CONDITION

Nitroglycerin overdose

Nitroglycerin overdose is excessive exposure that can dangerously lower blood pressure or reduce oxygen delivery.

WHAT IT IS
Harmful exposure to too much nitroglycerin

BODY SYSTEM
Heart, circulation, and blood

MAIN SYMPTOMS
Severe headache, dizziness, fainting, breathing difficulty

WHAT CAUSES IT
Excess medication exposure or dangerous drug interaction

HOW IT IS DIAGNOSED
Clinical assessment; co-oximetry confirms methemoglobinemia

MAIN TREATMENT
Supportive hospital care and treatment of abnormal haemoglobin

CAN IT BE CURED?
Yes - effects usually reverse with prompt care

IS IT AN EMERGENCY?
Yes, suspected overdose needs immediate assessment

LONG-TERM OUTLOOK
Most recover fully after prompt treatment

Overview

Nitroglycerin is a medicine used to prevent or relieve chest pain called angina. It may be taken under the tongue, sprayed into the mouth, applied as an ointment, given through a skin patch, or administered into a vein in hospital. It is also called glyceryl trinitrate in some countries.

Nitroglycerin widens blood vessels. This reduces the heart's workload and can improve blood flow. Too much can widen the blood vessels so greatly that blood pressure falls to a dangerous level.

A large exposure can also cause methemoglobinemia . This is a blood problem in which haemoglobin, the part of red blood cells that carries oxygen, is changed into a form that cannot deliver oxygen normally. It is uncommon, but it can be serious.

An overdose may result from swallowing the medicine accidentally, applying too many patches, using more ointment or spray than directed, or receiving too much through an intravenous line. Dangerous interactions with certain medicines can produce similar severe effects even when the nitroglycerin dose would not usually be considered excessive.

Suspected overdose is an emergency. Do not wait for symptoms to develop before contacting emergency services or a poison centre.

Symptoms

Symptoms may begin within minutes after taking a tablet or spray. They can develop more gradually with ointment or a patch. Effects may last longer if a patch remains on the skin or a long-acting product was swallowed.

Possible symptoms include:

Headache and mild dizziness can occur with a correctly used dose. These symptoms alone do not prove that an overdose has happened. The amount used, other medicines taken, and the presence of fainting, confusion, or breathing problems are important.

Severe poisoning can cause shock, meaning that the brain and other organs are not receiving enough blood. Signs may include confusion, cold or clammy skin, extreme weakness, very low blood pressure, loss of consciousness, or seizures.

Methemoglobinemia may cause shortness of breath, headache, fatigue, confusion, or a blue-grey colour around the lips, skin, or nails. A fingertip oxygen monitor may stay low even while oxygen is being given. In severe cases, the person may become unconscious.

- A strong, throbbing headache
- Dizziness, weakness, or unusual sleepiness
- Flushed, warm, or sweaty skin
- Nausea or vomiting
- A fast, pounding, or unusually slow heartbeat
- Blurred vision
- Low blood pressure, especially when standing
- Fainting or collapse

Causes and risk factors

Overdose happens when the body is exposed to more nitroglycerin than it can safely tolerate. There is no single amount that causes poisoning in everyone. The formulation, route of exposure, other medicines, and the person's health all affect the response.

Common situations include:

Some medicines greatly increase nitroglycerin's blood-pressure-lowering effect. These include medicines for erectile dysfunction such as sildenafil, tadalafil, vardenafil, and avanafil. Riociguat, a medicine used for certain types of high blood pressure in the lungs, can also cause a dangerous interaction.

Alcohol and other medicines that lower blood pressure may make dizziness or fainting more likely. Dehydration or an existing problem with blood pressure may make the effects harder to tolerate.

Chest pain that continues after nitroglycerin may be a sign of a heart emergency rather than a need to keep taking extra doses. Follow the emergency plan supplied with the medicine and do not exceed its instructions.

- Taking repeated tablets or sprays beyond the product instructions
- Forgetting to remove an old patch before applying another
- Applying too much ointment or using the wrong measuring applicator
- A child or adult swallowing nitroglycerin accidentally
- A medication error involving intravenous nitroglycerin
- Skin exposure to concentrated nitroglycerin in a workplace
- Using another person's medicine

Diagnosis

There is no routine blood test that directly confirms a nitroglycerin overdose. Diagnosis is usually based on the exposure history, symptoms, blood pressure, pulse, and response to treatment.

If possible, healthcare professionals will need to know:

An electrocardiogram, or ECG, records the heart's electrical activity. It can help identify an abnormal heart rhythm and check for signs of the heart condition that led to nitroglycerin use. Blood tests may assess kidney function, body salts, acid levels, and evidence of organ stress.

If methemoglobinemia is suspected, a blood test called co-oximetry measures the different forms of haemoglobin. This confirms the diagnosis more reliably than a standard fingertip

oxygen monitor. The oxygen level measured in an arterial blood sample can appear normal even when haemoglobin is not carrying oxygen properly.

Other causes of low blood pressure, fainting, or blue-grey skin must also be considered. These include heart problems, infection, blood loss, and poisoning by other substances.

- The product and strength involved
- How much may have been taken or applied
- When the exposure happened
- Whether a patch is still present
- Which other medicines, alcohol, or substances were used

Treatment and management

Treatment begins by stopping further exposure and supporting breathing and circulation. Care is usually provided in an emergency department, with advice from a poison centre or medical toxicologist when needed.

If a patch is still attached, it should be removed without touching the medicated surface unnecessarily. The skin may be washed with soap and water. A used patch should be folded with the sticky sides together and kept away from children and pets. Emergency services or a poison centre can give instructions suited to the product.

In hospital, treatment may include:

Activated charcoal may occasionally be considered after a recent swallowed exposure, but only under professional direction. It should not be taken at home, and vomiting should not be induced.

Clinically important methemoglobinemia is often treated with methylene blue, a medicine that helps haemoglobin return to its normal oxygen-carrying form. Whether it is appropriate depends on the methemoglobin level, symptoms, and health history. It requires particular caution in people with glucose-6-phosphate dehydrogenase deficiency, an inherited red blood cell condition, and in people taking certain medicines that affect serotonin. Specialists can use other approaches when methylene blue is unsuitable or ineffective.

Treatment must also address the reason nitroglycerin was being used. For example, continuing chest pain may require urgent assessment for a heart attack or another heart problem.

- Continuous blood pressure and heart monitoring
- Oxygen and support for breathing when needed

- Intravenous fluids for low blood pressure
- Medicines to support blood pressure if fluids are not enough
- Treatment for seizures or other complications
- Observation until symptoms and vital signs remain stable

Complications

The main immediate complication is severe low blood pressure. If blood flow remains too low, the brain, heart, kidneys, and other organs may not receive enough oxygen. This can lead to shock or organ injury.

Fainting may cause a fall, head injury, or broken bone. Vomiting while very drowsy can allow stomach contents to enter the lungs.

Methemoglobinemia reduces oxygen delivery even when the lungs are working. Severe cases can cause abnormal heart rhythms, seizures, coma, or damage related to low tissue oxygen.

People who already have heart or circulation problems may be less able to tolerate low blood pressure or reduced oxygen delivery. The underlying cause of chest pain can also create complications separate from the overdose.

Serious outcomes are less likely when the exposure is recognised and treated promptly.

Prevention

Most nitroglycerin overdoses are preventable. Use the medicine only according to its label and the plan provided by the prescribing healthcare professional.

Helpful precautions include:

Do not take extra nitroglycerin simply because chest pain continues. Follow the medicine's emergency instructions. Persistent, severe, or changing chest pain may need emergency assessment.

Dispose of expired tablets, sprays, ointment, and patches according to local pharmacy or medicine-disposal guidance. Even used patches can contain active medicine.

- Keep tablets and sprays in their original labelled containers
- Record each dose so that doses are not repeated by mistake
- Remove an old patch before applying a new one

- Use the supplied measuring paper or applicator for ointment
- Store all forms out of sight and reach of children
- Never share nitroglycerin with another person
- Check before combining it with any erectile dysfunction medicine
- Tell healthcare professionals and pharmacists about all current medicines

Living with it and what to expect

Nitroglycerin overdose is an acute event, not a long-term condition. Once exposure stops, nitroglycerin itself is generally cleared quickly. However, symptoms can continue if medicine remains on the skin, if a long-acting product was taken, or if complications have developed.

People with mild effects may improve over several hours with monitoring and supportive care. Severe low blood pressure, loss of consciousness, or methemoglobinemia may require hospital admission and longer observation. Recovery can take longer if low blood flow or reduced oxygen delivery has injured an organ.

Most people who receive prompt treatment recover without lasting effects. A severe episode can have a less predictable course, particularly when it causes prolonged shock, a fall, or damage from low oxygen.

After recovery, routine follow-up may focus on preventing another exposure. This can include reviewing how tablets, sprays, ointment, or patches are used and checking for interacting medicines. If the overdose happened because chest pain was not controlled, the underlying heart condition may also need review.

Symptoms such as repeated fainting, ongoing breathlessness, persistent confusion, or continuing blue-grey skin are not part of routine recovery and need urgent reassessment.

When to get medical help

Contact emergency services or a poison centre immediately if too much nitroglycerin may have been swallowed, sprayed, applied, or given. Do this even if the person currently feels well.

Call emergency services at once for:

Do not make the person vomit. Do not give food, drink, or home remedies unless a poison specialist advises it. Do not let a dizzy or faint person stand or walk, and do not have them drive.

If it can be done safely, remove any nitroglycerin patch while waiting for help. Keep the

package, applicator, or remaining medicine so responders can identify the product. In the United States, Poison Help can be reached at 1-800-222-1222. Elsewhere, use the local poison centre or emergency number.

Routine follow-up is appropriate after recovery to review medicine use, storage, interactions, and the condition for which nitroglycerin was prescribed. It does not replace urgent care for new symptoms.

- Fainting, collapse, or inability to wake
- Severe difficulty breathing
- Blue-grey lips, skin, or nails
- Confusion, seizure, or marked drowsiness
- Severe weakness or signs of very low blood pressure
- Chest pain that is severe, changing, or not improving as directed

Common questions

How much nitroglycerin causes an overdose?

There is no single toxic amount for everyone. Tablets, sprays, ointments, patches, and intravenous nitroglycerin enter the body differently. Other medicines, alcohol, dehydration, and heart or circulation problems can change the effect. Any suspected excess exposure should be discussed immediately with a poison centre or emergency service.

Can a nitroglycerin patch cause an overdose?

Yes. Applying multiple patches, failing to remove an old patch, or accidental contact with the medicated surface can cause excessive exposure. A patch continues releasing medicine while it remains attached, so it should be removed during a suspected overdose.

Can nitroglycerin overdose be fatal?

Severe poisoning can be fatal because of extremely low blood pressure, abnormal heart rhythms, or reduced oxygen delivery from methemoglobinemia. Prompt recognition and hospital treatment improve the chance of full recovery.

How long do overdose symptoms last?

Sublingual tablets and sprays act quickly, and their direct effects may begin to fade within hours after exposure stops. Patches, ointment, swallowed products, severe low blood pressure, or methemoglobinemia can cause longer-lasting symptoms. Medical observation is based on the product and the person's clinical response.

Will a pulse oximeter detect methemoglobinemia?

It may show a low reading, but it cannot confirm the condition or measure it accurately. The reading may remain unexpectedly low despite oxygen. A hospital blood test using co-oximetry is used to confirm methemoglobinemia.

What should I do if chest pain continues after nitroglycerin?

Follow the emergency instructions supplied with the medicine. Do not keep taking extra doses beyond those instructions. Chest pain that persists, worsens, or feels different can signal a heart emergency and needs immediate assessment.

Sources

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