CONDITION

Diabetes insipidus

Diabetes insipidus is a condition that causes frequent urination and intense thirst because the body cannot conserve water properly.

WHAT IT IS
A condition causing excessive loss of water in urine

BODY SYSTEM
Hormone system and kidneys

MAIN SYMPTOMS
Frequent urination, intense thirst, nighttime urination, dehydration

WHAT CAUSES IT
Too little vasopressin or kidneys not responding

HOW IT IS DIAGNOSED
Blood and urine tests, supervised fluid testing

MAIN TREATMENT
Desmopressin or treatment of the underlying cause

CAN IT BE CURED?
Sometimes - reversible causes can be treated

IS IT AN EMERGENCY?
Sometimes - confusion or inability to drink

LONG-TERM OUTLOOK
Usually manageable with treatment and reliable access to water

Overview

Diabetes insipidus is a condition in which the body has trouble maintaining the right amount of water. It causes large amounts of pale, diluted urine, leading to strong thirst and frequent drinking during the day and night.

Despite its name, diabetes insipidus is different from diabetes mellitus, which causes high blood sugar. Both can cause thirst and frequent urination, but their causes and treatments differ.

Water balance is partly controlled by vasopressin, also called antidiuretic hormone or ADH. This hormone is made in the brain and released by the pituitary gland. It tells the kidneys to return water to the bloodstream instead of losing it in urine.

Diabetes insipidus occurs when the body does not make or release enough vasopressin, or when the kidneys do not respond properly. Without treatment or reliable access to water, it can cause dehydration and high blood sodium. The condition may be temporary or lifelong, but most people can manage it well with appropriate care.

Symptoms

The main symptom is persistently passing much more urine than expected. The urine is usually very pale.

Other symptoms include:

Symptoms may worsen during hot weather, exercise, illness or when water is difficult to obtain.

Babies and young children may have very wet nappies, irritability, poor feeding, vomiting, constipation, fever or slow growth. These signs have several possible causes and need medical assessment.

People who can drink whenever they are thirsty may maintain a normal blood sodium level. Complications are more likely when thirst is impaired, water is unavailable, swallowing is difficult or illness prevents drinking.

- Urinating often, including during the night
- Passing large amounts each time
- Intense or constant thirst
- Interrupted sleep and daytime tiredness
- Dry mouth, dizziness or other signs of dehydration

Causes and risk factors

There are two main forms.

Central diabetes insipidus , also called cranial diabetes insipidus or arginine vasopressin deficiency, occurs when the brain does not make or release enough vasopressin. Causes include head injury, brain or pituitary surgery, tumours, inflammation, infection and inherited changes. Sometimes no cause is found.

Nephrogenic diabetes insipidus , or arginine vasopressin resistance, occurs when the kidneys do not respond normally to vasopressin. It may result from an inherited change, kidney disease, certain medicines or abnormal calcium or potassium levels.

Lithium, used for some mental health conditions, is a well-known cause. Do not stop lithium or another prescribed medicine without medical advice, because stopping suddenly can be harmful.

Gestational diabetes insipidus is a temporary form that occurs during pregnancy when the placenta breaks down vasopressin too quickly. It usually improves after pregnancy but needs treatment and monitoring.

Primary polydipsia can cause similar symptoms. In this separate condition, excessive fluid intake lowers vasopressin activity. Correct diagnosis matters because treatment differs.

Diagnosis

Thirst and frequent urination have many possible causes, including diabetes mellitus, high fluid intake, medicines, kidney conditions and high calcium levels.

Your clinician may ask about fluid intake, urine volume, nighttime symptoms, medicines and whether symptoms started after surgery, pregnancy or an injury. A 24-hour urine measurement may confirm unusually high urine output.

Blood and urine tests may check:

A water deprivation test assesses whether the kidneys concentrate urine when fluids are withheld. Blood and urine samples are taken, and desmopressin may then be given to test the kidneys' response.

This test must be done under close medical supervision. Never try to restrict fluids at home for testing, as this can cause severe dehydration or dangerously high blood sodium.

Specialist centres may measure copeptin, a marker of vasopressin release, after a controlled stimulus. This can help distinguish central and nephrogenic diabetes insipidus from primary polydipsia.

If central diabetes insipidus is suspected, an MRI may be used to examine the pituitary gland and nearby brain structures. Further tests may look for an underlying cause.

- Blood sodium and other minerals
- Plasma and urine osmolality, which show concentration
- Blood glucose
- Kidney function

Treatment and management

Treatment depends on the type, severity and cause. Reliable access to water is essential.

Central diabetes insipidus is often treated with desmopressin, which acts like vasopressin. It is available as tablets, a nasal preparation or an injection. A clinician will choose the appropriate form and schedule.

Too much desmopressin, particularly with excessive fluid intake, can cause low blood sodium, called hyponatraemia. Symptoms include headache, nausea, unusual tiredness and confusion; severe cases can cause seizures. Follow your treatment team's medicine and fluid instructions.

Mild central diabetes insipidus may sometimes be managed by drinking according to thirst if thirst is normal and water is always available. Any underlying pituitary or inflammatory condition may also need treatment.

For nephrogenic diabetes insipidus, desmopressin usually has limited benefit. Management may involve treating the cause, reviewing medicines and correcting calcium or potassium abnormalities.

A clinician may recommend less salt or prescribe a thiazide diuretic. Although diuretics like furosemide or hydrochlorothiazide usually increase urination, thiazides can reduce urine volume in this condition. Other medicines may be used under specialist supervision.

Gestational diabetes insipidus is usually treated with desmopressin and monitored during and after pregnancy.

Surgery, fasting, vomiting or other illnesses can interrupt access to water or medicine. Tell healthcare staff that you have diabetes insipidus and which treatment you use.

Complications

Untreated or poorly controlled diabetes insipidus can cause dehydration, with dry mouth, weakness, dizziness, low blood pressure or reduced alertness.

Severe water loss can cause high blood sodium, or hypernatraemia. This may affect the brain and cause marked drowsiness, confusion, muscle twitching or seizures.

Desmopressin can cause the body to retain too much water, resulting in low blood sodium. Warning signs include headache, nausea, confusion and seizures. Drinking large amounts "just in case" while desmopressin is active increases this risk.

Nighttime urination may disrupt sleep and affect concentration, mood, school, work or driving. Poorly controlled symptoms in children may contribute to feeding or growth problems.

Prevention

Most cases cannot be prevented. Inherited forms result from gene changes, while central diabetes insipidus may follow an unpredictable brain or pituitary problem.

Monitoring kidney function and mineral levels during treatment with medicines that affect the kidneys may limit some acquired nephrogenic cases. These medicines should not be avoided when medically necessary.

If you take lithium, attend recommended blood and kidney checks and report a clear increase in thirst or urination. Do not change or stop lithium yourself.

Using appropriate head protection may reduce the risk of some head injuries, although it cannot prevent every cause.

Living with it and what to expect

Temporary diabetes insipidus after surgery, head injury or pregnancy may improve over weeks or months. Inherited forms and cases caused by permanent damage are usually long term.

With stable treatment, most people can work, study, exercise and travel normally. Plan for access to water, toilets and medication.

Follow-up may include reviewing thirst, fluid intake, urine output and blood sodium. Kidney function and other blood tests may also be needed. People with a pituitary condition may require monitoring of other pituitary hormones.

Illness, pregnancy, kidney changes or new medicines can alter treatment needs. Arrange follow-up if thirst or urine volume changes, nighttime symptoms return or treatment becomes difficult to manage.

Consider carrying medical identification, especially if you use desmopressin or have impaired thirst. Keep medication available when travelling and plan access to water on long journeys.

Do not avoid drinking to reduce bathroom visits. If your clinician has given specific fluid instructions, follow those rather than general advice.

When to get medical help

Arrange a routine appointment if you have persistent intense thirst, regularly pass large amounts of pale urine or repeatedly wake to urinate. These symptoms require assessment but do not confirm diabetes insipidus.

If you have already been diagnosed, seek prompt advice if symptoms change, you cannot take your usual medicine, or vomiting or diarrhoea prevents normal drinking. Children, older adults and people with impaired thirst may dehydrate more quickly.

Get urgent medical help for:

A seizure, collapse or severe reduction in consciousness is an emergency. Call your local emergency service.

- New confusion or unusual difficulty staying awake
- Inability to drink or keep fluids down
- Severe weakness, fainting or marked dizziness
- A severe or worsening headache with nausea after desmopressin
- Muscle twitching or a seizure

Common questions

Is diabetes insipidus a type of diabetes?

No. Diabetes mellitus involves high blood sugar, while diabetes insipidus affects water balance and vasopressin. Testing is needed because both can cause thirst and frequent urination.

How much urine does diabetes insipidus cause?

The amount varies with body size, fluid intake and severity. The key feature is a persistently large volume of dilute urine, rather than frequent small amounts. A 24-hour urine collection may help assess this.

Can diabetes insipidus go away?

Sometimes. Cases related to pregnancy or temporary changes after brain surgery or injury may resolve. Inherited forms and those caused by permanent damage may be lifelong. Follow-up testing helps determine whether treatment is still needed.

Can I drink as much water as I want?

Access to water is important, especially when diabetes insipidus is untreated. However, excessive drinking while taking desmopressin can lower blood sodium. Follow your fluid plan and ask for advice during illness or hot weather.

Why am I still thirsty while taking desmopressin?

Possible reasons include an insufficient treatment effect, missed or poorly absorbed medicine, another cause of thirst, or nephrogenic diabetes insipidus. Do not take extra desmopressin without advice, because too much can cause low sodium. Arrange a treatment review.

Can I exercise or travel with diabetes insipidus?

Usually, yes. Carry enough medication, keep water available and plan toilet stops. Heat, long flights and strenuous exercise can change fluid needs. Medical identification and a written care plan may be helpful.

Sources

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