CONDITION

Paradichlorobenzene poisoning

Paradichlorobenzene poisoning is illness caused by swallowing or breathing harmful amounts of a chemical used in some mothballs and deodorizer blocks.

WHAT IT IS
Toxic illness from too much paradichlorobenzene exposure

BODY SYSTEM
Brain, blood, liver, kidneys, lungs, and digestive system

MAIN SYMPTOMS
Nausea, headache, drowsiness, poor balance

WHAT CAUSES IT
Swallowing or repeatedly breathing paradichlorobenzene

HOW IT IS DIAGNOSED
Exposure history, urine testing, blood tests, clinical assessment

MAIN TREATMENT
Exposure removal, supportive care, and complication-specific treatment

CAN IT BE CURED?
Sometimes - many recover after exposure stops

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

LONG-TERM OUTLOOK
Recovery is common, but severe brain injury may persist

Overview

Paradichlorobenzene poisoning happens when enough paradichlorobenzene enters the body to cause harm. The chemical is also called 1,4-dichlorobenzene or p-dichlorobenzene. It is a white solid that slowly turns into vapor at room temperature.

Paradichlorobenzene is used in some mothballs, toilet or room deodorizer blocks, and pest-control products. Not every mothball contains it. Some contain naphthalene, which causes a different pattern of poisoning. The product label or packaging can help identify the chemical.

Exposure can happen by swallowing the product, breathing concentrated vapor, or having repeated contact with it. A single large exposure can cause sudden illness. Smaller exposures over weeks or months can also build up, especially when products are used in enclosed living

areas or are repeatedly swallowed.

The chemical can affect the brain and nerves, blood cells, liver, kidneys, lungs, and digestive system. Severe poisoning can be life-threatening, but many people recover after the exposure stops and appropriate care is provided.

Symptoms

Symptoms depend on how much entered the body, how exposure occurred, and whether it happened once or repeatedly. They may begin soon after a large exposure or develop gradually.

Early symptoms may include:

More serious nervous system effects can include unsteady walking, tremor, slurred speech, muscle weakness, unusual behavior, seizures, or loss of consciousness. Long-term heavy exposure has been linked to damage in the brain's white matter, called toxic leukoencephalopathy. White matter carries signals between different parts of the brain.

Paradichlorobenzene may damage red blood cells. This is called hemolysis. Possible signs include pale skin, weakness, shortness of breath, a fast heartbeat, yellow skin or eyes, and dark urine.

It can also contribute to methemoglobinemia, a blood problem in which hemoglobin cannot carry oxygen normally. Signs may include blue or gray lips, breathlessness, headache, confusion, or marked tiredness.

Liver or kidney injury may not cause clear symptoms at first. When symptoms occur, they can include reduced urination, swelling, pain in the upper abdomen, jaundice, or worsening nausea.

- Headache, dizziness, or unusual tiredness
- Nausea, vomiting, or abdominal pain
- Drowsiness, confusion, or poor concentration
- Irritation of the eyes, nose, throat, or skin

Causes and risk factors

Poisoning is caused by taking in more paradichlorobenzene than the body can safely process. The chemical is absorbed through the lungs and digestive tract. Skin absorption is usually less important but can add to exposure, particularly with prolonged contact.

Common situations include accidentally swallowing a mothball, storing large amounts in an occupied room, or using deodorizer blocks in ways not allowed by the label. Repeated intentional inhalation or swallowing can lead to very high levels. Some people develop pica, a repeated urge to eat non-food items, and may swallow mothballs or deodorizer blocks.

Children are at risk because mothballs may look like sweets. Anyone living or working in a poorly ventilated area where the chemical is used can also be exposed to concentrated vapor.

Paradichlorobenzene is stored in body fat. With heavy or repeated exposure, it may continue moving from fat into the blood after the source has been removed. This helps explain why symptoms or abnormal test results may not disappear immediately.

Diagnosis

Diagnosis starts with identifying the exposure and assessing symptoms. If possible, take the product container, label, or a clear photograph of it to the hospital. Do not handle loose chemicals unnecessarily.

A urine test for 2,5-dichlorophenol, the main substance produced when the body breaks down paradichlorobenzene, can confirm exposure. Specialized laboratories may also measure paradichlorobenzene in blood. These tests are not always immediately available, and a detected level does not by itself show how severe the poisoning is.

Other tests look for organ injury and complications. They may include a complete blood count, liver and kidney tests, electrolyte measurements, and urine testing. A co-oximetry blood test can identify methemoglobinemia. An electrocardiogram may be used to check heart rhythm.

If there are significant neurological symptoms, brain imaging may be needed. Magnetic resonance imaging, or MRI, can sometimes show changes in the brain's white matter. The examination and pattern of symptoms remain important because similar problems can result from other chemicals, medicines, infections, or metabolic conditions.

Treatment and management

The first step is to stop exposure. Move away from vapor into fresh air when it is safe to do so. Remove contaminated clothing and wash exposed skin. Rinse irritated eyes with clean water.

Do not make someone vomit after swallowing a mothball or deodorizer product. Do not give home remedies, oils, alcohol, or other substances to "neutralize" the chemical. Contact a poison center for instructions, even if symptoms have not started.

There is no specific antidote that removes paradichlorobenzene from the body. Hospital care is supportive, meaning it protects breathing and circulation while the body clears the chemical. Treatment may include oxygen, intravenous fluids, medicines for symptoms, and repeated blood tests.

In selected recent ingestions, clinicians may consider activated charcoal to reduce absorption. It is not safe or useful in every situation, especially if the person is drowsy or cannot protect their airway.

Complications receive specific treatment. Severe hemolytic anemia may require a blood transfusion. Methemoglobinemia may be treated with an antidote when clinically appropriate, but the choice requires care because certain inherited red blood cell conditions can affect its safety and effectiveness. Seizures, liver injury, kidney injury, and breathing problems are treated according to their severity.

People with long-term neurological effects may need physical therapy, occupational therapy, speech therapy, or cognitive rehabilitation. Treatment for pica, substance use, nutritional problems, or mental health concerns can reduce the chance of another exposure.

Complications

Severe or prolonged poisoning can damage the brain's white matter. This may affect walking, coordination, speech, memory, attention, mood, or the ability to manage daily activities. Improvement can continue after exposure ends, but some neurological problems may remain.

Damage to red blood cells can lead to anemia and reduced oxygen delivery. Methemoglobinemia can further limit the blood's ability to carry oxygen. Liver and kidney injury are also possible.

Vomiting combined with severe drowsiness can allow stomach contents to enter the lungs. This is called aspiration and can cause lung injury or pneumonia. Seizures or loss of consciousness can result in falls and other injuries.

A large exposure or major organ injury can be life-threatening. Early poison-center advice and medical assessment help identify which exposures require observation or hospital care.

Prevention

Most paradichlorobenzene poisoning can be prevented. Check the active ingredient before using mothballs or deodorizer blocks, and follow the product label exactly.

Keep these products in their original, clearly marked containers. Store them in a locked place away from children, pets, food, and medicines. Never place mothballs loose in bedrooms, cupboards, vehicles, or other occupied spaces unless the label specifically permits that use.

Moth-control products are generally intended for tightly closed storage containers rather than open living areas. Air out and wash treated clothing before wearing it, following the product and clothing labels. Do not wear clothing that still has a strong chemical odor.

Workplaces that use paradichlorobenzene should follow the safety data sheet and occupational controls for ventilation, storage, and protective equipment. Anyone with repeated urges to swallow non-food products should seek medical support for pica rather than relying only on removing one product.

Living with it and what to expect

After a small, one-time exposure, symptoms may settle once the person is away from the chemical. Medical observation may still be needed because symptoms and blood abnormalities are not always immediate.

Recovery after heavy or repeated exposure can take longer. Because paradichlorobenzene may be stored in body fat, blood levels can remain elevated after exposure stops. Headaches, fatigue, balance problems, or difficulty thinking may improve over weeks or months rather than all at once.

Follow-up may include repeat blood counts and liver or kidney tests. People with neurological symptoms may need repeat examinations, imaging, and rehabilitation. Temporary changes at work or school may help while concentration, coordination, or stamina improve.

Some people recover fully. Others who have had severe toxic brain injury may have lasting problems with movement, speech, memory, or independent living. The course cannot be predicted from odor or exposure history alone; symptoms, examinations, and test results provide better guidance.

Avoid further contact during recovery. If exposure was connected to pica or intentional use, addressing the underlying behavior is an important part of long-term care and is not a reason for shame.

When to get medical help

Call emergency services now if someone exposed to paradichlorobenzene has:

Contact a poison center promptly after any known or possible swallowing of a mothball or deodorizer block. Also call after a substantial exposure in an enclosed space, an exposure involving a child, or repeated intentional exposure. In the United States, Poison Control is available at 1-800-222-1222. Elsewhere, use the local poison information service or emergency number.

Arrange prompt medical assessment for persistent headache, nausea, unusual tiredness, dark urine, jaundice, poor balance, tremor, memory changes, or personality changes after repeated exposure.

Routine follow-up is important after diagnosed poisoning, even when you feel better. Blood, liver, kidney, or neurological changes may need monitoring until they improve or become stable.

- A seizure, collapse, or loss of consciousness
- Severe confusion or difficulty being awakened
- Trouble breathing or blue or gray lips
- Repeated vomiting with marked drowsiness
- Sudden severe weakness or inability to walk safely

Common questions

Are paradichlorobenzene mothballs the same as naphthalene mothballs?

No. They may look and smell similar, but they contain different chemicals and can cause different complications. Check the label for "paradichlorobenzene," "p-dichlorobenzene," "1,4-dichlorobenzene," or "naphthalene." Bring the packaging when seeking help.

Can the smell of mothballs make me sick?

The smell means vapor is present, but smell alone cannot show whether the amount is harmful. Headache, nausea, dizziness, irritation, or drowsiness in a strongly scented area may signal significant exposure. Move to fresh air and contact a poison center for advice.

How long does paradichlorobenzene stay in the body?

The body breaks it down and removes much of it through urine. After repeated or heavy exposure, some can remain in body fat and return slowly to the blood. Symptoms and test results may therefore take days or longer to settle.

Is there an antidote for paradichlorobenzene poisoning?

There is no antidote that directly removes or neutralizes paradichlorobenzene. Treatment

stops further exposure, supports breathing and circulation, and manages complications. An antidote may be used for methemoglobinemia, but it treats that blood complication rather than the chemical itself.

Can paradichlorobenzene cause permanent brain damage?

Severe, prolonged exposure can cause lasting damage, particularly when toxic leukoencephalopathy develops. Some people improve substantially after exposure stops, and recovery may continue for months. Others may have persistent problems.

Can I wear clothes stored with paradichlorobenzene mothballs?

Air out and launder the clothing according to its care instructions and the product label. Do not wear it while a strong chemical smell remains. Keep the clothing and moth-control products away from children during airing and cleaning.

Sources

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