K+ Sparing Diuretics

These are a class of diuretic drug which do not promote the secretion of potassium into the urine. They work by either competing with aldosterone for binding sites or directly blocking epithelial Na⁺ channels (ENaC). They are indicated to treat hypertension and CHF, and are combined with other diuretics to counter the hypokalemia which they may cause. Furthermore, potassium sparing diuretics such as Spironolactone may be used to treat hyperaldosteronism. Common side effects of these medications include hyperkalemia, which may lead to arrhythmias and muscle weakness, as well as spironolactone-induced gynecomastia.



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Indications

CHF and Hypertension

CHF Heart-balloon and Hiker-BP

K⁺ sparing diuretics are indicated for CHF and hypertension treatment.

Hypokalemia

Hippo-banana

These diuretics are typically combined with loop diuretics (or others), which tend to decrease body K⁺ to dangerously low levels. Using K+ sparing diuretics with these other K+ wasting drugs tends to keep a normal potassium reference range.

Hyperaldosteronism

Hiker-Aldo-stereo

The K⁺sparing diuretic spironolactone is often used in hyperaldosteronism, as it is a competitive aldosterone receptor antagonist.

Mechanism of Action

Collecting Tubule

Collecting Tube

These medications work in the cortical collecting tubule, to antagonize aldosterone or Na⁺channels.

Spironolactone

Spiral-of-milk

Spironolactone is a drug used for heart failure, ascites, hypertension, hypokalemia and hyperaldosteronism. This drug is also used as an antiandrogenic medication, as it blocks androgen binding through various mechanisms. Eplerenone is a very similar drug to spironolactone.

Competitive Aldosterone Receptor Antagonist

Competitive Aldo-stereo Receptor Ant-toga

Spironolactone works by competing for intracellular mineralocorticoid receptors in the late distal tubule, or collecting tubule. This decreases the reabsorption of Na⁺ and water, while decreasing the secretion of K⁺.

Amiloride and Triamterene

Amelia-rider and Triathlete

Amiloride and triamterene are K⁺ sparing diuretics which act in the distal tubule or collecting tubule to decrease K⁺ loss by exerting their actions on epithelial sodium channels (ENaC).

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Block Na+ Channels

Block-guy Blocking Salt-shaker Channel

These medications directly block epithelial Na⁺ channels (ENaC) to prevent its resorption in the collecting tubule in the kidneys. By blocking this channel, Na⁺ is not resorbed and K⁺is not exchanged or wasted into the collecting tubule lumen.

Side Effects

Hyperkalemia

Hiker-banana

These medications have the potential to cause hyperkalemia, as they prevent its secretion in the cortical collecting tubule. Hyperkalemia can lead to muscle weakness and fatal arrhythmias.

Gynecomastia

Man-boobs

A side effect of Spironolactone administration is gynecomastia (male breasts), as this drug has antiandrogen effects and weak progesteronic effects (progesterone is linked to breast development).

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