Minoxidil (Loniten, Rogaine)

Minoxidil (Loniten, Rogaine) is a vasodilator that acts primarily on arterioles. Although the medication produces more intense arteriolar vasodilation than hydralazine, it also causes more severe adverse reactions (refer to the Picmonic on "Hydralazine"). Minoxidil is indicated for individuals with severe hypertension and baldness. Side effects include reflex tachycardia, blood volume expansion, and pericardial effusion. The patient may also develop excessive hair growth or a rash. To minimize adverse effects, minoxidil may be administered with beta blockers and diuretics.

PLAY PICMONIC

Mechanism

Vasodilates Arterioles

Vase-dyed with Artery-O's

Minoxidil is a vasodilator that acts primarily arterioles. By dilating the resistance vessels, the medication decreases afterload and subsequently cardiac workload. This action causes cardiac output and tissue perfusion to increase. Minoxidil has little to no venous effects.

Indications

Severe Hypertension

Severed Hiker-BP

For patients unresponsive to safer anti-hypertensive medications, minoxidil is indicated for the treatment of severe hypertension. Administered orally, the medication dilates arterioles to facilitate blood flow through the vasculature.

Baldness

Bald

Excessive hair growth is a characteristic side effect of minoxidil. Topical administration of minoxidil is indicated to promote hair growth in individuals experiencing baldness.

Side Effects

Reflex Tachycardia

Reflex-hammer Tac-heart-card

Arteriolar dilation causing blood pressure reduction triggers reflex tachycardia. As baroreceptors in the aortic arch and carotid sinus sense a decreased in blood pressure, the vasomotor center of the medulla tries to restore normal blood pressure by increasing heart rate and myocardial contractility.

Blood Volume Expansion

Blood Volume-cup Expanding

Chronic use of arteriolar vasodilators causes prolonged reduction of blood pressure. Decreased blood pressure triggers adrenal glands to secrete aldosterone to promote sodium and water retention. In addition, decreasing arterial pressure leads to decreased renal blood flow and reduced glomerular filtration rate. Decreasing the filtrate volume increases the kidney's ability to reabsorb sodium and water and leads to blood volume expansion.

Hypertrichosis

Hiker-trick-hat

A significant percentage of patients taking minoxidil for at least 4 weeks develop hypertrichosis or excessive hair growth. The vasodilatory effects of minoxidil causes proliferation of epithelial cells at the base of the hair follicle. Hair growth beings on the face and progresses to arms, legs, and back. Hypertrichosis may be managed with shaving or using a depilatory. Since some patients are unable to tolerate the excessive hair growth, they refuse to continue taking minoxidil.

Pericardial Effusion

Pear-heart with E-fuse fluid

Fluid retention caused by minoxidil may lead to fluid accumulation underneath the pericardium and develop pericardial effusion. Although this condition is often asymptomatic, excessive fluid accumulation may compress the heart and lead to cardiac tamponade. Since this decreases cardiac performance, pericardiocentesis or surgical drainage is required to restore normal cardiac functioning.

Rash

Rash

Rash may occur in patients prescribed minoxidil. Oral administration of minoxidil may cause Stevens-Johnson syndrome. This rare medical emergency is characterized by a painful red or purple rash and requires hospitalization. Topical administration of minoxidil may cause local irritation at the site of application.

Considerations

Give with Beta Blocker and Diuretic

Beta-fish with Blocks and Die-rocket

To minimize the effect of reflex tachycardia, pre-medicating the patient with a beta blocker will prevent sympathetic stimulation of the heart. Since blood volume increase negates the effect of vasodilation, diuretics are often administered to prevent fluid retention and volume expansion. If diuretic therapy is inadequate, the patient may undergo dialysis or the medication will need to be withdrawn.