

## Pharmacotherapy of Acute Decompensated Heart Failure

Medication	Suggested Dosing	Adverse Effects	Monitoring Parameters
Furosemide	Twice the patient's usual dose; if ineffective, may repeat at double the initial dose. The suggested initial dose is 40 mg IV over one to two minutes. Effect may be augmented by giving metolazone prior to furosemide. IV infusion is also an option.	Hypotension, renal toxicity, ototoxicity, electrolyte abnormalities	Electrolytes, blood pressure, serum creatinine, weight, fluid intake and output
Dopamine	1 – 5 mcg/kg/min up to 20 mcg/kg/min. Titrate to desired response (maximum, 50 mcg/kg/min). Hemodynamic effects with intermediate dose (3 –10 mcg/kg/min): increased renal blood flow, heart rate, cardiac contractility, and cardiac output.	Ectopic beats, tachycardia, angina, palpitations, hypotension, vasoconstriction, headache, nausea/vomiting, dyspnea	Blood pressure, ECG, heart rate, urine output, hemodynamic response
Dobutamine	2 – 7 mcg/kg/min, titrated up to 20 mcg/kg/min based on response.	Increased heart rate, increased blood pressure, increased ventricular ectopic activity, hypotension, premature ventricular beats	Blood pressure, ECG, heart rate, potassium, urine output, hemodynamic response
Milrinone	Loading dose: 50 mcg/kg/min administered over 10 minutes followed by a maintenance dose titrated according to the hemodynamic and clinical response. Standard maintenance dose: 0.77 mcg/kg/day. Maximum daily dose: 1.13 mg/kg/day.	Ventricular arrhythmia, hypotension, headache	Blood pressure, ECG, heart rate, potassium, hemodynamic response
Nitroglycerin	5 mcg/min. Increase by 5 mcg/min every three to five minutes to 20 mcg/min; if no response at 20 mcg/min, increase by 10 mcg/min every three to five minutes, up to 200 mcg/min.	Headache, hypotension, reflex tachycardia	Blood pressure, heart rate
Nitroprusside	Initial: 0.3 – 0.5 mcg/kg/min. Increase in increments of 0.5 mcg/kg/min, titrating to the desired hemodynamic effect or the appearance of headache or nausea.	Hypotension, palpitations, headache, nausea/vomiting, hypoxia, thiocyanate toxicity, cyanide toxicity	Blood pressure, heart rate, acid/base balance, renal function
Nesiritide	Initial: 2 mcg/kg (bolus), followed by continuous infusion at 0.01 mcg/kg/min.	Hypotension, increased serum creatinine	Blood pressure, serum creatinine, hemodynamic response
Warfarin	Initial: 5 – 10 mg qd; for elderly patients, <5 mg. Titrate to INR of 2.0 – 3.0.	Bleeding events	INR, CBC
Heparins	UFH: 5,000 units bid. LMWH: Enoxaparin: 30 mg bid or 40 mg qd. Dalteparin: 5,000 units qd.	Bleeding events, heparin-induced thrombocytopenia	aPTT, factor-Xa (LMWH), CBC

<b>Drugs Associated with QT Prolongation and TdP</b>				
<b>Antiarrhythmics</b>	<b>Antimicrobials</b>	<b>Antidepressants</b>	<b>Antipsychotics</b>	<b>Others</b>
Amiodarone Sotalol Quinidine Procainamide Dofetilide Ibutilide	Levofloxacin Ciprofloxacin Gatifloxacin Moxifloxacin Clarithromycin Erythromycin Ketoconazole Itraconazole	Amitriptyline Desipramine Imipramine Doxepin Fluoxetine Sertraline Venlafaxine	Haloperidol Droperidol Quetiapine Thioridazine Ziprasidone	Cisapride Sumatriptan Zolmitriptan Arsenic Dolasetron Methadone

<b>Drug Interactions That May Delay Repolarization</b>		
<b>Isozyme</b>	<b>Drug Shown to Prolong QT</b>	<b>Inhibitor</b>
CYP3A4	Amiodarone Erythromycin Quinidine Haloperidol Pimozide Tacrolimus Cisapride Dofetilide Disopyramide Tamoxifen Mesoridazine	Cimetidine Erythromycin Indinavir Ketoconazole Ritonavir Diltiazem Clarithromycin Itraconazole
CYP1A2	Imipramine	Cimetidine Fluvoxamine Ciprofloxacin
CYP2D6	Thioridazine Imipramine Amitriptyline Flecainide Doxepin Tamoxifen	Amiodarone Diphenhydramine Chlorpheniramine Quinidine Fluoxetine

<b>Risk Factors</b>
Age Female gender Bradycardia Left ventricular failure Recent cardioversion Congenital long QT syndrome Electrolyte abnormalities Hypomagnesemia Hypokalemia Hypocalcemia Hepatic dysfunction