TEST

Echocardiogram - children

An echocardiogram uses sound waves to show a child's heart structure, movement, and blood flow.

WHAT IT MEASURES
Heart structure, movement, pumping, and blood flow

SAMPLE
None

FASTING NEEDED?
Sometimes, if sedation is planned

HOW LONG IT TAKES
Usually 30 to 60 minutes

RESULTS IN
Same day to several days; varies by reporting service

USED FOR
Diagnosis and monitoring

MAIN LIMITATION
Image quality can hide small or complex abnormalities

Overview

An echocardiogram, often called an "echo," is an ultrasound scan of the heart. It uses high-frequency sound waves to create moving pictures of the heart's chambers, valves, walls, and nearby blood vessels.

Doppler ultrasound is usually included. It shows the direction and speed of blood moving through the heart. This can help estimate whether valves are narrowed or leaking and whether blood is flowing through an unexpected opening.

Most children have a transthoracic echocardiogram. "Transthoracic" means the ultrasound probe is moved over the chest. The test does not use X-rays or radiation.

An echocardiogram is not the same as an electrocardiogram, or ECG. An ECG records the heart's electrical activity. An echocardiogram shows its structure and movement.

Why the test is ordered

A clinician may request an echocardiogram to investigate a symptom, examination finding, or result from another test. It can also monitor a heart condition that is already known.

Reasons may include:

Many childhood heart murmurs are harmless. Whether an echocardiogram is needed depends on the sound of the murmur, the child's age, symptoms, examination, and medical history.

- A heart murmur or unusual heart sound
- Possible differences in heart structure present from birth
- Breathlessness, poor feeding, slow growth, fainting, or chest symptoms
- An abnormal ECG, chest X-ray, or oxygen reading
- High blood pressure or a condition that may affect the heart
- Follow-up after heart surgery or another heart procedure
- Monitoring during treatments that can affect heart function

Who should have the test

A child may need an echocardiogram when a healthcare professional suspects a structural or pumping problem. Children with congenital heart disease, meaning a heart difference present from birth, may have repeat scans to follow growth, blood flow, or the results of treatment.

Testing may also be considered when a child has a genetic condition associated with heart differences, a close family history of certain inherited heart conditions, or an illness that can affect the heart.

An echocardiogram is not generally used as a stand-alone screening test for every healthy child. A normal result also does not rule out every cause of chest pain, fainting, palpitations, or breathlessness.

How to prepare

Most children can eat, drink, and take their usual medicines normally. Follow the appointment instructions if they say otherwise.

Choose clothing that makes the chest easy to uncover. Babies and young children may be calmer if you bring a bottle, pacifier, favorite toy, book, or video. Explain that the scan should not hurt, but that the child will need to lie fairly still.

Some young children need sedation because movement can prevent clear images. Sedation

uses medicine to make a child sleepy or relaxed. If sedation is planned, the service will provide specific instructions about when to stop food, milk, and clear drinks. Follow those instructions carefully and ask before giving medicines if anything is unclear.

Tell the team about allergies, current medicines, previous reactions to sedation, and any recent illness. A cough, fever, or breathing problem may affect whether planned sedation can go ahead safely.

What happens during the test

The child usually lies on an examination bed, sometimes turned onto the left side. A parent or caregiver can often stay nearby.

Small ECG stickers may be placed on the chest to record the heartbeat during the scan. The sonographer applies water-based gel and moves a handheld probe over several areas of the chest, upper abdomen, and base of the neck.

The probe sends out sound waves and receives their echoes. A computer turns these echoes into moving images. The child may hear pulsing or swishing sounds when Doppler measurements are taken.

The probe may need firm pressure to obtain a clear view, but it should not be painful. Let the sonographer know if the child is uncomfortable.

A standard study usually takes 30 to 60 minutes. Complex heart anatomy, movement, or the need for sedation can make the appointment longer.

Understanding your results

A specialist reviews the images and measurements. The report may describe:

Children's heart measurements are often compared with expected values for their body size. A report may use a "z-score," which shows how far a measurement is from the average for children of a similar size.

A result described as normal means no important abnormality was seen within the test's limits. Minor valve leakage can sometimes be seen in healthy hearts and may not require treatment.

Ranges and interpretation vary by imaging laboratory, age, sex, body size, pregnancy status, medicines, and clinical context. One measurement should not be interpreted on its own.

- The arrangement and connections of the heart chambers and blood vessels

- Heart chamber and wall size
- How strongly the heart muscle contracts
- Valve structure, opening, and leakage
- The direction and speed of blood flow
- Pressure estimates within parts of the heart
- Fluid around the heart

What affects the results

Clear images require useful "ultrasound windows," meaning places where sound waves can reach the heart without too much interference. Ribs and air-filled lungs block ultrasound. Body shape, chest dressings, previous surgery, and some lung conditions can therefore limit particular views.

Movement, talking, crying, or rapid breathing may blur images. A fast heart rate can make it harder to separate events that happen close together during each heartbeat.

Recent exercise, fever, pain, anxiety, dehydration, and some medicines can temporarily change heart rate, blood flow, pressure estimates, or how strongly the heart contracts. Sedation may also alter heart rate and loading conditions. These effects do not mean that the equipment or laboratory is wrong, but they can change how the findings are interpreted.

Blood flow and pressure estimates are calculated from ultrasound measurements rather than measured directly. A poor probe angle can make flow appear slower than it is. The sonographer usually takes several views to reduce this problem.

Accuracy and limitations

An echocardiogram is very good at showing many structural heart differences, valve problems, and changes in pumping function when image quality is adequate. It can often identify where blood flow is abnormal and estimate its severity.

However, it can miss very small openings, subtle valve changes, or structures that are difficult to see. Some pulmonary veins, coronary arteries, the aortic arch, and areas behind air-filled lungs may not be fully shown. A limited study does not necessarily mean that anything is wrong; it means the available pictures could not answer every question.

The test can occasionally suggest a problem that is not present. Image artifacts, normal

blood-flow patterns, or measurements taken at an imperfect angle may resemble an abnormality. Repeat imaging or review by a congenital heart specialist can clarify uncertain findings.

Depending on the question, a fetal echocardiogram, transesophageal echocardiogram, cardiac MRI, CT scan, exercise test, ECG monitor, or cardiac catheterization may provide better information. No single test evaluates every possible cause of heart-related symptoms.

Risks and complications

A standard transthoracic echocardiogram has no known harmful effects from the diagnostic ultrasound used. The gel may feel cold, and probe pressure may cause brief discomfort.

Sedation has additional risks, including vomiting, changes in breathing, or an unexpected reaction to the medicine. If sedation is needed, trained staff monitor the child and explain the specific risks and recovery instructions beforehand.

Occasionally, an intravenous contrast agent or a saline "bubble study" is used to answer a particular question. The team will explain the added procedure and its risks if this is planned.

What happens next

The sonographer may not be able to discuss the findings during the scan. A pediatric cardiologist or other qualified specialist usually reviews the complete study before a report is issued.

A normal result may need no further action, or the clinician may continue investigating symptoms that an echocardiogram cannot assess. An unclear result may lead to a repeat scan or a different imaging test. If a heart difference is found, follow-up depends on its type, severity, symptoms, and change over time.

Waiting for a scheduled report or follow-up appointment is usually appropriate when the child is otherwise well. Seek urgent medical advice for new or worsening symptoms such as increased breathing effort, poor feeding with unusual sweating, or reduced responsiveness.

Call emergency services for severe breathing difficulty, blue or grey lips or skin, collapse, or chest pain accompanied by fainting or marked distress. Do not wait for an echocardiogram result in an emergency.

Common questions

Can my child eat or drink beforehand?

Usually, yes. Fasting is generally required only when sedation or another procedure is planned. Use the exact fasting instructions provided by the service.

Can my child have their usual medicines?

Usually, but follow the appointment instructions. Some medicines change heart rate or blood pressure and may be relevant to the interpretation. Do not stop a prescribed medicine unless the healthcare team has told you to.

Does the test hurt?

The scan should not hurt. The probe may press firmly between the ribs, and some children dislike the cold gel or ECG stickers.

Can my child exercise before the scan?

Ordinary activity is usually fine. Strenuous exercise can temporarily change heart rate and blood-flow measurements, so avoid it immediately beforehand unless the test is specifically assessing exercise.

Will my child need sedation?

Most older children do not. Sedation may be considered for babies or young children who cannot remain still long enough to obtain clear images.

Can I stay with my child?

A parent or caregiver can usually remain in the room. Local rules may differ during sedation or certain specialized procedures.

Sources

- American Society of Echocardiography. Guidelines for Performing a Comprehensive Pediatric Transthoracic Echocardiogram: Recommendations From the American Society of Echocardiography . Journal of the American Society of Echocardiography, 2024.
- Lopez L, Colan SD, Frommelt PC, et al. Recommendations for Quantification Methods During the Performance of a Pediatric Echocardiogram . Journal of the American Society of Echocardiography, 2010.
- Lai WW, Geva T, Shirali GS, et al. Guidelines and Standards for Performance of a Pediatric Echocardiogram . Journal of the American Society of Echocardiography, 2006.

- American Heart Association. Echocardiogram in Children . Patient information on pediatric echocardiography.
- Great Ormond Street Hospital for Children NHS Foundation Trust. Echocardiogram . Patient and family information.
- Radiological Society of North America and American College of Radiology. Pediatric Echocardiography . RadiologyInfo patient information.