CONDITION

Aminophylline overdose

Learn how aminophylline overdose happens, which symptoms need emergency care, and how theophylline toxicity is diagnosed, treated, and monitored.

WHAT IT IS
Theophylline poisoning from excess aminophylline

BODY SYSTEM
Digestive, nervous, heart and circulation, metabolism

MAIN SYMPTOMS
Repeated vomiting, tremor, irregular heartbeat, seizures

WHAT CAUSES IT
Excess dose or gradual medicine buildup

HOW IT IS DIAGNOSED
Repeated blood theophylline tests

MAIN TREATMENT
Emergency supportive care and toxin removal

CAN IT BE CURED?
Sometimes - many recover with timely treatment

IS IT AN EMERGENCY?
Yes - any known or suspected overdose

LONG-TERM OUTLOOK
Often recovery with treatment, possible death in severe poisoning

Overview

Aminophylline is a medicine that helps open narrowed airways. It may be used to treat serious breathing problems related to asthma, chronic obstructive pulmonary disease (COPD), or other lung conditions. Its use has become less common because other treatments are often easier to manage safely.

Aminophylline is a combination of theophylline, the active medicine, and ethylenediamine, which helps the medicine dissolve. After aminophylline enters the body, clinicians monitor its effects by measuring theophylline in the blood.

An aminophylline overdose occurs when the body contains enough theophylline to cause harmful effects. This may happen after a large amount is taken at once, after an error with intravenous medicine, or when regular doses gradually build up in the body. This gradual

buildup is called chronic toxicity.

Theophylline has a narrow therapeutic range . This means the difference between a helpful amount and a harmful amount can be small. The body's ability to clear the medicine can also change because of illness, age, smoking habits, or interactions with other medicines.

Overdose can affect the digestive system, brain, heart, and metabolism. Severe poisoning may cause dangerous heart rhythms or seizures. Prompt assessment matters because symptoms and blood levels can change over time, especially after extended-release products.

If an overdose may have occurred, contact a poison control center or emergency medical service immediately. In the United States, Poison Control can be reached at 1-800-222-1222 . Do not wait for symptoms, and do not make the person vomit unless a medical professional specifically instructs you to do so.

Symptoms

Early symptoms often resemble common medication side effects. They may become more intense or persistent as toxicity worsens.

Possible symptoms include:

Vomiting may be severe and difficult to control. A person may also feel very restless or unusually alert. These symptoms should not be dismissed when the person takes aminophylline or theophylline.

Severe poisoning can sometimes develop without a long period of mild symptoms. This is particularly important in chronic toxicity, where serious effects may occur at a lower blood concentration than they would after one large, sudden overdose.

Seek emergency medical help immediately for:

Symptoms may be delayed after an extended-release product. A person who initially feels well may still need monitoring.

- Repeated nausea or vomiting
- Stomach pain or diarrhea
- Headache
- Restlessness, anxiety, or irritability
- Trouble sleeping
- Shaking or tremor

- Sweating
- Fast breathing
- A rapid, pounding, or irregular heartbeat
- Dizziness or weakness
- Increased thirst or urination
- A seizure
- Fainting, collapse, or inability to wake
- Chest pain
- Severe confusion or extreme agitation
- A very fast or irregular heartbeat
- Trouble breathing
- Severe weakness or signs of shock, such as cold or clammy skin
- Repeated vomiting with an inability to keep fluids down
- Any known or suspected large overdose

Causes and risk factors

An acute overdose may happen when someone takes too many tablets, receives too much medicine through an intravenous line, or accidentally takes both aminophylline and another theophylline-containing product. Medication pump, calculation, or administration errors can also cause acute toxicity.

Chronic toxicity develops when usual or near-usual doses accumulate because the body is clearing theophylline more slowly. It can be harder to recognize because symptoms such as nausea, poor appetite, tremor, or sleep problems may develop gradually.

Factors that may increase the risk of buildup include:

Tobacco smoke can make the body clear theophylline faster. If a person stops smoking or sharply reduces smoking, the medicine may remain in the body longer. This can raise the risk of toxicity unless a clinician reviews the treatment. Nicotine replacement itself does not have the same effect as tobacco smoke.

Several medicines can change theophylline levels. Examples include certain antibiotics, such as ciprofloxacin or erythromycin, and some medicines used for stomach acid, mood disorders, heart conditions, or seizures. The importance of an interaction depends on the specific

medicine and the person's health.

Caffeine and other stimulants like methylphenidate or lisdexamfetamine may add to restlessness, tremor, or a rapid heartbeat, even when they are not the main cause of the overdose. Patients taking aminophylline should tell clinicians and pharmacists about all prescription medicines, over-the-counter products, supplements, caffeine use, and changes in smoking.

- Liver disease
- Heart failure
- A prolonged fever
- Severe infection, sepsis, or shock
- Older age or very young age
- A recent change in smoking habits
- Starting a medicine that slows the breakdown of theophylline
- Taking different brands, formulations, or strengths incorrectly
- Missing recommended blood tests or medication reviews

Diagnosis

Aminophylline overdose is diagnosed from the person's symptoms, medication history, examination, blood testing, and heart monitoring. Clinicians will try to determine the product, strength, amount, route, and time of exposure. They will also ask whether the person takes the medicine regularly and whether there have been recent illnesses or medication changes.

A blood test measures the theophylline concentration , not simply the amount of aminophylline taken. One result may not show the full picture. Clinicians may repeat the test to learn whether the level is rising or falling.

Timing is important. A concentration measured soon after swallowing an extended-release product may be misleadingly low because absorption can continue for hours. In chronic toxicity, the severity of symptoms may matter more than a single number. Serious effects can occur at lower concentrations in older adults or people with prolonged exposure.

Other tests may include:

Clinicians also consider other possible causes of vomiting, agitation, seizures, or abnormal heart rhythms. A medication list, pill container, or photo of the label can help, but collecting these items should not delay emergency care.

- An electrocardiogram, or ECG, to check heart rate and rhythm
- Continuous heart monitoring
- Blood glucose and electrolyte tests, including potassium
- Kidney and liver function tests
- Tests of the body's acid-base balance
- Additional blood tests if seizures, muscle injury, or another illness is suspected

Treatment and management

Treatment is provided in an emergency department or hospital when significant toxicity is possible. The goals are to support breathing and circulation, limit further absorption, control symptoms, and help remove theophylline from the body.

Initial care may include intravenous fluids, oxygen when needed, repeated blood tests, and continuous ECG monitoring. Abnormal potassium, glucose, or other laboratory results are corrected carefully. Treatment decisions are based on the person's symptoms, blood concentrations, type of exposure, age, and overall health.

Activated charcoal can bind theophylline in the digestive tract. Clinicians may use a single dose or repeated doses in selected patients, particularly after a significant oral exposure or an extended-release product. It is not safe for everyone. A person who is very drowsy, vomiting heavily, or unable to protect their airway may breathe charcoal into the lungs. For that reason, charcoal should not be taken at home unless a poison specialist or clinician directs it.

Medicines may be given to control repeated vomiting. Seizures are treated promptly, usually with medicines that calm excessive electrical activity in the brain. Fast or abnormal heart rhythms are managed according to the rhythm, blood pressure, and advice from medical toxicology or poison control specialists.

For severe poisoning, hemodialysis may be needed. Hemodialysis passes the blood through a machine that removes theophylline and corrects some chemical abnormalities. It may be considered when there are seizures, dangerous heart rhythms, shock, very high or rising blood concentrations, or worsening symptoms despite other treatment. Modern intermittent hemodialysis is generally the preferred method when extracorporeal removal is required.

Vomiting or diarrhea can cause dehydration, but giving fluids alone does not remove the overdose. Home remedies, forced drinking, or induced vomiting can cause harm and should be avoided.

Complications

Many people recover with timely treatment and monitoring. The risk of complications depends on the amount and formulation involved, whether toxicity was sudden or chronic, and how quickly treatment began.

Possible complications include:

Chronic toxicity can be especially serious in older adults or people with heart, liver, or lung disease. Their symptoms may initially appear less dramatic even though the risk of complications is significant.

Death is possible in severe poisoning, but emergency treatment, specialist consultation, repeated monitoring, and dialysis when needed can reduce the risk.

- Severe dehydration
- Low potassium and other metabolic disturbances
- Dangerous heart rhythms
- Low blood pressure or shock
- Seizures
- Aspiration, in which vomit enters the lungs
- Muscle injury after prolonged seizures
- Kidney injury related to dehydration, shock, or muscle breakdown
- Brain injury if prolonged seizures or severe circulation problems reduce oxygen delivery

Follow up

Hospital monitoring continues until symptoms have resolved, heart rhythm is stable, and repeat theophylline concentrations show a safe downward trend. Monitoring may last longer after extended-release products or chronic toxicity because levels can rise again or fall slowly.

Before discharge, the care team may review what caused the overdose. Follow-up may include checking the medicine name and strength, simplifying the schedule, reviewing other medicines for interactions, and arranging repeat blood tests when appropriate.

A prescribing clinician should review aminophylline treatment after toxicity. The clinician may consider whether it remains the best option for the underlying breathing condition. Patients should not restart, stop, or change the medicine on their own after an overdose.

Routine follow-up should also cover recent fever, changes in smoking, liver or heart problems, and any new prescriptions or supplements. A pharmacist can help identify duplicate products and interactions.

After returning home, seek urgent advice for renewed vomiting, worsening tremor, marked restlessness, or a persistently fast heartbeat. Call emergency services for a seizure, fainting, chest pain, severe confusion, breathing difficulty, or an irregular heartbeat.

Sources

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