CONDITION

Anti-rust product poisoning

Learn how anti-rust products can cause poisoning, what symptoms may occur, what first aid to use, and when emergency medical care is needed.

WHAT IT IS
Poisoning from corrosive anti-rust chemicals

BODY SYSTEM
Multiple body systems

MAIN SYMPTOMS
Burns, breathing difficulty, vomiting, abnormal heartbeat

WHAT CAUSES IT
Chemical exposure

HOW IT IS DIAGNOSED
Product identification, examination, ECG, blood tests

MAIN TREATMENT
Decontamination and supportive hospital care

CAN IT BE CURED?
Sometimes - many recover with prompt care

IS IT AN EMERGENCY?
Sometimes - trouble breathing or abnormal heartbeat

LONG-TERM OUTLOOK
Many recover, but severe exposure can cause lasting damage

Overview

Anti-rust products remove rust from metal or change it into a more stable coating. They may be sold as rust removers, rust converters, metal cleaners, wheel cleaners, or industrial descaling products.

These products do not all contain the same chemicals. Some contain strong acids, such as hydrofluoric acid, oxalic acid, phosphoric acid, or hydrochloric acid. Others contain solvents or different corrosive ingredients. A corrosive chemical can burn or destroy tissue on contact.

Poisoning can happen when a product is swallowed, inhaled, splashed into the eyes, or spilled on the skin. The possible effects depend on the ingredients, concentration, amount, route of exposure, and time before treatment.

Hydrofluoric acid deserves special attention. In addition to causing burns, fluoride can move through tissue and disrupt calcium, magnesium, and potassium levels. This may affect the heart and other organs. Pain or visible skin damage may be delayed after exposure to a dilute product, so a mild-looking injury is not always a minor one. Oxalic acid can also lower calcium and may injure the kidneys. [1-4]

Any suspected poisoning should be discussed promptly with a poison center or medical professional. In the United States, Poison Control can be reached at 1-800-222-1222. Outside the United States, contact the local poison information service. Call emergency services for severe symptoms.

Symptoms

Symptoms may begin right away or develop over several hours. The absence of immediate pain does not rule out a significant exposure, especially when hydrofluoric acid may be present.

Skin exposure may cause burning, redness, swelling, pale or hardened skin, blisters, or deep tissue injury. Hydrofluoric acid exposure may produce severe, throbbing pain that seems greater than the visible skin damage. With weaker solutions, pain can be delayed.

Eye exposure may cause intense pain, tearing, redness, sensitivity to light, blurred vision, or loss of vision. Eye injury from a corrosive product requires immediate irrigation and urgent medical assessment.

Breathing fumes or spray may irritate the nose, throat, and lungs. Symptoms can include coughing, choking, chest tightness, wheezing, hoarseness, shortness of breath, headache, or dizziness. Fluid and inflammation in the lungs may develop after the initial exposure.

Swallowing an anti-rust product can burn the mouth, throat, esophagus, and stomach. Possible symptoms include drooling, painful swallowing, vomiting, abdominal pain, chest pain, or blood in vomit or stool. Swelling may interfere with breathing.

If the chemical affects the body's mineral balance, symptoms may include weakness, tingling, muscle cramps, confusion, tremors, seizures, low blood pressure, or an abnormal heartbeat.

Seek emergency help immediately for:

Do not wait for symptoms to appear if the label lists hydrofluoric acid, hydrogen fluoride, ammonium bifluoride, or another fluoride-containing acid.

- Trouble breathing, severe coughing, blue or gray lips, or throat swelling
- Collapse, confusion, a seizure, or difficulty waking

- Chest pain, fainting, or a fast or irregular heartbeat
- Significant eye exposure or any change in vision
- Swallowing a corrosive anti-rust product
- A large skin exposure, severe pain, blistering, or suspected hydrofluoric acid exposure

Causes and risk factors

Most poisonings are accidental. A splash may occur while applying, pouring, diluting, or cleaning up a product. Spray or fumes can be inhaled when a product is used in an enclosed area.

Risk can be higher when someone:

Mixing cleaning products is especially dangerous. An acidic rust remover mixed with chlorine bleach may release poisonous chlorine gas. Other mixtures may generate heat, splashing, or additional toxic fumes.

Children may swallow a product that has been moved into a drink container. Adults may be exposed during home repairs or work. Intentional ingestion is also possible and requires emergency medical and mental health support.

- Transfers the product into a cup, bottle, or unlabeled container
- Uses it without ventilation, gloves, or eye protection
- Handles an industrial or highly concentrated product
- Mixes it with bleach, ammonia, or another cleaner
- Uses high-pressure spraying, which can create airborne droplets
- Works with metal cleaning, vehicle detailing, construction, or industrial maintenance
- Stores the product where children or other household members can reach it

Diagnosis

Diagnosis begins with identifying the product and understanding how the exposure occurred. Clinicians may ask for the product name, ingredient list, concentration, amount involved, time of exposure, symptoms, and first aid already given. Bring the container or a clear photograph of its label if this can be done safely.

A physical examination focuses on breathing, circulation, mental alertness, skin and eye

injuries, and signs of burns in the mouth or throat. A normal-looking mouth does not always exclude injury farther down the digestive tract.

Depending on the exposure, testing may include:

The product's safety data sheet can help the poison center and medical team identify hazardous ingredients. Measuring fluoride in the blood is generally not needed to begin treatment; clinicians act based on the exposure, symptoms, heart rhythm, and mineral levels.

- An electrocardiogram to check the heart rhythm
- Blood tests for calcium, magnesium, potassium, kidney function, and acid-base balance
- Repeated laboratory tests because mineral changes can develop over time
- Chest imaging or oxygen measurements after inhalation
- Eye examination with special lighting and dye
- Endoscopy to look for burns in the esophagus or stomach after selected ingestions

Treatment and management

The first priority is to stop the exposure without putting anyone else at risk.

For inhalation, move to fresh air if this can be done safely. Do not enter a contaminated enclosed space without proper protective equipment.

For skin exposure, remove contaminated clothing and jewelry. Rinse the skin immediately with plenty of running water. Do not scrub damaged skin or try to neutralize the chemical with another substance. Continue rinsing while contacting a poison center.

For eye exposure, begin gentle irrigation at once with clean, lukewarm water. Remove contact lenses if they come out easily, and keep rinsing. Do not put neutralizing chemicals, creams, or drops into the eye unless a clinician directs you to do so.

If the product was swallowed, do not induce vomiting. Do not give baking soda, vinegar, or another substance to neutralize it. Vomiting or a chemical reaction may cause additional burns. Do not give food or drink to a person who is drowsy, having a seizure, vomiting repeatedly, or unable to swallow. Contact a poison center immediately for instructions based on the exact product.

Hospital treatment depends on the ingredient and route of exposure. It may include pain control, continued irrigation, wound care, oxygen, breathing support, intravenous fluids, and close monitoring of the heart and blood mineral levels.

Hydrofluoric acid injuries often require calcium treatment because calcium can bind fluoride.

Clinicians may use calcium gluconate on or around an affected area or give calcium through a vein or artery in selected severe cases. These treatments require professional supervision. A person should not delay water irrigation while looking for a calcium product. [2-5]

Eye injuries may require an ophthalmologist. Serious skin injuries may need a burn or hand specialist. After ingestion, a gastroenterologist may perform endoscopy when the findings could guide care.

Activated charcoal does not reliably treat corrosive acid exposure and may interfere with examination. Decisions about gastrointestinal decontamination should be made by a poison specialist or emergency clinician.

Complications

Many people recover with prompt decontamination and appropriate care. The risk of complications depends on the chemical, concentration, amount, exposed body area, and treatment delay.

Possible complications include deep skin burns, tissue death, infection, scarring, and loss of movement if the injury affects nerves, tendons, or joints. Severe hand or finger injuries can threaten function even when the exposed area is small.

Eye exposure can damage the cornea, the clear front surface of the eye. This may lead to scarring or lasting vision problems.

Inhaled chemicals can cause airway swelling, chemical inflammation of the lungs, or respiratory failure. These problems may worsen after an apparent period of improvement.

Swallowed corrosives may cause bleeding or a hole in the esophagus or stomach. Healing can produce scar tissue that narrows the esophagus, leading to later swallowing problems.

Hydrofluoric acid and oxalic acid may cause dangerously low calcium. Hydrofluoric acid can also disturb magnesium and potassium. Severe mineral changes may lead to abnormal heart rhythms, seizures, or cardiac arrest. Oxalate crystals can contribute to acute kidney injury. [2-5]

Follow up

Follow the discharge plan provided by the poison center or treatment team. Follow-up may involve a primary care clinician, burn specialist, eye specialist, hand surgeon, kidney specialist, or gastroenterologist, depending on the injury.

Routine follow-up is important when there is a healing skin burn, ongoing pain, reduced

movement, an eye injury, abnormal laboratory testing, or a swallowing injury. Wounds should be checked for healing and infection. People with an esophageal injury may need assessment for later narrowing if swallowing becomes difficult.

Return for urgent medical assessment if pain is increasing, a wound is becoming more swollen or discolored, vision changes, vomiting continues, or swallowing becomes painful or difficult.

Call emergency services for trouble breathing, fainting, severe weakness, confusion, a seizure, chest pain, or a fast or irregular heartbeat.

To reduce future risk, keep anti-rust products in their original labeled containers. Store them away from food and out of reach of children. Follow the label's ventilation and protective-equipment instructions, and never mix the product with another cleaner.

Sources

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