# Calcium Channel Blockers (Verapamil and Diltiazem)

Verapamil belongs to the Phenylalkylamines class of calcium channel blockers and Diltiazem belongs to a class called the Benzothiazepines. These two medications are different than other calcium channel blockers because they have direct action on cardiac tissue at therapeutic levels. They are also classified as Type IV antiarrhythmics and work to slow AV conduction. Common indications include angina pectoris, essential hypertension and arrhythmias.




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## Mechanism of Action

**Slows AV Conduction**
Slowed AViator Snail-conductor
Calcium channel blockers work by blocking voltage-dependent calcium channels. Since these channels are concentrated in sinoatrial nodes (SA node) and atrioventricular nodes (AV node), this drug class helps by decreasing conduction through the AV node. This mechanism explains why these drugs are contraindicated in heart block, especially 2nd degree block and complete heart block.

## Indications

**Angina Pectoris**
Angel with Pectorals
Calcium channels are also in the smooth muscle of vasculature and blocking them allows blood vessels to dilate. This action allows these medications to be effective in treating angina pectoris.

**Arrhythmias**
Broken Arrhythmia-drum
These drugs are effective in treating arrhythmias, especially atrial tachyarrhythmias, as they slow impulse conduction through the AV node. Calcium channel blockers are considered class IV antiarrhythmic medications.

**Essential Hypertension**
Espresso Hiker-BP
These medications act to decrease blood pressure and are effective in essential hypertension. Blood pressure is lowered by dilation of the arterioles. These drugs are not frequently prescribed, but remain an important option to consider in the treatment of essential hypertension.

## Side Effects

**Bradycardia**
Snail-heart
Bradycardia or slowed heart rate can develop with these medications, as they work to slow impulse conduction through the AV node to the ventricles.

**Hypotension**
Hippo-BP
By blocking calcium channels and consequentially relaxing smooth muscle in vasculature, these medications can lead to the side effect of hypotension.

**Constipation**
Corked Con-toilet
Calcium channel blockade in this drug class leads to decreased smooth muscle motility and can manifest as constipation. This occurs more often with verapamil than with diltiazem.

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**Peripheral Edema**

Peripheral Edamame

Peripheral edema is an annoying, common side effect of these medications. It occurs due to arteriolar dilation, leading to capillary hypertension, which causes fluid extravasation into tissues.

**Gingival Hyperplasia**

Gums and Teeth Wind-up Toy

Verapamil is known for having the side effect of gingival hyperplasia, which is described as an enlargement and overgrowth of the gums.

## Nursing Consideration

**Medication Education**

Medication Educator

It is important to provide medication education to the patients. Inform them to notify health care providers of peripheral edema, and patients should monitor swelling in ankles and feet. They should not crush or chew sustained-release oral medications. Patients should avoid grapefruit juice, as it can raise blood levels and lead to toxicity.

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