CONDITION

Renal vein thrombosis

Renal vein thrombosis is a blood clot in a vein that carries blood away from one or both kidneys.

WHAT IT IS
Blood clot blocking a vein draining a kidney

BODY SYSTEM
Kidneys and circulation

MAIN SYMPTOMS
No symptoms, flank pain, bloody urine, reduced urine

WHAT CAUSES IT
Increased clotting, kidney disease, cancer, injury

HOW IT IS DIAGNOSED
Contrast CT or magnetic resonance vein imaging

MAIN TREATMENT
Anticoagulant medicines and treatment of the underlying cause

CAN IT BE CURED?
Sometimes - clot clears; risks may remain

IS IT AN EMERGENCY?
Sometimes - breathlessness or chest pain may mean pulmonary embolism

LONG-TERM OUTLOOK
Often good when treated and kidney function remains preserved

Overview

Renal vein thrombosis is a blood clot in a renal vein. These veins carry blood away from the kidneys and back toward the heart. A clot may affect one kidney or both.

The clot can appear suddenly, called acute thrombosis, or develop gradually over time. A slow-growing clot may cause no obvious symptoms because smaller veins can begin carrying blood around the blockage.

Renal vein thrombosis matters because it may interfere with kidney drainage and function. Part of the clot can also break away and travel to the lungs, causing a pulmonary embolism. However, the effect differs from person to person. Some people have a clot found by chance and continue to have normal kidney function.

The condition is strongly linked with nephrotic syndrome. This is a kidney problem in which large amounts of protein leak into the urine. Losing these proteins can make the blood more likely to clot. Renal vein thrombosis can also occur with cancer, injury, severe dehydration, pregnancy, or an inherited tendency to form clots.

Symptoms

Renal vein thrombosis may cause no symptoms, especially when the clot forms slowly. It may be discovered during imaging performed for another reason or while investigating kidney disease.

A clot that forms suddenly is more likely to cause:

Swelling in the legs, ankles, face, or abdomen may come from nephrotic syndrome rather than the clot itself. Foamy urine can be a sign of excess protein in the urine.

If both renal veins are blocked, or if the person has only one working kidney, the loss of kidney function may be more serious.

Babies can also develop renal vein thrombosis, although their signs may be different. Possible signs include blood in the urine, a swollen or tender abdomen, reduced urine, or a lump that can be felt in the abdomen. These signs need prompt medical assessment.

Symptoms such as sudden breathlessness, chest pain, coughing up blood, or fainting may indicate that a clot has reached the lungs. This is an emergency.

- Pain in the side or back, between the ribs and hip
- Blood in the urine, which may look pink, red, or brown
- Less urine than usual
- Nausea, vomiting, or fever
- A sudden decline in kidney function

Causes and risk factors

A clot forms when blood flow slows, a blood vessel is injured, or the blood becomes unusually likely to clot. More than one factor may be involved.

Nephrotic syndrome is an important risk factor. It can result from several kidney conditions, including membranous nephropathy, a condition affecting the kidney's filtering units. The risk of clotting tends to be greater when blood protein levels are very low and protein loss in the

urine is heavy.

Other possible causes and risk factors include:

In some people, no clear cause is found.

Having one risk factor does not mean you will develop renal vein thrombosis. Clinicians consider the combination of risks, test results, and current health rather than any single factor.

- Kidney cancer or another tumour pressing on or growing into a renal vein
- Cancer elsewhere in the body
- Injury to the abdomen, back, or kidney
- Surgery, hospital admission, or long periods of limited movement
- Pregnancy and the weeks after giving birth
- Oestrogen-containing medicines
- Inherited or acquired blood-clotting conditions
- Severe dehydration, particularly in newborn babies
- Serious infection or illness
- A previous blood clot

Diagnosis

Symptoms alone cannot confirm renal vein thrombosis. Other conditions, including kidney stones, kidney infection, bleeding within the urinary system, and muscle or spine problems, can cause similar pain.

A contrast-enhanced CT scan is commonly used to confirm the diagnosis. Contrast is a substance injected into a vein to make blood vessels easier to see. The scan can show the clot, whether one or both kidneys are involved, and whether a tumour or another problem is present.

Magnetic resonance venography uses a magnetic resonance imaging scanner to examine the veins. It may be considered when CT imaging is unsuitable, although the use of contrast still needs careful consideration in some people with poor kidney function.

Doppler ultrasound uses sound waves to assess blood flow. It does not involve radiation and can be useful in babies, during pregnancy, or when contrast cannot be used. However, it may miss a clot, particularly in adults, so another scan may be needed.

Catheter venography, in which contrast is placed directly into the vein through a thin tube, is

invasive and is now rarely needed solely for diagnosis.

Blood and urine tests do not confirm the clot, but they help show its effects and possible cause. Testing may include kidney function, blood counts, clotting tests, urine protein, and blood albumin. Albumin is an important protein that may become low in nephrotic syndrome.

Further tests may be used to look for kidney disease, cancer, or a clotting disorder. Testing for inherited clotting conditions is not useful for everyone and can be affected by an active clot or anticoagulant treatment.

Treatment and management

Treatment aims to stop the clot growing, prevent a pulmonary embolism, protect kidney function, and address the cause.

Most people are treated with an anticoagulant like warfarin or apixaban . These medicines are often called blood thinners, although they do not literally thin the blood. They reduce the blood's ability to form and extend clots while the body gradually breaks down the existing clot.

The choice of anticoagulant and length of treatment are individual decisions. They are influenced by kidney function, bleeding risk, pregnancy, cancer, other medicines, and whether the cause is temporary or ongoing. Treatment commonly continues for months and may last longer when nephrotic syndrome or another continuing risk remains.

Anticoagulants can cause bleeding. Before treatment, clinicians review recent bleeding, planned procedures, medicines, and other health conditions. Some anticoagulants need regular blood tests, while others do not. Kidney function may still need monitoring because it affects which medicines can be used safely.

Severe acute cases may need a procedure to remove or dissolve the clot. Catheter-directed thrombolysis delivers clot-dissolving medicine through a small tube placed near the clot. Mechanical thrombectomy removes it with a device. These treatments are generally reserved for selected situations, such as serious loss of kidney function, because they can cause bleeding and other complications.

Surgery is now uncommon. Treatment to remove a kidney may be considered only in exceptional circumstances, such as a non-functioning kidney with extensive damage or certain kidney tumours.

The underlying problem also needs care. This may involve treating nephrotic syndrome, managing cancer, correcting dehydration, or reviewing medicines that increase clotting risk. Do not stop a prescribed medicine without medical advice.

Complications

Possible complications include:

Serious kidney failure is more likely when both kidneys are affected, when there is only one functioning kidney, or when another kidney condition is present.

Not everyone develops complications. A slowly forming clot may be partly bypassed by new or enlarged veins, allowing kidney function to remain stable.

- Acute kidney injury, meaning a sudden decline in kidney function
- Long-term kidney damage or shrinkage of the affected kidney
- Chronic kidney disease
- Pulmonary embolism
- Extension of the clot into the large vein in the abdomen
- Another blood clot in the future
- Bleeding caused by anticoagulant treatment

Prevention

Renal vein thrombosis cannot always be prevented. An inherited tendency to clot, cancer, or the kidney condition causing nephrotic syndrome may not be avoidable.

The risk may sometimes be reduced by treating the underlying condition and avoiding preventable periods of immobility or dehydration. During hospital care, measures such as movement, compression devices, or preventive anticoagulants may be used when appropriate.

Preventive anticoagulation is sometimes considered for people with nephrotic syndrome who have a particularly high risk of clotting. It is not suitable for everyone because it also increases bleeding risk. This decision requires an individual assessment and should not be based only on one laboratory result.

If you have previously had renal vein thrombosis, follow the plan for anticoagulants and discuss long journeys, surgery, pregnancy, or oestrogen-containing medicines with your healthcare team in advance.

Living with it and what to expect

Recovery depends on how quickly the clot formed, whether one or both kidneys are involved,

and whether the underlying cause continues. Kidney function often remains stable when one kidney is affected and the other is healthy.

Anticoagulant treatment usually lasts for months rather than days. Follow-up may include kidney function tests, urine protein measurements, blood counts, or anticoagulant monitoring. Repeat imaging is sometimes used when the result would affect treatment, but it is not needed in every case.

The clot may shrink or disappear, or the vein may remain partly blocked. A persistent blockage does not always cause ongoing symptoms. The body can develop alternative channels for blood flow.

If nephrotic syndrome is the cause, the longer-term course often follows the kidney condition. Clot risk may fall when urine protein loss improves and blood albumin rises. Risk may return during a relapse.

Most people can continue everyday activities once the acute symptoms have settled. While taking an anticoagulant, activities with a high risk of major injury may need to be avoided. Tell dentists and other healthcare professionals about anticoagulant treatment before procedures.

Keep routine follow-up appointments even if you feel well. They are used to check kidney function, review bleeding or clotting risk, and decide how long treatment should continue.

When to get medical help

Call emergency services for:

These symptoms may indicate a pulmonary embolism or serious bleeding.

Seek prompt same-day medical assessment for new flank pain, visible blood in the urine, a major drop in urine output, or rapidly increasing swelling. These symptoms have several possible causes and need proper evaluation.

If you are taking an anticoagulant, contact your healthcare team promptly about repeated nosebleeds, unusually heavy menstrual bleeding, increasing bruising, blood in the urine, or blood in bowel movements. Do not stop the medicine on your own unless emergency care professionals tell you to do so.

Routine follow-up is appropriate for questions about activity, travel, planned dental work, treatment duration, or mild stable bruising.

- Sudden shortness of breath or difficulty breathing
- Chest pain, especially when breathing in

- Coughing up blood
- Fainting, severe weakness, or confusion
- Uncontrolled bleeding, vomiting blood, or black bowel movements
- Sudden severe headache or new weakness on one side while anticoagulated

Common questions

Can renal vein thrombosis go away?

Sometimes. Anticoagulants prevent the clot from growing while the body breaks it down. Some clots clear fully, while others leave part of the vein blocked. Symptoms and kidney function can still improve even if imaging continues to show some blockage.

Is renal vein thrombosis the same as a kidney blood clot?

It is one type of kidney blood clot. It affects a vein carrying blood away from the kidney. A clot in a renal artery blocks blood going into the kidney and is a different condition with different causes and treatment.

Does renal vein thrombosis cause kidney failure?

It can, but many people keep useful or normal kidney function. The risk is higher if both renal veins are blocked, the clot forms suddenly, there is only one working kidney, or kidney disease was already present.

How long will I need blood thinners?

Treatment often continues for several months. It may be longer if nephrotic syndrome, cancer, or another ongoing clotting risk remains. The decision balances the chance of another clot against the risk of bleeding.

Can I exercise with renal vein thrombosis?

Gentle movement is often encouraged once acute pain and illness have settled, but the safe level depends on your condition and treatment. Contact sports and activities with a high risk of falling may be unsuitable while you take an anticoagulant.

Can renal vein thrombosis come back?

Yes. Recurrence is more likely if the underlying cause continues or anticoagulant treatment is stopped before the risk has settled. Follow-up focuses on controlling ongoing risks and deciding whether longer treatment is appropriate.

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