CONDITION

Oxalic acid poisoning

Oxalic acid poisoning is toxic and corrosive injury caused by swallowing, breathing, or touching concentrated oxalic acid.

WHAT IT IS
Toxic injury from exposure to concentrated oxalic acid

BODY SYSTEM
Digestive system, kidneys, heart, nervous system, skin, and eyes

MAIN SYMPTOMS
Mouth burns, vomiting, muscle spasms, reduced urination

WHAT CAUSES IT
Swallowing, breathing, or touching concentrated oxalic acid

HOW IT IS DIAGNOSED
Exposure history, blood tests, urine microscopy, and ECG

MAIN TREATMENT
Emergency supportive care, calcium replacement, and sometimes dialysis

CAN IT BE CURED?
Sometimes - early treatment can prevent lasting injury

IS IT AN EMERGENCY?
Yes - swallowing or significant exposure needs immediate care

LONG-TERM OUTLOOK
Often good after prompt care; kidney injury may persist

Overview

Oxalic acid poisoning happens when concentrated oxalic acid enters the body or damages tissues. Oxalic acid is a corrosive chemical, meaning it can burn the mouth, throat, digestive tract, skin, or eyes. Once absorbed, it can also disturb calcium levels and damage the kidneys.

Oxalic acid is used in some rust removers, metal treatments, bleaching products, cleaning products, and industrial processes. The concentration differs between products. Crystals, powders, and strong solutions can be especially hazardous.

Oxalic acid binds to calcium and forms calcium oxalate crystals. This can lower calcium in the blood and deposit crystals in the kidneys. Severe poisoning may affect the heartbeat, muscles, brain, and circulation.

Oxalate also occurs naturally in foods such as spinach, nuts, and rhubarb. Normal food exposure is different from poisoning with a concentrated chemical product. People with certain kidney stone risks may receive advice about dietary oxalate, but that is not the same condition as acute oxalic acid poisoning.

Suspected swallowing of oxalic acid requires immediate poison-control or emergency advice. Do not wait for symptoms, because serious effects may develop after the first burning or stomach symptoms.

Symptoms

Symptoms depend on how the exposure happened, the product's strength, and how much entered the body. Swallowing concentrated oxalic acid often causes immediate burning and digestive symptoms. Kidney and calcium problems may develop over the following hours or days.

Possible symptoms after swallowing include:

Low blood calcium, called hypocalcemia , can cause tingling around the mouth, painful muscle tightening, spasms, seizures, and abnormal heart rhythms. These signs need urgent treatment.

Breathing oxalic acid dust or mist may irritate the nose, throat, and lungs. Symptoms can include coughing, chest tightness, wheezing, or shortness of breath.

Skin contact can cause pain, redness, burns, or slow-healing sores. Contact through damaged skin may allow more chemical to enter the body. Repeated workplace contact may also damage the skin and nails.

An eye splash can cause severe pain, watering, redness, light sensitivity, and vision problems. Eye injury may be serious even if the splash was small.

- Burning pain in the mouth, throat, chest, or abdomen
- Drooling or difficulty swallowing
- Nausea, vomiting, or diarrhea, sometimes with blood
- Muscle cramps, twitching, tingling, or weakness
- Dizziness, confusion, seizures, or loss of consciousness
- Fast, slow, or irregular heartbeat
- Reduced urination, blood in the urine, or pain near the kidneys

Causes and risk factors

Poisoning is usually caused by accidental or intentional exposure to a concentrated product. It is not an infection, inherited condition, or allergic reaction.

Situations that raise the risk include:

The product label or safety data sheet can help identify the concentration and other ingredients. Some products contain several chemicals, so symptoms may not be due to oxalic acid alone.

Ethylene glycol, an ingredient in some antifreeze products, is not oxalic acid. However, the body can break ethylene glycol down into toxic substances, including oxalate. Ethylene glycol poisoning requires a different assessment and may need an antidote. Tell emergency staff the exact product involved whenever possible.

- Storing chemicals in drink bottles or unlabelled containers
- Using industrial cleaners or rust removers without suitable protection
- Creating dust while handling oxalic acid crystals or powder
- Working in poorly ventilated areas
- Leaving chemical products where children can reach them
- Attempting to use industrial oxalic acid in food or home remedies

Diagnosis

Diagnosis begins with the exposure history. Clinicians need to know the product name, concentration, route of exposure, estimated amount, and time it happened. The container or a clear photograph of its label can be useful, but do not bring a leaking or contaminated container into an enclosed space.

Blood tests are used to measure calcium and other salts, kidney function, blood acidity, and signs of organ injury. The more biologically active form of calcium, called ionized calcium , may be checked because oxalic acid can lower it.

An electrocardiogram, or ECG, records the heart's electrical activity. It can show changes caused by low calcium or other chemical disturbances.

Urine may be examined for calcium oxalate crystals and signs of kidney injury. Crystals can support the diagnosis, but they do not prove poisoning by themselves. They can also occur for other reasons.

Specialist laboratories can measure oxalate in blood or urine, but these results may not be

available quickly. Emergency treatment is therefore based on the exposure, symptoms, and routine test results rather than waiting for an oxalate level.

After significant swallowing, clinicians may assess for burns to the food pipe and stomach. This can involve endoscopy, in which a flexible camera is passed through the mouth. Imaging may be needed if there are signs of a hole, severe swelling, or damage deeper in the chest or abdomen.

Treatment and management

Treatment starts with stopping the exposure and supporting breathing, circulation, and heart function. The specific care depends on whether the chemical was swallowed, inhaled, or splashed onto the body.

If oxalic acid gets on the skin, contaminated clothing should be removed carefully and the skin rinsed immediately with plenty of running water. An exposed eye should also be irrigated immediately. Contact lenses should be removed if they come out easily. Medical assessment is important for continuing pain, burns, or any eye exposure.

Move away from dust or fumes into fresh air without entering an unsafe area. Breathing problems need urgent assessment.

If oxalic acid is swallowed, do not make the person vomit. Vomiting can expose the throat to the corrosive chemical again. Do not try to neutralize it with another chemical, and do not give food, drink, or home remedies unless a poison specialist or emergency professional directs you to do so.

Hospital treatment may include:

Dialysis filters the blood. It may help remove oxalate and correct dangerous changes in body chemistry. It is not needed in every case.

Surgery is uncommon but may be necessary if corrosive injury causes a hole in the digestive tract or severely damaged tissue.

- Intravenous fluids and close monitoring
- Medicines for pain, nausea, seizures, or other symptoms
- Calcium replacement for symptomatic or significant hypocalcemia
- Airway and breathing support if swelling or reduced consciousness develops
- Treatment of burns to the digestive tract, skin, or eyes
- Dialysis for severe poisoning, kidney failure, major acid disturbance, or persistent toxicity

Complications

Corrosive injury may cause deep burns, bleeding, swelling, or a hole in the food pipe or stomach. Healing can produce scar tissue. A narrowed area of the food pipe, called a stricture , may later make swallowing difficult.

Calcium oxalate crystals can block and inflame the kidneys. This can cause acute kidney injury, meaning the kidneys suddenly stop working normally. Kidney function often improves with treatment, but some people develop lasting impairment.

Other possible complications include:

The risk of complications is higher after concentrated or prolonged exposure, delayed treatment, severe early symptoms, or reduced kidney function before the poisoning.

- Severe low blood calcium
- Dangerous heart rhythm changes
- Seizures or reduced consciousness
- Low blood pressure and poor circulation
- Lung injury after inhalation or vomit entering the lungs
- Permanent eye damage after a severe splash
- Chronic kidney disease after major kidney injury

Prevention

Most oxalic acid poisoning is preventable. The chemical should remain in its original, clearly labelled container and be stored securely away from food, medicines, and children.

Follow the product label and workplace safety data sheet. Depending on the task, protection may include chemical-resistant gloves, eye protection, suitable clothing, ventilation, and respiratory equipment selected for that workplace. Ordinary glasses do not provide the same protection as chemical goggles.

Avoid producing dust when handling crystals or powder. Do not eat, drink, or smoke in a chemical work area. Wash exposed hands before touching food or the face.

Never transfer oxalic acid into a cup, soft-drink bottle, or food container. Do not mix it with other cleaning products or attempt to use an industrial product as a medicine or food ingredient.

Dietary oxalate does not usually cause this type of acute corrosive poisoning. People who have

calcium oxalate kidney stones or certain bowel and kidney conditions may need separate, individualized dietary advice.

Living with it and what to expect

Oxalic acid poisoning is usually a one-time injury rather than a continuing illness. The course over the following weeks and months depends mainly on the amount absorbed and whether the digestive tract, kidneys, eyes, or lungs were damaged.

Minor skin irritation may settle after thorough washing and appropriate care. Deeper chemical burns can take longer to heal and may need wound follow-up.

After significant swallowing, pain and inflammation may improve while scar tissue is still forming. New or increasing trouble swallowing in the following weeks needs medical review because it may indicate a stricture.

Kidney tests can remain abnormal after the immediate crisis has passed. Recovery from acute kidney injury may take days to months. Follow-up commonly focuses on kidney function, urine output, calcium levels, blood pressure, and any ongoing symptoms. Some people need temporary dialysis; a smaller number may be left with chronic kidney disease.

A severe poisoning can also be emotionally difficult. Accidental workplace or household exposures may lead to anxiety about using chemicals again. Intentional poisoning should be followed by compassionate mental health support and a safety plan.

Complete recovery is possible, particularly when exposure is recognized and treated early, but it cannot be guaranteed after major tissue or kidney injury.

When to get medical help

Get emergency help now after any known or suspected swallowing of concentrated oxalic acid. Call emergency services for severe pain, repeated vomiting, breathing difficulty, confusion, collapse, seizures, muscle spasms, very little urine, or an abnormal heartbeat.

In the United States, call Poison Control at 1-800-222-1222 or use its online service. Elsewhere, contact the local poison information center or emergency service. Do not wait for symptoms and do not induce vomiting.

An eye splash needs immediate rinsing followed by urgent medical assessment. Significant skin burns, continuing pain after rinsing, or breathing symptoms after inhalation also require prompt care.

Routine follow-up is appropriate after the emergency has passed if you were advised to repeat kidney or calcium tests, have a healing burn, or need monitoring for digestive scarring. Arrange earlier review if swallowing becomes harder, urine output falls, swelling develops, or symptoms return.

Common questions

Can oxalic acid poisoning be fatal?

Yes, severe poisoning can be fatal because it may cause corrosive burns, very low calcium, abnormal heart rhythms, seizures, shock, or kidney failure. Prompt poison-center and emergency treatment can reduce these risks.

What should I do if I swallowed oxalic acid?

Call a poison center or emergency service immediately. Do not make yourself vomit, try to neutralize the chemical, or take a home remedy. Keep the product label available so professionals can identify its concentration and other ingredients.

Is oxalic acid in food the same as industrial oxalic acid?

It is the same basic chemical, but the amount and concentration are very different. Foods contain oxalate as part of a normal diet and do not usually cause acute corrosive poisoning. Concentrated crystals and cleaning or industrial solutions can cause serious injury.

Does oxalic acid poisoning cause kidney stones?

The absorbed acid can form calcium oxalate crystals that injure the kidneys. This is not exactly the same as slowly developing kidney stones, although both involve calcium oxalate. A poisoning episode may cause sudden kidney failure even without a typical stone.

Is oxalic acid the same as antifreeze?

No. Some antifreeze contains ethylene glycol, which the body can convert into toxic acids and oxalate. The two exposures can produce some similar kidney findings, but ethylene glycol poisoning has different tests and treatments, including specific antidotes.

Can milk or calcium tablets neutralize oxalic acid?

Do not use milk, calcium tablets, baking soda, or another substance as a home treatment unless a poison specialist specifically directs it. Attempting to neutralize a corrosive chemical can cause more injury or delay effective treatment.

Sources

- MedlinePlus Medical Encyclopedia: Oxalic acid poisoning , U.S. National Library of Medicine
- NIOSH Pocket Guide to Chemical Hazards: Oxalic acid , National Institute for Occupational Safety and Health
- Oxalic Acid and Sodium Oxalate, Poisons Information Monograph 780 , International Programme on Chemical Safety
- PubChem Compound Summary: Oxalic Acid , National Center for Biotechnology Information
- Caustic Ingestion , Merck Manual Professional Edition
- Poison Control: Get help , National Capital Poison Center