



# Echocardiography



# What is Echocardiography?

Echocardiography is a non-invasive, painless and harmless diagnostic test that uses high-frequency sound waves to give doctors detailed images of your heart's structure and function.

It provides doctors with vital information to detect abnormalities and disease in your heart and assess how effectively your heart is pumping.

## Different Echocardiographic tests

There are three types of echocardiography tests. Your doctor will advise which is most suitable for you.

1. **Trans-Thoracic Echocardiography (TTE)**
2. **Stress Echocardiography**
3. **Trans-Esophageal Echocardiography (TEE)**

## 1. Trans-Thoracic Echocardiography (TTE)

This is a scan of your heart using ultrasound or high-frequency sound waves. Pictures of the beating heart with blood flow through it can be demonstrated on a monitor screen so that the doctor can tell whether or not the heart is pumping properly and heart valves are working normally. Other structural and functional problems (eg. tumours and fluid collections around the heart and holes-in-the-heart can also be identified).

### How do I prepare for the test?

- No special preparation is required. You should continue with your usual medication unless your doctor tells you otherwise.

### How is the test performed?

- You will need to remove your upper garments and change to a hospital gown. You will then lie on your left side on the examination couch.
- The clinical technologist or doctor will then move a small handheld ultrasound probe with some gel at its tip over your chest. Images of the heart will appear on the monitor screen and be recorded.
- You may hear some whooshing sounds which come from blood pulsing through the heart.
- The scan will take about 30 minutes to an hour depending on the complexity of your heart condition.

### What happens after the scan?

- You can resume your normal activities immediately after the procedure.

## What are the benefits versus risks?

### BENEFITS

- Physicians use the echocardiogram to look for abnormalities in the large physical structures of the heart, including the heart chambers and valves.
- It is also used to identify the cause of an abnormal heart sound (a murmur), to check the size of the heart chambers, fluid around the heart, or to inspect the pumping capability of the heart if a patient has shortness of breath, chest pain or palpitations.

### RISKS

- This test is safe with no known risks to the patient.

## 2. Stress Echocardiography

A Stress Echocardiogram is an ultrasound scan to evaluate heart function by combining a stress modality with an echocardiogram to indirectly assess adequacy of blood supply to the heart muscle. The information obtained will enable your doctor to plan further appropriate tests for you. There are two major forms of stress that can be used. The first is the standard treadmill exercise (Exercise Stress Echocardiogram), while the second involves the use of medication to stimulate the heart (Pharmacological Stress Echocardiogram). Your doctor will decide on the appropriate one for you.

## How do I prepare for the test?

- Take a light meal.
- You may be instructed to stop certain medicines before the test, such as beta-blocker. Your doctor will give you specific instructions.
- Stop using tobacco products for a few hours before the test.
- Bring or wear comfortable walking shoes for the test.
- A gown will be provided and informed consent will be taken from you.

## How is the test performed?

### A. EXERCISE STRESS ECHOCARDIOGRAPHY

- You will need to remove your upper garments and change to a hospital gown. You will then lie on your left side on the examination couch.
- The clinical technologist or doctor will then move a small handheld ultrasound probe with gel at its tip over your chest. Images of the heart will appear on the monitor screen and be recorded.
- You will then need to walk on the treadmill machine with the speed and inclination of the slope increasing every 3 minutes to stress your heart gradually.
- Once the targeted heart rate is reached or if you are unable to continue due to fatigue, breathlessness, chest pain or abnormal heart rhythm, the test will be stopped.
- You will then need to fall back on the couch immediately and lie on your left side so that another echocardiogram can be obtained within 1 minute.
- Your doctor will then compare the before and after stress images to look for abnormal pump function of the heart.
- The whole procedure will take about 45 to 60 minutes.

### B. PHARMACOLOGICAL STRESS ECHOCARDIOGRAPHY

This is an alternative test that does not require you to walk on the treadmill machine. You will instead be given medication through an infusion into the vein to increase your heart rate to simulate the effect of physical stress on the heart. The infusion rate will be increased gradually until;

- your target heart rate is achieved
- symptoms such as breathlessness, chest pain, nausea or giddiness occur

- your doctor stops the test for other reasons.

You may experience a sensation of fast or pounding heartbeats. This is an expected response and you should not be unduly worried. Your doctor or clinical technologist will record your echocardiogram through each stage of the test and images obtained will be analyzed side by side on the monitor screen.

This pharmacological stress echo test will take about 60 minutes.

## What happens after the scan?

- You can resume your normal activities after the procedure.

## What are the benefits versus risks?

### BENEFITS

- Stress Echocardiography is very useful for early detection of coronary artery blockage and is much more accurate than a stress ECG test.
- It is also very safe as you are continuously monitored by your doctor and technician.

### RISKS

- There is a small possibility of chest pain, irregular heart rhythms, blood pressure changes or, very rarely, a heart attack.

## 3. Trans-Esophageal Echocardiography (TEE)

A Transesophageal Echocardiogram (TEE) is a scan to evaluate the function and small detailed structures of the heart and associated blood vessels. It is in fact an extension of the transthoracic echocardiography, differing only in the approach which requires passing a tube into the esophagus (food pipe).

## How do I prepare for the test?

- You should not eat or drink for 6 hours before the test.
- Preferably have someone drive you home as light sedation may be given prior to the test.
- If you are currently taking medications, you should check with your doctor whether you can continue to take them before the procedure.
- Antibiotics may need to be given if you have a prosthetic heart valve or previous history of infection of the heart, and your doctor will advise you on this.

## How is the test performed?

- You will be asked to lie on your left side.
- A local anesthetic will be sprayed into your throat to minimize any discomfort.
- An intravenous line will be placed on your hand for injection of medication as required.
- A mouth-piece will then be placed in between your teeth to prevent you from accidentally biting the TEE probe.
- As the probe is passed down the throat, you may experience some mild discomfort, which you can minimize by swallowing when asked to do so.
- The actual scan usually takes 10 to 20 minutes, excluding the preparation time.

## What happens after the scan?

- You are required to wait for another 10 to 15 minutes for observation before going home, or longer if you have been given sedation.
- You may resume eating after the anesthetic effect in the throat has worn off, usually about half an hour later.

## What are the benefits versus risks?

### BENEFITS

- Doctors use this procedure to look for abnormalities in the physical structures of the heart, including the heart chambers, valves, and associated blood vessels.
- This procedure is more accurate in defining some abnormalities in the heart that standard transthoracic echocardiography may miss.

### RISKS

- This carries a very small risk, including soreness in the mouth and trauma of the throat.



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