CONDITION

Phenytoin overdose

Phenytoin overdose is a harmful buildup of an antiseizure medicine in the body.

WHAT IT IS
Harmful buildup of the antiseizure medicine phenytoin

BODY SYSTEM
Nervous system, heart and circulation

MAIN SYMPTOMS
Unsteady walking, jerking eye movements, slurred speech, drowsiness

WHAT CAUSES IT
Excess dosing, medicine interactions, or slowed drug clearance

HOW IT IS DIAGNOSED
Blood phenytoin levels and clinical assessment

MAIN TREATMENT
Supportive hospital care and stopping further absorption

CAN IT BE CURED?
Yes - toxicity usually resolves after drug clearance

IS IT AN EMERGENCY?
Yes - suspected overdose needs immediate poison-centre assessment

LONG-TERM OUTLOOK
Most people recover fully with prompt care

Overview

Phenytoin is a medicine used to prevent some types of seizures. An overdose happens when enough phenytoin builds up in the body to cause harmful effects. It is also called phenytoin toxicity or Dilantin overdose.

An overdose may follow a single large amount, repeated extra doses, or a gradual buildup during prescribed treatment. A person can develop toxicity even without intentionally taking too much. Changes in health, other medicines, and the way the liver processes phenytoin can all raise its level.

Phenytoin mainly affects the brain and nerves. Higher levels can interfere with balance, speech, alertness, and eye movements. Severe poisoning can affect breathing, blood pressure, or heart rhythm, although major heart effects are more strongly associated with phenytoin given too quickly into a vein.

Phenytoin overdose needs prompt assessment. Symptoms and blood levels may rise slowly, so feeling well soon after an extra dose does not prove that it is safe to wait.

Symptoms

Early or moderate toxicity commonly causes problems with coordination and alertness. Symptoms may include:

With more severe poisoning, a person may become very difficult to wake, lose consciousness, or breathe less effectively. Seizures can occur, although phenytoin is normally used to prevent them. A seizure after a suspected overdose may also have another cause, such as another substance taken at the same time.

Long-term buildup can be less obvious. Someone taking phenytoin regularly may gradually become unsteady, have repeated falls, speak less clearly, or seem unusually tired or confused. These changes should not be dismissed as ageing, a return of the underlying seizure condition, or intoxication from alcohol.

Symptoms do not match a blood level perfectly. Some people develop symptoms at a lower measured level, while others remain more alert despite a higher level.

- Unsteady walking or difficulty standing
- Jerking or uncontrolled eye movements, called nystagmus
- Slurred speech
- Dizziness or blurred vision
- Nausea or vomiting
- Shaking, poor coordination, or unusual clumsiness
- Irritability, confusion, or unusual behaviour
- Increasing sleepiness

Causes and risk factors

A single large dose may be accidental or intentional. Accidental overdoses can happen when doses are repeated, different strengths are confused, or more than one person gives the same medicine.

Phenytoin is processed mainly by the liver. Its processing can become saturated, meaning the liver cannot clear each additional amount at the same rate. Because of this, a relatively small

increase in dose can sometimes produce a much larger rise in the blood level.

Other factors that can contribute include:

Most phenytoin in the blood is attached to a protein called albumin. Only the unbound, or "free," portion is active. When albumin is low, or kidney function is poor, the active portion may be high even when the total blood result does not appear severely raised.

Phenytoin overdose is not an inherited condition. However, biological differences can affect how quickly an individual processes the medicine.

- A recent dose increase
- Starting or stopping a medicine that interacts with phenytoin
- Liver disease, which may slow drug processing
- Kidney disease or low blood protein levels
- Acute illness, poor nutrition, or major changes in health
- Changes between formulations or problems measuring liquid medicine
- Errors involving phenytoin given into a vein

Diagnosis

Diagnosis is based on what happened, the symptoms, an examination, and blood tests. If possible, the healthcare team will need to know the formulation, strength, amount, and approximate time taken. Extended-release capsules can take longer to be absorbed.

A blood test measures the total phenytoin level. The result is interpreted together with symptoms rather than used on its own. A free phenytoin level may be useful when albumin is low, kidney function is reduced, or the total level does not fit the person's condition.

Levels may be repeated because phenytoin absorption can be delayed and concentrations may continue to rise after arrival at hospital.

Other assessment may include:

Brain scans are not routinely needed to confirm phenytoin overdose. They may be used when symptoms suggest a head injury, stroke, infection, or another neurological problem.

- Heart rhythm monitoring and an electrocardiogram, or ECG
- Blood sugar, electrolytes, kidney function, liver function, and albumin
- Tests for other medicines or substances when relevant

- Checks for injuries, dehydration, aspiration, or another cause of confusion

Treatment and management

There is no specific antidote for phenytoin. Treatment supports the body while the medicine is absorbed, processed, and cleared.

Further phenytoin doses are usually held in significant toxicity, but this decision belongs with the treating team. If you take phenytoin for seizures, do not stop it or restart it on your own. Abrupt changes may allow seizures to return.

Hospital care may include close observation, repeated neurological checks, heart monitoring, intravenous fluids, oxygen, and treatment for vomiting. Severe drowsiness may require help protecting the airway and supporting breathing. Seizures or dangerous heart effects are treated directly if they occur.

Activated charcoal may be considered after some recent oral overdoses. It binds medicine in the digestive tract and can reduce absorption. It is not suitable for everyone, particularly if a person is very drowsy and cannot protect their airway. It should never be taken at home unless a poison specialist specifically directs it.

Repeated doses of activated charcoal are sometimes considered by toxicology specialists, but they are not routine for every case. Making someone vomit is not recommended.

Dialysis does not usually remove phenytoin efficiently because much of the medicine is attached to blood proteins. An extracorporeal treatment, in which blood passes through a machine, may be considered in rare, severe, or prolonged cases based on the person's condition rather than the blood level alone.

An intentional overdose also calls for compassionate mental health assessment and support once urgent physical care is underway.

Complications

Most complications result from reduced alertness or poor coordination. They can include falls, head injuries, dehydration, and breathing vomit into the lungs, known as aspiration.

Severe poisoning can lead to coma or ineffective breathing. Low blood pressure and abnormal heart rhythms are possible, especially when intravenous phenytoin is administered too quickly or incorrectly.

Toxicity can last for several days because phenytoin may be absorbed slowly and becomes

harder for the body to clear at high levels. Persistent balance or coordination problems have been reported after severe or repeated toxicity, but they are not the usual outcome of a promptly treated episode.

Prevention

Many phenytoin overdoses can be prevented, although not every episode is predictable.

Take phenytoin exactly as directed. Do not double a dose after a missed or vomited dose unless your prescribing team or pharmacist has told you what to do. Use an oral syringe or other supplied measuring device for liquid medicine rather than a household spoon.

Other useful steps include:

Monitoring may be especially important after a dose change, a significant illness, pregnancy, a new interacting medicine, or a change in liver or kidney function. If familiar toxicity symptoms appear, seek advice rather than adjusting the dose yourself.

- Keep an up-to-date list of medicines and supplements
- Check before starting or stopping another medicine
- Use one clearly labelled strength and formulation
- Keep medicines in their original packaging or a correctly prepared organiser
- Store phenytoin away from children and anyone at risk of taking it accidentally
- Attend planned blood tests and medication reviews

Living with it and what to expect

Phenytoin overdose is usually a temporary episode rather than a lifelong condition. Recovery may take days because the medicine can leave the body slowly. Balance, speech, eye movements, and alertness generally improve as the active level falls, but the timing cannot be predicted from one blood result.

Most people recover without lasting effects after supportive care. A prolonged or severe overdose may require a longer hospital stay and rehabilitation for weakness, falls, or persistent coordination problems.

If you still need antiseizure treatment, your specialist will decide whether and when to restart phenytoin, change the dose, or use another medicine. Follow-up may include repeat blood tests and a review of interactions, nutrition, kidney or liver health, and the circumstances that

caused the overdose.

After an intentional overdose, ongoing mental health support is an important part of recovery. The aim is to reduce immediate risk and address the distress that led to the event.

When to get medical help

Contact a poison information centre or emergency medical service immediately after a suspected phenytoin overdose, even if there are no symptoms. Do not wait for a blood test or for symptoms to develop. In the United States, Poison Control can be reached at 1-800-222-1222. Elsewhere, use your local poison centre or emergency service.

Call emergency services now if the person:

Do not make the person vomit. Do not give food, drink, or charcoal to someone who is very drowsy. Do not let them drive.

If safe, take the medicine packaging and information about other possible substances to the hospital. After recovery, routine follow-up should review the phenytoin plan and any continuing balance, speech, memory, or seizure concerns.

- Is difficult to wake, collapses, or loses consciousness
- Has trouble breathing
- Has a seizure
- Cannot stand or walk safely
- Develops severe confusion or rapidly worsening drowsiness
- Has fainting, chest pain, or an abnormal heartbeat

Common questions

How much phenytoin causes an overdose?

There is no single amount that causes toxicity in everyone. Risk is affected by the formulation, usual dose, liver function, blood proteins, other medicines, and whether the exposure happened at once or gradually. Any suspected extra amount should be discussed promptly with a poison centre.

What blood level means phenytoin toxicity?

Laboratories provide a reference range, but no blood level diagnoses toxicity by itself. Symptoms can occur when the total level seems only modestly raised, especially if albumin is

low or kidney function is poor. Doctors may repeat the test or measure free phenytoin.

How long does phenytoin overdose last?

Symptoms may continue for several days. Large amounts and extended-release products can be absorbed slowly, while high concentrations are cleared less efficiently. Recovery is judged through symptoms, examinations, and changing blood levels.

Is there an antidote for phenytoin overdose?

No. Treatment focuses on monitoring and supporting breathing, circulation, hydration, and safety while the body clears the medicine. Activated charcoal may reduce absorption in selected cases.

Can phenytoin overdose be fatal?

Severe poisoning can be life-threatening, particularly when breathing or circulation is affected, when phenytoin has been given too quickly into a vein, or when other substances were also taken. Prompt assessment and supportive care improve the chance of recovery.

Can I take my next dose after accidentally taking extra?

Do not make that decision alone. Contact a poison centre, pharmacist, or the healthcare service managing your phenytoin immediately. The safest timing depends on the amount taken, symptoms, formulation, and blood results.

Sources

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