CONDITION

Renovascular hypertension

Renovascular hypertension is high blood pressure caused by reduced blood flow through one or both kidney arteries.

WHAT IT IS
High blood pressure caused by reduced kidney artery blood flow

BODY SYSTEM
Heart, circulation, and kidneys

MAIN SYMPTOMS
Often none, headache, blurred vision, breathlessness

WHAT CAUSES IT
Renal artery narrowing from plaque or fibromuscular dysplasia

HOW IT IS DIAGNOSED
Renal artery imaging with blood pressure and kidney assessment

MAIN TREATMENT
Blood pressure medicines; artery procedures for selected people

CAN IT BE CURED?
Sometimes - artery treatment can normalize pressure

IS IT AN EMERGENCY?
Sometimes - severe breathlessness, chest pain, or stroke signs

LONG-TERM OUTLOOK
Often manageable; heart and kidney risks may remain

Overview

Renovascular hypertension is high blood pressure caused by reduced blood flow to one or both kidneys. The usual reason is narrowing of a renal artery, one of the blood vessels that supplies the kidneys.

When a kidney receives less blood, it may respond as though the body's blood pressure is too low. It releases hormones that retain salt and water and tighten blood vessels. This raises blood pressure throughout the body.

Renal artery narrowing is also called renal artery stenosis. Not everyone with renal artery stenosis develops renovascular hypertension. The narrowing must be significant enough to affect kidney blood flow and contribute to high blood pressure.

The condition matters because blood pressure may be difficult to control, kidney function may decline, and the risk of heart and blood vessel problems may rise. Many people can manage it with medicines and regular monitoring. A procedure to improve blood flow is helpful in selected situations but is not needed by everyone.

Symptoms

Renovascular hypertension often causes no noticeable symptoms. High blood pressure can remain silent even when readings are well above the healthy range.

When symptoms occur, they are usually related to very high blood pressure or its effects rather than the narrowed artery itself. They may include:

Some people develop sudden fluid buildup in the lungs, sometimes called flash pulmonary edema. This causes abrupt, severe breathlessness and may produce a cough with frothy sputum. It requires emergency care.

Possible clues include blood pressure that becomes difficult to control, rises suddenly after being stable, or starts at an unusual age. These patterns do not confirm renovascular hypertension because they can have several other causes.

- Headache, blurred vision, dizziness, or confusion
- Chest discomfort or shortness of breath
- Reduced exercise tolerance
- Nosebleeds, although these have many other causes

Causes and risk factors

The most common cause is atherosclerosis. This is a buildup of fatty plaque inside an artery. Plaque can narrow the opening of a renal artery and reduce blood flow to the kidney.

Atherosclerotic renal artery narrowing is more likely in people who have risk factors for blood vessel disease, including:

Another important cause is fibromuscular dysplasia. In this condition, abnormal cell growth changes the wall of an artery. It is not caused by fatty plaque or inflammation. It is diagnosed more often in women and may affect the arteries supplying the kidneys, brain, or other organs. Its underlying cause is not fully understood.

Less common causes include inflammation of blood vessels, a tear in an artery wall, injury,

previous radiation treatment, or pressure on a renal artery from a nearby structure.

Renovascular hypertension can involve one kidney or both. It may also affect the only functioning kidney in someone who has one kidney. Narrowing on both sides, or in a single functioning kidney, can have a greater effect on overall kidney function.

- Smoking
- Diabetes
- High cholesterol
- Older age
- Kidney disease
- A history of coronary artery or peripheral artery disease

Diagnosis

Renovascular hypertension cannot be diagnosed from a single blood pressure reading. Assessment usually begins with repeated blood pressure measurements, a medical history, a physical examination, and blood and urine tests.

A clinician may consider it when blood pressure is resistant to treatment, worsens unexpectedly, or occurs with declining kidney function. Other clues include unequal kidney sizes, a whooshing sound over the abdomen called a bruit, or sudden fluid buildup in the lungs.

Blood tests measure kidney function and levels of potassium and other salts. Urine tests look for protein or other signs of kidney damage. These tests help assess the effects of high blood pressure but do not show whether a renal artery is narrowed.

Imaging may include:

The safest imaging choice depends on kidney function, allergies, previous test results, and the likelihood that finding a narrowing would change treatment. Blood renin measurements alone usually cannot confirm or exclude the condition.

- Duplex ultrasound: Uses sound waves to examine the renal arteries and estimate blood flow. It does not use radiation or injected contrast, but results can be limited by body shape, bowel gas, or local expertise.
- CT angiography: Uses X-rays and injected contrast to create detailed images of the arteries.

- MR angiography: Uses a magnetic scanner, sometimes with contrast, to examine blood vessels.
- Catheter angiography: Places a thin tube into an artery and injects contrast directly. It provides detailed images but is invasive, so it is generally reserved for uncertain cases or when a procedure is being considered.

Treatment and management

Treatment aims to lower blood pressure, protect kidney function, and reduce the risk of heart attack and stroke. The best approach is influenced by the cause and severity of the narrowing, kidney function, symptoms, and response to medicines.

Blood pressure medicines are the main treatment for many people. Several categories may be used, including medicines that affect the renin-angiotensin system, calcium channel blockers like amlodipine or diltiazem , diuretics like furosemide or hydrochlorothiazide , and beta blockers like metoprolol or propranolol .

ACE inhibitors and angiotensin receptor blockers can be effective, particularly when only one renal artery is affected. In some people with severe narrowing on both sides, or narrowing affecting a single functioning kidney, these medicines can cause kidney function to fall. Blood tests are therefore often checked after starting them or changing the dose. Do not stop a prescribed medicine without medical advice.

If atherosclerosis is the cause, management also focuses on overall blood vessel health. This may include cholesterol-lowering treatment, diabetes care, stopping smoking, physical activity suited to your health, and antiplatelet treatment when there is a separate reason to use it.

Routine stenting does not improve outcomes for most people with stable atherosclerotic renal artery narrowing when compared with appropriate medical treatment. Restoring blood flow may still be considered in selected situations, such as repeated flash pulmonary edema, worsening kidney function linked to severe narrowing, or blood pressure that remains uncontrolled despite appropriate medicines.

Procedures include balloon angioplasty, which widens the artery, and stenting, which places a small mesh tube to keep it open. Angioplasty is often the preferred artery procedure for fibromuscular dysplasia. Surgery is now uncommon but may be considered when the artery's anatomy is complex or another blood vessel operation is needed.

Procedures have risks, including bleeding, artery injury, contrast-related kidney problems, and the artery narrowing again. They may improve blood pressure without completely normalizing it.

Complications

Long-term high blood pressure can damage the heart, brain, blood vessels, eyes, and kidneys. Possible complications include chronic kidney disease, heart attack, stroke, heart failure, and vision problems.

Reduced kidney blood flow can also contribute directly to loss of kidney function. In some people, severe narrowing triggers repeated episodes of sudden fluid buildup in the lungs.

Good blood pressure control lowers many of these risks, even when the renal artery itself is not treated with a procedure.

Prevention

Not every case can be prevented. There is no proven way to prevent fibromuscular dysplasia, and its cause is not fully understood.

The risk of atherosclerotic renal artery narrowing may be reduced by not smoking, managing diabetes and cholesterol, staying physically active, and following a heart-healthy eating pattern. These steps cannot guarantee prevention, but they support the health of arteries throughout the body.

If renal artery narrowing is already present, controlling blood pressure and other cardiovascular risks may help limit further damage.

Living with it and what to expect

Some people remain stable for years with medicines and monitoring. Others need treatment adjustments because blood pressure, kidney function, or the degree of narrowing changes. Atherosclerotic narrowing may progress as part of wider blood vessel disease.

Follow-up commonly includes blood pressure checks and blood tests for kidney function and potassium. Repeat imaging is not always needed. It may be used when kidney function worsens, blood pressure becomes harder to control, symptoms change, or an artery procedure needs follow-up.

Home blood pressure readings can show patterns that a single clinic measurement may miss. Use a validated upper-arm monitor, sit quietly before measuring, and record readings as instructed. A single unusual result is less informative than a repeated pattern.

Most people can continue everyday activities. Exercise, work, travel, and sexual activity are

generally guided by overall blood pressure control and heart and kidney health rather than the artery narrowing alone.

After angioplasty or stenting, blood pressure may improve quickly or gradually. Medicines may still be needed, and the artery can narrow again. Follow-up remains important even when a procedure has worked well.

When to get medical help

Arrange routine follow-up if your home readings are repeatedly above the range set for you, your blood pressure becomes harder to control, or medicine side effects are affecting daily life. Also seek medical review for new swelling, reduced urine output, or an unexplained decline in kidney test results.

Contact a healthcare service promptly if repeated readings are extremely high even when you feel well. You may need same-day assessment, but the reading alone does not always mean there is immediate organ damage.

Call emergency services for very high blood pressure accompanied by symptoms such as:

These symptoms may indicate a hypertensive emergency, stroke, heart problem, or fluid in the lungs. Do not drive yourself for emergency care.

- Sudden severe breathlessness
- Chest pain
- New weakness or numbness on one side
- Trouble speaking, seeing, or walking
- Severe confusion, fainting, or a seizure

Common questions

Is renovascular hypertension the same as ordinary high blood pressure?

No. Primary, or essential, hypertension has no single identifiable cause and is much more common. Renovascular hypertension is secondary hypertension, meaning another condition-in this case reduced kidney artery blood flow-is contributing to it.

Can renal artery stenosis be cured?

The narrowing can sometimes be widened with angioplasty or a stent, but this does not always cure high blood pressure. A cure is more likely in some people with fibromuscular dysplasia

than in those with long-standing atherosclerosis. Other causes of high blood pressure may remain.

Will I need a renal artery stent?

Most people with stable atherosclerotic narrowing do not need one. Medicines and cardiovascular risk management are usually tried first. A procedure may be considered when severe narrowing is linked to repeated pulmonary edema, worsening kidney function, or blood pressure that remains uncontrolled.

Can renovascular hypertension cause kidney failure?

It can contribute to chronic kidney disease, especially when both kidneys are affected or blood pressure remains high. Progression to kidney failure is not inevitable. Monitoring kidney function and controlling blood pressure help reduce the risk.

Are ACE inhibitors dangerous if a renal artery is narrowed?

They are useful and commonly used, but they can reduce kidney function in certain patterns of severe renal artery narrowing. Blood tests after starting or adjusting treatment help identify this effect. Any change should be managed with the prescribing clinician rather than by stopping the medicine yourself.

Does lowering salt intake open the narrowed artery?

No. Eating less sodium does not remove plaque or correct fibromuscular dysplasia. It may still help lower blood pressure and reduce fluid retention as part of an overall treatment plan.

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