CONDITION

Hydrochloric acid poisoning

Hydrochloric acid poisoning is corrosive injury caused by swallowing, breathing, or touching hydrochloric acid.

WHAT IT IS
Corrosive injury from exposure to hydrochloric acid

BODY SYSTEM
Digestive tract, lungs, skin, and eyes

MAIN SYMPTOMS
Burning pain, drooling, cough, breathing difficulty

WHAT CAUSES IT
Accidental, workplace, or intentional acid exposure

HOW IT IS DIAGNOSED
Exposure history, examination, endoscopy, and imaging

MAIN TREATMENT
Decontamination, supportive care, and burn treatment

CAN IT BE CURED?
Sometimes - mild injuries may heal fully

IS IT AN EMERGENCY?
Yes - swallowing, breathing difficulty, or eye exposure

LONG-TERM OUTLOOK
Mild injuries often heal; deep burns may cause lasting damage

Overview

Hydrochloric acid is a strong, corrosive chemical. It is used in industry, laboratories, metal cleaning, swimming pool products, and some household cleaners. Hydrogen chloride gas forms hydrochloric acid when it comes into contact with moisture, including moisture in the eyes, airways, and lungs.

Hydrochloric acid poisoning usually causes damage by burning tissue rather than by spreading through the body as a typical poison. Injury can occur after swallowing the liquid, breathing its fumes, or getting it on the skin or in the eyes.

How serious the injury is depends on the acid's concentration, the amount involved, how long it touched the body, and the route of exposure. Diluted products can still cause injury. Concentrated acid can quickly damage deep tissue.

Symptoms do not always show the full extent of the damage. For example, someone may have few visible mouth burns but still have an injured food pipe, also called the oesophagus. Breathing problems can also become worse after the initial exposure. Prompt advice from emergency services or a poison centre is therefore important.

Symptoms

Swallowed hydrochloric acid can burn the lips, mouth, throat, oesophagus, and stomach. Possible symptoms include:

Breathing hydrogen chloride fumes may cause burning in the nose and throat, coughing, chest tightness, wheezing, headache, or difficulty breathing. A severe exposure can cause inflammation and fluid in the lungs. This may worsen over several hours.

Skin contact may cause pain, redness, blisters, or a chemical burn. The skin can sometimes look pale or discoloured. Deeper burns may damage tissue below the surface.

Eye exposure may cause immediate pain, watering, redness, sensitivity to light, blurred vision, or loss of vision. Even a small splash requires urgent rinsing and medical assessment.

Severe exposure can lead to confusion, weakness, fainting, low blood pressure, or collapse. These are emergency symptoms.

- Severe burning pain in the mouth, chest, or abdomen
- Drooling or difficulty swallowing
- Vomiting, sometimes with blood
- A hoarse voice, noisy breathing, or swelling in the throat
- Coughing, choking, or shortness of breath

Causes and risk factors

Hydrochloric acid poisoning happens when the chemical enters or contacts the body. Common circumstances include accidental splashes, spills at work, incorrect storage, and using a product in a poorly ventilated area.

Risk is higher when handling concentrated industrial or laboratory products. People who work with metal processing, chemical manufacturing, pool maintenance, cleaning products, or laboratory chemicals may have greater exposure unless suitable controls and protective equipment are used.

Children may swallow a product that has been transferred into a drink bottle or left within reach. Keeping chemicals in their original labelled containers helps prevent this.

Hydrochloric acid should never be mixed with bleach. Mixing an acid with bleach can release chlorine gas, which can seriously irritate the eyes and lungs. Other cleaning products should not be mixed unless their labels clearly say this is safe.

Intentional swallowing can cause especially severe injury. It also signals a need for compassionate mental health support after immediate medical care.

Diagnosis

Diagnosis begins with finding out what product was involved, its concentration if known, the route of exposure, and when it happened. Bringing the container or a photograph of its label can help, but you should not handle a leaking container or delay emergency care to retrieve it.

The medical team examines the mouth, breathing, skin, eyes, chest, and abdomen. Normal-looking lips or mouth tissue do not rule out deeper injury.

After swallowing, an endoscopy may be needed. This involves passing a thin camera through the mouth to examine the oesophagus and stomach. It helps show the depth and extent of the burns. The timing and safety of endoscopy are decided by the hospital team.

Chest or abdominal imaging may be used if there are signs of a hole in the oesophagus or stomach, known as a perforation. A CT scan can also help assess deep tissue injury. Chest imaging may be needed after significant inhalation or if breathing symptoms develop.

Blood tests do not confirm hydrochloric acid poisoning. They can show complications such as blood acidity changes, inflammation, bleeding, or kidney problems. Tests of breathing and oxygen levels may be used after fume exposure.

An eye specialist may examine the surface of the eye and check vision after a splash.

Treatment and management

Immediate treatment starts by stopping further exposure without putting anyone else at risk.

For skin contact, contaminated clothing and jewellery should be removed carefully. The affected skin should be rinsed immediately with plenty of running water. Do not scrub the skin or apply neutralising chemicals.

For an eye splash, begin gentle rinsing with clean, lukewarm water straight away. Remove contact lenses if they come out easily. Continue rinsing while emergency or poison-centre

advice is arranged. Do not put drops, chemicals, or ointments in the eye unless instructed.

After inhalation, move into fresh air only if this can be done safely. Do not enter an enclosed or contaminated space without proper protective equipment.

If hydrochloric acid has been swallowed, do not cause vomiting. Vomiting exposes the throat and oesophagus to the acid again. Do not try to neutralise it with baking soda, alkali, or another chemical because the reaction may produce heat and gas. Activated charcoal does not absorb hydrochloric acid and may interfere with examination. Do not give food or drink unless a poison specialist or emergency professional advises it.

Hospital treatment is based on the injuries present. It may include oxygen, breathing support, intravenous fluids, pain relief, and close monitoring. Early swelling in the throat can make breathing difficult, so some people need a breathing tube.

Endoscopy helps guide treatment after ingestion. Deep burns, tissue death, perforation, or severe bleeding may require surgery. Antibiotics and steroid medicines are not routine treatments for every exposure; they may be considered in selected circumstances.

Skin burns are cleaned, covered, and managed according to their depth. Serious burns may need specialist burn care. Eye injuries may require repeated irrigation and urgent treatment by an eye specialist.

Later narrowing of the oesophagus may be treated by carefully stretching it during endoscopy. Some people need this procedure more than once. Severe narrowing may require feeding support or surgery.

Complications

Most complications result from deep chemical burns.

Swelling of the throat can block airflow. Lung complications include inflammation, chemical pneumonitis, fluid in the lungs, and acute respiratory distress syndrome, a severe form of breathing failure.

A deep burn can create a hole in the oesophagus, stomach, or bowel. Leakage into the chest or abdomen can cause serious infection and inflammation. Severe bleeding, shock, and injury to other organs are also possible after major exposure.

As injured tissue heals, scar tissue may narrow the oesophagus. This is called an oesophageal stricture. It can cause food to stick, painful swallowing, vomiting after meals, weight loss, or repeated chest infections from food entering the airway.

Skin exposure can leave scars or affect movement if a deep burn crosses a joint. Eye exposure

may scar the cornea, the clear front surface of the eye, and can permanently affect vision.

People with major caustic injury to the oesophagus have a higher long-term risk of oesophageal cancer. This risk relates mainly to severe injury and develops over many years. A specialist can explain whether long-term monitoring is appropriate.

Prevention

Most accidental hydrochloric acid exposures can be prevented.

Keep products in their original, labelled containers. Never store acid in a cup, food container, or drink bottle. Lock hazardous products away from children and pets.

Read the label before use. Follow workplace safety procedures and use the ventilation, gloves, eye protection, clothing, or respiratory protection specified for that product. Ordinary masks do not reliably protect against corrosive gases.

Do not mix hydrochloric acid, toilet cleaner, pool chemicals, or other acidic products with bleach. Avoid mixing cleaning products in general.

Use concentrated products only in suitable, well-ventilated areas. Keep the container closed when it is not in use. Workplaces should have appropriate spill plans, washing facilities, and access to safety data sheets.

Living with it and what to expect

The course depends mainly on how deeply the acid damaged tissue. A brief, minor skin or fume exposure may settle over days after proper decontamination and assessment. More significant burns can take weeks or months to heal.

After a serious inhalation exposure, coughing and breathing problems may continue while the lungs recover. Follow-up may include breathing tests or chest assessment, especially if symptoms persist.

After swallowing acid, early improvement does not always mean healing is complete. Scar tissue can form as the oesophagus heals, leading to swallowing difficulty during the following weeks or months. New trouble swallowing, food sticking, vomiting after eating, or unplanned weight loss needs prompt review.

People with an oesophageal stricture may require repeated endoscopic stretching. Nutrition support can help if eating becomes difficult. Deep injuries may lead to lasting changes in eating, breathing, vision, skin movement, or appearance, but these outcomes are not

inevitable.

Routine follow-up may involve a digestive specialist, lung specialist, burns team, eye specialist, dietitian, or rehabilitation service. Follow-up is particularly important after hospital treatment, deep burns, ongoing breathing symptoms, or any change in swallowing.

An intentional exposure may be followed by emotional distress, shame, anxiety, or low mood. Mental health care is an important part of recovery and should be offered without judgement.

When to get medical help

Swallowing hydrochloric acid is an emergency even if symptoms seem mild. Contact emergency services and a poison centre immediately. Do not wait for pain or vomiting to develop.

Call emergency services now for:

Any hydrochloric acid splash in the eye needs immediate rinsing and urgent medical assessment. Significant skin burns also need urgent care, especially if there are blisters, numbness, severe pain, discolouration, or a large affected area.

After an inhalation exposure, seek urgent advice if coughing, wheezing, chest discomfort, or shortness of breath develops or worsens. Lung symptoms can be delayed.

Routine follow-up is appropriate for a healing minor burn that has already been assessed, stable symptoms after discharge, or planned checks of swallowing, breathing, vision, or scarring. Do not wait for a routine appointment if symptoms suddenly worsen.

In the United States, Poison Control can be reached at 1-800-222-1222. Elsewhere, contact your local poison information centre or emergency service.

- Trouble breathing, noisy breathing, blue or grey lips, or severe chest tightness
- Drooling, inability to swallow, repeated vomiting, or vomiting blood
- Fainting, confusion, seizure, severe weakness, or collapse
- Severe chest or abdominal pain
- A large exposure, concentrated product, or exposure in an enclosed space

Common questions

What happens if you swallow hydrochloric acid?

It can burn the mouth, throat, oesophagus, and stomach. The most serious risks include airway

swelling, bleeding, perforation, and later scar-related narrowing. The amount of pain does not reliably show how deep the injury is, so urgent assessment is needed.

Can hydrochloric acid fumes damage your lungs?

Yes. Hydrogen chloride gas reacts with moisture in the airways and can cause chemical burns. Symptoms may include coughing, wheezing, chest tightness, and shortness of breath. Severe inflammation or fluid in the lungs can develop after the exposure.

Should I make myself vomit or neutralise the acid?

No. Vomiting can burn the oesophagus a second time. Trying to neutralise acid with another chemical may release heat or gas and worsen the injury. Rinse the mouth, avoid swallowing the rinse water, and follow emergency or poison-centre instructions.

Will hydrochloric acid poisoning cause permanent damage?

Not always. Minor exposures may heal fully. Deep burns can leave scars, swallowing problems, lung damage, skin changes, or impaired vision. Early decontamination and appropriate medical care can limit continuing exposure but cannot always reverse damage that has already occurred.

How long after exposure can symptoms appear?

Burning and coughing often begin immediately, but some complications develop later. Breathing may worsen over several hours, while narrowing of the oesophagus can appear during healing over the following weeks or months.

Is hydrochloric acid the same acid that is in the stomach?

The stomach naturally produces hydrochloric acid to help digest food, but its lining has protective mechanisms. Commercial products may be much more concentrated, and the mouth, oesophagus, eyes, lungs, and skin do not have the same protection.

Sources

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