Digitalis toxicity

Practical Clinical Toxicology

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- A group of pharmacologically active compounds are extracted mostly from the leaves and in pure form are referred to by common chemical names such as ***digitoxin*** or ***digoxin***,

Mechanism of action

Digitalis works by

inhibiting sodium-potassium ATPase.

- This increased cytosolic calcium ion concentration results in increased calcium ion storage in the sarcoplasmic reticulum.

Digitalis toxicity

- Digitalis toxicity can be caused by high levels of digitalis in the body, or a decreased tolerance to the drug.

- Digoxin toxicity causes hyperkalemia, or high potassium.

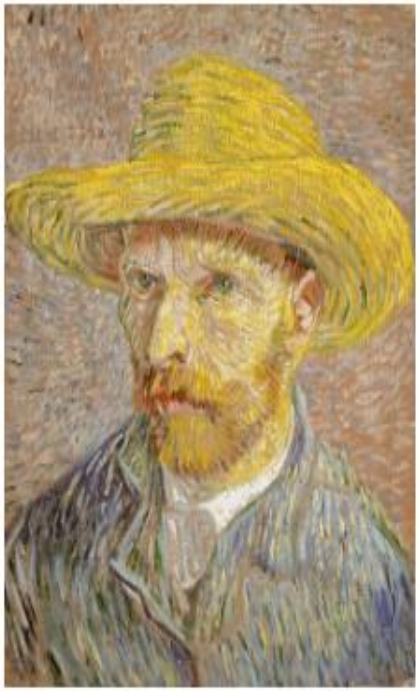
- *4-Taking medications that interact with digitalis*

- Thiazide and Loop diuretics – cause hypokalemia which increase the toxicity

Toxicity features

- ***Cardiac:*** Digitalis poisoning can cause heart block and either *Brady-cardiac arrhythmia* or *tachy-cardiac arrhythmia or both*, depending on the dose and the condition of one's heart.

- ***Neurological:*** confusion, drowsiness, dizziness, insomnia, nightmares, agitation, depression, psychosis, delirium, amnesia, and convulsions.



Cardiac arrest and death can occur from ventricular fibrillation, ventricular tachycardia and severe bradyarrhythmias.

Neurological symptoms including altered mental status can occur, even without hypoperfusion of the brain. Ocular manifestations include xanthopsia, or seeing yellow.

Most experts believe that the famous artist Vincent van Gogh was using foxglove, the flower from which digoxin is derived, which could explain the yellow paintings toward the end of his life. Here are two examples — one a self-portrait, the other a street scene.

Management of poisoning

1. Stop further absorption & increase the removal of unabsorbed digitalis.

- Induced emesis with *ipecac syrup* is not recommended because of the increased vagal effect and can worsen slow heart rhythms .

- Activated charcoal is indicated for acute overdose or accidental ingestion, blood levels may be lowered with repeated doses of charcoal, given after gastric lavage.

2. Reversal of arrhythmias

- Bradyarrhythmias that are hemodynamically stable may be treated with observation and discontinuation of the drug. Ensure proper hydration to optimize renal clearance of excess drug.

3. Correct electrolyte abnormalities

- In acute settings, hyperkalemia is more common, while in chronic intoxication, hypokalemia and hypomagnesaemia are common.

- Correct *hypomagnesemia*. **IV magnesium sulfate**, 2 g over 5 minutes, has been shown to terminate digoxin-toxic cardiac arrhythmias.

- *Forced diuresis* is not recommended because it has not been shown to increase renal excretion and can worsen electrolyte abnormalities.

- **Digoxin Immune Fab (Ovine)**

- DigiFab has an affinity for digoxin greater than the affinity of digoxin for its sodium pump receptor.

Indications for digibind

- • Serum digoxin level > (10 ng/mL) in acute ingestion

- Each vial of DigiFab contains
- [40 mg of digoxin immune Fab, which will bind approximately to 0.6 mg digoxin or digitoxin, is intended for intravenous administration after reconstitution with 4 mL of Sterile Water for Injection USP.

ADVERSE REACTIONS

- Exacerbation of low cardiac output states and congestive heart failure due to the withdrawal of inotropic effect of digitalis.

References

1- Gossel TA, Bricker TD, (Eds.); Principles of Clinical Toxicology; latest edition.

2- Viccellio P, (Ed.); Handbook of Medicinal Toxicology; latest edition.

3- journals of pharmacology and toxicology