

Drug	Use	Normal units in which drip is ordered	MRMC standard concentration	Primary short-term side effects	Half-life	Onset	Peak	Duration of effect when infusion is stopped	MRMC Recommended Nursing Monitoring Parameters	usual dose	maximum dose	CCU/PACU /ER/ Cardiac cath lab	Cardiac/surgical stepdown	Medical telemetry	Cardiac telemetry	Notes
Amiodarone (Cordarone)	Treatment/prophylaxis of VT/VF, supraventricular arrhythmia, cardiac arrest	mg/min	1.8 mg/ml provided as 450 mg/250 ml dextrose or 900 mg/500 ml dextrose glass bottle	hypotension (Usually within 1st few hours, rate related), arrhythmia ,ARDS	15-100 days	Prompt, usually within hr	Days	Days	Continuous EKG monitoring . BP monitoring: q 15 min x4, then q 30 min x2, then q 1hr x2, then q 4hr	load:150 mg over 10 min (max rate of 30 mg/min) maintenance: 1 mg/min x 6 hr then 0.5 mg/min. Rate may be adjusted, but > 2100 mg/day associated with increased hypotension	doses > 2100 mg/day associated with increased hypotension	May initiate and maintain	May initiate and maintain up to 1 mg/min	Maintain fixed infusion up to 1 mg/min in stable patient	May initiate and maintain up to 1 mg/min	*run through filter set *in glass bottle for infusion greater than 2 hr * conc greater than 2 mg/ml must be run through central line *monitor QT interval and report prolongation to physician
Fenoldopam (Corloпам)	Short term control (up to 48 hr) of severe hypertension	mcg/kg/min	10 mg/250 ml which is 40 mcg/ml	cardiac arrhythmia, hypotension, hypokalemia	5 min	5-15 min	15-20 min, another text lists 30 min-2 hr)	15 min-4 hr	Continuous EKG monitoring. BP monitoring: q 15 min x4, then q 30 min x2, then q 1hr	0.1 to 1.7 mcg/kg/min. doses < 0.1 mcg/kg/min usually have modest effects, usual recommended starting dose is 0.1 mcg/kg/min and adjust by 0.05 mcg/kg/min- 0.1 mcg/kg/min q 15 min (less frequently as bp goal approached)	1.7 mcg/kg/min	May initiate, maintain and titrate	no	no	no	*Monitor serum potassium at least q 6 hr initially. *Maximum recommended infusion is 48 hour
Diltiazem (Cardizem)	temporary control of rapid ventricular rate in atrial fibrillation or flutter, conversion of PSVT to NSR	mg/hr	1 mg/ml	arrhythmia, hypotension, CHF	3.4 hr	1-3 min if started with bolus.	2-7 minutes after bolus	0.5-10 hr after drip turned off	Continuous EKG monitoring. BP monitoring: q 15 min x4, then q 30 min x2, then q 1hr x2, then q 4hr	bolus: initial: 0.25 mg/kg over 2 min. max bolus: 0.35 mg/kg over 2 min. maintenance: 5-15 mg/hr	15 mg/hr. Some physicians use up to 20 mg/hr	May initiate, maintain, titrate (20 mg/hr maximum)	May initiate, maintain fixed infusion rate, titrate up to 15 mg/hr	may initiate and maintain fixed infusion rate up to 15 mg/hr	May initiate, maintain fixed infusion rate, titrate up to 15 mg/hr	*Maximum recommended duration is 24 hr. Check with MD about switching to oral formulation after 24 hr-first dose of oral medication usually given before stopping infusion *multiple incompatibilities including heparin and furosemide *prepared as 1:1 drip by adding 125 mg of diltiazem (which is contained in 25 ml of solution) to 100 ml of diluent for a total volume of 125 ml and a final concentration of 1 mg/ml
DoPAmine	hypotension, CHF	mcg/kg/min	800 mg/250 ml which is 3200 mcg/ml	arrhythmia, hypotension, vasoconstriction, necrosis with extravasation	2 min	5 min		very short after drip turned off	Continuous EKG monitoring. BP monitoring: q 15 min x4, then q 30 min x2, then q 1hr x2, then q 4hr. Urine output. Daily weight For all doses > 10 mcg/kg/min: q 2 hr peripheral pulse and extremity checks.	2-20 mcg/kg/min. up to 50 mcg/kg/min has been used, but is not recommended	20 mcg/kg/min unless specifically instructed by physician to go higher. Doses up to and beyond 50 mcg/kg/min have been used	May initiate, maintain, titrate	May initiate, maintain fixed infusion rate up to 10 mcg/kg/min, titrate up to 10 mcg/kg/min	no	May initiate, maintain flat infusion rate up to 5 mcg/kg/min	*Extravasation requires treatment. If available, phentolamine is the preferred agent. If unavailable, nitroglycerin is used (see note at end of table) *note: look alike/sound alike drug with doBUTamine. Check order and IV bag carefully.
DoBUTamine (Dobutrex)	short term inotropic support	mcg/kg/min	500 mg/250 ml which is 2000 mcg/ml	arrhythmia, hypertension, hypotension, increased HR	2 min	2 min	10 min	very short after drip turned off	Continuous EKG monitoring. BP monitoring: q 15 min x4, then q 30 min x2, then q 1hr x2, then q 4hr. Urine output. Daily weight.	2-20 mcg/kg/min. up to 40 mcg/kg/min has been used, but increases potential for toxicity	20 mcg/kg/min unless specifically instructed by physician to go higher.	May initiate, maintain, titrate	May initiate, maintain fixed infusion rate up to 10 mcg/kg/min, titrate up to 10 mcg/kg/min	May initiate, maintain fixed infusion rate up to 10 mcg/kg/min	May initiate, maintain fixed infusion rate up to 10 mcg/kg/min	*note: look alike/sound alike drug with DoPAmine. Check order and IV bag carefully.
Eptifibatid (Integrilin)	acute coronary syndrome and PCI *Note: not a vasoactive drip, but frequently used in cardiac areas	mcg/kg/min	75 mg/100 ml premixed bottle which is 0.75 mg/ml Note: Eptifibatid is also available in a 20 mg/10 ml vial that is to be used for the bolus only	bleeding-usually from invaded site or GI or GU sites	2.5 hr	bolus followed by infusion produces immediate inhibition, steady state reached in 4-6 hr	1 hr	2-4 hr	FOR ALL PATIENTS: check creatinine clearance and verify dose. (NOTE: CREATININE CLEARANCE CALCULATOR AVAILABLE ON BON SECOURS INTRANET. CONTRAINDICATED IN DIALYSIS PATIENTS). Monitor patients for signs/symptoms of bleeding. FOR PRECATH PATIENTS AND PATIENTS NOT GOING TO CATH LAB: continuous EKG monitoring. vital signs and check of invaded sites and neurochecks q 1 hr x4, then q 2hr x2, then q 4 hr. heme test all stools/gastrocult all emesis. POSTCATH PATIENTS: per cath lab protocol	180 mcg/kg bolus x1 over 1 min (for acute coronary syndrome) or x2 (for PCI) with boluses 10 min apart, each bolus over 1 min), then 2 mcg/kg/min (for creatinine clearance greater than or equal to 50 ml/min) or 1 mcg/kg/min (for creatinine clearance less than 50 ml/min)	2 mcg/kg/min for patients (with maximum dose of 20 ml/hr of the 0.75 mg/ml infusion) with creatinine clearance greater than or equal to 50 ml/min. 1 mcg/kg/min for patients (with maximum dose of 10 ml/hr of the 0.75 mg/ml infusion) with creatinine clearance less than 50 ml/min.	May initiate, maintain	May initiate, maintain	No	May initiate and maintain in precath patients or patients not going to cath lab	Monitor for bleeding or signs and symptoms of bleeding. Report any bleeding or changes in vital signs or status suggestive of bleeding to physician immediately. NOTE: two sizes of bottles stocked. 2 mg/ml 10 ml vial is for bolus. 0.75 mg/ml 100 ml vial is for infusion
Epinephrine (Adrenalin)	vasopressor	mcg/min	2 mg/250 ml which is 8 mcg/ml	anxiety, pallor, palpitations, profound vasoconstriction and compromise of renal and gut blood flow, hypertension	short	rapid		short	continuous EKG monitoring BP monitoring: q 5 min until stable, then q 15 min x4, then q 30 min x2, then q 1 hr. Peripheral pulse and extremity checks q 2 hr. urine output.	1-10 mcg/min	10 mcg/min	may initiate, maintain, titrate	no	no	no	*multiple drug interactions and contraindicated drug combinations.

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Esmolol (Brevibloc)	SVT, intraoperative and postoperative hypertension and/or tachycardia	mcg/kg/min	2.5 grams/250 ml which is 10 mcg/ml	hypotension, bradycardia, inflammation of infusion site. Beta-blockers, such as esmolol, may cause arrhythmia, angina, MI, death if stopped abruptly.	1-2 min	1-2 min		within 30 min	continuous EKG monitoring. BP monitoring: q 15 min x4, then q 30 min x2, then q 1 hr	FOR SVT: load: 500 mcg/kg over 1 min, continuous infusion at 50-200 mcg/kg/min (start at 50 mcg/kg/min. after 4 minutes, may give additional bolus and increase rate by 50 mcg/kg/min. As desired effect is approached, eliminate bolus and titrate in increments of 25-50 mcg/kg/min. May increase titration time from 5 to 10 min. FOR HYPERTENSION: as for SVT, but may require doses up to 300 mcg/kg/min. May also give 80 mg IV over 1 minute followed by 150 mcg/kg/min infusion if needed. titrate as needed.	300 mcg/kg/min for hypertension. 200 mcg/kg/min for SVT	May initiate, maintain, titrate	no	no	no	"for short term use only"
ibutilide (Convert)	rapid conversion of afib or flutter of short duration to sinus rhythm	ordered as 1 mg or less	may be given undiluted or diluted in 50 ml of NS or D5W and given as an infusion. MRMC recommends an infusion, but in either case the dose should be given over 10 minutes	ventricular arrhythmias, including torsades de pointes. (risk increases with QTc interval > 440 msec, K less than 4, pts on other Class Ia or III antiarrhythmics-in clinical studies held for 5 1/2 hr after)	6 hr	conversion usually occurs within 30 min, but may occur up to 90 min			continuous EKG monitoring while administering and for 4 hr after finishing, or longer if arrhythmia occurs or patient has liver dysfunction. BP monitoring: q 15 min x 4, then q 30 min x 2, then q 1 hr x2, then q 4 hr	>60 kg: 1 mg over 10 minutes. May repeat x1 10 min after end of first infusion if arrhythmia is not terminated. If < 60 kg, 0.01 mg/kg over 10 min, may repeat x1 10 minutes after end of first infusion if arrhythmia is not terminated		initiate	initiate	no	initiate	"While administering, staff ratio must be 1:1. Patient must be placed on lifepack with multifunction pads attached while receiving and for at least 4 hr afterward (longer if arrhythmia occurs or liver dysfunction) *watch QT interval for prolongation *risk of torsades de pointes *hypokalemia, hypomagnesia should be corrected prior to administration (electrolyte abnormalities increase risk of arrhythmia) *patients should not receive other Class Ia or Class III antiarrhythmics (quinidine, procainamide, disopyramide, bretylium, amiodarone, sotalol) concomitantly with ibutilide or for 4 hours afterward, and these agents should preferably be held for five half-lives prior to administering ibutilide. These agents increase risk of arrhythmia.
Isoproterenol (Isuprel)	atropine-resistant hemodynamically significant bradycardia, shock, diagnosis of mitral regurgitation, diagnosis of CAD, refractory torsades de pointes, beta-adrenergic blocker poisoning	mcg/min		tachycardia, hypotension, cardiac ischemia, cardiac arrhythmias	3-7 hr	immediate		1-2 hr	continuous EKG monitoring. BP monitoring: q 15 min x4, then q 30 min x2, then q 1hr	atropine resistant bradycardia: 2-20 mcg/min, shock: 0.5-5 mcg/min up to 30 mcg/min	30 mcg/min in advanced shock. Administer for 1 hr or less in septic shock	initiate, maintain, titrate	no	no	no	
Labeltalol (Trandate Normodyne)	hypertension decrease bp and symptoms in patients with pheochromocytoma	mg/min	500 mg/250 ml which is 2 mg/ml	hypotension (especially postural orthostatic hypotension), less likely to cause bradycardia than other beta-blockers, ventricular arrhythmia (1%)	6 hrs, some effects may last up to 16 hr	5-20 min		with bolus administration: 3-6 hr with BP returning to baseline in 16-18 hr	continuous EKG monitoring. BP monitoring: q 15 min x4, then q 30 min x2, then q 1 hr x2, then 4 hr. Maintain patient in supine position	0.5-2 mg/min. recommended to stop infusion when max of 300 mg is reached or satisfactory response is achieved (and begin oral form), but has been used as continuous infusion in CCU patients at 1-180 mg/hr for up to 9 days	see previous column	initiate, maintain, titrate	no	no	no	
Lidocaine	treatment or prophylaxis of v/fib/v tach, status epilepticus (unlabeled use)	mg/min	2 grams/250 ml D5W which is 8 mg/ml	anaphylaxis, cardiac arrest, qrs widening, tremor, twitching, confusion, nervousness	1.5-2 hr	45-90 sec after bolus		10-20 min after single bolus	continuous EKG monitoring	usually bolus followed by 4 mg/min	4 mg/min	initiate, maintain	initiate, maintain	no	initiate, maintain	Obtain serum levels with use greater than 24 hours or suspected toxicity. Half-life increases over time and infusion rate may require decrease
Milrinone (Primacor)	short term management of acute decompensated heart failure	mcg/kg/min	20 mg/100 ml D5W which is 200 mcg/ml	arrhythmia, hypotension	1-3 hr		10 min if load given		continuous EKG monitoring BP monitoring: q 15 min x 4, then q 30 min x2, then q 1 hr x 2 and then q 4 hr. daily weight. Urine output	load: 50 mcg/kg over 10min, then infusion at 0.375 mcg/kg/min- 0.75 mcg/kg/min. Decrease dose with renal dysfunction	0.75 mcg/kg/min	initiate, maintain	initiate, maintain	initiate, maintain	initiate, maintain	*not shown to be safe or effective for more than 48 hr

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Nesiritide (Natrecor)	treatment of acutely decompensated CHF in pt with dyspnea at rest or minimal activity	mcg/kg/min	1.5 mg/250 ml which is 6 mcg/ml	hypotension	18 min (but pharmacodynamic half-life longer, and hypotension may last several hours)	60 % of 3 hr effect of 3 hr pcwp reduction seen in 15 min, 95% seen in 1 hour, 75% of 3 hr sbp reduction reached within 15 min		half of recovery of sbp toward baseline after d/c is seen with 60 min. hypotension may last several hr. following d/c pcwp within 10 % of baseline within 2 hr	continuous EKG monitoring BP monitoring q 15 min x 4, then q 30 min x 2, then q 1 hr x 2 and then q 4 hr. daily weight. Urine output	2 mcg/kg bolus over 1 min, then 0.01 mcg/kg/min. May increase dose as follows: 1 mcg/kg bolus followed by increase in rate of 0.005 mcg/kg/min. Increases may be made as frequently as q 3 hr to max of 0.03 mcg/kg/min.	0.03 mcg/kg/min	may initiate and maintain	may initiate and maintain	no	may initiate and maintain	*IV tubing should be primed with 25 ml of infusion prior to administration of bolus or infusion *use limited to 48 hours *hypotension when it occurs can be prolonged. *Concurrent use of other IV vasodilators or oral antihypertensives may be additive *If hypotension occurs, nesiritide may be restarted once BP stabilized if ordered by physician-infusion rate should be reduced by 30% and no bolus should be given *must run through dedicated line
Nitroglycerin (Tridil)	Unstable angina, CHF, hypertension	mcg/min	50 mg/250 ml D5W	headache, hypotension, tachycardia	2-30 min	1-2 min		5-10 min	continuous EKG monitoring BP monitoring: q 15 min x 4, then q 30 min x 2, then q 1 hr x 2, then q 4hr. frequent assessment of chest pain	initial: 5-10 mcg/min. adjusted upward as needed (usually by units of 5-20 mcg/min depending upon indication and current dose).	doses up to 1000 mcg/min have been used but our maximum is 200 mcg/min without physician approval	initiate, titrate, maintain	initiate, maintain, titrate up to 50 mcg/min	no	initiate, maintain tit rate, titrate up to 20 mcg/min	*contraindicated in patients using sildenafil (Viagra), vardenafil (Levitra) or tadalafil (Cialis) which are erectile dysfunction agents *safe interval between use of sildenafil or vardenafil and nitroglycerin has not been determined. levels at 24 hr after sildenafil are much lower than at peak. *for tadalafil, the interaction is present up to and including 24 hr after tadalafil. At 48 hours, the interaction by most hemodynamic measures was not seen, but some tadalafil patients had a greater drop in blood pressure than placebo patients. Beyond 48 hours interaction is not detectable.
nitroprusside	hypertensive emergency, acute CHF, cardiogenic shock	mcg/kg/min	100 mg/250 ml D5W which is 400 mcg/ml	hypotension, sweating, EKG changes, increased ICP, muscle twitching, restlessness, cyanide toxicity, methemoglobinemia, thiocyanate toxicity. Cyanide results from the breakdown of nitroprusside in the body. The elimination of cyanide depends upon its conversion to thiocyanate; how much cyanide may be processed depends upon the amount of thiosulfate in the body (stores may be depleted in chronically or critically ill patients). Thiocyanate is then eliminated by the kidney. Whether cyanide toxicity develops depends upon the rate of nitroprusside infusion (prolonged infusions or rates greater than 2 mcg/kg/min can result in cyanide toxicity) and the amount of thiocyanate the patient's body contains. Whether thiocyanate toxicity develops depends upon the amount of thiocyanate formed (which depends on the nitroprusside infusion rate) and the patient's renal function.	3-4 min	30-60 sec	1-2 min	1-10 min	continuous EKG monitoring .continuous BP monitoring: BP documentation at least q 5 min til stable, then q 15 min x 4, then q 30 min x 2, then q 1 hr .	0.1-5 mcg/kg/min. absolute max is 10 mcg/kg/min which should never be run for more than 10 min. best to avoid doses > 3 mcg/kg/min in pt with nl renal function and doses > 1 mcg/kg/min in anuric patients b/c thiocyanate levels require several days to come back from lab. Doses greater than 2 mcg/kg/min may result in cyanide toxicity.	see previous column	initiate, maintain, titrate	only post-carotid surgical patient	no	no	* contraindicated in patients taking Viagra, Levitra or Cialis (see nitroglycerin note) * symptoms of cyanide toxicity are air hunger, bright red venous blood, confusion, restlessness, agitation convulsions, cardiovascular instability metabolic acidosis (ANION GAP METABOLIC ACIDOSIS IS ONE OF EARLIEST, MOST CONSISTENT FINDINGS). Treatment of cyanide toxicity is d/cing infusion, oxygen and sodium thiosulfate. * symptoms of thiocyanate toxicity are primarily CNS in nature including weakness, tremor, agitation, tremor, hallucinations, lethargy, may also include abdominal pain and vomiting. Treatment is hemodialysis. * Methemoglobinemia is characterized by cyanosis unresponsive to oxygen, despite normal arterial oxygen tension
Norepinephrine (Levophed)	hypotensive state	mcg/min	8 mg/250 ml D5W which is 32 mcg/ml	anxiety, arrhythmias, chest pain, ischemia, necrosis with extravasation	1-2 min				continuous EKG monitoring, continuous BP monitoring: BP documentation at least q 5 min til stable, then q 15 min x 4, then q 30 min x 2, then q 1 hr . Peripheral pulse and extremity checks q 2 hr. Urine output	0.5 to 30 mcg/min. (usual 8-12 mcg/min initially, maintenance usually 2-12 mcg/min. Alternatively may start with 0.5-1 mcg/min, and titrate as needed to 2-12 mcg/min) .	40 mcg/min	initiate, maintain, titrate	no	no	no	*Extravasation requires treatment. If available, phentolamine is the preferred agent. If unavailable, nitroglycerin is used (see note at end of table)
Phenylephrine (Neosynephrine)	hypotension	mcg/min	10 mg/250 ml D5W which is 40 mcg/ml	bradycardia, hypertension, tremors, ventricular tachycardia, ventricular extrasystoles, extravasation causes necrosis	1-2 min	1-2 min		15 min	continuous EKG monitoring, continuous BP monitoring: documentation of BP q 5 min til stable, then q 15 min x 4, then q 30 min x 2, then q 1 hr . Peripheral pulse and extremity checks q 2 hr.	40-180 mcg/min. usually begin at 100-180 mcg/min, until bp stabilized, then decrease to 40-60 mcg/min	200 mcg/min	initiate, maintain, titrate	only post-carotid surgical patient	no	no	*Extravasation requires treatment. If available, phentolamine is the preferred agent. If unavailable, nitroglycerin is used (see note at end of table)

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Procainamide (Pronestyl)	ventricular tachycardia when lidocaine contraindicated or has not suppressed, wide-complex tachycardias difficult to distinguish from VT	mg/min	4 grams/500 ml D5W or 2 grams/250 ml D5W which is 8 mg/ml	hypotension, PR interval prolongation, QRS widening, QT interval prolongation, ventricular arrhythmias, blood dyscrasias, lupus like syndrome	2.5-8 hr				continuous EKG monitoring BP monitoring: q 15 min x4, then q 30 min x2, then 1 hr x2, then q 4hr. Keep patient supine	may give up to 20 mg/min in loading dose phase (up to maximum of 1 gram). Maintenance: 1-4 mg/min	6 mg/min maintenance	initiate, maintain	initiate,maintain	no	initiate, maintain	

****treatment of extravasation for dopamine, norepinephrine, phenylephrin** RNs may initiate phentolamine (Regitine) therapy following dopamine, phenylephrine or norepinephrine infiltration in peripheral IV sites. The IV is discontinued immediately and phentolamine therapy is initiated within one hour of infiltration (per nursing policy PF726). If phentolamine is unavailable, nitroglycerin ointment may be used. For adults, 1 inch is applied to the affected area and may be repeated q 6-8 hr if ischemia continues or returns.

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