CONDITION

Coarctation of the aorta

Learn how coarctation of the aorta affects blood flow, what symptoms may occur, and how this congenital heart condition is diagnosed, treated, and monitored.

WHAT IT IS
Congenital narrowing of the aorta

BODY SYSTEM
Heart and circulation

MAIN SYMPTOMS
High blood pressure, breathing difficulty, headaches, leg tiredness

WHAT CAUSES IT
Often unknown, sometimes genetic

HOW IT IS DIAGNOSED
Echocardiogram, MRI or CT angiography

MAIN TREATMENT
Surgery or catheter procedures

CAN IT BE CURED?
Sometimes - repair restores flow, risks remain

IS IT AN EMERGENCY?
Sometimes - severe breathing difficulty or collapse

LONG-TERM OUTLOOK
Often good with repair and lifelong follow-up

Overview

Coarctation of the aorta is a narrowing of the aorta, the main artery that carries oxygen-rich blood from the heart to the body. The narrowing is usually near the arteries that supply the upper body, close to a temporary fetal blood vessel called the ductus arteriosus.

Coarctation is a congenital heart condition, meaning it is present at birth. The narrowing can be short and severe or involve a longer section of the aorta. Some babies become seriously ill soon after birth. Milder cases may not be found until childhood or adulthood.

A narrowed aorta makes it harder for the heart to pump blood to the lower body. Blood pressure may become high above the narrowing and lower below it. Over time, this can strain the heart and damage blood vessels.

Treatment can restore better blood flow, but it does not always eliminate every long-term risk. High blood pressure, repeat narrowing, or enlargement of the aorta can develop after a successful repair. For this reason, people with coarctation need lifelong follow-up with clinicians experienced in congenital heart disease.

Symptoms

Symptoms depend on how narrow the aorta is, the person's age, and whether other heart conditions are present.

A baby with severe coarctation may appear well at first because the ductus arteriosus is still open. This fetal blood vessel provides another route for blood to reach the lower body. It normally begins to close after birth. When it closes, blood flow past a severe narrowing may fall quickly.

Possible symptoms in a baby include:

Severe weakness, difficulty breathing, poor responsiveness, or pale or gray skin in a newborn requires emergency medical care. These signs can occur when the body is not receiving enough blood and oxygen. They should not be managed through routine follow-up.

Children and adults with less severe coarctation may have no clear symptoms. The condition may be discovered after high blood pressure, a heart murmur, or weaker pulses in the legs are noticed.

When symptoms occur later in life, they may include:

Chest pain, fainting, sudden severe shortness of breath, new weakness on one side of the body, or a sudden severe headache requires urgent emergency assessment. These symptoms are not specific to coarctation, but they can signal a serious heart, aortic, or neurologic problem.

- Fast or difficult breathing
- Poor feeding or sweating during feeds
- Unusual sleepiness or irritability
- Pale, gray, or bluish skin
- Cool feet or legs
- Fewer wet diapers
- Poor weight gain

- Headaches or nosebleeds associated with high blood pressure
- Dizziness
- Chest discomfort
- Shortness of breath with activity
- Leg tiredness, pain, or cramping during exercise
- Cold feet
- Reduced exercise tolerance

Causes and risk factors

Coarctation develops while the heart and major blood vessels are forming before birth. Its exact cause is often unknown. It is not caused by something a parent did during pregnancy.

The narrowing may occur by itself, but other congenital heart or blood vessel differences are common. These can include a bicuspid aortic valve, in which the valve between the heart and aorta has two flaps instead of the usual three. Other associated conditions include an underdeveloped aortic arch, a hole between the heart's lower chambers, or abnormalities affecting the mitral valve.

Coarctation is also associated with certain genetic conditions, especially Turner syndrome. Turner syndrome affects people who are born female and have a missing or altered X chromosome. A clinician may recommend genetic assessment when physical findings, family history, or other medical features suggest an underlying genetic condition.

Having one congenital heart condition may raise the likelihood that another is present. However, most cases cannot be predicted from routine family or pregnancy history alone.

Diagnosis

Before birth, a detailed fetal ultrasound may raise concern for coarctation. Diagnosis can be difficult because fetal circulation bypasses much of the area where narrowing occurs. A suspected case generally requires repeat fetal imaging and careful evaluation after delivery.

Newborn screening with pulse oximetry measures oxygen levels in the blood and can identify some critical congenital heart conditions. However, a baby with coarctation can have a normal screening result. A normal pulse-oximetry test does not rule it out.

During a physical examination, a clinician may compare pulses and blood pressure in the arms

and legs. Coarctation can cause higher pressure in the arms, lower pressure in the legs, and delayed or weak pulses in the groin. A heart murmur may be heard over the chest or back.

An echocardiogram is usually central to diagnosis. This painless ultrasound test shows the heart, valves, aortic arch, and patterns of blood flow. It can also identify related heart abnormalities.

Magnetic resonance angiography uses a magnetic resonance imaging, or MRI, scanner to create detailed pictures of the aorta and nearby blood vessels. Computed tomography angiography, or CT angiography, uses X-rays and contrast material to provide similar anatomic detail. These tests are particularly useful in older children and adults or when planning treatment.

Cardiac catheterization involves guiding a thin tube through a blood vessel to the heart and aorta. Clinicians can directly measure pressures across the narrowing and obtain detailed images. Catheterization is often performed when balloon treatment or stent placement is being considered rather than as the first diagnostic test.

Diagnosis also includes checking for related issues. This may involve evaluating the aortic valve, heart muscle, blood pressure, and the rest of the aorta. Some adults may need assessment for abnormal enlargement of brain arteries when their individual history or anatomy makes screening appropriate.

Treatment and management

Treatment depends on age, symptoms, anatomy, blood pressure, the severity of obstruction, and previous procedures. A congenital cardiology team helps determine which approach is most suitable.

A critically ill newborn may receive prostaglandin medicine through a vein in the hospital. This medicine temporarily keeps the ductus arteriosus open, allowing more blood to reach the lower body until a procedure can be performed. The baby may also need breathing support and treatment for problems caused by poor circulation.

Surgery is commonly used in infants and young children. The surgeon may remove the narrowed section and connect the healthy ends, enlarge the area with nearby tissue or a patch, or use another technique suited to the child's anatomy. Each method has potential advantages and risks.

Cardiac catheter procedures are used in selected children, teenagers, and adults. Balloon angioplasty expands a small balloon inside the narrowing. A stent is a mesh tube placed within the aorta to keep it open. Stents are often considered when the body and blood vessel are

large enough, including in many adolescents and adults. Catheter treatment may also be used when narrowing returns after surgery.

Medicine does not remove the narrowed area, but it may be used to control high blood pressure before or after repair. Treatment choices depend on factors such as age, kidney function, pregnancy plans, and other heart or aortic conditions. Patients should take blood pressure medicine only as directed and should not stop it without medical advice.

Regular physical activity is beneficial for many people after treatment. The appropriate type and intensity depend on blood pressure, residual narrowing, aortic enlargement, valve disease, and heart function. Heavy weightlifting or high-intensity competitive exercise may need to be limited when blood pressure is not controlled or the aorta is enlarged. A congenital heart specialist can provide individualized guidance.

Good dental care is also important for overall cardiovascular health. Coarctation alone does not mean that antibiotics like amoxicillin or doxycycline are needed before dental procedures. Preventive antibiotics are reserved for certain people at highest risk of infective endocarditis, an infection of the heart's inner lining or valves.

Complications

Untreated severe coarctation can lead to heart failure or inadequate blood flow to vital organs. In people with less severe narrowing, long-term high blood pressure can gradually affect the heart, brain, kidneys, and arteries.

Possible complications include:

Procedures also have risks. These can include bleeding, blood vessel injury, aneurysm formation, movement or fracture of a stent, or the need for another procedure. The specific risks vary by anatomy and treatment method.

Pregnancy places extra demands on the heart and aorta. Many people with repaired coarctation can have a successful pregnancy, but high blood pressure, residual obstruction, or aortic enlargement can increase risk. Pre-pregnancy assessment by an adult congenital heart disease specialist and a high-risk obstetric team is important.

- Persistent high blood pressure, even after successful repair
- Thickening or weakening of the heart muscle
- Recurrent narrowing at the repaired area
- Bulging of the aorta, called an aneurysm

- Tearing within the wall of the aorta, called a dissection
- Early coronary artery disease or stroke
- Problems related to an associated bicuspid aortic valve
- Aneurysms in arteries within the brain in some patients

Follow up

Coarctation requires lifelong follow-up, including after childhood repair. Care is ideally coordinated by a cardiologist trained in congenital heart disease. Adults should not rely only on general adult cardiology when specialized congenital care is available.

Follow-up may include:

Routine appointments are used to look for high blood pressure, repeat narrowing, an aneurysm, valve disease, or changes in heart function before symptoms develop. The timing of visits and imaging depends on the person's anatomy, age, treatment history, and test results.

Contact the treating clinician promptly for a clear drop in exercise ability, repeated headaches with high blood pressure, new leg pain during activity, or new shortness of breath. These concerns may need earlier assessment but are not always emergencies.

Call emergency services for sudden severe chest or upper-back pain, fainting, severe breathing difficulty, stroke-like symptoms, or collapse. A sick newborn with poor feeding, unusual sleepiness, breathing difficulty, or pale or gray skin also needs emergency evaluation.

- Blood pressure measurements in the arms and a leg
- Home or 24-hour ambulatory blood pressure monitoring
- Echocardiograms to assess the heart and aortic valve
- Periodic MRI or CT imaging of the full aorta and repair site
- Review of exercise, medicines, dental health, and pregnancy plans

Sources

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