

## **Solutions to [Metabolic Alkalosis: What Is the Cause?](#)**

1. **LIDDLE SYNDROME:** Liddle syndrome is an autosomal dominant form of hereditary hypertension, hypokalemia, and metabolic alkalosis. It is caused by a permanent activation of renal eNaC (epithelial Na<sup>+</sup> channel). The symptoms resemble hyperaldosteronism (hypokalemia, volume expansion, hypertension, metabolic alkalosis) despite suppressed renin and aldosterone secretion. Treatment is with a low sodium diet and a potassium sparing diuretic that directly blocks the sodium channel, such as amiloride and triamterene.

2. **MILK ALKALI SYNDROME:** In the early 1900s, due to excessive milk intake and Sippy diet, there were many cases of milk alkali syndrome. In the 1980s, due to decreases in milk intake and the advent of H<sub>2</sub> blockers, this disease entity declined. However, in the last 2 decades, many cases of this syndrome have emerged due to increased intake of calcium and vitamin D. The syndrome is now termed “calcium alkali syndrome.” It is the third most common cause of hospital admissions for hypercalcemia in the United States. It classically presents with acute kidney injury, hypercalcemia, hypophosphatemia, and metabolic alkalosis. Levels of 1,25 vitamin D in patients with this syndrome are usually low due to suppression, but there can be few cases of normal to inappropriately high as well (due to co-ingestion of vitamin D supplements).

3. **CONTRACTION ALKALOSIS:** Contraction alkalosis occurs with loss of large volumes of bicarbonate-free fluid. Use of loop diuretics in a markedly edematous patient is a common cause of a contraction alkalosis. Newer studies suggest this is more likely due to chloride depletion than sodium depletion. Chloride administration without volume expansion is sufficient to correct this alkalosis. The urinary chloride is low, bicarbonate is low, pH is low, and potassium is high. The serum chloride is low, bicarbonate is high, and pH is alkaline.

4. **ANOREXIA NERVOSA:** Surreptitious vomiting, ingestion of alkali or drugs with mineralocorticoid activity, or diuretic or laxative abuse can cause metabolic alkalosis in cases where the diagnosis is not very obvious. One such disease entity to consider strongly in the right age group is anorexia nervosa.