CONDITION

Lithium toxicity

Lithium toxicity happens when lithium builds up and harms the nervous system, kidneys, digestive system, or heart.

WHAT IT IS
Harmful buildup of lithium in the body

BODY SYSTEM
Nervous system, kidneys, digestive system, and heart

MAIN SYMPTOMS
Nausea, coarse shaking, unsteady walking, confusion

WHAT CAUSES IT
Overdose, dehydration, interactions, or reduced kidney clearance

HOW IT IS DIAGNOSED
Blood lithium levels, symptoms, and kidney tests

MAIN TREATMENT
Stopping exposure, intravenous fluids, monitoring, and sometimes dialysis

CAN IT BE CURED?
Yes - most episodes resolve with treatment

IS IT AN EMERGENCY?
Yes - suspected toxicity needs urgent assessment

LONG-TERM OUTLOOK
Usually good, but severe poisoning can cause lasting problems

Overview

Lithium toxicity means there is enough lithium in your body to cause harmful effects. Lithium is a medicine used to treat bipolar disorder and, in some cases, severe depression.

The amount of lithium that helps and the amount that causes toxicity can be fairly close. This is called a narrow therapeutic range . Your kidneys remove lithium from your body, so dehydration, kidney problems, and certain medicines can make lithium levels rise.

Lithium toxicity can happen after taking too much at once. It can also develop gradually while taking a usual dose, especially if your body is no longer clearing lithium normally. Some people have an acute-on-chronic episode, meaning they already take lithium and then take an extra amount.

Symptoms and blood levels do not always match closely. This is especially true when lithium has built up over days or weeks. A person may have important nervous system symptoms even if one blood result is not extremely high.

Suspected lithium toxicity needs urgent medical assessment. Prompt treatment often leads to a full recovery, but severe toxicity can affect the brain, kidneys, heart, or breathing.

Symptoms

Symptoms may begin suddenly after an overdose or develop slowly over several days. Gradual toxicity can be mistaken for an infection, worsening mental health, medication side effects, or normal ageing.

Early or milder symptoms may include:

A fine hand tremor can occur as an ordinary lithium side effect. A coarse tremor , involving larger and less controlled movements, is more concerning when it is new or accompanied by other symptoms.

More serious nervous system symptoms include:

Heart rhythm changes can occur, particularly in severe poisoning or in people with existing heart disease. Lithium toxicity may also worsen kidney function, which can then slow lithium removal further.

- Nausea, vomiting, diarrhoea, or stomach discomfort
- Increasing thirst or passing more urine
- Unusual tiredness, weakness, or drowsiness
- A new or worsening hand tremor
- Difficulty concentrating
- Unsteady walking or poor coordination
- Slurred speech
- Muscle twitching, stiffness, or jerking
- Confusion, agitation, or unusual behaviour
- Severe drowsiness or difficulty waking
- Seizures or loss of consciousness

Causes and risk factors

An acute overdose may be accidental or intentional. It can involve lithium alone or lithium together with other medicines. Extended-release tablets may stay in the digestive system and continue releasing lithium for many hours.

Chronic toxicity usually happens because lithium gradually builds up. Common reasons include dehydration from vomiting, diarrhoea, fever, heavy sweating, or not drinking enough. A sudden major reduction in dietary salt may also increase lithium retention because the kidneys handle lithium and sodium in related ways.

Reduced kidney function is an important risk factor. Kidney function may decline because of illness, older age, dehydration, or another medicine.

Medicines that can raise lithium levels include some:

Not every medicine in these groups has the same effect. A pharmacist or prescriber can check specific combinations. Prescription medicines, non-prescription products, and supplements should all be included in that review.

Other risk factors include changes to the lithium dose, missed blood monitoring, taking an extra dose after forgetting whether one was taken, and conditions that affect fluid or salt balance.

- Anti-inflammatory pain medicines, including many non-steroidal anti-inflammatory drugs like ibuprofen or naproxen
- Water tablets like furosemide or hydrochlorothiazide , also called diuretics
- Blood pressure medicines known as ACE inhibitors or angiotensin receptor blockers

Diagnosis

Diagnosis is based on your symptoms, lithium use or possible exposure, and blood tests. A blood lithium level helps confirm exposure, but it cannot be interpreted safely on its own.

The timing of the test matters. After a recent overdose, lithium may still be moving from the digestive system into the blood. Levels can continue to rise, especially with extended-release tablets. In chronic toxicity, brain and nerve symptoms may be more severe than the blood level suggests.

Repeated lithium measurements may therefore be needed. Blood tests usually also check kidney function, sodium and other body salts, and glucose. These results help show how well your body is clearing lithium and whether dehydration or another imbalance is present.

An electrocardiogram, or ECG, records the heart's electrical activity. It may be used to look for

rhythm or conduction changes. Clinicians may also check temperature, blood pressure, breathing, alertness, coordination, and urine output.

Other tests may be needed if the cause is unclear or another illness could explain the symptoms. A single "normal" result does not automatically rule out toxicity when symptoms or the timing of exposure remain concerning.

Treatment and management

Treatment takes place in an emergency department and, for more serious cases, in hospital. The immediate priorities are to prevent further exposure, support breathing and circulation, correct dehydration, and monitor the nervous system, kidneys, and heart.

Intravenous fluids are often used to restore fluid balance and help the kidneys remove lithium. Fluid treatment is monitored carefully, especially in people with heart or kidney problems.

Activated charcoal, which can bind many swallowed poisons, does not bind lithium effectively. It may still be considered if other substances were taken, but it is not a treatment for lithium itself.

In selected recent overdoses involving extended-release tablets, specialists may consider bowel irrigation. This uses a medical solution to move tablets through the digestive system. It is not suitable for everyone.

Haemodialysis may be needed for severe toxicity. This treatment passes blood through a machine that removes lithium. The decision is based on several factors, including symptoms, kidney function, the lithium level, whether the level is falling, and the expected time needed for the body to clear it. Some people need more than one dialysis session because lithium can move back into the blood after treatment.

Mental health support is part of care when an overdose was intentional. Treatment should address both the poisoning and the circumstances that led to it.

Complications

Most people recover with timely care. Complications are more likely after severe poisoning, delayed treatment, or prolonged exposure.

Possible complications include kidney injury, abnormal heart rhythms, aspiration of vomit into the lungs, seizures, and reduced consciousness. Severe vomiting or diarrhoea can also worsen dehydration and salt disturbances.

Neurological symptoms such as tremor, poor coordination, memory difficulty, or speech problems may take days or weeks to improve after the lithium level falls.

Rarely, nervous system problems continue for months or become permanent. This is sometimes called syndrome of irreversible lithium-effectuated neurotoxicity , or SILENT. Persistent symptoms need specialist assessment and rehabilitation rather than blood-level monitoring alone.

Prevention

Many episodes of lithium toxicity can be prevented, although not every episode is predictable.

Keep all scheduled lithium and kidney-function blood tests. Monitoring may need to be more frequent after a dose change, a new interacting medicine, or a change in kidney health.

Take lithium only as directed. Do not double a dose to make up for one that was missed. If you are unsure whether you have already taken a dose, check the instructions provided with your medicine or contact a pharmacist or prescribing service.

Try to keep your fluid and salt intake reasonably consistent. During hot weather, intense exercise, fever, vomiting, or diarrhoea, fluid losses can increase the risk of lithium buildup. Seek prompt advice if you cannot drink normally or are losing significant fluid.

Before starting a prescription or non-prescription medicine, tell the pharmacist or prescriber that you take lithium. This is particularly important for anti-inflammatory pain medicines, diuretics, and some blood pressure medicines.

Store lithium in its original labelled container and away from children or anyone for whom it was not prescribed.

Living with it and what to expect

A mild or moderate episode may improve over several days as lithium is removed and fluid balance returns to normal. More severe nervous system symptoms can take longer to settle. Recovery may continue for weeks or months if coordination, speech, strength, or memory were affected.

Blood lithium levels can fall before symptoms fully disappear. Follow-up may include checks of kidney function, fluid balance, movement, coordination, and thinking. Rehabilitation, such as physical, occupational, or speech therapy, may help when neurological problems continue.

Having lithium toxicity does not automatically mean that you can never take lithium again. The

decision is individual and considers why toxicity occurred, how severe it was, kidney health, alternative treatments, and lithium's previous benefits. If lithium is restarted, the care team may adjust monitoring or reduce risks from interacting medicines.

Some people change to another mood-stabilising treatment. Any change needs a planned approach because suddenly losing effective treatment may increase the chance of a mood episode. Ongoing mental health follow-up remains important whether lithium is restarted or replaced.

When to get medical help

Get urgent medical advice if you take lithium and develop new vomiting, diarrhoea, worsening tremor, unusual drowsiness, weakness, slurred speech, confusion, or unsteady walking. Do not wait for a routine blood test to decide whether symptoms matter.

Call emergency services now if someone:

Do not make the person vomit. Take the medicine packet or container to the hospital if it is safe to do so.

For routine follow-up, arrange a review if you notice a persistent change in thirst, urination, tremor, or medication side effects without signs of acute toxicity. Regular reviews are also appropriate after changes to kidney health or other medicines.

- Has a seizure, collapses, or cannot be woken
- Has severe confusion or rapidly worsening coordination
- Has trouble breathing
- Has taken a large or unknown amount of lithium
- Has intentionally taken extra lithium or may be at risk of self-harm

Common questions

Can I have lithium toxicity with a "normal" blood level?

It is possible. The result depends on when the sample was taken and whether exposure was sudden or gradual. In chronic toxicity, symptoms can be important even when the level is not dramatically raised. Medical assessment should consider both the result and how you feel.

Can dehydration cause lithium toxicity?

Yes. Dehydration can make the kidneys retain more lithium and reduce its removal. Vomiting,

diarrhoea, fever, heavy sweating, and poor fluid intake are common triggers.

How long does lithium toxicity last?

Digestive symptoms may settle as hydration improves and lithium is cleared. Tremor, confusion, or coordination problems can take longer. Severe poisoning may require several days in hospital, and neurological recovery can continue for weeks or months.

Can I take lithium again after toxicity?

Some people can, while others change treatment. The decision considers the cause and severity of the episode, kidney function, remaining symptoms, and the benefits lithium previously provided. Restarting should be planned and monitored.

Does activated charcoal treat a lithium overdose?

No. Activated charcoal does not bind lithium effectively. Hospital treatment may include intravenous fluids, repeated blood tests, bowel irrigation in selected cases, or haemodialysis for severe toxicity.

What should I do if I accidentally take an extra lithium dose?

Contact an urgent medical advice service or poison centre promptly, even if you feel well. The safest response depends on the amount, tablet type, timing, kidney function, and whether other medicines were taken. Do not take further lithium until you have received specific advice.

Sources

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