CONDITION

Reflux nephropathy

Reflux nephropathy is permanent kidney scarring linked to urine flowing backward toward the kidneys.

WHAT IT IS
Kidney scarring linked to backward urine flow

BODY SYSTEM
Kidneys and urinary tract

MAIN SYMPTOMS
No symptoms, recurrent UTIs, high blood pressure, swelling

WHAT CAUSES IT
Urine backflow, usually from congenital urinary anatomy

HOW IT IS DIAGNOSED
DMSA kidney scan and voiding cystourethrogram

MAIN TREATMENT
Kidney protection, infection control, sometimes reflux correction

CAN IT BE CURED?
No - existing kidney scars are permanent

IS IT AN EMERGENCY?
Sometimes - confusion or severe weakness with UTI symptoms

LONG-TERM OUTLOOK
Often stable; some develop chronic kidney disease

Overview

Reflux nephropathy means that parts of one or both kidneys have become scarred. It is usually associated with vesicoureteral reflux, often shortened to VUR.

Normally, urine travels from each kidney to the bladder through a tube called a ureter. A valve-like connection at the bladder helps stop urine from going backward. With VUR, this connection does not close properly, allowing urine to flow back toward the kidney.

VUR and reflux nephropathy are not the same thing. VUR describes the backward flow of urine. Reflux nephropathy describes kidney damage linked to that flow. Many people with VUR never develop significant scarring.

Some kidney damage may develop before birth because the kidney or urinary tract formed

differently. Further scarring can sometimes occur when backward urine flow is combined with kidney infections, particularly during childhood.

The scars do not usually heal. However, finding the condition matters because monitoring and treatment can reduce the effects of high blood pressure, urinary infections, and reduced kidney function.

Symptoms

Reflux nephropathy often causes no clear symptoms. It may be discovered during tests for a urinary tract infection, high blood pressure, pregnancy, or reduced kidney function.

Children may have repeated urinary tract infections, or UTIs. A bladder UTI can cause pain or burning when passing urine, frequent urination, urgency, lower abdominal discomfort, or new wetting accidents. Babies may have less specific signs, such as fever, poor feeding, vomiting, or irritability.

A kidney infection can cause fever, pain in the back or side, nausea, or vomiting. These infections are also called pyelonephritis.

Kidney scarring may eventually be associated with:

These symptoms have many possible causes. Tests are needed to find out whether reflux nephropathy is responsible.

- High blood pressure
- Protein in the urine, which may make urine look persistently foamy
- Swelling around the eyes, feet, or ankles
- Tiredness, nausea, or itching if kidney function becomes significantly reduced
- Slow growth in some children with more extensive kidney problems

Causes and risk factors

The usual underlying problem is VUR. In primary VUR, a child is born with a ureter-to-bladder connection that does not prevent backward flow effectively. This connection may work better as the child grows, particularly when reflux is less severe.

VUR can also occur because pressure inside the bladder is too high. Possible causes include a urinary blockage, problems with bladder emptying, or a bladder that does not store and release urine normally. This is called secondary VUR.

Kidney scars can form in more than one way. Some are related to abnormal kidney development before birth. Others may develop or worsen when infected urine reaches the kidney. A high fever with a UTI can be a sign that the infection involves the kidney rather than only the bladder.

Factors associated with a greater chance of kidney damage include more severe reflux, repeated kidney infections, delayed treatment of infection, and bladder or bowel problems. Constipation and regularly holding urine can interfere with bladder emptying.

VUR sometimes occurs in families, but its inheritance is not simple. Having an affected relative does not mean that someone will develop reflux nephropathy.

Diagnosis

The assessment usually begins with a history of urinary infections and any urinary symptoms. Blood pressure is checked because kidney scarring can contribute to hypertension, meaning persistently high blood pressure.

Urine tests can look for infection, blood, and protein. A urine culture identifies bacteria and can help guide treatment for a UTI. Blood tests measure creatinine, a waste product used to estimate how well the kidneys filter blood.

Imaging tests provide different information:

An ultrasound cannot reliably rule out VUR or small kidney scars. A VCUG confirms active reflux, but it may not show reflux that has already resolved. This is important in adults who have kidney scars from a childhood problem that is no longer present.

The overall diagnosis may therefore be based on the pattern of scarring, past infections, kidney function, and current or previous evidence of VUR.

- A kidney and bladder ultrasound shows kidney size, urinary tract structure, swelling, and some larger scars
- A DMSA scan uses a small amount of radioactive tracer to show working kidney tissue and areas of scarring
- A voiding cystourethrogram, or VCUG, uses a thin bladder catheter and X-rays to show whether urine flows backward during bladder filling or urination

Treatment and management

Existing scars cannot be removed. Treatment aims to protect the remaining kidney tissue,

prevent or promptly treat infections, and manage the underlying urinary problem when it is still active.

A confirmed UTI is treated with antibiotics like amoxicillin or doxycycline chosen for the type of infection and, when available, the urine culture result. People with fever or signs of a kidney infection may need a different level of treatment from those with a simple bladder infection.

Some children with VUR are offered a low daily dose of antibiotic to reduce recurrent infections. This is not needed for everyone. The decision considers age, reflux severity, infection history, bladder and bowel function, and the possible disadvantages of long-term antibiotics.

Bladder and bowel management may include regular toilet visits, avoiding prolonged urine holding, treating constipation, and addressing incomplete bladder emptying.

Procedures to correct VUR may be considered when reflux is severe, infections continue despite management, or there is a correctable structural problem. Options include an endoscopic injection near the ureter opening or surgery to reconnect the ureter to the bladder. These procedures may reduce reflux, but they cannot reverse kidney scars.

High blood pressure and protein in the urine require ongoing management. Medicines that lower blood pressure may also reduce protein loss and help protect kidney function. The choice is based on age, kidney function, pregnancy plans, and other health factors.

People with reduced kidney function may need broader chronic kidney disease care. This can include blood and urine monitoring, medication review, dietary guidance, and avoiding medicines that may place extra stress on the kidneys. Regular use of anti-inflammatory painkillers such as ibuprofen or naproxen should be discussed with a healthcare professional if kidney function is reduced.

Complications

Possible complications include repeated kidney infections, high blood pressure, and protein leaking into the urine. More extensive scarring can lead to chronic kidney disease, meaning the kidneys remain less able to filter blood over time.

A small proportion of affected people develop kidney failure and may eventually need dialysis or a kidney transplant. This is not the expected outcome for everyone. Risk is greater when both kidneys are significantly affected, kidney function is already reduced, or protein loss and high blood pressure remain difficult to control.

Reflux nephropathy can also affect pregnancy. Reduced kidney function, high blood pressure, or a history of frequent UTIs may increase the chance of complications such as pre-eclampsia

or further loss of kidney function.

Prevention

Primary VUR and kidney differences that develop before birth cannot usually be prevented. It may also be impossible to prevent scars that formed before the condition was recognised.

The aim is to reduce avoidable additional kidney injury. This includes having possible UTIs assessed promptly, completing prescribed treatment, and following any plan for monitoring or preventing infections.

Managing constipation and bladder-emptying problems may reduce urine retention and infection risk. Children should be supported to use the toilet regularly rather than repeatedly holding urine.

Regular monitoring of blood pressure, urine protein, and kidney function helps identify changes early. This does not prevent the original condition, but it allows kidney-protective treatment to begin when needed.

Living with it and what to expect

The course differs according to how much kidney tissue is scarred, whether one or both kidneys are affected, and whether infections, protein loss, or high blood pressure continue.

In children, lower-grade VUR often improves as the urinary tract grows. Kidney scars, however, remain visible even after reflux resolves. Correcting reflux also does not erase existing damage.

Many people maintain stable kidney function and take part in school, work, exercise, and family life without major limits. Others need long-term treatment for blood pressure or chronic kidney disease. Changes in kidney function often develop gradually, which is why follow-up remains useful even when you feel well.

Routine follow-up may include blood pressure checks, urine testing for protein, blood tests for kidney function, and occasional imaging. The timing is based on age, previous results, infection history, and the extent of scarring.

If you are planning a pregnancy, a review before conception can assess blood pressure, kidney function, urine protein, infection history, and whether current medicines are suitable during pregnancy. Additional monitoring may be advised during pregnancy.

When to get medical help

Arrange routine medical follow-up if you or your child has repeated UTIs, known VUR, persistently foamy urine, swelling, or blood pressure readings that remain high. Follow-up is also important after reflux has resolved if kidney scars are already present.

Seek urgent same-day medical assessment for:

Use emergency services if UTI symptoms occur with confusion, fainting, severe weakness, difficulty breathing, or extreme drowsiness. These can be signs of a severe infection or another serious problem.

- Fever with pain in the back or side
- UTI symptoms with vomiting or difficulty keeping fluids down
- Fever or unusual illness in a baby
- Much less urine than usual
- New or worsening swelling

Common questions

Is reflux nephropathy the same as VUR?

No. VUR is urine flowing backward from the bladder toward a kidney. Reflux nephropathy is kidney scarring associated with that backward flow. A person can have VUR without kidney scarring.

Can kidney scars from reflux heal?

Existing kidney scars are generally permanent. Treatment focuses on protecting unscarred tissue and managing infections, high blood pressure, urine protein, and any continuing reflux.

Can adults have reflux nephropathy?

Yes. Some adults are diagnosed after high blood pressure, reduced kidney function, protein in the urine, pregnancy-related monitoring, or imaging for another reason. The reflux may have improved during childhood even though the scars remain.

Will I or my child need surgery?

Not necessarily. Many people are managed with monitoring, infection treatment, and bladder or bowel care. A procedure may be considered for continuing severe reflux, repeated infections despite management, or a correctable urinary blockage. Surgery does not repair existing scars.

Is reflux nephropathy inherited?

VUR can occur in families, so inherited factors may contribute. However, the pattern is not straightforward, and an affected relative does not mean that every family member will have reflux or kidney damage.

Can I have a healthy pregnancy with reflux nephropathy?

Many people do, especially when kidney function and blood pressure are stable. Pregnancy may require closer monitoring because kidney impairment, high blood pressure, urine protein, and recurrent infections can increase pregnancy risks.

Sources

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