

## Rate Limiting Calcium Channel Blockers

### Introduction

The calcium channel blockers are a type of medication which affect many cells within the body. It is split into two families, the Dihydropyridines which mainly have a role in the management of angina and high blood pressure and the rate limiting calcium channel blockers which share these properties but also have a use in changing the rate and rhythm of the heart. The second group can be used either alone or in conjunction with other medications to help in the management of Atrial Fibrillation. The two examples are Verapamil and Diltiazem.

### How do they work

These medications affect the way that calcium salts are moved into the muscular cells of the body. In the arteries this leads to a widening of the artery and this causes a drop in blood pressure. In the heart this leads to a less contractual force of the muscle cells and reduces the overall force of the heart beat. This change to the flow of calcium also affects the conduction of the heart beat from the upper chambers of the heart to the lower chambers. In this way it has an effect of slowing the heart beat. This is unlike beta-blocking medications that slow the heart beat by also having an effect on the adrenalin receptors in the heart.

### Clinical Use

**Anti-arrhythmic:** Rate limiting calcium channel blockers can be used to try to maintain the heart in its normal rhythm. Verapamil is the most frequently used drug for this purpose and is often used in people who can not tolerate beta-blocker medication.

**Rate Reduction:** Some patients with Atrial Fibrillation find that their heart races which can cause unpleasant symptoms and reduce their

activity levels. Rate Limiting Calcium Channel Blockers can be use alone or in combination with other medication such as beta-blockers or digoxin.

**Hypertension:** The Rate Limiting Calcium Channel Blockers are effective blood pressure reducing medications. However their related medication, the Dihydropyridines, are more commonly used in this setting.

### Side Effects and Problems

**Heart Failure:** Due to their effect on the strength on heart muscle contraction the rate limiting calcium channel blockers should not be used in patients who have problems with the strength of their heart beat. These patients are classed as having heart failure also referred to as left ventricular impairment.

**Lightheadedness:** Due to their ability to drop the blood pressure, in some people this may give a sensation of lightheadedness or dizziness.

**Ankle Swelling:** Due to their effect in widening the arteries and veins these medications can occasionally cause ankle swelling. This will return to normal when the medication is discontinued.

**Use with Beta-blockers:** Diltiazem can be used in conjunction with beta-blockers to assist with heart rate reduction. The companion drug Verapamil should only be used together with a beta-blocker under specialist guidance.

Author: Dr Matthew Fay, GP  
Endorsed: Professor A John Camm, EP  
Mrs Jayne Mudd, Arrhythmia Nurse Specialist  
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