

DIGOXIN DELUSIONS

The effect of digoxin on mortality and morbidity in patients with heart failure. N Engl J Med. 1997;336(8):525-33.
Rathore SS, et al. Sex-based differences in the effect of digoxin for the treatment of heart failure. N Engl J Med. 2002;347(18):1403-11.
Rathore SS, et al. Association of serum digoxin concentration and outcomes in patients with heart failure. JAMA. 2003;289(7):871-8.

Take home points:

1. If you want to use digoxin, realize that at levels above 1.2 ng/ml, there is increased mortality in CHF pt's.
2. Digoxin arrhythmias can occur in any form; classically they are supraventricular arrhythmias with concomitant AV block
3. **Know the indications for digibind:** ingestion of > 10 mg of digoxin, digoxin level > 10 ng/ml, life-threatening arrhythmia

What are the indications for digoxin?

- Congestive heart failure (to improve contractility and decrease sympathetic flow)
- Atrial fibrillation (to slow rate)

What about the pro-arrhythmic effects of digoxin?

- Here's a pearl: digoxin slows the SA node and the AV node but speeds up everything in between. Classic dig-associated arrhythmias include atrial tachycardia or junctional tachycardia associated with AV block.
- Here's another pearl: digoxin can cause pretty much arrhythmia!

What were the results of the DIG trial?

- In patients with CHF (EF < 45%), digoxin did not reduce mortality but it did reduce hospitalizations.

What about digoxin in women?

- Recent NEJM study demonstrated that in a sub-group analysis of the DIG trial, women with CHF and a low ejection fraction that were treated with digoxin had a higher all-cause mortality than those treated with placebo. Editorialists question the effect of digoxin level on mortality, citing the fact that in the DIG trial, women had a higher serum digoxin levels.

What about the serum digoxin level?

- In a recent JAMA study (Feb 2003), another sub-group analysis of the DIG trial confirmed that higher serum digoxin levels correlate to increase mortality.
- There was increased mortality in the digoxin group when serum digoxin levels exceed 1.2 ng/ml. The upper limit of normal in most labs is 2.0 ng/ml. In fact, at digoxin levels of 0.9 ng/ml or higher, there is no benefit to giving digoxin.
- **Bottom line:** if you are going to use digoxin in your heart failure patients, think twice. If you really want to use it effectively, make sure the digoxin level is below 0.9 ng/ml.

What about the serum digoxin toxicity?

- Causes and risk factors include intentional ingestion, renal failure, elderly patients, drug-drug interactions, hypokalemia (potentiates Na/K ATPase); concomitant cardiac disease (e.g. acute ischemia) can increase cardiac sensitivity to digoxin.
- Clinical manifestations: fatigue, blurred vision, yellow-green vision, anorexia, n/v/d, abd pain, HA, confusion, delirium.
- ECG manifestations: "scooping" ST segments can be seen at any level of digoxin; *for digoxin toxicity, look for arrhythmias (classically supraventricular arrhythmia with AV block, but can be any arrhythmia).*
- Digoxin level should only be used as a guide to toxicity; steady state doesn't occur until 6 hours after administration.
- Treatment of digoxin toxicity: charcoal, atropine for bradyarrhythmias, **lidocaine or phenytoin** are first line for anti-arrhythmic therapy (especially ventricular arrhythmias). Verapamil is useful for supraventricular arrhythmias.
- **Indications for Digibind:** ingestion of > 10 mg of digoxin, digoxin level > 10 ng/ml, life-threatening arrhythmia