase ischemia. **Use with caution:** pregnancy, in the elderly, MI, and ACS. **Contraindications:** hypersensitivity, second-degree heart block type II, third-degree heart block, or heart transplants.



Calcium Chloride

Dosage: 500 to 1,000 mg slowly IV (5 to 10 mL of a 10% solution); may repeat if necessary.

Precautions: **Use with caution:** patients receiving digitalis, in pregnancy, and in kidney disease. **Contraindications:** hypercalcemia, V fib, and digitalis toxicity; incompatible with sodium bicarbonate. Not routinely used in cardiac arrest.



Calcium Channel Blockers

Dosage: **Diltiazem:** 0.25 mg/kg IV over 2 minutes; may repeat in 15 minutes at 0.35 mg/kg over 2 minutes; if no response after 15 minutes, start IV infusion of 5 to 15 mg/hr, titrated to heart rate. **Verapamil:** 2.5 to 5 mg IV over 2 minutes (over 3 minutes in elderly patients); repeat dose: 5 to 10 mg every 15 to 30 minutes after first dose, to a total dose of 20 mg. An alternative is to give a 5 mg bolus every 15 minutes to a total dose of 30 mg.

Precautions: **May cause:** brief episode of hypotension and/or bradycardia. **Use with caution:** pregnancy; reduce dose and slow the infusion rate in the elderly. **Contraindications:** hypersensitivity; do not use in WPW syndrome, wide complex tachycardias (VT), hypotension (if systolic blood pressure is less than 90 mm Hg), severe CHF, sick sinus syndrome, or acute MI. Do not use with second- or third-degree AV block, unless a temporary pacemaker is available.



Clopidogrel Bisulfate (Plavix)

Action: Anticoagulant

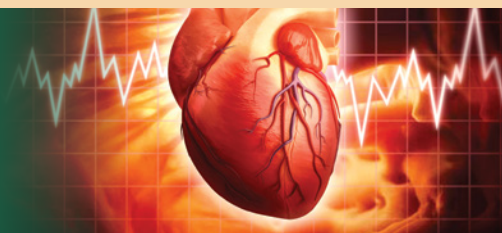
Indications: Antiplatelet therapy for ACS patients who cannot tolerate aspirin.



Digitalis Glycoside (Digoxin; Lanoxin)

Action: Increases myocardial contractility, resulting in increased cardiac output; helps slow ventricular response to atrial dysrhythmias; alternative medication for reentry SVT.

Indications: To treat atrial flutter or A fib; alternative treatment for atrial tachycardias, including SVT; to treat chronic CHF.



Digoxin Immune FAB (Ovine) (Digibind, DigiFab)

Action: Corrects digoxin toxicity.

Indications: To treat digoxin toxicity with life-threatening dysrhythmias, shock, CHF; hyperkalemia (potassium level greater than 5.5 mEq/L); elevated digitalis blood levels, if the patient is symptomatic.



Dobutamine Hydrochloride

Action: Increases force and rate of contraction of heart muscle, increasing cardiac output and increasing coronary artery blood flow.

Indications: To treat heart failure with systolic blood pressure of 70–100 mm Hg and no signs or symptoms of shock.



Digitalis Glycoside

Dosage: Initial dose of 4 to 6 mcg/kg administered IV over 5 minutes. Second and third doses of 2 to 3 mcg/kg at 4- to 8-hour intervals (total loading dose: 8 to 12 mcg/kg divided over 8 to 16 hours). Maintenance dose is affected by body size and renal function.

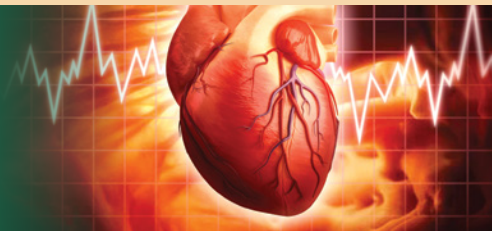
Precautions: **Use with caution:** pregnancy, in the elderly, and with hypersensitivity to digitalis. If given with amiodarone, decrease dose by 50%. **Contraindications:** hypersensitivity, V fib, heart rate less than 60 beats/min. Avoid cardioversion if patient is taking digitalis, unless condition is life threatening; then use 10 to 20 joules settings.



Clopidogrel Bisulfate

Dosage: **STEMI/NSTE-ACS patients younger than 75 years:** give loading dose of 300 to 600 mg orally, followed by maintenance dose of 75 mg PO daily. (It will take several days for the full effects to develop.) **Erectile dysfunction patients with suspected ACS and unable to take loading dose:** give maintenance dose of 75 mg PO daily. **Patients unable to take loading dose:** give maintenance dose of 75 mg PO daily.

Precautions: **May cause:** nausea, vomiting, heartburn, GI bleeding. **Use with caution:** pregnancy; kidney or liver disease. **Contraindications:** hypersensitivity; active peptic ulcer disease; active bleeding, if coronary artery bypass graft (CABG) is planned within 5 days.



Dobutamine Hydrochloride

Dosage: 2 to 20 mcg/kg/min IV infusion; titrated so heart rate does not increase more than 10%.

Precautions: **May cause:** headache, nausea, vomiting, changes in BP, tachycardias, PVCs, or increased ischemia. **Use with caution:** pregnancy; hypertension. May increase AV conduction in A fib, causing rapid ventricular response. **Contraindications:** hypersensitivity to dobutamine hydrochloride and sulfites. Do not use in patients with systolic blood pressure less than 100 mm Hg who are in shock, or in shock caused by known poisons or drugs. Do not mix with sodium bicarbonate or other medications. Incompatible with aminophylline, verapamil, digoxin, and heparin.



Digoxin Immune FAB

Dosage: **Chronic toxicity:** 3 to 5 vials (120 to 200 mg); each vial binds 0.6 mg digoxin. **Acute toxicity:** 10 vials (400 mg); may require up to 20 vials (800 mg). Dosage varies with amount of digoxin taken.

Precautions: Serum digoxin level should not be used to calculate the additional dosage of Digibind because serum levels usually rise after treatment. **Use with caution:** pregnancy, in the elderly, in cardiac or kidney disease, and in those with a sheep protein allergy. **Contraindications:** hypersensitivity to Digibind or mild digoxin toxicity. Do not mix with any other medication.



Dopamine Hydrochloride

Action: Increases myocardial contractility and heart rate, improving cardiac output; increases BP by constricting peripheral arteries and veins.

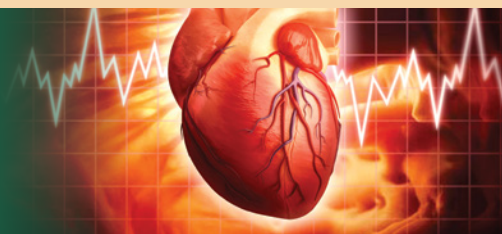
Indications: To treat hypotension with signs and symptoms of shock; to treat symptomatic bradycardia.



Epinephrine Hydrochloride (Adrenaline)

Actions: Increases rate and force of cardiac contractions; increases coronary and cerebral blood flow; increases automaticity.

Indications: During CPR for cardiac arrest: V fib, pulseless VT, asystole, PEA, or anaphylaxis (severe allergic reaction). Use in severe bradycardia or hypotension not responding to other therapies.

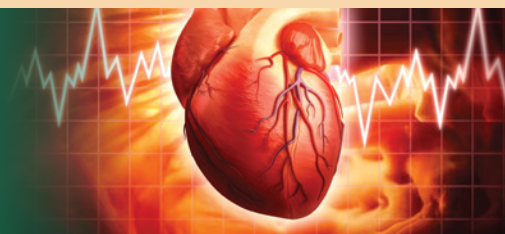


Fibrinolytic/Thrombolytic Agents

“Clot Busters”; Alteplase (Activase), Tissue Plasminogen Activator (T-PA); Reteplase (Retavase); Tenecteplase (TNKase)

Action: Dissolves clots in the coronary arteries, decreasing cardiac ischemia and infarction; may reduce the number of deaths from MI.

Indications: To treat symptoms and ECG findings of STEMI or acute ischemic stroke when PCI is not available within a reasonable period of time. Must be given within 12 hours of symptom onset. Patients *must* meet specific criteria determined by the manufacturer and your institution.



Flumazenil

Action: Complete or partial reversal of respiratory depression and sedative effects of benzodiazepines.

Indications: Benzodiazepine overdose; benzodiazepines are used to treat cocaine overdose or cocaine-induced ACS.



Epinephrine Hydrochloride

Dosage: **IV/IO bolus:** 1 mg of a 1:10,000 dilution; may be repeated at 3- to 5-minute intervals during resuscitation. **Continuous IV infusion:** initial rate: 0.1 to 0.5 mcg/kg/min (for 70 kg patient: 7 to 35 mcg per minute); titrate to response.

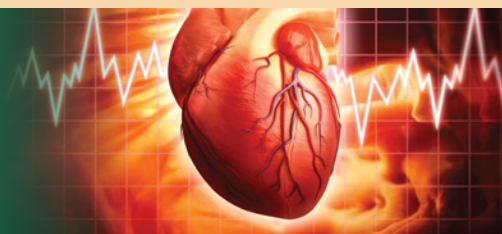
Precautions: **May cause:** increased ischemia; ventricular ectopy (abnormal beat). **Use with caution:** hypertension; pregnancy; in the elderly. **Contraindications:** hypersensitivity. Do not mix with sodium bicarbonate. Concentrations may vary with institution.



Dopamine Hydrochloride

Dosage: 2 to 20 mcg/kg/min continuous IV infusion. Titrate all doses to patient's BP and HR. Use with infusion pump. Discontinue medication administration slowly.

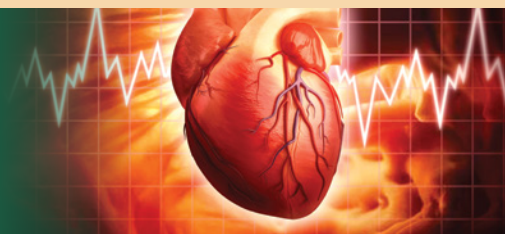
Precautions: **May cause:** headaches, nausea, vomiting, ischemia, tachycardic dysrhythmias. **Use with caution:** pregnancy and in the elderly. **Contraindications:** hypersensitivity; V fib, or tachycardias. Do not mix with sodium bicarbonate.



Flumazenil

Dosage: Initial dose: 0.2 mg IV over 15 seconds; second dose: 0.3 mg IV over 30 seconds, if consciousness does not occur; third dose: 0.5 mg over 30 seconds, if needed. Repeat every minute until the patient regains consciousness or a total of 3 mg has been given.

Precautions: **May cause:** seizures. **Use with caution:** pregnancy, in the elderly, liver or kidney disease, or seizure disorders. **Contraindications:** hypersensitivity to medication or long-term use of benzodiazepines; tricyclic antidepressant overdose; alcohol intoxication or patients being given benzodiazepines for life-threatening conditions; seizure-prone patients. Monitor for recurrent respiratory depression. Do not use for unknown drug overdose.



Fibrinolytic/Thrombolytic Agents

Dosage: Varies with specific fibrinolytic agent; follow the manufacturer's directions or the policy of your institution and specific instructions of the physician.

Precautions: **May cause:** increased bleeding, decreased clot formation, or intracranial bleeding. **Use with caution:** pregnancy. **Contraindications:** hypersensitivity; bleeding disorders, recent surgery, recent hemorrhagic cerebrovascular accidents (CVAs). All patients receiving fibrinolytic therapy should also receive 160 to 325 mg of chewable aspirin as soon as possible, if no contraindications exist. May require heparinization after fibrinolytic therapy.



Furosemide (Lasix)

Action: Removes excessive fluid from tissues; increases urine formation.

Indications: Hypertensive emergencies; acute pulmonary edema in patients with systolic blood pressure > 90 to 100 mm Hg (without signs and symptoms of shock).



Glucagon

Action: Relaxes smooth muscles; raises blood glucose level.

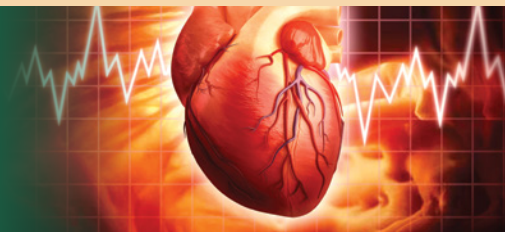
Indications: To treat toxic effects of calcium channel blockers or beta-blockers; hypoglycemia.



Glycoprotein IIb/IIIa Inhibitors (Abciximab; Eptifibatide, Tirofiban)

Action: Platelet inhibitor.

Indications: NSTEMI-ACS.



Heparin, Unfractionated (UFH)

Action: Anticoagulant; prevents or delays formation of clots.

Indications: ACS and adjuvant therapy in MI.



Glucagon

Dosage: For toxic effects of calcium channel blockers or beta-blockers: Initial dose: 3 to 10 mg IV slowly over 3 to 5 minutes, titrated to the patient's BP and pulse, followed by IV infusion of 3 to 5 mg/hour, as needed. For toxic effects of hypoglycemia: Initial dose: 1 mg injection or IV; may repeat in 15 minutes as needed.

Precautions: **May cause:** nausea, vomiting, or high blood glucose levels.

Contraindications: hypersensitivity.



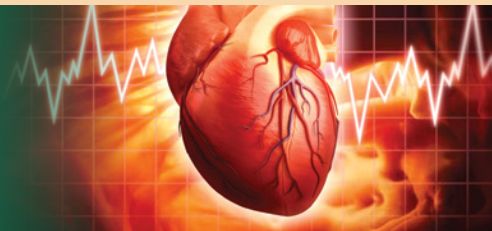
Furosemide

Dosage: 0.5 to 1 mg/kg given IV slowly over 1 to 2 minutes. If no response, give 2 mg/kg IV slowly over 1 to 2 minutes. Start at less than 0.5 mg/kg IV slowly for patients with new onset of pulmonary edema with hypovolemia.

Precautions: **May cause:** severe dehydration, hypotension, hypovolemia, hypokalemia, electrolyte imbalances, high blood glucose levels, or damage to hearing.

Use with caution: pregnancy, diabetes, severe kidney or liver disease, dehydration.

Contraindications: hypovolemia or severely decreased electrolyte levels.



Heparin, Unfractionated

Dosage: Check initial activated partial thromboplastin time at 3 hours, then every 6 hours until stable, then daily. NSTEMI-ACS: Initial bolus: 60 units/kg. Maximum 4,000 units. Initial rate: 12 units/kg/hour. Maximum initial rate: 1,000 units per hour. Follow institutional protocol. Concentrations may vary with institution. Follow weight-based protocol per institution.

Precautions: **May cause:** active bleeding, severe hypertension, bleeding disorders, and gastrointestinal bleeding. **Use with caution:** pregnancy, liver and kidney disease, and in the elderly. **Contraindications:** recent surgery, severe hypertension, liver or kidney disease, known thrombocytopenia (low platelet count), or hypersensitivity. Do not use if platelet count is or falls to less than 100,000 or if heparin-induced low platelet count is diagnosed. Onset with IV route usually starts within 5 minutes; duration is dose dependent.



Glycoprotein IIb/IIIa Inhibitors

Dosage: Check package insert for current indications and dosages, as they may change.

Abciximab: **ACS with PCI:** 0.25 mg/kg bolus (10 to 60 minutes before procedure), then 0.125 mcg/kg/min IV infusion for 12 hours. **PCI only:** 0.25 mg/kg IV bolus, then 10 mcg/min IV infusion. **Eptifibatide:** **PCI:** 180 mcg/kg IV bolus over 1 to 2 minutes, then 2 mcg/kg per min IV infusion, then repeat bolus in 10 minutes; reduce dose by 50% if creatinine clearance less than 50 mL/min. **Tirofiban:** **ACS or PCI:** 25 mcg/kg over 3 minutes IV infusion; then 0.15 mcg/kg/min IV infusion for 18 to 24 hours after PCI; reduce rate of infusion by 50% if creatinine clearance is less than 60 mL/min.

Precautions: **Use with caution:** pregnancy and in the elderly. **Contraindications:** hypersensitivity; bleeding, bleeding disorders, surgery, or trauma within 30 days; platelet count less than 150,000 mm³. **Notes:** Check package insert for current indications, dosage, and duration of therapy, since optimal duration of therapy has not been established.



Heparin

Low-Molecular-Weight Heparin (LMWH);
Enoxaparin (Lovenox)

Action: Anticoagulant; delays formation of clots.

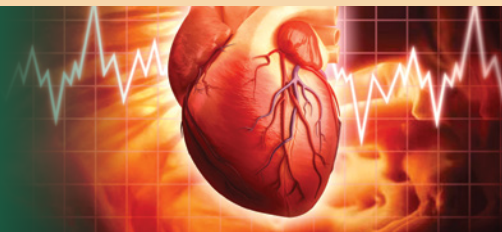
Indications: ACS, NSTEMI-ACS.



Ibutilide (Corvert)

Action: Decreases heart rate by slowing AV junctional conduction and by lengthening refractory periods.

Indications: To treat rapid ventricular response in supraventricular dysrhythmias, including atrial flutter and atrial fibrillation, of less than 48 hours' duration.



Intravenous Fluids (IV Fluids); Intraosseous Fluids (IO Fluids)

Action: Replaces lost body fluids; provides IV or IO access for medication administration; dilutes and delivers medications.

Indications: Hypovolemia; IV or IO medication administration.



Isoproterenol Hydrochloride (Isuprel)

Action: Increases force and rate of myocardial contractions, improving cardiac output and systolic blood pressure.

Indications: Torsades de pointes that does not respond to magnesium sulfate; used for symptomatic bradycardia unresponsive to atropine, until temporary pacing can be established. Used infrequently.



Ibutilide

Dosage: **Adults more than 60 kg:** 1 mg (10 mL) IV over 10 minutes. May repeat dose after 10 minutes at same rate. **Adults less than 60 kg:** 0.01 mg/kg IV over 10 minutes. May repeat dose after 10 minutes at same rate.

Precautions: **May cause:** VT or torsades de pointes, monitor during use and for 6 hours afterward; keep defibrillator available. **Use with caution:** liver or kidney disease, pregnancy, in the elderly, and with heart blocks.

Contraindications: hypersensitivity.



Heparin (LMWH)

Dosage: **Enoxaparin:** Age younger than 75 years with a normal creatinine clearance: Initial bolus of 30 mg IV, followed by second bolus 15 minutes later of 1 mg/kg subcutaneously; repeat every 12 hours with a maximum 100 mg per dose for first two doses. Age 75 years or older with a normal creatinine clearance: no initial IV dose; give 0.75 mg/kg subcutaneously every 12 hours with a maximum of 75 mg per dose for first two doses. If creatinine clearance is less than 30 mL/min, give 1 mg/kg subcutaneously every 24 hours.

Precautions: **May cause:** active bleeding. **Use with caution:** pregnancy, in the elderly, severe hypertension, blood disorder, liver or kidney disease. **Contraindications:** if given with tenecteplase in men with creatinine blood level greater than 2.5 mg/dL or in women greater than 2 mg/dL; hypersensitivity to pork products or heparin; recent surgery; platelet count less than 100,000/mm³; elevated creatinine blood level. Do not use in conjunction with epidural therapy.



Isoproterenol Hydrochloride

Dosage: **Continuous infusion:** 2 to 10 mcg/min, titrated to the patient's BP and pulse. **Torsades de pointes:** titrate to increase the HR of the underlying rhythm (causing the QT intervals to shorten), until the torsades de pointes is resolved.

Precautions: **Use with extreme caution.** Do not use with other tachycardic dysrhythmias or cardiac arrest. Must be used with an infusion pump. Do not mix with other medications. **Use with caution:** pregnancy and in the elderly. **Contraindications:** hypersensitivity or sulfite allergies. Do not mix with epinephrine (may cause V fib or VT).



IV/IO Fluids

Dosage: 10 to 20 mL/kg of 0.9% normal saline (NS) solution or lactated Ringer's (LR) solution. **IV:** access in vein via needle or specialized catheter.

IO: access into the bone marrow of specific areas of the arms, legs, sternum, or pelvic bones via an adult IO device. **Hypovolemia:** bolus (rapid infusion) of 20 mL/hr or greater. **Medication access:** usually 60 mL/hr or less. **Continuous infusion:** varies because the rate is titrated (adjusted) to the patient's needs.

Precautions: **Use with caution:** in the elderly, chronic lung disease, congestive heart failure, and brain injury. Monitor insertion site for infiltration of solution.



Lidocaine Hydrochloride (Xylocaine)

Action: Decreases automaticity, helping to decrease ventricular dysrhythmias.

Indications: Alternative treatment for PVCs, VT, pulseless VT or V fib.



Magnesium Sulfate

Action: Reduces ventricular dysrhythmias that may follow an MI (decreased magnesium levels may cause V fib and may also prevent VT from responding to treatment).

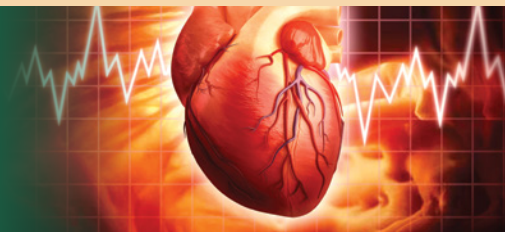
Indications: Cardiac arrest due to torsades de pointes, hypomagnesemia, or ventricular dysrhythmia due to digitalis toxicity.



Milrinone

Action: Improves cardiac output by increasing the strength of cardiac contractions; decreases BP by relaxing and dilating the blood vessel walls.

Indications: Congestive heart failure that has not responded to other drug therapy.



Morphine Sulfate

Action: Narcotic analgesic that provides chest pain relief; reduces need for oxygen in the myocardium.

Indications: Pain relief of choice for MI; cardiogenic pulmonary edema (fluid in the lung caused by heart disease) with stable BP.



Magnesium Sulfate

Dosage: Cardiac arrest due to torsades de pointes or hypomagnesemia: 1 to 2 g diluted in 10 mL IV fluid over 5 to 20 minutes, IV/IO. **Torsades de pointes with a pulse:** loading dose of 1 to 2 g in 50 to 100 mL IV fluid, over 5 to 60 minutes. Follow with 0.5 to 1 g/hr IV, titrating dosage to control torsades de pointes.

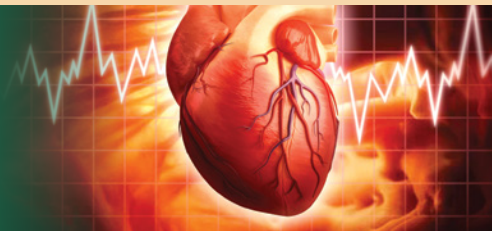
Precautions: May cause: flushing, sweating, slight bradycardia, and hypotension. **Use with caution:** kidney failure and in pregnancy. **Contraindications:** hypersensitivity. Should be diluted in IV fluid.



Lidocaine Hydrochloride

Dosage: Cardiac arrest: 1 to 1.5 mg/kg IV/IO, repeated at 5- to 10-minute intervals in doses of 0.5 to 0.75 mg/kg IV, until a total of 3 mg/kg has been given; if the ventricular ectopy has been suppressed and the patient has a pulse, begin a continuous infusion at 1 to 4 mg/min. **Dysrhythmia with a pulse:** 0.5 to 0.75 mg/kg, up to 1 to 1.5 mg/kg may be used. Repeat 0.5 to 0.75 mg/kg every 5 to 10 minutes to maximum total dose of 3 mg/kg.

Precautions: Signs of toxicity: numbness in hands or feet, slurred speech, decreased hearing, confusion, muscle twitching or tremors, and/or agitation. In severe cases of toxicity, seizures may occur; large doses of lidocaine may cause bradycardia, heart block, or AV conduction dysrhythmias. **Use with caution:** pregnancy and in the elderly. **Contraindications:** hypersensitivity; in patients with WPW syndrome or severe heart block. Reduce maintenance dose if impaired liver or left ventricular function is present.



Morphine Sulfate

Dosage: STEMI: slow IV dose of 2 to 4 mg. Subsequent doses of 2 to 8 mg IV slowly; may be given every 5 to 15 minutes until pain is relieved. **NSTE-ACS:** Use with caution. May give 1 to 5 mg IV slowly *only* if nitrates do not relieve ACS symptoms, or if symptoms return.

Precautions: May cause: hypotension or bradycardia. **Use with caution:** right ventricular infarction or MI. Use naloxone if respirations become depressed. **Contraindications:** hypersensitivity.



Milrinone

Dosage: Initial bolus: 50 mcg/kg IV over 10 minutes. Maintenance dose: 0.375 to 0.750 mcg/kg/min; may reduce dose with kidney problems. Use an infusion pump to administer.

Precautions: May cause: stomach upset, fever, liver problems, kidney failure. **Use with caution:** atrial flutter, A fib, liver or kidney disease. **Contraindications:** incompatible with furosemide or procainamide.



Naloxone Hydrochloride (Narcan)

Action: Unknown; may replace opioids at opioid receptor sites.

Indications: Respiratory depression or unconsciousness due to known or suspected opioid overdose.



Nitroglycerin

Action: Relieves cardiac chest pain and hypertension by relaxing and dilating smooth muscle in blood vessels, including the coronary arteries.

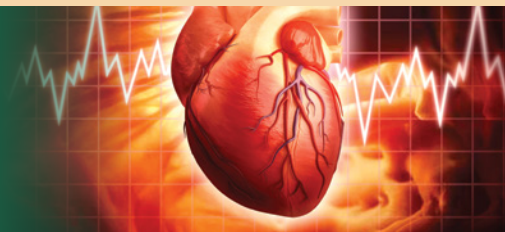
Indications: To treat acute angina, unstable angina, and congestive heart failure associated with MI; reduces pain and hypertension associated with MI (ACS).



Nitroprusside Sodium (Sodium Nitroprusside)

Action: Dilates and relaxes the smooth muscle of blood vessels; increases cardiac output; reduces the myocardium's need for oxygen (may reduce ischemia); relieves chest pain.

Indications: Hypertensive emergencies (when high BP will not respond to other medications) and acute congestive heart failure.



Norepinephrine Bitartrate (Levophed)

Action: Constricts blood vessels and increases BP, heart rate, and the force of cardiac contractions.

Indications: Acute and severe hypotension not caused by hypovolemia.



Nitroglycerin

Dosage: **Sublingual** (under the tongue): 1 tablet (0.3 or 0.4 mg); repeat at 5-minute intervals; maximum dose is 3 tablets. **Spray: (Caution: Do not shake):** 1 to 2 sprays (0.4 mg) under or on the tongue; maximum dose is 3 sprays in 15 minutes. **Infusion:** start at 10 mcg/min. Titrate to relief of symptoms; increase by 10 mcg/min every 3 to 5 minutes until symptoms are relieved. IV bolus of 12.5 to 25 mcg, if sublingual or spray has *not* been given. Usual maximum dose of 200 mcg/min.

Precautions: **May cause:** headache, nausea, vomiting, severe hypotension (monitor vital signs frequently). **Use with caution:** pregnancy, liver or kidney disease, or in the elderly. **Contraindications:** systolic BP less than 90 mm Hg or 30 mm Hg below normal BP; extreme bradycardia (heart rate less than 50); tachycardia (heart rate greater than 100); in right ventricular infarction; hypersensitivity or nitrate allergy; use of medications for erectile dysfunction within the last 48 hours. Do not mix with other medications. Absorbed by plastic; use glass bottle and polyethylene tubing.



Naloxone Hydrochloride

Dosage: **IV:** 0.4 to 2 mg IV, titrated until respirations improve; may repeat dose every 2 to 3 minutes; up to 6 to 10 mg within 10 minutes. Respiratory rate increases within 1 to 2 minutes. **Intranasal:** 2 mg, repeated every 3 to 5 minutes, if necessary.

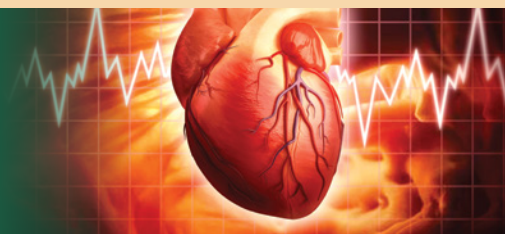
Precautions: **May cause:** opioid withdrawal (nausea, vomiting, anxiety, abdominal cramping, hypertension). **Use with caution:** increased cardiac irritability, pregnancy, or seizure disorders. **Contraindications:** hypersensitivity to medication or sulfite allergies. May need to repeat doses since narcotic effect lasts longer than Narcan. Do not mix with other medications.



Norepinephrine Bitartrate

Dosage: 0.5 to 1 mcg/kg/min IV (**only route**), titrate infusion to patient's BP, to a maximum dose of 30 mcg/kg/min. Use only with D₅W or D₅NS.

Precautions: **May cause:** increased need for oxygen in the myocardium; continuously monitor the patient's rhythm for dysrhythmias. Since BP can increase very rapidly, monitor vital signs (VS) every 2 to 3 minutes. **Use with caution:** pregnancy and in the elderly. **Contraindications:** hypersensitivity; V fib, dysrhythmias with rapid heart rates, or hypertension. Assess IV site frequently, as infiltration may cause death of tissue around the IV site. Do not use with aminophylline, lidocaine, sodium bicarbonate, or NS solution.



Nitroprusside Sodium

Dosage: 50 mg diluted in 250 mL D₅W solution; **initial IV dose:** 0.1 mcg/kg/min; titrate every 3 to 5 minutes until desired BP or maximum dose of 10 mcg/kg per minute. Action occurs within 1 to 2 minutes. Administer with an infusion pump.

Precautions: BP may rapidly decrease; monitor vital signs every 2 to 3 minutes. **May cause:** headache, nausea, vomiting, abdominal cramps, and severe hypotension. **Use with caution:** pregnancy; the elderly; systolic blood pressure below 90 mm Hg or 30 mm Hg below normal BP; extreme bradycardia (heart rate less than 50); tachycardia (heart rate greater than 100 in the absence of heart failure); in right ventricular infarction. **Contraindications:** hypersensitivity, and in patients taking erectile dysfunction medications. Solution must be protected from light; follow your institution's policy regarding covering IV tubing. Do not use with bacteriostatic water or saline solution. Do not add any other medications or preservatives to nitroprusside solution.



Oxygen (O₂)

Action: Increases oxygen available to all tissue cells; helps to reduce shortness of breath; may help to decrease ischemia.

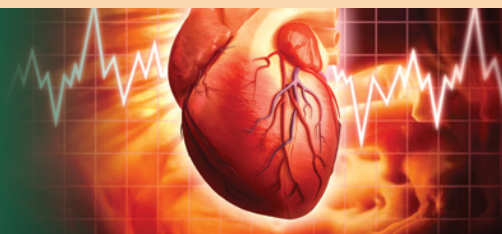
Indications: For all patients with hypoxia (pulse oximetry < 94%) and respiratory distress, suspected ischemic pain, suspected stroke, shock, and major blood loss, and in all cardiopulmonary arrests.



Procainamide Hydrochloride

Action: Suppresses ventricular and atrial ectopy; decreases cardiac excitability and automaticity.

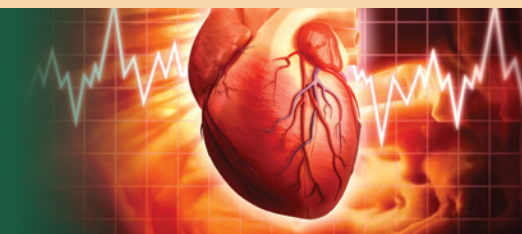
Indications: To control a variety of dysrhythmias, such as SVT or wide complex tachycardia.



Sodium Bicarbonate

Action: Reduces acidosis.

Indications: Metabolic acidosis; aids in elimination of some drug overdoses; pre-existing hyperkalemia.



Sotalol (Betapace, Sotylize, Sorine)

Action: Prolongs absolute refractory period without affecting conduction; suppresses ventricular ectopy when amiodarone and procainamide have not been effective.

Indications: To treat supraventricular and ventricular dysrhythmias.



Procainamide Hydrochloride

Dosage: 20 mg/min IV until any of the following occurs:

1. The dysrhythmia is suppressed.
2. The patient becomes hypotensive.
3. The QRS complex widens by 50% of its original width.
4. A maximum dose of 17 mg/kg has been given.

If necessary, 50 mg/min IV up to 17 mg/kg IV can be given, until any of the above occur. A continuous IV infusion at a rate of 1 to 4 mg/min should be started if the ventricular dysrhythmia has been suppressed and the patient has a pulse.

Precautions: **May cause:** hypotension if administered too quickly; decrease maintenance dose if patient has kidney failure. **Use with caution:** bradycardia or pregnancy. **Contraindications:** hypersensitivity; prolonged QT intervals; second- and third-degree heart blocks; myasthenia gravis; systemic lupus; torsades de pointes or prolonged QT intervals. Monitor BP closely.



Sotalol

Dosage: 1 to 1.5 mg/kg IV slowly over 5 minutes.

Precautions: **Must be given slowly.** **May cause:** bradycardia, hypotension, torsades de pointes. **Use with caution:** in pregnancy, in the elderly, and medications that prolong QT intervals. **Contraindications:** hypersensitivity, COPD, bradycardia, second- and third-degree heart blocks, or creatinine clearance less than 40 mL/min. May become toxic in patients with renal impairment.



Oxygen

Dosage: **For alert patients with mild distress:** 1 to 6 L/min (liters per minute) delivered by nasal cannula. **For patients with moderate respiratory distress:** 4 to 12 L/min by Venturi mask, at 24% to 50%. **For patients with severe respiratory distress:** 6 to 10 L/min of 100% oxygen, delivered by a partial nonrebreather mask at 35% to 60% or nonrebreather mask with reservoir at 6 to 15 L/min at 60% to 100%. **During CPR:** give by bag-mask device or endotracheal tube at 15 L/min at 100%. Pulse oximetry may be helpful in oxygen titration. May use bag-mask ventilation with room air if oxygen is not immediately available.

Precautions: Do not use in the presence of flames or sparks. **Use with caution:** in alert patients with end-stage COPD. Should be used at 100% in all resuscitation attempts. Pulse oximetry may be inaccurate with low cardiac output or anemia. Bag-mask ventilation can cause gastric distention (air in the stomach) and its complications. Bag-mask ventilation is not recommended for a single rescuer. Supraglottic airway devices (eg, LMA, Combitube, King airway) may be used by trained personnel during cardiac arrest.



Sodium Bicarbonate

Dosages: 1 mEq/kg IV; flush with 20 mL NS solution before and after administering medication to reduce possibility of medication interactions. Repeat dose based on arterial blood gas results to reduce possibility of medication interactions.

Precautions: Monitor electrolytes, arterial blood gases, and kidney function. **Use with caution:** pregnancy, CHF, and in the elderly. **Contraindications:** hypersensitivity or respiratory acidosis. Do not mix with any other medications. No longer routinely used in treatment of cardiac arrest.