Cardiac Medications in a Nutshell

Beta Blockers

Atenolol

Atenolol is a drug belonging to the group of β-blockers, a class of drugs used primarily in cardiovascular diseases. Introduced in 1976, atenolol was developed as a replacement for propranolol in the treatment of hypertension. The chemical works by slowing down the heart and reducing its workload.

Atenolol (trade name Tenormin) can be used to treat cardiovascular diseases and conditions such as hypertension, coronary heart disease, arrhythmias, angina (chest pain) and to treat and reduce the risk of heart complications following myocardial infarction (heart attack).

Carvedilol

Carvedilol is a non-selective beta blocker indicated in the treatment of mild to moderate congestive heart failure (CHF).

Carvedilol blocks the binding to those receptors, which both slows the heart rhythm and reduces the force of the heart's pumping. This lowers blood pressure and reduces heart failure.

Sotalol

Sotalol (trade names Betapace and Betapace AF) is a drug used in individuals with rhythm disturbances (cardiac arrhythmias) of the heart, and to treat hypertension in some individuals.

It lengthens the QT interval.

It also slows atrioventricular (AV) nodal conduction (beta-blocking effect).

Sotalol is not selected for its beta-blocking ability, but rather for its Class III (potassium blocking) properties.

Sotalol is used to treat ventricular tachycardias as well as atrial fibrillation. Betapace AF is specifically labeled for atrial fibrillation.

It has also been suggested that it be used in the prevention of atrial fibrillation.

ACE Inhibitors

Benazepril

Benazepril, brand name Lotensin, is a medication used to treat high blood pressure (hypertension), congestive heart failure, and chronic renal failure.

Veterinary use

Benazepril hydrochloride is used to treat congestive heart failure in dogs and chronic renal failure in cats.

Diuretics

Furosemide
**Furosemide** is a loop diuretic used in the treatment of congestive heart failure and edema. It is most commonly marketed under the brand name Lasix. It has also been used to prevent thoroughbred and standardbred race horses from bleeding through the nose during races.

Furosemide is also used in animals for pulmonary edema, congestive heart failure (in combination with other drugs), and allergic reactions. Despite the fact that it increases circulation to the kidneys, it does not help kidney function, and is not recommended for kidney disease.

**Spironolactone**

Used primarily to treat heart failure, ascites in patients with liver disease, low-renin hypertension, hypokalemia, and Conn's syndrome as well as high blood pressure. On its own, spironolactone is only a weak diuretic, but it can be combined with other diuretics.

**OTHERS**

**Diltiazem**

Diltiazem is a member of the group of drugs known as benzothiazepines, which are a class of calcium channel blockers, used in the treatment of hypertension, angina pectoris, and some types of arrhythmia. It is a class 3 anti-anginal drug, and a class IV antiarrhythmic. It incites very minimal reflex sympathetic changes.

Diltiazem is a potent vasodilator, increasing blood flow and variably decreasing the heart rate via strong depression of A-V node conduction.

Diltiazem increases coronary blood flow and decreases myocardial oxygen consumption, secondary to decreased peripheral resistance, heart rate, and contractility. Because of its vasodilatory effects, diltiazem is useful for treating hypertension.

**Mexiletine HCl**

Mexiletine is used to treat arrhythmias within the heart - or seriously irregular heartbeats. It slows nerve impulses in the heart and makes the heart tissue less sensitive.

**Pimobendan**

Pimobendan (trade names Vetmedin and Acardi), is used in the management of heart failure in dogs, most commonly caused by myxomatous mitral valve disease (also known as endocardiosis), or dilated cardiomyopathy. Research has shown that pimobendan increases survival time and improves quality of life in patients with congestive heart failure when compared with benazepril, an angiotensin-converting-enzyme (ACE) inhibitor.

Pimobendan also causes peripheral vasodilation by inhibiting the function of phosphodiesterase III. This results in decreased pressure, translating into smaller cardiac preload and afterload (decreases the failing heart's workload).

Pimobendan is often used in combination with three other drugs to palliate dogs with heart disease and reduce clinical signs of disease. These are:

- **Furosemide**, a diuretic, to reduce pulmonary oedema. This can be given intravenously if the animal is in respiratory distress (6-8mg/kg), and then titrated down to the minimum dose required orally.
- **Spironolactone**, an aldosterone antagonist. This has two actions, firstly, as a potassium-sparing diuretic, although its diuretic properties are small compared with those of furosemide. Secondly, it reduces aldosterone-mediated myocardial remodelling and fibrosis, slowing the progression of heart disease.
• An ACE inhibitor, often enalapril (trade name Enacard) or benazepril (Fortekor). These drugs inhibit the action of angiotensin-converting enzyme, producing a balanced vasodilation, along with other favourable effects.

Other drugs may also be used as required to manage certain arrhythmias that are often associated with heart disease.

**Digoxin**

*Digoxin*, also known as *Digitalis*, is a purified cardiac glycoside extracted from the *foxglove* plant, *Digitalis lanata*. Digoxin is widely used in the treatment of various heart conditions, namely atrial fibrillation, atrial flutter and sometimes heart failure that cannot be controlled by other medication.

Its main cardiac effects are

- A decrease of conduction of electrical impulses through the AV node, making it a commonly used antiarhythmic agent in controlling the heart rate during atrial fibrillation or atrial flutter.
- An increase of force of contraction via inhibition of the Na+/K+ ATPase pump

Digoxin also increases vagal activity via its action on the central nervous system, thus decreasing the conduction of electrical impulses through the AV node. This is important for its clinical use in different arrhythmias.