

## Digoxin

Lead as a 10 minute group discussion with active participation from the trainees. Use a white board to add visual learning component.

### Objectives

1. Identify appropriate patients for digoxin therapy.
2. Understand adverse effects of digoxin in older patients.
3. Know when it is appropriate to discontinue digoxin.

**Mechanism of Action:** Na/K ATPase inhibitor, Slow conduction at AV node, positive inotropic activity

### Dosing Considerations in Older adults:

Parameter	Geriatric Patients
Hydrophilic	More fat, less water
Long Half-life	36-44 hours
Narrow Therapeutic Index <i>Serum Drug Concentration obtained 6 hours post-dose</i>	Atrial fibrillation <2 ng/mL Heart failure 0.5-0.9 ng/mL
Eliminated Renally	Declining renal function
Beers Medication	Avoid doses >0.125mg/day

### Indications:

	Atrial Fibrillation	Heart Failure
Clinical Practice Guidelines	"May be combined with beta blockers to improve rate control during exercise"	"Digoxin can be beneficial in patients with Heart Failure with reduced ejection fraction, unless contraindicated, to decrease hospitalizations for HF"
Mortality	Independently associated with increased mortality in TREAT-AF 2014	No effect on mortality
Heart Failure-related Hospitalizations	n/a	Reduced hospitalizations (DIG trial)
Withdraw of Digoxin	?	Increased HF hospitalizations No effect on mortality or all cause hospitalizations **Note: these outcomes were conducted before beta blockers were standard of care and therefore difficult to interpret

## Toxicity Side Effects

Non-cardiac Symptoms - GI, visual	Cardiac Symptoms - CV
<ul style="list-style-type: none"><li>• Anorexia, nausea, vomiting, abdominal pain</li><li>• Visual disturbances (halos, photophobia, red-green or yellow-green vision)</li><li>• Fatigue, weakness, dizziness, headache, confusion, delirium</li></ul>	<ul style="list-style-type: none"><li>• Ventricular arrhythmias</li><li>• Ventricular tachycardia, fibrillation</li><li>• Atrioventricular (AV) block</li><li>• First, second, or third-degree block</li><li>• Sinus bradycardia</li><li>• Atrial arrhythmias</li></ul>

### Predisposition to Digoxin Toxicity

- Drug-drug interactions (e.g., amiodarone, verapamil, erythromycin, quinidine, telmisartan)
- Acute renal insufficiency or failure
- Hypokalemia, hypercalcemia, hypomagnesemia

### References

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4. January, C. T., et al. (2014). 2014 AHA/ACC/HRS guideline for the management of patients with atrial fibrillation: a report of the American College of Cardiology/American Heart Association Task Force on practice guidelines and the Heart Rhythm Society. Circulation 130(23): e199-267.
5. Yancy, C. W., et al. (2013). 2013 ACCF/AHA guideline for the management of heart failure: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol 62(16): e147-239.
6. The effect of digoxin on mortality and morbidity in patients with heart failure. N Engl J Med 1997. 336(8): 525-533.
7. Turakhia, M. P., et al. (2014). "Increased mortality associated with digoxin in contemporary patients with atrial fibrillation: findings from the TREAT-AF study." J Am Coll Cardiol 64(7): 660-668.
8. Hopper, I., et al. (2014). "Can medications be safely withdrawn in patients with stable chronic heart failure? systematic review and meta-analysis." J Card Fail 20(7): 522-532.