CONDITION

Minimal change disease

Minimal change disease is a kidney condition that causes large amounts of protein to leak into the urine.

WHAT IT IS
Kidney condition causing heavy protein loss into urine

BODY SYSTEM
Kidneys and urinary system

MAIN SYMPTOMS
Swelling, foamy urine, weight gain, tiredness

WHAT CAUSES IT
Usually unknown immune dysfunction; sometimes medicines, infections, or cancer

HOW IT IS DIAGNOSED
Urine and blood tests; kidney biopsy confirms

MAIN TREATMENT
Corticosteroids, supportive care, sometimes other immune medicines

CAN IT BE CURED?
Sometimes - treatment can bring lasting remission

IS IT AN EMERGENCY?
Sometimes - breathing trouble, clot symptoms, or very low urine

LONG-TERM OUTLOOK
Usually good kidney function, though relapses can occur

Overview

Minimal change disease is a kidney condition that damages the kidneys' filtering system. It is a common cause of nephrotic syndrome , especially in children, but adults can develop it too.

Nephrotic syndrome means the kidneys leak a large amount of protein into the urine. This lowers the level of a blood protein called albumin. Albumin normally helps keep fluid inside blood vessels. When albumin falls, fluid can collect in tissues and cause swelling.

The name "minimal change" comes from how the kidney tissue looks under a standard microscope. It may appear nearly normal. However, an electron microscope, which gives a much more detailed view, shows changes in tiny filtering cells called podocytes.

Minimal change disease usually responds well to treatment. Relapses, when protein leakage

returns after a period of improvement, are common. Most people keep good long-term kidney function, but monitoring is important because the condition and its treatments can cause complications.

Symptoms

Symptoms often develop over days or weeks. Swelling may be the first change you notice.

Common symptoms include:

Some people have high blood pressure. Blood that can be seen in the urine is not typical, although small amounts may be found during testing.

Swelling and foamy urine can have many causes. These symptoms do not confirm minimal change disease on their own.

- Puffiness around the eyes, often most noticeable in the morning
- Swelling of the feet, ankles, legs, abdomen, or genitals
- Foamy or frothy urine caused by excess protein
- Rapid weight gain caused by retained fluid
- Tiredness, reduced appetite, or general discomfort
- Passing less urine than usual

Causes and risk factors

In most cases, the exact cause is not known. Abnormal immune activity appears to affect podocytes, allowing protein to pass through the kidney filters. This is different from the immune system directly attacking the kidneys with visible inflammation.

Minimal change disease sometimes develops after:

These events may be linked in time without being the definite cause. Most people with an infection, allergy, or exposure to these medicines do not develop minimal change disease.

The condition is not usually inherited. Having a relative with it does not generally mean that you or your children will develop it.

- An infection, particularly a respiratory infection
- An allergic reaction or immunisation

- Use of certain medicines, especially nonsteroidal anti-inflammatory drugs such as ibuprofen or naproxen
- Hodgkin lymphoma or, less commonly, another cancer affecting the immune system

Diagnosis

Testing begins by confirming nephrotic syndrome and checking how well your kidneys are working.

A urine test can detect protein and blood. A laboratory may measure the urine protein-to-creatinine or albumin-to-creatinine ratio. These tests estimate how much protein is being lost without requiring every drop of urine to be collected for a full day.

Blood tests commonly measure:

Other blood tests may be used to look for infections, immune conditions, or other causes of nephrotic syndrome. Your medicines and recent illnesses are also reviewed.

A kidney biopsy is the test that confirms minimal change disease. During a biopsy, a needle removes a very small sample of kidney tissue for examination. Standard microscopy usually shows little change, while electron microscopy shows flattening or merging of the podocytes' tiny projections, called foot processes.

Adults with unexplained nephrotic syndrome usually need a biopsy because several kidney conditions can cause the same symptoms. Children with a typical first episode are often treated based on their symptoms, urine tests, and response to corticosteroids like prednisone or hydrocortisone . A biopsy may be considered if the presentation is unusual, kidney function is reduced, or treatment does not have the expected effect.

- Albumin and total protein
- Creatinine, which helps estimate kidney function
- Cholesterol and other blood fats
- Electrolytes, including sodium and potassium

Treatment and management

Treatment aims to stop protein leakage, relieve swelling, prevent complications, and reduce the chance or impact of relapses.

Corticosteroids are the main initial treatment. These medicines calm immune activity and allow

the kidney filters to recover. Children often improve sooner than adults. Treatment usually continues beyond the first improvement and is reduced gradually rather than stopped suddenly.

Corticosteroids can cause increased appetite, mood or sleep changes, higher blood sugar, high blood pressure, bone thinning, infection risk, and changes in appearance. The risks become more important with repeated or prolonged courses.

If the condition keeps returning, becomes dependent on corticosteroids, or does not respond as expected, other immune-suppressing medicines may be considered. Options include calcineurin inhibitors, cyclophosphamide, mycophenolate, and rituximab. The choice is based on age, relapse pattern, previous side effects, fertility considerations, and other health conditions.

Supportive care may include:

Severe swelling must be treated carefully. Removing fluid too quickly can lower blood volume and worsen kidney function, even when the body still looks swollen.

Do not stop corticosteroids suddenly unless you have been specifically instructed to do so. After longer use, the body may need time to restart its normal production of steroid hormones.

- Limiting excess salt to help control swelling
- Diuretics like furosemide or hydrochlorothiazide , sometimes called water tablets, to remove extra fluid
- Medicines to manage high blood pressure or reduce protein leakage
- Treatment for high cholesterol when appropriate
- Vaccination and infection-prevention planning before or during immune-suppressing treatment
- Blood-thinning medicine for selected people at high risk of clots

Complications

Heavy protein loss and fluid imbalance can lead to complications, particularly while nephrotic syndrome is active.

Possible complications include:

Children may temporarily grow more slowly during prolonged corticosteroid treatment. Adults may have a higher risk of treatment-related diabetes, bone loss, or high blood pressure.

Permanent kidney failure is uncommon in confirmed minimal change disease. If treatment

does not work, the diagnosis may need to be reconsidered because another kidney condition can look similar in an early biopsy sample.

- Blood clots, including clots in the legs or lungs
- Infections, partly because protective proteins are lost in urine
- Acute kidney injury, meaning a sudden decline in kidney function
- High cholesterol and other abnormal blood fats
- Poor nutrition if protein loss is prolonged
- Side effects from corticosteroids or other immune medicines

Prevention

Minimal change disease usually cannot be prevented because its cause is often unknown. It is not normally linked to something you ate or did.

If a medicine appears to have triggered the condition, avoiding that medicine may reduce the chance of another episode. Do not stop a prescribed medicine without discussing the reason and alternatives with the prescriber.

During treatment, recommended vaccinations, careful hand hygiene, and prompt attention to infections may reduce complications. A moderate salt intake can help manage fluid retention, but it does not prevent the underlying condition.

Living with it and what to expect

Many people enter remission , meaning urine protein falls and swelling resolves. Children often respond relatively quickly to initial treatment. Adults can also enter remission, although improvement may take longer.

Relapses may follow an infection or may occur without an obvious trigger. Some people have only one episode. Others have occasional or frequent relapses over several years. Relapses often become less common with time, particularly as children grow older, but this cannot be predicted for one person.

Monitoring usually includes urine protein, weight, blood pressure, kidney function, and treatment side effects. Some families are taught to check urine protein at home. A sudden weight increase can be an early sign of fluid retention.

Most people can attend school, work, exercise, and travel when the condition is controlled.

During active swelling or infection, activities may need to be adjusted. If you take immune-suppressing medicine, planning for vaccinations, travel, and exposure to contagious infections is important.

Routine follow-up remains useful during remission. It can identify a relapse early and monitor the longer-term effects of treatment.

When to get medical help

Arrange a routine medical review if you develop new puffiness, ankle swelling, persistent foamy urine, or unexplained weight gain. If you already have minimal change disease, report a return of protein in your urine or swelling according to your follow-up plan.

Seek urgent same-day medical advice for:

Call emergency services for:

These symptoms can suggest a blood clot, severe infection, or a major disturbance in fluid balance.

- Fever or signs of infection while taking immune-suppressing medicine
- A major decrease in urine output
- Rapidly worsening swelling
- Vomiting or diarrhoea that makes it difficult to keep fluids down
- New redness, warmth, or pain in a swollen area
- Symptoms of very high or very low blood pressure, such as fainting or a severe headache
- Sudden shortness of breath, chest pain, or coughing up blood
- One-sided leg swelling or pain with breathing symptoms
- Severe breathing difficulty caused by swelling
- Collapse, confusion, or inability to wake normally

Common questions

Is minimal change disease an autoimmune condition?

It involves abnormal immune activity, but it is not usually classified in the same way as conditions such as lupus. The immune system appears to disrupt podocyte function without causing the inflammation or antibody deposits seen in many other kidney conditions.

Can minimal change disease go away completely?

Yes, some people have one episode followed by lasting remission. Others experience relapses. Doctors usually use the word remission rather than cure because protein leakage can return after months or years.

Why would I need a kidney biopsy if the changes are "minimal"?

The name refers to how the tissue looks under an ordinary microscope, not to the severity of the symptoms. Electron microscopy can show the podocyte changes. A biopsy also helps separate minimal change disease from other causes of nephrotic syndrome.

Does minimal change disease cause permanent kidney damage?

Most people with confirmed minimal change disease maintain good kidney function. Temporary acute kidney injury can occur, especially with severe fluid imbalance. Lasting loss of kidney function is unusual and may prompt a review of the diagnosis.

What should I eat if I have minimal change disease?

A moderate-salt diet may help control swelling and blood pressure. Very high-protein diets are not generally used to replace urine protein because they may increase the kidneys' workload. Dietary needs can change with kidney function, swelling, blood potassium, and treatment.

Is minimal change disease contagious?

No. You cannot catch it from someone else or pass it to family members. An infection may sometimes occur before a relapse, but the kidney condition itself is not infectious.

Sources

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