Cilostazol and Dipyridamole

Cilostazol and dipyridamole are phosphodiesterase type 3 inhibitors that result in increased levels of cAMP. Elevated cAMP inhibits platelet aggregation and also causes vasodilation. Therefore these medications are useful in diseases involving atherosclerosis, where arteries are clogged with lipids and platelet products. Cilostazol and dipyridamole can be used in intermittent claudication, stroke prevention, and coronary stent stenosis prevention. Dipyridamole specifically is used in cardiac stress testing to reveal diseased vessels. Side effects include flushing and hypotension.



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Mechanism of Action

Phosphodiesterase 3 Inhibitor (PDE-3)

Phosphorus-P Duster (3) Tree in Inhibiting-chains

Cilostazol and dipyridamole inhibit the enzyme phosphodiesterase type 3 (PDE-3). Normally this enzyme breaks down the molecule cAMP; therefore, these meds result in increased levels of cAMP. This leads to decreased platelet aggregation and therefore decreased clotting. It also leads to increased vasodilation.

Inhibits Platelet Aggregation

Plates with Inhibiting-chains

Inhibition of the enzyme PDE-3 by these medications leads to increased cAMP. In platelets, this results in decreased aggregation and therefore decreased clotting. The ensuing improvement in blood flow can help manage or prevent atherosclerotic or thrombotic conditions like claudication, stroke or coronary stent thrombosis.

Vasodilation

Vase-dyed

Increased levels of cAMP secondary to PDE-3 inhibition result in widespread vasodilation. This improved blood flow can help manage conditions like claudication.

Indications

Intermittent Claudication

In-mitten Claws

Vascular claudication refers to pain typically in the extremities that occurs when blood demand exceeds supply in a patient with peripheral artery disease (PAD / PVD). These patients typically have atherosclerotic or clogged arteries. Activities like walking or running increase the demand of muscles beyond what the arteries can supply, leading to symptoms like pain. Cilostazol and dipyridamole can help manage claudication by inhibiting clotting and promoting vasodilation.

Stroke Prevention

Stroke-crew

Strokes often have atherosclerosis as an underlying factor, where clogged arteries in the brain prevent adequate blood flow from occurring. Cilostazol and dipyridamole can be used in combination with aspirin to prevent strokes in some patients by improving vasodilation and preventing platelet aggregation within vessels.

Coronary Stent Stenosis Prevention

Crown-heart Stent of Stone

Coronary artery disease occurs when atherosclerosis results in occlusion of the small coronary vessels in the heart, leading to myocardial ischemia. Stents can be placed which hold these vessels open, returning normal blood flow. Cilostazol and dipyridamole inhibit platelet aggregation, and so can prevent these stents from later becoming occluded and stenosed.

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Cardiac Stress Testing (Dipyridamole)

Stressed Heart

Cardiac stress testing is indicated in patients where coronary artery disease is suspected, for example patients with angina. In stress testing, the patient performs an activity like jogging, while coronary blood flow is measured. Dipyridamole is a non-specific PDE inhibitor, unlike cilostazol, and so more effectively leads to increased levels of adenosine in the heart. Adenosine vasodilates healthy coronary vessels, while diseased or stenotic ones remain closed. Dipyridamole highlights this discrepancy during stress testing, allowing diseased vessels to be identified.

Side Effects

Flushing

Flashlight

Because these medications result in vasodilation, one side effect is flushing. Patients should be reminded that this side effect may occur.

Hypotension

Hippo-BP

Hypotension can result when cilostazol and dipyridamole cause excessive vasodilation, leading to a decrease in blood pressure. Therefore patients who are newly prescribed these medications or are undergoing dosage changes should have their blood pressure periodically monitored.

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