Cardiac Glycosides: How do cardiac glycosides work?

The mechanism of action of cardiac glycosides involves inhibiting the Na+ K+ ATPase enzyme, also known as the sodium-potassium pump. This causes sodium to build up inside the heart cells, decreasing the ability of the sodium-calcium exchanger to push calcium out of the cells, consequently causing calcium to build up in the sarcoplasmic reticulum. Increased intracellular calcium results in a positive inotropic effect, which in turn has the effect of increasing the force of the heart's contractions.

Which receptor does the cardiac glycoside digoxin bind to?

Digoxin reversibly binds to a receptor site on the Na+ K+ ATPase enzyme, inhibiting its function of exchanging sodium and potassium across the cell membrane.

What are potential side effects of cardiac glycosides?

Cardiac glycosides can have some potential side effects, and can also be an important cause of poisoning and toxicity. The most frequent side effects of cardiac glycosides include unusual tiredness and fatigue, anxiety, and hallucinations. In addition, symptoms of toxicity can include visual disturbances, nausea or vomiting, and cardiac arrhythmias.

Diuretics: also called water pills, are a common treatment for high blood pressure. Find out how they work and when you might need them. Diuretics, sometimes called water pills, help rid your body of salt (sodium) and water. Most of these medicines help your kidneys release more sodium into your urine. The sodium helps remove water from your blood, decreasing the amount of fluid flowing through your veins and arteries. This reduces blood pressure.

There are three types of diuretics:

1. Thiazide: Chlorothiazide and Hydrochlorothiazide
2. Loop: Bumetanide (Bumex) and Ethacrynic acid (Edecrin)
3. Potassium sparing: Amiloride (Midamor) and Eplerenone (Inspra)

When diuretics are used?

High blood pressure, Heart failure, Liver failure, Tissue swelling (edema) , kidney stones.

Antiarrhythmic Drugs:

Antiarrhythmics are medications that prevent and treat a heart rhythm that is too fast or irregular also known as arrhythmias. Arrhythmia involves a problem with your heart's electrical system. Your heart may beat too quickly, too slowly or erratically (irregularly). Antiarrhythmics treat abnormal heart rhythms including atrial fibrillation, atrial flutter, ventricular tachycardia or ventricular fibrillation.

How do antiarrhythmic work?

- Stop an irregular, extra electrical impulse in your heart.
- Prevent abnormally fast electrical impulses from traveling along heart tissues.

What are the classes of antiarrhythmic medications?

There are four classes of antiarrhythmics, based on the Vaughan-Williams (VW) classification system:

- **Class I, sodium channel blockers:** These drugs prevent sodium from getting through cell membranes. This can slow electrical impulses in the heart muscle. Examples include disopyramide, flecainide, mexiletine, propafenone and quinidine.
- **Class II, beta blockers:** These drugs slow down the heart rate, often by blocking hormones such as adrenaline. Examples include acebutolol, atenolol, bisoprolol, metoprolol, nadolol and propranolol.
- **Class III, potassium channel blockers:** These drugs prevent potassium from getting through cell membranes. This can slow down electrical impulses in all of the heart's cells. Examples include amiodarone, bretylium, dofetilide, dronedarone, ibutilide and sotalol.
- **Class IV, nondihydropyridine calcium channel blockers:** These drugs block calcium channels in heart muscle. This can decrease heart rate and contractions. Examples include diltiazem and verapamil.

Other antiarrhythmic drugs not included in the VW classification system include:

- **Adenosine:** This medication can block or slow down electrical impulses at the atrioventricular node, between the upper and lower chambers of the heart.
- **Digoxin:** This drug can slow the heart rate and increase contractility of the heart.

What are the side effects of antiarrhythmic?

1. Chest pain.
2. Dizziness or lightheadedness.
3. Fainting.
4. Heart palpitations.
5. Shortness of breath.

Vasodilators:

Vasodilators are medications that open (dilate) blood vessels. They affect the muscles in the walls of the arteries and veins, preventing the muscles from tightening and the walls from narrowing.

Uses for vasodilators

1. High blood pressure
2. High blood pressure during pregnancy or childbirth (preeclampsia or eclampsia)
3. Heart failure
4. High blood pressure that affects the arteries in the lungs (pulmonary hypertension)

Side effects and cautions

1. Rapid heartbeat (tachycardia)
2. Heart palpitations
3. Fluid retention (edema)
4. Nausea
5. Vomiting
6. Headache
7. Excessive hair growth
8. Joint pain
9. Chest pain