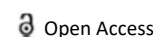




## COMMENTARY



# Symptoms of Severe Hypocalcemia and its Causes

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## Description

Hypocalcemia is a medical condition characterized by a low level of calcium in the blood serum. The normal range for blood calcium is typically between 2.1–2.6 mmol/L (8.8–10.7 mg/dL, 4.3–5.2 mEq/L), while levels below 2.1 mmol/L are defined as hypocalcemic. Mildly low levels that develop slowly often have no symptoms. Otherwise, symptoms may include numbness, muscle spasms, seizures, confusion, or cardiac arrest.

The most common cause of hypocalcemia is iatrogenic hypoparathyroidism. Other causes include other forms of hypoparathyroidism, vitamin D deficiency, renal failure, pancreatitis, calcium channel blocker overdose, rhabdomyolysis, tumor lysis syndrome, and drugs such as bisphosphonates or denosumab. The diagnosis should generally be confirmed by a corrected calcium or ionized calcium level. Specific changes can be seen on the electrocardiogram (ECG).

Initial treatment of severe disease is intravenous administration of calcium chloride and possibly magnesium sulfate. Additional treatment may include vitamin D, magnesium, and calcium supplements. Hydrochlorothiazide, phosphate binders, and a low-salt diet may also be recommended for hypoparathyroidism. About 18% of people who are treated in hospital have hypocalcemia.

## Symptoms

The neuromuscular symptoms of hypocalcemia are due to a positive bathmotropic effect (ie, increased sensitivity) due to decreased interaction of calcium with sodium channels. Because calcium blocks sodium channels and inhibits depolarization of nerve and muscle fibers, reduced calcium lowers the depolarization threshold. Symptoms can be evoked with the mnemonic “CATs go numb” - convulsions, arrhythmias, tetany and numb-

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ness in the hands and feet and around the mouth.

- Petechiae that appear as on-off spots later coalesce to appear as purpura (larger bruised areas, usually in dependent areas of the body).
- Oral, perioral and acral paresthesias, tingling or “tingling” in and around the mouth and lips and extremities. This is often the earliest symptom of hypocalcemia.
- Carpopedal and generalized tetany (unrelaxed and strong contractions of the hands and large muscles of the rest of the body) is seen.

## Causes

There are many complex functions and factors involved in maintaining stable calcium levels in the blood and body. Because of this, several different medical conditions and disorders can cause hypocalcemia.

In most cases, the cause of hypocalcemia is a problem with your Parathyroid Hormone (PTH) and/or vitamin D levels. This is because PTH helps control the level of calcium in your blood and vitamin D helps your body absorb calcium.

The three most common causes of hypocalcemia include;

**Hypoparathyroidism:** Hypoparathyroidism occurs when your parathyroid glands (the four small pea-sized glands behind the thyroid gland in the neck) do not make enough Parathyroid Hormone (PTH). Low PTH levels cause low calcium levels in your body. You may have hypoparathyroidism from an inherited disorder or from surgical removal of one or more of your parathyroid glands or thyroid gland.

**Vitamin D deficiency:** Vitamin D helps your body absorb calcium properly, so a lack of vitamin D in the body can cause low levels of calcium in the blood (hypocalcemia). Vitamin D deficiency can be caused by an inherit-

ed disorder or a lack of sunlight or insufficient vitamin D consumption.

**Kidney failure (kidney failure):** Hypocalcemia in chron-

ic kidney failure is caused by increased levels of phosphorus in the blood and reduced production of a certain type of vitamin D by the kidneys.