CONDITION

Calcium carbonate overdose

Learn how excess calcium carbonate from antacids or supplements can cause high blood calcium, kidney problems, and other symptoms, and when to seek help.

WHAT IT IS
Calcium carbonate poisoning causing high blood calcium

BODY SYSTEM
Digestive system, kidneys, heart and nervous system

MAIN SYMPTOMS
Nausea or vomiting, constipation, unusual thirst, confusion

WHAT CAUSES IT
Too many calcium carbonate antacids or supplements

HOW IT IS DIAGNOSED
Blood calcium, bicarbonate and kidney function tests

MAIN TREATMENT
Stopping exposure, hydration and supportive care

CAN IT BE CURED?
Sometimes - most improve, injury may persist

IS IT AN EMERGENCY?
Sometimes - collapse, seizure, breathing trouble or unresponsiveness

LONG-TERM OUTLOOK
Most improve, but prolonged kidney injury may persist

Overview

Calcium carbonate is a form of calcium used in many antacids and dietary supplements. It can relieve heartburn and help people meet their calcium needs when taken as directed. An overdose happens when someone takes more calcium carbonate than the body can safely handle.

An overdose may be a single large ingestion, such as a child swallowing many tablets. It can also develop gradually when a person regularly takes too much calcium carbonate. Chronic exposure may happen when someone combines several antacids and supplements without realizing that they contain the same ingredient.

Too much calcium carbonate can raise the amount of calcium in the blood. This is called hypercalcemia . It can also make the blood too alkaline and reduce kidney function. Together,

these findings are often called calcium-alkali syndrome , formerly known as milk-alkali syndrome.

The effects range from mild stomach symptoms to confusion, abnormal heart rhythms, and kidney injury. The risk does not depend only on the number of tablets. Tablet strength, duration of use, kidney function, hydration, other medicines, and vitamin D intake can all affect the outcome.

If an overdose may have occurred, do not wait for symptoms before getting advice. In the United States, contact Poison Help at 1-800-222-1222 . The service is free and connects callers with a local poison center. Outside the United States, contact the local poison information service or emergency system.

Symptoms

Symptoms depend on how much calcium carbonate was taken, whether it was taken at once or over time, and whether blood calcium or kidney function has changed.

Early digestive symptoms may include:

As the blood calcium level rises, the kidneys may release more water into the urine. This can cause frequent urination and dehydration. A person may feel weak, tired, or generally unwell.

Effects on the brain and nerves can include headache, poor concentration, irritability, slowed thinking, confusion, or unusual sleepiness. Severe hypercalcemia can lead to marked confusion, loss of consciousness, or seizures, although these outcomes are uncommon.

High calcium can also affect the heart's electrical system. A person may notice palpitations, weakness, lightheadedness, or fainting. Some people have no obvious heart symptoms even when an electrocardiogram shows a change.

Call emergency services now if the person collapses, has a seizure, has trouble breathing, cannot be awakened, is severely confused, or has fainted. Do not drive a seriously ill person to the hospital if emergency transport is available.

For a possible overdose without emergency symptoms, call a poison center promptly. Do not make the person vomit unless a poison specialist or healthcare professional specifically tells you to do so.

- Nausea or vomiting
- Constipation
- Abdominal pain

- Loss of appetite
- Unusual thirst
- Dry mouth

Causes and risk factors

Calcium carbonate overdose most often results from taking too many antacid or calcium supplement tablets. It may be accidental, related to misunderstanding a label, or intentional. Some people use increasing amounts of antacid because their heartburn continues, which can lead to repeated excess exposure.

Different products contain different amounts of calcium carbonate and elemental calcium , the amount of calcium the body can absorb. A label may list both numbers. Counting tablets without checking their strength can therefore be misleading.

Another common problem is using several calcium-containing products at the same time. For example, a person may take a calcium supplement, a multivitamin with calcium, and calcium carbonate antacids. Prescription and nonprescription products should be included when calculating total intake.

Factors that may increase the chance of toxicity include:

Calcium-alkali syndrome develops when absorbed calcium and alkali overwhelm the body's ability to keep calcium and acid-base balance normal. High calcium can narrow blood vessels in the kidneys and increase urine production. The resulting dehydration and kidney impairment make it harder to remove calcium, creating a cycle that can worsen the problem.

Ordinary calcium-containing foods are not the usual cause of calcium carbonate overdose. The concern is generally concentrated antacids or supplements, especially when taken above label directions or combined with other sources.

- Reduced kidney function
- Dehydration
- Frequent or long-term use of calcium carbonate
- Taking vitamin D, which can increase calcium absorption
- Use of thiazide diuretics, which can reduce calcium loss in urine
- Older age or medical conditions that make it harder to maintain hydration
- A history of kidney stones or abnormal calcium levels

Diagnosis

Healthcare professionals first ask what product was taken, how much may have been taken, and when it happened. They also ask about regular supplement use, antacids, vitamin D, prescription medicines, kidney disease, and recent symptoms.

If possible, bring the product container or a clear photograph of its label. Do not delay emergency care to search for packaging. Poison specialists may use the product name, tablet strength, estimated amount, age, weight, and symptoms to recommend home observation or medical evaluation.

Blood tests may measure total calcium and, in some situations, ionized calcium , which is the biologically active form. Because some calcium travels in the blood attached to the protein albumin, clinicians interpret total calcium in relation to the albumin level.

Other tests may include:

If the reason for high calcium is uncertain, clinicians may test parathyroid hormone, vitamin D, and other markers. A low parathyroid hormone level can support the possibility that excess calcium intake or another non-parathyroid cause is responsible. Imaging is not always needed, but it may be used when kidney stones, calcium deposits, or another condition is suspected.

Diagnosis is based on the overall pattern. A calcium level alone does not show how the problem developed or how urgently it needs treatment.

- Kidney function tests, including creatinine
- Electrolytes such as potassium, magnesium, and phosphate
- Bicarbonate or blood gas testing to check for excess alkalinity
- Urine testing and measurement of urine output
- An electrocardiogram to look for heart rhythm or conduction changes

Treatment and management

The first step is to stop further exposure to calcium carbonate. A poison center or healthcare professional can help identify all relevant products. People should not restart calcium supplements or calcium-containing antacids after an overdose until a clinician has reviewed the reason they were being used.

At home, do not induce vomiting or try to "neutralize" the calcium carbonate with another substance. Do not force large amounts of water, particularly if the person is vomiting, confused, has heart or kidney disease, or has been told to limit fluids. Follow the poison

center's instructions.

Mild exposures may only require observation and follow-up. The poison specialist may recommend watching for vomiting, confusion, unusual weakness, increased thirst, frequent urination, or reduced urine output.

Hospital treatment depends on symptoms, calcium level, hydration, kidney function, and heart findings. Care may include intravenous fluids to correct dehydration and help the kidneys remove calcium. Clinicians monitor fluid balance carefully because too much fluid may be harmful in some people with heart or kidney disease.

Medicines that lower blood calcium may be considered for significant or persistent hypercalcemia. The choice depends on the cause and clinical severity. Calcium-alkali syndrome often improves after calcium carbonate is stopped and hydration is restored, so not every person needs a calcium-lowering medicine.

Dialysis, a treatment that filters the blood, may be needed in selected severe cases. It may be considered when kidney failure limits calcium removal, when hypercalcemia is life-threatening, or when standard treatment cannot be used safely.

Treatment also includes reviewing why the person was taking calcium carbonate. Ongoing heartburn may need a different evaluation or management plan. If calcium was being taken for bone health, a clinician can review dietary intake, supplement need, vitamin D use, and bone-related risk factors.

An intentional overdose requires both medical treatment and a compassionate mental health assessment. If you or someone else may act on thoughts of self-harm, contact emergency services or a local crisis service now.

Complications

Most recognized cases improve when excess calcium carbonate is stopped and the resulting dehydration and electrolyte problems are treated. However, complications can occur when hypercalcemia is severe or continues for a long time.

Possible complications include acute kidney injury, kidney stones, and calcium deposits within kidney tissue. Kidney function often improves, but prolonged injury may not be fully reversible.

Severe calcium or acid-base disturbances can cause abnormal heart rhythms. Neurologic complications may include profound confusion, reduced consciousness, or seizures.

Vomiting and increased urination can worsen dehydration. Changes in potassium, magnesium, or phosphate may add to muscle weakness or heart rhythm problems. In uncommon severe

cases, inflammation of the pancreas or deposits of calcium in other tissues may occur.

Prompt assessment is especially important when symptoms are progressing, urine output is falling, or the person has existing kidney or heart disease.

Follow up

Follow-up depends on the severity of the exposure. After a clinically important overdose, a healthcare professional may repeat calcium, bicarbonate, kidney function, and other electrolyte tests until they return toward the expected range.

Seek prompt medical advice if nausea, constipation, thirst, frequent urination, weakness, or slowed thinking continues after the suspected exposure. Reduced urination, worsening confusion, repeated vomiting, fainting, or palpitations require urgent assessment.

Routine follow-up should include a review of every medicine, antacid, vitamin, and supplement being used. Keeping an updated product list can help prevent accidental duplication. Labels should be checked for both calcium carbonate and elemental calcium.

Store antacids and supplements out of children's sight and reach. Their candy-like appearance and flavor may make chewable tablets attractive to children.

A clinician can also help address the original reason for taking the product. Persistent or frequent heartburn should not simply be treated with increasing amounts of antacid. People taking calcium for bone health may benefit from a review of whether supplementation is needed and how it fits with dietary calcium.

Sources

- MedlinePlus Medical Encyclopedia. Calcium carbonate overdose. U.S. National Library of Medicine.
- America's Poison Centers. Get Poison Help. National poison center guidance for suspected poisoning and the Poison Help line.
- Goltzman D. Approach to Hypercalcemia. Endotext. MDText.com, Inc.; National Center for Biotechnology Information Bookshelf. Updated 2023.
- Patel AM, Adeseun GA, Goldfarb S. Calcium-alkali syndrome in the modern era. Nutrients. 2013;5(12):4880-4893. doi:10.3390/nu5124880.



- Medarov BI. Milk-alkali syndrome. Mayo Clinic Proceedings. 2009;84(3):261-267. doi:10.1016/S0025-6196(11)61144-0.
- DailyMed. Calcium carbonate chewable tablet drug labeling. U.S. National Library of Medicine.