

DISCHARGE REFERENCE GUIDE ON

POTENTIALLY HAZARDOUS INTERACTIONS IN PATIENTS WITH HEART FAILURE DUE TO SYSTOLIC DYSFUNCTION

Discharge Reference Guide on Potentially Hazardous Interactions In Patients with Heart Failure Due to Systolic Dysfunction

This reference guide is meant to aid in weighing the risks versus benefits of cardiac medications chosen for use in HF due to systolic dysfunction or other medications commonly used in patients who have HF due to systolic dysfunction. This guide should serve as a reminder to the practicing hospitalist of the potentially common or serious adverse drug reactions seen with a number of classes of medications which should either preclude their use or trigger anticipatory and close monitoring of the potential for serious adverse drug effects.

Medications with Potential Adverse Drug Reactions in Heart Failure Due to Systolic Dysfunction

<u>Medication(s)</u>	<u>Generic/Brand Name(s)</u>	<u>Interaction Effect(s)</u>
Antibiotics	IV Vancomycin, Bactrim require large fluid volumes for administration. Potentially all IV Beta- lactams, cephalosporins, carbapenems have a higher sodium content that is dose dependent.	These listed intravenous antibiotics often require a large fluid volume and/or high sodium content. Monitor fluid status.
Calcium Channel Blockers	Dihydropyridines: nifedipine XL (Procardia XL), felodipine (Plendil), amlodipine (Norvasc), nisoldipine (Sular) Non-dihydropyridines: diltiazem (Cardizem CD, Tiazac, Cartia XT, Dilacor XR) & verapamil (Calan, Calan SR, Verelan, Covera-HS, Isoptin SR)	The non-dihydropyridines may cause heart block when used in combination with additional nodal blocking agents. Non-dihydropyridines and beta-blockers are beneficial agents for patients with primarily <i>diastolic dysfunction</i> .
Disopyramide	Disopyramide (Norpace)*	Strongly anticholinergic; hypotension, CHF.
NSAIDS including COX-2 Inhibitors	NSAIDS (Note: List represents a comprehensive but not complete list of NSAIDS) : Ibuprofen (Motrin/Advil), naproxen (Aleve, Naprosyn), diclofenac (Voltren), ketorolac (Toradol), flubiprofen (Ansaid), oxaprozin (Daypro), diflunisal (Dolobid), nabumetone (Relafen), diclofenac/misoprostol (Arthrotec), sulindac (clinoril), piroxicam (Feldene) COX-2 Inhibitors: celecoxib (Celebrex)	Decrease renal perfusion, increase sodium/fluid retention, risk of hyperkalemia. Specific mechanism of blocking prostaglandin mediated vasodilation of the renal tubules resulting in fluid retention and precipitation of CHF.

Medications with Potential Adverse Drug Reactions in Heart Failure Due to Systolic Dysfunction

<u>Medication(s)</u>	<u>Generic/Brand Name(s)</u>	<u>Interaction Effect(s)</u>
Systemic Corticosteroids	Supraphysiologic doses of all glucocorticoids	Increased rates of MI, CVA, CHF. Monitor for sodium & fluid retention.
Thiazolidinediones	Rosiglitazone(Avandia), pioglitazone (Actos)	Edema 5% but up to 15% in combination with insulin or sulfonylurea; CHF

Special Considerations in Medications Used in Heart Failure Due to Systolic Dysfunction

ACE Inhibitors & ARBs	<p>ACE Inhibitors: Lisinopril (Zestril), ramipril (Altace), captopril (Capoten), fosinopril (Monopril), quinipril (Accupril), perindopril (Aceon), enalapril (Vasotec)</p> <p>ARB's: Losartan (Cozaar), candesartan (Atacand), valsartan (Diovan) eprosartan (Teveten), irbesartan (Avapro), olmesartan (Benicar), telmisartan (Micardis)</p>	<p>When initiating or increasing the dose, a transient elevation in serum creatinine may be seen. Monitor serum creatinine and potassium closely with initiation or increase in dose.</p> <p>Contraindicated in pregnancy and severe aortic stenosis.</p>
Aldosterone Antagonists	Spironolactone (Aldactone), eplerenone (Inspra)	Hyperkalemia. Should only be initiated in patients with a serum creatinine <1.6-2.5, GFR >30 ml/min, and potassium <5.0. This risk of hyperkalemia is increased for patients receiving higher doses of an ACE inhibitor.
Amiodarone	Amiodarone (Cordarone)*	<p>Potential for drug-drug interactions, especially digoxin, warfarin.</p> <p>Adverse reactions are significant and numerous. Most common side effects include thyroid and hepatic function alterations. Most serious side effects: blindness and pulmonary toxicity.</p> <p>Drug has a long half life with mean plasma half life of about 60 days.</p> <p>FDA approved for VT/VF. Although an unlabeled use for atrial fibrillation Amiodarone is included in the ACC/AHA/ESC guid lines for atrial fibrillation.</p>

Special Considerations in Medications Used In Heart Failure Due to Systolic Dysfunction

<u>Medication(s)</u>	<u>Generic/Brand Name(s)</u>	<u>Interaction Effect(s)</u>
Anticoagulants	Warfarin (Coumadin)	Routine monitoring, multiple drug interactions. Anticipate heightened anticoagulant effect with amiodarone, cyclosporine, grapefruit juice, erythromycin, cimetadine, ketoconazole.
Beta Blockers	Bisoprolol(Zebeta), carvedilol(Coreg), metoprolol succinate (Toprol XL) are preferred for HF based on study evidence. Note: Bisoprolol (Zebeta) is not FDA-approved for this indication. There is evidence to support the use of metoprolol tartrate in systolic heart failure.	Not initiating if the HR < 50 bpm without a pacemaker or patient has symptomatic bradycardia. Expect some fatigue and fluid retention; treat the fluid retention and monitor closely with upward dose titration.
Digitalis	Digoxin (Lanoxin)	Risk of drug-drug interaction especially with amiodarone. Narrow toxic-therapeutic index drug; toxicity with declining renal function
Dofetilide	Dofetilide (Tikosyn)	Risk of VT, Torsade de pointes; not to be used with QTc-prolonging agents

asterisked items (*) = A list of drugs or classes of drugs that should generally be avoided in the elderly because they are ineffective or high risk for an elderly person with a safer alternative available. Amiodarone (Cordarone), although an unlabeled use for atrial fibrillation, Amiodarone is included in the ACC/AHA/ESC guidelines for atrial fibrillation. **Special dosing recommendations for the aging patient:** Dose of Digoxin should not exceed >0.125 mg/dl except when treating atrial arrhythmias.

General Caveats for Discharge Follow-Up of the Heart Failure Patient:

Stability of Patient

If the heart failure (HF) patient is not stable enough to be seen by a physician in 48-72 hours then don't discharge from the hospital. This would include: starting or increasing new HF meds on the day of discharge, rising BUN/Cr, symptomatic HF requiring ongoing monitoring and daily physician oversight.

Destinations of Care

If discharge to home, ask: Can the patient or caregiver self report?—if not, than the patient needs in-home care oversight (visiting nurse or physician) or close physician supervision and follow-up in the office.

If discharge to a nursing home or skilled nursing (most skilled nursing occurs in nursing homes), remember that the accepting physician is required to see the patient within 48 hours. Make certain the patient is stable enough to be seen in this time frame, particularly the late Friday discharges. Ordering labs for the covering NH physician who may not see the patient over the weekend is not an alternate in a potentially unstable patient.

Lab Follow-Up (within 72 hours of discharge)

Electrolytes, BUN/creatinine (GFR):

1. Patients with ongoing diuresis
2. Patients on ACEI/ARB with newly added spironolactone or eplerenone

INR:

1. Patients newly started on warfarin
2. Patients with variable in-hospital INR values
3. Patients started on medications that interact with warfarin

High Risk Meds:

Close Follow-up and monitoring

Warfarin

CV drugs

Hypoglycemic agents

Electrolyte-disturbing medications (diuretics)

Corticosteroids

Narcotic analgesics

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<p>ACE Inhibitors & ARB's</p>	<p>Hunt SA, Abraham WT, Chin MH, et al. ACC/AHA Guideline Update for the Diagnosis and Management of Chronic Heart Failure in the Adult. <i>Circulation</i> 2005; 112:e154.</p> <p>Adams, KF, Lindenfeld J, Arnold JM, et al. HFSA 2006 Comprehensive Heart Failure Practice Guideline <i>J Card Fail</i> 2006; 12:e1-e119.</p>
<p>Aldosterone Antagonists</p>	<p>Pitt B, Zannad F, Remme WJ, et al. The effects of spironolactone on morbidity and mortality in patients with severe heart failure. RALES Investigators. <i>N Engl J Med</i> 1999;341:709.</p> <p>Pitt B, Remme WJ, Zannad F, et al. Eplerenone, a selective aldosterone blocker, in patients with left ventricular dysfunction after myocardial infarction. EPHESUS Investigators. <i>N Engl J Med</i> 2003;348:1309.</p> <p>Hunt SA, Abraham WT, Chin MH, et al. ACC/AHA Guideline Update for the Diagnosis and Management of Chronic Heart Failure in the Adult. <i>Circulation</i> 2005; 112:e154.</p> <p>ACC/AHA Guideline Update for the Diagnosis and Management of Chronic Heart Failure in the Adult. <i>Circulation</i> 2005;</p>
<p>Amiodarone</p>	<p>Goldschlager N, Epstein AE, Naccarelli G, et al. Practical guidelines for clinicians who treat patients with amiodarone. Practice guidelines subcommittee, north American Society of Pacing and Electrophysiology. <i>Arch Intern Med</i> 2000;160:1741.</p> <p>Vorperian VR, Havighurst TC, Miller S, et al. Adverse effects of low dose amiodarone: A meta-analysis. <i>J Am Coll Cardiol</i> 1997;30:791.</p>
<p>Antibiotics</p>	<p>Micromedex online</p> <p>PDR online</p>
<p>Anticoagulants</p>	<p>Micromedex online</p> <p>PDR online</p> <p>Lexi-Comp online</p>

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Beta Blockers

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Calcium Channel Blockers

Micromedex online

PDR online

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Digitalis

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Disopyramide

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Flaker GC, Blackshear JL, McBride R, et al. Antiarrhythmic drug therapy and cardiac mortality in atrial fibrillation investigators. *J Am Coll Cardiol* 1992;20:527.

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*Drugs to avoid in the aging patient	<p>Beers criteria—Fick DM, Cooper JW, Wade WE, et al. Updating the Beers criteria for potentially inappropriate medication use in older adults <i>Arch Intern Med</i> 2003; 163:2726. <i>Arch Intern Med</i> 2005;165:2069.</p> <p>Podrazik PM, Schwartz JB. Cardiovascular pharmacology of aging. <i>Cardiol Clin N Am</i> 1999; 17:17.</p>
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Systemic Corticosteroids	<p>Wei L, MacDonald TM, Walker BR. Taking glucocorticoids by prescription is associated with subsequent cardiovascular disease. <i>Ann Intern Med</i> 2004;141:764.</p> <p>Choi HK, Seeger JD. Glucocorticoid use and serum lipid levels in US adults: the Third National Health and Nutrition Examination Survey. <i>Arthritis Rheum</i> 2005;53:528.</p> <p>Souverein PC, Berard A, Van Staa TP, et al. Use of glucocorticoids and risk of cardiovascular disease and cerebrovascular disease in a population based case-control study. <i>Heart</i> 2004;90:859.</p>
Thiazolidinediones	<p>AHA/ADA 2003 Consensus</p>
Discharge Planning	<p>Keeping your Patient with Heart failure Safe. <i>Arch Intern med</i> 2004;164:709-720.</p>