CONDITION

Pulmonic valve stenosis

Pulmonic valve stenosis is narrowing of the valve that controls blood flow from the heart to the lungs.

WHAT IT IS
Narrowing of the valve from heart to lungs

BODY SYSTEM
Heart and circulation

MAIN SYMPTOMS
Often none, breathlessness, chest discomfort, fainting

WHAT CAUSES IT
Usually congenital valve formation; rarely acquired damage

HOW IT IS DIAGNOSED
Echocardiogram with Doppler blood-flow measurements

MAIN TREATMENT
Monitoring, balloon valve opening, or surgery

CAN IT BE CURED?
Sometimes - procedures can relieve narrowing

IS IT AN EMERGENCY?
Sometimes - severe breathing trouble, blue skin, or collapse

LONG-TERM OUTLOOK
Usually good with monitoring and timely treatment

Overview

Pulmonic valve stenosis is a narrowing of the pulmonic valve, also called the pulmonary valve. This valve sits between the heart's lower right chamber, the right ventricle, and the pulmonary artery, which carries blood to the lungs.

Most people with this condition were born with it. The valve's thin flaps may be partly joined or unusually thick, so they cannot open fully. This forces the right ventricle to pump harder to move blood through the valve.

Mild narrowing may cause no symptoms or health problems. More severe narrowing can increase pressure in the right ventricle, thicken its muscle, and reduce blood flow to the lungs. Severe cases in newborns can interfere with the amount of oxygen reaching the body.

Pulmonic valve stenosis is not the same as pulmonary hypertension, which means high blood pressure in the lung arteries. It is also different from narrowing within the pulmonary artery itself.

The condition can often be managed successfully. What it means for you depends mainly on how narrow the valve is, whether you have symptoms, how well the right side of your heart works, and whether the valve leaks.

Symptoms

Many people with mild pulmonic valve stenosis have no symptoms. It may be found when a clinician hears a heart murmur, which is an extra sound caused by turbulent blood flow.

When symptoms occur, they are more likely with moderate or severe narrowing. They can include:

Symptoms in a newborn or young baby can be different. Severe narrowing may cause rapid breathing, difficulty feeding, sweating during feeds, poor weight gain, or blue or grey lips and skin. The colour change happens when the blood does not carry enough oxygen.

Symptoms do not always show how severe the narrowing is. Some people adapt by reducing their activity without noticing. An echocardiogram is needed to assess the valve and blood flow.

- Shortness of breath, especially during exercise
- Tiredness or reduced ability to exercise
- Chest discomfort
- Dizziness or fainting during activity
- A fast, pounding, or irregular heartbeat

Causes and risk factors

Pulmonic valve stenosis usually develops before birth as the heart forms. The valve flaps may be fused together, thickened, or shaped differently from usual. In most cases, there is no clear reason why this happened.

The condition is not usually caused by anything a parent did during pregnancy. It often occurs by itself and is not passed directly from parent to child.

Pulmonic valve stenosis can sometimes occur with other congenital heart conditions. It is also

associated with certain genetic conditions, particularly Noonan syndrome. Having a genetic condition does not mean every family member will have the same heart problem.

Congenital rubella syndrome can include pulmonary valve or pulmonary artery abnormalities. This can happen when rubella infection affects a pregnancy, although vaccination has made congenital rubella much less common in countries with established vaccination programs.

Rarely, a valve that formed normally can become narrowed later. Possible causes include rheumatic heart disease or carcinoid syndrome, a condition in which certain tumours release chemicals that can damage heart valves. These acquired causes are much less common than congenital valve narrowing.

Lifestyle, diet, exercise, and body weight do not cause congenital pulmonic valve stenosis.

Diagnosis

A clinician may first suspect pulmonic valve stenosis after hearing a heart murmur. The murmur alone cannot show how narrow the valve is.

An echocardiogram is the main test used to confirm the condition. This painless ultrasound scan shows the valve, right ventricle, and nearby blood vessels. Doppler measurements use reflected sound waves to estimate the speed of blood moving through the valve and the pressure difference across it.

Other tests may help assess its effects:

Cardiac catheterisation involves passing a thin tube through a blood vessel to the heart. It can directly measure pressures. It is not always needed for diagnosis, but it is commonly used when balloon treatment is being performed.

Severity is judged from several findings, not symptoms alone. These include blood-flow measurements, right ventricular pressure and function, valve shape, and the amount of valve leakage.

- An electrocardiogram, or ECG, records the heart's electrical activity
- A chest X-ray may show changes in heart size or lung blood flow
- Cardiac magnetic resonance imaging, or MRI, can provide detailed images
- Exercise testing can assess symptoms and heart function during activity

Treatment and management

Treatment is based on the severity of the narrowing and its effect on the heart.

Mild pulmonic valve stenosis may need only periodic follow-up. This usually includes an examination and echocardiograms. The timing is individual because the condition may remain stable for years or occasionally become more significant.

Medicines do not open a narrowed pulmonic valve. They may sometimes be used to manage related problems, such as an abnormal heart rhythm or signs of heart failure.

Balloon pulmonary valvuloplasty is the usual procedure for significant narrowing when the valve's shape is suitable. During cardiac catheterisation, a balloon is guided across the valve and briefly inflated. This separates the joined valve flaps and widens the opening. It does not require open-heart surgery.

A thick or unusually shaped valve may not respond as well to balloon treatment. Surgery may then be considered. Surgery can separate the valve flaps, remove obstructing tissue, or replace a valve that cannot be repaired.

A newborn with critical stenosis needs urgent specialist care. Treatment may include medicine that temporarily keeps a fetal blood vessel open so blood can reach the lungs, followed by a catheter procedure or surgery.

Opening the valve can create or worsen pulmonary regurgitation, meaning the valve leaks backward. A small leak may cause few problems, but a major leak can enlarge the right ventricle over time. Some people eventually need another procedure or valve replacement.

Even after successful treatment, follow-up remains important. It checks for renewed narrowing, valve leakage, right ventricular changes, and abnormal heart rhythms.

Complications

Untreated severe stenosis can place increasing strain on the right ventricle. The muscle may become thick and stiff, and its pumping ability may eventually weaken. This can lead to right-sided heart failure, with symptoms such as swelling, breathlessness, and tiredness.

Other possible complications include abnormal heart rhythms and reduced blood flow to the lungs. Infective endocarditis, an infection of the heart's inner lining or valves, is uncommon but possible.

After balloon treatment or surgery, pulmonary valve leakage is an important long-term concern. Repeat narrowing can also occur, although it does not happen to everyone.

Serious complications are mainly associated with severe narrowing, major valve leakage, or delayed care. Mild disease usually has much less effect on the heart.

Prevention

Most pulmonic valve stenosis is congenital and cannot be prevented. Healthy habits during pregnancy cannot guarantee that a baby's heart valve will form normally.

Rubella vaccination before pregnancy helps prevent congenital rubella and the heart problems it can cause. Anyone planning a pregnancy can review vaccination and medicine records with a healthcare professional.

There is no diet, supplement, or exercise program that can prevent congenital narrowing from developing or open an already narrowed valve.

Good dental care does not prevent the stenosis, but it may lower the chance of bacteria entering the bloodstream. Antibiotics like amoxicillin or doxycycline before dental work are recommended only for certain people at high risk of infective endocarditis, not for everyone with pulmonic valve stenosis.

Living with it and what to expect

Mild pulmonic valve stenosis often remains stable for long periods. Many people have no symptoms and live without major activity limits. Regular follow-up is still useful because valve measurements and heart function can change over time.

When moderate or severe narrowing is treated successfully, symptoms and right ventricular pressure often improve. Treatment does not make the valve completely normal, and ongoing checks may be needed for life. Follow-up becomes especially important if the valve leaks after treatment.

Most everyday activities are possible. Whether competitive sports or intense exercise are suitable depends on the severity of the narrowing, symptoms, heart rhythm, and right ventricular function. Avoiding all activity is not usually necessary, but individual advice matters before starting high-intensity exercise.

Pregnancy is often well tolerated when stenosis is mild and heart function is normal. Severe narrowing, significant valve leakage, or reduced right ventricular function can increase the demands and risks of pregnancy. Assessment by a congenital heart specialist before pregnancy can help plan appropriate care.

Children who have a successful procedure may grow and develop normally. They still need follow-up as they move into adult care. Keeping copies of echocardiogram reports and procedure records can make this transition easier.

When to get medical help

Call emergency services for:

A baby with blue or grey colouring, marked breathing difficulty, unusual sleepiness, or an inability to feed needs emergency assessment.

Seek prompt medical advice for new fainting, worsening breathlessness, reduced exercise ability, chest discomfort during activity, or repeated episodes of a fast or irregular heartbeat. New ankle or abdominal swelling also needs assessment.

Arrange routine follow-up if symptoms are gradually changing, a planned heart review is overdue, or you are considering pregnancy or high-intensity sport. Routine appointments are important even when you feel well because valve changes may not cause early symptoms.

- Severe trouble breathing, especially at rest
- Blue or grey lips or skin
- Collapse, unresponsiveness, or difficulty waking
- Chest pain with fainting or severe breathlessness

Common questions

Is pulmonic valve stenosis serious?

It can be, but many cases are mild. The main concerns are severe narrowing, symptoms, high pressure in the right ventricle, or reduced heart function. Echocardiogram results provide more useful information than the presence of a murmur alone.

Can pulmonic valve stenosis go away on its own?

The valve does not usually become structurally normal by itself. Mild narrowing may remain stable and never need treatment. Significant narrowing can often be relieved with balloon valvuloplasty or surgery.

Will I need heart surgery?

Not necessarily. Mild cases usually need monitoring rather than a procedure. When treatment is needed, many suitable valves can be opened through a catheter using a balloon. Surgery is considered when balloon treatment is unsuitable or when the valve needs repair or replacement.

Can I exercise with pulmonic valve stenosis?

Many people can exercise normally, especially when narrowing is mild and heart function is

normal. Severe narrowing, fainting, abnormal rhythms, or right ventricular problems may require limits on intense activity until assessed or treated.

Can pulmonic valve stenosis come back after treatment?

The valve can narrow again, although this does not happen to everyone. Valve leakage may also develop or become more important over time. Follow-up echocardiograms check for both problems.

Is this the same as pulmonary hypertension?

No. Pulmonic valve stenosis is a narrow valve at the outlet of the right ventricle. Pulmonary hypertension is high pressure within the blood vessels of the lungs. They have different causes and treatments.

Sources

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