



## Polyuria

Polly-urinates

Polyuria is commonly seen in Gitelman syndrome as a result of the diuretic-like effect caused by defective sodium-chloride cotransporters, which mimics the effect of thiazide diuretics. This results in decreased sodium absorption at the distal tubule, leading subsequently to decreased absorption of water, which is then lost in the urine.

## Diagnosis

### Hypokalemia

Hippo-banana

Hypokalemia is seen in Gitelman syndrome as a result of increased action of the renin-angiotensin-aldosterone system (RAAS). Recall that aldosterone acts in the collecting ducts to cause absorption of sodium in exchange for excretion of potassium. It does so by increasing action of the basolateral sodium-potassium exchange pumps and by increasing expression of ENaC and ROMK channels, which absorb sodium and excrete potassium respectively. In Gitelman syndrome, aldosterone is increased in order to compensate for volume loss, leading to increased action at the sodium-potassium exchange, thereby decreasing serum potassium.

### Metabolic Alkalosis

Metal-ball Elk-loser

Metabolic alkalosis is commonly seen in Gitelman syndrome as a result of volume contraction caused by increased action of the renin-angiotensin-aldosterone system. Recall that one of the actions of aldosterone is to increase action of the  $H^+$ /ATPase in the intercalated cells of the collecting duct. Therefore increased aldosterone as compensation for volume loss leads to increased excretion of  $H^+$  in the urine.

### High Urine Chloride

up-arrow-chlorine-urine

High urine chloride is a characteristic finding seen in Gitelman syndrome. This is important in parsing out Gitelman syndrome from other potential causes of metabolic alkalosis, such as primary hyper-aldosteronism, in which urine chloride excretion is low. Of note, thiazide diuretics can also cause increased urine chloride excretion, however this should already have been made obvious when taking a patient's history if they are taking thiazide diuretics.

## Treatment

### Electrolyte Supplements

electric lights

All patients with Gitelman syndrome should be treated with supplements for electrolytes that may be depleted, namely potassium, magnesium (when hypomagnesemia is present), and sodium-chloride to promote volume retention.

### Spirinolactone

Spiral-of-milk

Spirinolactone (or any potassium-sparing diuretic) is often used in the treatment of Gitelman syndrome. It aids in treatment by blocking many of the actions of aldosterone that lead to the electrolyte abnormalities seen in Gitelman syndrome.