CONDITION

Acute arterial occlusion - kidney

Learn how a sudden blockage of a kidney artery can affect kidney tissue, including symptoms, causes, diagnosis, urgent treatment, and follow-up care.

WHAT IT IS
Sudden blockage of an artery supplying one or both kidneys

BODY SYSTEM
Kidneys and circulation

MAIN SYMPTOMS
Sudden flank pain, nausea or vomiting, blood in urine, reduced urine output

WHAT CAUSES IT
Usually a blood clot, sometimes unknown

HOW IT IS DIAGNOSED
CT angiography, magnetic resonance angiography, or catheter angiography

MAIN TREATMENT
Anticoagulation or catheter-based blood-flow restoration

CAN IT BE CURED?
Sometimes - prompt treatment may restore flow

IS IT AN EMERGENCY?
Yes - prompt hospital assessment is required

LONG-TERM OUTLOOK
Variable, with possible permanent kidney damage

Overview

Acute arterial occlusion of the kidney, also called acute renal artery occlusion, is a sudden blockage of an artery supplying one or both kidneys. If blood flow is interrupted long enough, kidney tissue can be injured or die. This is called a renal infarction.

The blockage may affect a main renal artery or one of its smaller branches. The amount of damage depends on the artery involved, how long blood flow is reduced, and whether the other kidney works normally.

Prompt assessment may improve the chance of preserving kidney function, especially when a large artery, both kidneys, or a person's only functioning kidney is affected. However, symptoms can resemble kidney stones, kidney infection, or a muscle injury, making the condition difficult to recognize.

Acute occlusion differs from renal artery stenosis, which is a gradual narrowing. A narrowed artery can develop a sudden clot, but the conditions do not always have the same symptoms or treatment.

Symptoms

A small blockage may cause mild symptoms or none at all. A larger blockage often causes sudden, persistent pain.

Possible symptoms include:

Pain is often felt in the flank, between the ribs and hip. Unlike kidney stone pain, it may be steady rather than occurring in waves. Symptoms alone cannot reliably distinguish an arterial blockage from other abdominal or urinary conditions.

Seek urgent medical assessment for sudden, unexplained flank or abdominal pain, particularly with blood in the urine, vomiting, fever, an irregular heart rhythm, or a history of blood clots.

Call emergency services for fainting, confusion, chest pain, severe shortness of breath, stroke symptoms, very low urine output, or severe pain with weakness or sweating. These may indicate a serious blood-flow problem affecting the kidneys or another organ.

- Sudden pain in the side, back, or upper abdomen
- Nausea or vomiting
- Fever
- Visible or microscopic blood in the urine
- New or sharply worsening high blood pressure
- Reduced urine output, especially if both kidneys or a single functioning kidney are affected
- Weakness or a general feeling of illness

Causes and risk factors

A renal artery may be blocked by an embolus or thrombosis. An embolus is material, usually a blood clot, that forms elsewhere and travels through the bloodstream. A thrombosis forms within the renal artery itself.

The heart is a common source of emboli. Atrial fibrillation can allow blood to pool and clot inside the heart. Other heart-related sources include a recent heart attack, heart valve disease,

infective endocarditis, or a clot within a heart chamber.

A clot can also form in an artery damaged or narrowed by atherosclerosis. Cholesterol-containing material from aortic plaque may break loose and block smaller kidney arteries. Other causes include abdominal or back injury, a tear in the aorta or renal artery, vascular procedures, blood-vessel inflammation, and disorders that increase clotting.

Risk factors include:

Sometimes no cause is identified despite detailed evaluation.

- Atrial fibrillation or another source of heart clots
- Atherosclerosis or aortic disease
- Recent heart attack
- Heart valve disease or infective endocarditis
- Previous blood clots or a clotting disorder
- Fibromuscular dysplasia
- Recent vascular treatment or aortic surgery
- Abdominal trauma
- Smoking, high blood pressure, diabetes, or high cholesterol

Diagnosis

Diagnosis is based on symptoms, medical history, examination, blood and urine tests, and imaging. Clinicians may ask about when the pain began, heart rhythm problems, vascular disease, recent procedures or injuries, medicines, and previous clots.

Blood tests assess kidney function and tissue injury. Creatinine may rise when kidney function falls, but it can remain normal if only part of one kidney is affected and the other kidney works normally. Lactate dehydrogenase, or LDH, may be high after a renal infarction, although it is not specific to the kidney. Other tests may evaluate blood counts, electrolytes, inflammation, clotting, and treatment risks.

A urine test may show blood or protein, but these findings can also occur with stones, infection, and other kidney diseases.

Computed tomography angiography, or CTA, can show the renal arteries, blockage location, and areas of reduced blood flow. It uses X-rays and injected contrast material. A noncontrast CT scan used to look for kidney stones may miss a renal infarction. Tell the clinical team about previous contrast reactions, pregnancy, kidney problems, and all medicines before imaging.

Magnetic resonance angiography is an alternative in some cases. Doppler ultrasound can assess blood flow but may miss small or difficult-to-see blockages. Catheter angiography provides detailed images and may allow treatment during the same procedure, but it is invasive.

Further testing may include an electrocardiogram, heart-rhythm monitoring, an echocardiogram, aortic imaging, or selected tests for clotting disorders.

Treatment and management

Acute renal artery occlusion generally requires prompt hospital assessment. Treatment depends on when symptoms began, the artery involved, the amount of kidney at risk, existing kidney function, bleeding risk, and the suspected cause. Kidney, heart, vascular, or interventional radiology specialists may be involved.

Anticoagulants like warfarin or apixaban reduce the blood's ability to clot. They may be used when an embolus or thrombosis is suspected, particularly if a procedure is unsuitable or diagnosis was delayed. The medicine and treatment duration depend on the cause, kidney function, other medicines, and bleeding risk.

Some patients may be offered a catheter-based procedure to restore blood flow. A thin tube is guided through an artery to the blockage. Treatment may include:

These procedures may be considered when symptoms began recently, a large amount of kidney is threatened, or both kidneys or a single functioning kidney are affected.

Restoring blood flow is not appropriate for everyone. Benefits become less certain after prolonged loss of blood supply. Clot-dissolving medicines, anticoagulants, and invasive procedures can cause serious bleeding or blood-vessel injury. A history of active bleeding, recent major surgery, bleeding in the brain, or certain other conditions may make clot-dissolving treatment unsafe. Specialists must weigh these risks against the kidney function that might be saved.

Open surgery is uncommon but may be used for selected injuries, arterial dissections, or blockages that cannot be treated through a catheter.

Supportive care can include pain and nausea treatment, careful fluid management, and monitoring of urine output, blood pressure, electrolytes, and kidney function. The underlying cause, such as atrial fibrillation, heart valve infection, vascular disease, or a clotting disorder, also requires treatment.

Dialysis may be needed for dangerous fluid, electrolyte, or acid-base problems caused by kidney failure. This is more likely if both kidneys are severely affected, only one kidney

functions, or kidney function was already reduced.

- Delivering a clot-dissolving medicine
- Removing the clot
- Widening the artery with a balloon
- Placing a stent to keep the artery open

Complications

The main complication is permanent loss of function in affected kidney tissue. A small infarction may have little effect on overall kidney function, while a large or bilateral blockage can cause acute kidney injury.

Other complications include:

High blood pressure can develop because an under-supplied kidney activates hormone systems that raise blood pressure. It may improve, but some people need continuing treatment.

The outlook depends on the amount of tissue damaged, how quickly the blockage is recognized, the health of the other kidney, and the underlying heart or vascular condition. Overall kidney function may remain adequate even if one kidney loses some function.

- Persistent or difficult-to-control high blood pressure
- Chronic kidney disease
- Kidney failure requiring dialysis
- Repeat emboli affecting the brain, intestines, limbs, or other organs
- Bleeding from medicines or procedures
- Blood-vessel damage during treatment

Follow up

Follow-up after discharge is important for monitoring kidney function, blood pressure, treatment safety, and the cause of the blockage. Care may involve a primary care clinician, kidney specialist, cardiologist, vascular specialist, or anticoagulation service.

Follow-up commonly includes blood pressure checks and blood tests for creatinine and electrolytes. Urine tests may look for blood or protein. Imaging may be recommended after a

procedure, if symptoms continue, or if the renal artery needs reassessment.

Take anticoagulants and other medicines exactly as directed. Do not stop an anticoagulant without speaking to the prescriber, because this may increase the risk of another clot. Before taking nonprescription medicines or supplements, ask whether they could increase bleeding or affect kidney function.

Report unusual bruising or bleeding. Seek emergency care for vomiting or coughing up blood, black or bloody stools, a severe unexplained headache, fainting, or bleeding that does not stop.

Seek urgent care for new flank or abdominal pain, visible blood in the urine, a major decrease in urine output, or rapidly worsening blood pressure. Call emergency services for stroke symptoms, chest pain, severe breathing difficulty, fainting, or a suddenly cold, painful, or weak limb.

Long-term care may address smoking, cholesterol, diabetes, physical activity, and blood pressure. These measures cannot reverse an infarction but may reduce future cardiovascular risk.

Sources

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