Commonly Used IV Cardiac Medications for Adults

This pocket reference contains information for nurses about vasoactive intravenous medications.

NOTE: This pocket reference card is for quick reference only and is not an all-inclusive resource. **Dose adjustments may need to be made for older adults or for those with renal impairment or other organ dysfunction.** Please review and follow your institutional policies and procedures before clinical use. For additional questions about these medications, including drug interactions, refer to a pharmacology resource or call the pharmacy department at your institution.

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Antidysrhythmic Medications

Generic Name	Uses	Therapeutic Effects	Adverse Effects	Dose/Half-Life (Adult)	Key Considerations
Adenosine	PSVT, WPW Not effective in AFib/flutter or VT	Slows AV node conduction; interrupts reentry pathways	Cardiac arrest, bradycardia, MI, AV block, bronchospasm, hypotension, flushing, chest discomfort	Initially give 6 mg IV over 1-2 sec. If no response within 1-2 min, give 12 mg rapid IV push. Half-life: less than 10 sec	Use port closest to insertion site. Follow each dose with rapid bolus of 20 mL 0.9% NS flush.
Amiodarone	Treatment and prophylaxis for patients with unstable VT/VF or stable wide-complex tachycardia	Prolongs action potential phase 3, prolongs refractory period, decreases SA node function and AV conduction	Hypotension, cardiac arrest, dysrhythmias, ARDS, CHF, abnormal liver and thyroid function tests, prolonged PR and QTc intervals	Pulseless VT or VF: after EPINEPHrine with no response to defibrillation, give 300 mg IV push. Ventricular dysrhythmias or stable wide-complex tachycardia: 150 mg IV over 10 min; follow with infusion of 1 mg/min x 6 h, then 0.5 mg/min for 18 h. Maintenance IV dose: 0.5 mg/min **Recommended max IV dose is 2.2 g in 24 h** Half-life: 28 days	Use solutions held in polyvinyl chloride bags within 2 h of dilution. Use solutions held in glass or polyolefin containers within 24 h of dilution. Central vein route preferred Needs in-line filter High risk for tissue necrosis if extravasation occurs

Atropine	Acute symptomatic bradycardia	Increases HR by reversing cholinergic-mediated decreases in HR	Doses less than 0.5 mg may cause slowing of HR. Increased HR may worsen ischemia.	1 mg IV push, repeat every 3-5 min to max of 3 mg.	If atropine fails to increase HR, consider TCP, or dopamine 5-20 mcg/kg/min, or epinephrine 2-10 mcg/min. Atropine is unlikely to work in a patient who has undergone cardiac transplantation; 2nd degree type II or 3rd degree heart block unlikely to respond to atropine
Digoxin	Control of ventricular response in AFib/flutter, PSVT	**Increases** force of contraction. **Decreases** conduction through the AV node, decreasing ventricular rate	Bradycardia, heart block Toxicity: CNS and GI symptoms	Loading dose: 0.25 mg IV Q6h x 4 doses (total 1.0 mg); then 0.125-0.375 mg IV Q24h. Inject over 3-5 min. May also use weight-based dosing. **Anticipate reduced dose based on creatinine clearance in patients with severe kidney impairment.** Half-life: 1.5-2 days	Monitor serum drug levels. Therapeutic serum level is 0.8-2 ng/mL. Toxic serum level is greater than 2 ng/mL. Hypokalemia potentiates toxic effects.
Diltiazem	Control of rapid ventricular rate in AFib/flutter, rapid conversion of SVT to NSR	Ca^{++} channel blocker, slows SA and AV node conduction, causes arterial vasodilation	Bradycardia, hypotension, AV block, CHF, edema, rash	IV: 0.25 mg/kg/actual body weight IV over 2 min. After 15 min may repeat with 0.35 mg/kg/ actual body weight IV over 2 min. Continuous infusion of 5-15 mg/h may be used for up to 24 h Half-life: 3-4.5 h	Ensure weight-based dosing for loading doses. Cautious use in patients with cardiomyopathy

Esmolol	ST, SVT, AFib/flutter, intraoperative tachycardia, or hypertension	Cardioselective beta blocker, slows sinus rate, **decreases** CO, reduces BP	Hypotension, bradycardia, heart block, heart failure, bronchospasm	Loading dose of 500 mcg/kg IV over 1 min, followed by infusion of 50 mcg/kg/min for 4 min; repeat procedure every 5 min, increasing infusion by 25-50 mcg/kg/min to max of 200 mcg/kg/min Half-life: 9 min	**IV Infusion ONLY:** infuse in a large vein. Avoid butterfly needles and very small veins. Do not administer by direct IV injection. Do not stop abruptly. Discard if discolored or contains precipitate.
Ibutilide	Rapid conversion of AFib/flutter of recent onset	Prolongs action potential and repolarization, and slows sinus rate and AV conduction	Polymorphic VT, torsades de pointes, heart block, QTc prolongation, hypotension, bradycardia	**More than 60 kg:** 1 mg IV infused over 10 min. May repeat once after 10 min if needed **Less than 60 kg:** give 0.01 mg/kg IV over 10 min. May repeat once after 10 min if needed Half-life: 2-12 h	Have ACLS equipment and personnel on hand during and after administration. Cautious use with uncorrected electrolyte abnormalities Correct Mg^{++} and K^{+} before administering.
Lidocaine	PVCs, VT, VF	**Decreases** depolarization, automaticity, excitability of the ventricle during diastole	Cardiac arrest, bradycardia, hypotension, CNS toxicity, nausea, and vomiting with repeated doses	IV/IO: 1-1.5 mg/kg over 2-3 min. May repeat doses of 0.5-0.75 mg/kg in 10-15 min to **a total of 3 mg/kg/24 h**. Continuous infusion: 1-4 mg/min Half-life: 1.5-2 h	Monitor serum drug level. Toxicity at serum level greater than 6 mcg/mL May exacerbate mental impairment in older adults
Metoprolol	Treatment of patients with stable acute MI. **Also used off-label for SVT**	Cardioselective beta blocker, **decreases** HR, BP, and CO. Reduces severity of myocardial ischemia	Hypotension, bradycardia, CHF	Post MI: 5 mg IV every 2 min x 3; then after 15 min may administer PO Half-life: 3-4 h	Overdose may cause profound bradycardia, hypotension, and bronchospasm. May exacerbate mental impairment in older adults

Procainamide	AFib, PSVT, PVCs, VT	**Increases** stimulation threshold of ventricles and His-Purkinje system **Decreases** myocardial excitability and conduction velocity, and depresses myocardial contractility	VF, asystole, tachycardia, PR or QTc prolongation, hypotension, bradycardia, GI effects	Loading: 20-50 mg/min IV **until dysrhythmia suppressed, hypotension ensues, QRS duration increases greater than 50%, or max dose of 17 mg/kg given** Maintenance infusion: 1-4 mg/min Half-life: 3-4 h	Paradoxical, extremely rapid ventricular rate may occur during treatment of patients with AFib or flutter. Infusion may need to be reduced if QRS widens 50%, or if PR interval exceeds 0.20 sec, or if BP drops rapidly. Lower degrees of heart block may progress to complete heart block.

Inotropic and Vasopressor Medications

All vasopressors can cause tissue necrosis if infiltration occurs. Central catheter infusion preferred. Notify provider for all infiltrations, and consult pharmacy for possible antidote. For DOPamine and norepinephrine extravasation: Anticipate infiltrating affected area with 10-15 mL of sterile saline containing 5-10 mg of phentolamine. Consult pharmacist if phentolamine is not available.

Generic Name	Uses	Therapeutic Effects	Adverse Effects	Dose/Half-Life (Adult)	Key Considerations
DOPamine	Hypotension associated with shock; bradycardia or heart block unresponsive to atropine/cardiac pacing	**Effects are dose related.** Beta-1 stimulant 2-10 mcg/kg/min **increases** contractility Alpha stimulant 10-20 mcg/kg/min **increases** vasoconstriction and BP	Tachycardia, dysrhythmias, angina, vasoconstriction, hypotension, headache	2-20 mcg/kg/min IV infusion. Titrate to desired BP/HR/MAP/SVR response. Half-life: 2 min	Correct hypovolemia before or concurrently with DOPamine infusion. Start with lower initial doses in older adults, due to decreased organ function and comorbidities.
EPINEPHrine	Hypotension unresponsive to volume resuscitation or decreased CO requiring inotropic support	**Increases** contractility **Increases** HR **Increases** SVR Relaxes smooth muscle of the bronchial tree, produces cardiac stimulation Beta-1, beta-2, and alpha stimulant	Tachycardia, acute hypertension, extreme hyperglycemia, ST segment depression indicative of myocardial ischemia, and increasing dysrhythmia	1-10 mcg/min IV infusion (average dose) Start at low dose and titrate upward to desired BP/MAP/HR response. Cardiac arrest: see ACLS protocol Half-life: 2 min	Monitor blood glucose levels because EPINEPHrine causes insulin resistance. Doses less than 2 mcg/min may decrease SVR, resulting in hypotension. Do not use if solution appears discolored or contains precipitate. Older adults may be more sensitive to the effects of beta-adrenergic receptor agonists.

Norepinephrine	Hypotension unresponsive to fluid volume resuscitation	**Increases** contractility **Increases** HR **Increases** SVR **Increases** systemic BP and coronary blood flow Beta-1 and alpha stimulant	Tachycardia, dysrhythmias, severe hypertension, myocardial ischemia, dyspnea	Start at 0.5 mcg/min IV infusion. Usual dose is 2-12 mcg/min, up to 30 mcg/min. Titrate to desired BP/MAP/SVR. Half-life: 2 min	Correct hypovolemia before initiating. Do not use if solution appears brown or contains precipitate. Monitor for decreased peripheral perfusion. Usually less pronounced adverse effects than EPINEPHrine

Vasopressor Medications

All vasopressors can cause tissue necrosis if infiltration occurs. Central line infusion preferred. Notify provider for all infiltrations, and consult pharmacy for possible antidote. For DOPamine and norepinephrine extravasation: Anticipate infiltrating affected area with 10-15 mL of sterile saline containing 5-10 mg of phentolamine. Consult pharmacist if phentolamine is not available.

Generic Name	Uses	Therapeutic Effects	Adverse Effects	Dose/Half-Life (Adult)	Key Considerations
Angiotensin II (Giapreza)	Hypotension in adults with septic or other distributive shock Indicated in adults with septic or other distributive shock only who have a minimum of 2 vasopressors with escalating doses	Increases BP by vasoconstriction and increased aldosterone release	Thromboembolic events	Start IV at 20 ng/kg/min. May titrate every 5 min by increments of up to 15 ng/kg/min as needed to achieve a MAP of 75 mm Hg. During the first 3 h, the max dose should not exceed 80 ng/kg/min. 3-48 h, titrate angiotensin II down by 5-15 ng/kg/min every 5 min. Then titrate down other vasopressors. Maintenance dose should not exceed 40 ng/kg/min. Doses as low as 1.25 ng/kg/min may be used.	Dilute in 0.9% NS. Ensure VTE prophylaxis.

Phenylephrine	Hypotension, salvage therapy in septic shock	**Increases** SVR **Increases** systolic BP Alpha stimulant	Myocardial ischemia, reflex bradycardia, mild CNS stimulation, tachycardia, and palpitations with large doses	Infuse IV at 10-35 mcg/min to **max of 200 mcg/min**; titrate to goal BP/MAP/SVR. May dose mcg/kg/min: 0.5 mcg/kg/min to 6 mcg/kg/min; doses above 6 mcg/kg/min do not show incremental changes in BP.	Assess for continued hypotension; if present, assess if additional IV fluids are needed. Do not use if solution appears brown or contains precipitate. May also be dosed as mcg/kg/min. Check institution policy before IV bolus; IV bolus therapy may be out of RN scope of practice.
Vasopressin	Used as an adjunct in septic shock when vasopressors and fluid resuscitation are ineffective in maintaining goal BP/MAP	**Increases** SVR A hormone (antidiuretic) that causes vasoconstriction, water retention, and urine concentration	Myocardial ischemia, abdominal cramps, nausea, vomiting, confusion, water intoxication	Infuse IV at 0.01-0.04 unit/min Usual dose for sepsis is 0.03 unit/min Half-life: 10-20 min	If used to augment vasopressors, it should be to attempt a reduction in the vasopressor dose. Do NOT infuse at a rate greater than 0.04 unit/min, because it may cause cardiac arrest.

Inotropic and Vasodilator Medications

Generic Name	Uses	Therapeutic Effects	Adverse Effects	Dose/Half-Life (Adult)	Key Considerations
DOBUTamine	Cardiac decompensation, positive inotropic agent in myocardial dysfunction, sepsis	**Decreases** preload and afterload, and enhances myocardial contractility, stroke volume, and CO without increasing oxygen demand Beta-1, beta-2 stimulation Improves renal blood flow and urine output by **increasing** CO	Tachycardia, hypertension, anginal pain, dysrhythmias	2-20 mcg/kg/min (**up to 40 mcg/kg/min**) Titrate to desired BP/MAP/CO. Half-life: 2 min	Correct hypovolemia before DOBUTamine infusion. Monitor for hypokalemia. Extravasation may cause tissue necrosis. Start with lower initial doses in older adults, due to decreased organ function and comorbidities.
Milrinone	Short-term management of heart failure, positive inotropic agent when unresponsive to other therapy	Phosphodiesterase inhibitor Relaxes vascular muscle, causing vasodilation **Decreases** preload and afterload, resulting in **increased** CO **Increases** contractility	Ventricular dysrhythmias, SVT, hypotension, diuresis, hypokalemia, headache	Initial bolus of 50 mcg/kg over 10 min. Maintenance infusion of 0.375-0.75 mcg/kg/min for desired CO/MAP **Max daily dose: 0.59-1.13 mg/kg** Half-life: 2.4 h	Assess for hemodynamic response and resolution of symptoms of heart failure. Anticipate reduced dose based on decreased creatinine clearance in patients with severe kidney impairment.

Vasodilator Medications

All vasodilator medications can cause severe hypotension. Close monitoring of BP is warranted.

Generic Name	Uses	Therapeutic Effects	Adverse Effects	Dose/Half-Life (Adult)	Key Considerations
Clevidipine	Management of hypertension	Selectively dilates arterial smooth muscle via calcium channel blockade Decreases SVR and BP	Acute renal failure, AFib, cardiac arrest, dyspnea, flushing, headache, hypotension, reflex tachycardia Monitor patients with heart failure for negative inotropic effects.	1-2 mg/h. Double the dose at 90-sec intervals. As BP goal is reached, increase the dose by less than double and lengthen the time between adjustments to every 5-10 min. 4-6 mg/h is usual maintenance dose. Max dose: 16 mg/h Half-life: ~1 min	Strict asceptic technique required. May require a reduction in concurrently administered lipids such as propofol. Monitor BP and HR during infusion and until vital signs are stable. BP should be monitored for 8 h after infusion discontinued. Contraindicated in allergy to soy or egg products, severe aortic stenosis, or defective lipid metabolism

Labetalol	Management of hypertensive urgency and emergency	Alpha, beta-1, beta-2 blocker **Decreases** SVR without reflex tachycardia **Decreases** BP Moderate **decrease** in preload and afterload	Orthostatic hypotension, bronchospasm, AV block, bradycardia	IV PUSH: 20 mg over 2-3 min. At 10-min intervals, may give additional 40-80 mg IV infusion: 1-2 mg/min; titrate to desired BP/MAP **Total dose for both routes: 300 mg** Half-life: 2.5-8 h	Lower BP gradually to avoid cerebral ischemia or infarction, optic nerve infarction, angina, myocardial ischemia, or MI. Patient should remain supine during infusion and for 3 h after IV administration. Do not use if solution is discolored or contains precipitate. Risk of hypotension increased in older adults with age-related peripheral vascular disease. Also may exacerbate mental impairment
NiCARdipine	Management of hypertension	Ca^{++} channel blocker depresses vascular smooth muscle contraction **Decreases** SVR and BP **Increases** HR and CO	Hypotension, orthostatic hypotension, palpitations, peripheral edema, tachy-dysrhythmia	Dose for patients not receiving PO niCARdipine: 5 mg/h IV infusion For rapid titration: titrate 2.5 mg/h every 5 min. For gradual titration: titrate 2.5 mg/h every 15 min **Max dose: 15 mg/h** Decrease to 3 mg/h after reaching BP goal Half-life: 14.4 h	Change IV site every 12 h if administered via peripheral catheter. Monitor BP and HR during infusion. Older adults may have increased sensitivity to effects; half-life may be prolonged.

Nitroglycerin	Acute coronary syndrome, decompensated heart failure	Dilates coronary arteries and improves collateral blood flow to ischemic areas in myocardium **Decreases** myocardial oxygen demand and **increases** peripheral vasodilation Strong preload reduction, mild afterload reduction	Headache, hypovolemia, hypotension, bradycardia, reflex tachycardia, flushing, orthostatic hypotension	IV infusion rate: 5-200 mcg/min. Start infusion at 5 mcg/min, and increase by 5 mcg/min every 3-5 min. Titrate to desired BP or CP relief. Half-life: 1-4 min	Must be mixed in glass bottle. Special tubing may be recommended to reduce absorption into polyvinyl chloride tubing. To avoid irreversible hypotension, **DO NOT** administer nitrates within 24 h of patient taking PDE-5 inhibitors such as sildenafil, tadalafil, or vardenafil. If used with alteplase, it may reduce thrombolytic effect of alteplase. Effects may be increased in older adults; lower-end initial doses may be indicated.
Nitroprusside	Hypertensive urgency and emergency	Potent vasodilator, acts directly on arterial and venous smooth muscle **Decreases** SVR, moderate preload reduction, strong afterload reduction	Severe hypotension, lethal levels of cyanide toxicity, reflex tachycardia, confusion, tinnitus, hyperreflexia, headache, vomiting, seizures	Once solution is prepared, it must be used within 24 h. Start at 0.1-0.5 mcg/kg/min IV. Titrate every 5-15 min in increments of 0.5 mcg/kg/min. **Max dose: 10 mcg/kg/min** Titrate to desired BP/MAP/SVR. Half-life: less than 10 min	Use cautiously in patients with hyponatremia, hypothyroidism, or severe hepatic or renal impairment. Discontinue infusion if desired response does not occur within 10 min at max dose. Monitor thiocyanate levels (cyanide toxicity). Thiocyanate half-life is 3 days. Cover with opaque material. Solution may have faint brown tint. Do not use if solution appears blue, green, or dark red. Extravasation causes tissue sloughing. Hypotensive effects may be increased in older adults.

Legend: **ACLS**, advanced cardiovascular life support; **AFib**, atrial fibrillation; **ARDS**, adult respiratory distress syndrome; **AV**, atrioventricular; **BP**, blood pressure; **CHF**, congestive heart failure; **CNS**, central nervous system; **CO**, cardiac output; **CP**, chest pain; **GI**, gastrointestinal; **h**, hours; **HR**, heart rate; **IO**, intraosseous; **IV**, intravenous(ly); **MAP**, mean arterial pressure; **max**, maximum; **MI**, myocardial infarction; **NS**, normal saline; **NSR**, normal sinus rhythm; **PDE-5**, phosphodiesterase-5; **PO**, per os (by mouth); **PSVT**, paroxysmal supraventricular tachycardia; **PVC**, premature ventricular contraction; **Q**, every; **RN**, registered nurse; **SA**, sinoatrial; **ST**, sinus tachycardia; **SVR**, systemic vascular resistance; **SVT**, supraventricular tachycardia; **TCP**, transcutaneous pacemaker; **VF**, ventricular fibrillation; **VT**, ventricular tachycardia; **VTE**, venous thromboembolism; **WPW**, Wolff-Parkinson-White

REFERENCES

American Heart Association. ACLS algorithms: bradycardia, tachycardia, cardiac arrest. Accessed July18, 2022. https://cpr.heart.org/en/resuscitation-science/cpr-and-ecc-guidelines/algorithms

Burns SM, Delgado SA. AACN Essentials of Critical Care Nursing. 4th ed. McGraw Hill Education; 2019.

Gahart BL. *Gahart's 2022 Intravenous Medications.* Elsevier; 2022.

Giapreza (Angiotensin II). La Jolla Pharmaceuticals. Accessed August 2, 2022. https://www.giapreza.com/

National Library of Medicine. Amiodarone. MedlinePlus. Accessed August 2, 2022. https://medlineplus.gov/druginfo/meds/a687009.html

Urden LD, Stacy KM, Lough ME. *Critical Care Nursing: Diagnosis and Management.* 8th ed. Elsevier; 2018.