

Role of Calcium Channel Blockers on Heart

Kentro Hayashida*

Department of Cardiology, Keio University School of Medicine, Tokyo, Japan

DESCRIPTION

Calcium Channel Blockers (CCBs) are a class of medications that are commonly used to treat hypertension and angina. They work by blocking the flow of calcium into heart muscle cells and blood vessel walls, leading to relaxation of the smooth muscle and a decrease in blood pressure.

Mechanism of action

Calcium is an important signalling molecule that is involved in many cellular processes, including muscle contraction, neurotransmitter release, and gene expression. In the heart, calcium plays a critical role in regulating the contraction and relaxation of the cardiac muscle cells. When calcium enters the muscle cells through voltage-gated calcium channels, it triggers a series of events that result in contraction of the muscle.

Calcium channel blockers work by blocking the entry of calcium into the muscle cells through these voltage-gated calcium channels. By doing so, they reduce the force of contraction of the heart and decrease the heart's oxygen demand. In addition, they also cause relaxation of the smooth muscle in the blood vessels, leading to a decrease in blood pressure.

Types of calcium channel blockers

There are three main types of calcium channel blockers

Dihydropyridines: They are the most commonly used calcium channel blockers. They work by selectively blocking the L-type calcium channels in the smooth muscle of the blood vessels, leading to vasodilation and a decrease in blood pressure. Examples of dihydropyridines include amlodipine, nifedipine, and felodipine.

Non-dihydropyridines: Non-dihydropyridines, such as verapamil and diltiazem, work by blocking both the L-type calcium channels in the smooth muscle of the blood vessels and the T-type calcium channels in the heart. They have a greater effect on the heart than dihydropyridines and are used to treat angina and certain arrhythmias.

Dual-action calcium channel blockers: Such as amlodipine/atorvastatin, combine a dihydropyridine calcium channel blocker with a statin to treat both hypertension and high cholesterol.

Uses

Some of the uses of calcium channel blockers to treat the following conditions,

Hypertension: Hypertension, or high blood pressure, is a common condition that affects millions of people worldwide. It is a major risk factor for heart disease, stroke, and kidney disease. Calcium channel blockers are often used as a first-line treatment for hypertension because of their effectiveness and tolerability. They are particularly effective in treating hypertension in elderly patients and patients with diabetes or chronic kidney disease.

Angina: Angina is a type of chest pain that occurs when the heart muscle is not getting enough oxygen-rich blood. Calcium channel blockers are used to treat angina by reducing the heart's oxygen demand and increasing blood flow to the heart muscle. They are particularly effective in treating vasospastic angina, a type of angina that occurs when the coronary arteries constrict.

Arrhythmias: Calcium channel blockers can also be used to treat certain types of arrhythmias, or abnormal heart rhythms. Non-dihydropyridine calcium channel blockers, such as verapamil and diltiazem, are used to treat atrial fibrillation, a type of arrhythmia that affects the upper chambers of the heart.

CONCLUSION

As the side effects which were caused by all medications, calcium channel blockers also cause some of the side effects. The most common side effects of calcium channel blockers are, headache, dizziness, flushing, swelling of the ankles, constipation, and nausea. Necessary precautions need to be taken before starting the treatment with calcium channel blockers. It is important to discuss with the doctor about the medical history and also about the medications which the person is taking.

Correspondence to: Kentro Hayashida, Department of Cardiology, Keio University School of Medicine, Tokyo, Japan, E-mail: hayashida@gmail.com

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