23. DIGOXIN

Class: Antiarrhythmic Agent, Miscellaneous;Cardiac Glycoside

Indications: Treatment of mild-to-moderate (or stage C as recommended by the ACCF/AHA) heart failure (HF); atrial fibrillation (rate-control)

Note: In treatment of atrial fibrillation (AF), use is not considered first-line unless AF coexistent with heart failure or in sedentary patients (Fuster, 2006).

Unlabeled : Fetal tachycardia with or without hydrops; to slow ventricular rate in supraventricular tachyarrhythmias such as supraventricular tachycardia (SVT) excluding atrioventricular reciprocating tachycardia (AVRT

Dosage: **Note:** When changing from oral (tablets or liquid) or I.M. to I.V. therapy, dosage should be reduced by 20% to 25%.

-Atrial fibrillation (rate control) in patients with heart failure: Loading dose: I.V.: 0.25 mg every 2 hours, up to 1.5 mg within 24 hours; for nonacute situations, may administer 0.5 mg orally once daily for 2 days followed by oral maintenance dose. Maintenance dose: I.V., Oral: 0.125-0.375 mg once daily (Fuster, 2006)

-Heart failure: Daily maintenance dose (**Note:** Loading dose not recommended): Oral: 0.125-0.25 mg once daily; higher daily doses (up to 0.5 mg/day) are rarely necessary. If patient is >70 years of age, has impaired renal function, or has a low lean body mass, low doses (eg, 0.125 mg daily or every other day) should be used (Hunt, 2009).

-Supraventricular tachyarrhythmias (rate control):

Initial: Total digitalizing dose:

-Oral: 0.75-1.5 mg

-I.V., I.M.: 0.5-1 mg (**Note:** I.M. not preferred due to severe injection site pain.)

Give $^{1}/_{2}$ (one-half) of the total digitalizing dose (TDD) as the initial dose, then give $^{1}/_{4}$ (one-quarter) of the TDD in each of 2 subsequent doses at 6- to 8-hour intervals. Obtain ECG 6 hours after each dose to assess potential toxicity.

Daily maintenance dose:

-Oral: 0.125-0.5 mg once daily

-I.V., I.M.: 0.1-0.4 mg once daily (**Note:** I.M. not preferred due to severe injection site pain.).

Geriatric

Dose is based on assessment of lean body mass and renal function. Elderly patients with low lean body mass may experience higher digoxin concentrations due to reduced volume of distribution (Cheng, 2010). Decrease dose in patients with decreased renal function (see Dosing in Renal Impairment).

Heart failure: If patient is >70 years of age, low doses (eg, 0.125 mg daily or every other day) should be used (Hunt, 2009).

Renal Impairment:

Loading dose:

-ESRD: If loading dose necessary, reduce dose by 50%.

-Acute renal failure: Based on expert opinion, if patient in acute renal failure requires ventricular rate control (eg, in atrial fibrillation), consider alternative therapy. If loading digoxin becomes necessary, patient volume of distribution may be increased and reduction in loading dose may not be necessary; however, maintenance dosing will require adjustment as long as renal failure persists.

-Maintenance dose :

-Cl_{cr} >50 mL/minute: No dosage adjustment necessary.

-Cl_{cr} 10-50 mL/minute: Administer 25% to 75% of the normal daily dose or administer normal dose every 36 hours

-Cl_{cr} <10 mL/minute: Administer 10% to 25% of the normal daily dose or administer normal dose every 48 hours

-Continuous renal replacement therapy (CRRT): Administer 25% to 75% of the normal daily dose or administer normal dose every 36 hours; monitor serum concentrations.

-Hemodialysis: Not dialyzable; no supplemental dose necessary.

-Heart failure: Initial maintenance dose: **Note:** The following suggested dosing recommendations are intended to achieve a target digoxin concentration of 0.7 ng/mL. Renal function estimated using Cockcroft-Gault formula.

-Cl_{cr} >120 mL/minute: 0.25 mg once daily

-Cl_{cr} 80-120 mL/minute: 0.25 mg once daily, alternating with 0.125 mg once daily

-Cl_{cr} 30-80 mL/minute: 0.125 mg once daily

-Cl_{cr} <30 mL/minute: 0.125 mg every 48 hours.

Note: A contemporary digoxin dosing nomogram using creatinine clearance and ideal body weight or height has been published for determining the initial maintenance dose in patients with heart failure to achieve a target digoxin concentration of 0.7 ng/mL (Bauman, 2006).

Hepatic Impairment:

No dosage adjustment provided in manufacturer's labeling.

Available dosage form in the hospital: 50MCG/ML SYRUP, 125MCG TAB, 0.25MG TAB, 0.0625MG TAB.

Common side effect: Cardiovascular: Accelerated junctional rhythm, asystole, atrial tachycardia with or without block, AV dissociation, first-, second- (Wenckebach), or third-degree heart block, facial

edema, PR prolongation, PVCs (especially bigeminy or trigeminy), ST segment depression, ventricular tachycardia or ventricular fibrillation

Central nervous system: Dizziness (6%), mental disturbances (5%), headache (4%), apathy, anxiety, confusion, delirium, depression, fever, hallucinations

Dermatologic: Rash (erythematous, maculopapular [most common], papular, scarlatiniform, vesicular or bullous), pruritus, urticaria, angioneurotic edema

Gastrointestinal: Nausea (4%), vomiting (2%), diarrhea (4%), abdominal pain, anorexia

Neuromuscular & skeletal: Weakness

Pregnancy Risk Factor: C