

# Tests to Diagnose Heart Disease

## Coronary angiogram

Angiograms are X-ray pictures of blood vessels. A special dye that can be seen on an X-ray is injected into a blood vessel through a thin tube called a catheter. As the dye flows in the blood vessel, a series of X-rays are taken.

Angiograms allow your healthcare provider to check the inside of a blood vessel to see if it is narrowed, leaking, or blocked. There are many kinds of angiograms to examine different kinds of blood vessels. Angiograms generally look at arteries. For example:

- A carotid angiogram examines the carotid arteries. These arteries travel up each side of the neck and carry blood to the brain.
- A cerebral angiogram shows the blood vessels in the head.
- A coronary angiogram looks at the arteries that bring blood to the heart muscle.

## Chest X-ray

X-rays are a form of electromagnetic energy, or radiation. X-rays are able to penetrate body tissues. They are used to create pictures of body structures on film. An X-ray of your chest can show, for example:

- if the heart is enlarged or normal
- fluid in the lungs.

## Computed tomography (CT) scan

Cardiac electron-beam computed tomography is a computer-assisted X-ray scan of the heart. It is also called ultra-fast CT. It can show how much calcium is in the coronary arteries of the heart. Normal coronary arteries have very little or no calcium in them. The more calcium there is in the arteries, the higher your risk of a heart attack may be.

After you are positioned in an X-ray scanner, a series of X-ray pictures are taken quickly. The whole test is painless and takes only a few minutes.

## Echocardiogram

An echocardiogram makes pictures by bouncing high-frequency (ultrasound) waves off your heart. The echoes

of the sound waves, translated by a computer and recorded on a videotape or computer disk, provide a picture of your heart as it beats. The heart valves, heart chambers, blood vessels, and heart muscle itself can be carefully measured and examined. Ultrasound pictures of the heart are better than X-rays for outlining details of the heart. A special part of the echocardiogram called the color Doppler signal shows blood flow through your heart.

There are 2 types of echocardiograms:

- Transthoracic. In this type of echocardiogram, the sound waves are produced by a transducer placed on your chest.
- Transesophageal. For this type of echocardiogram, you swallow a transducer, or probe. The transducer is carefully placed in your esophagus, which is behind your heart. (The esophagus is the tube that carries food from the throat to the stomach.) Because the probe is much nearer your heart when it is inside you instead of outside and on your chest, the pictures of the heart structures are much clearer.

## **Electrocardiogram**

An electrocardiogram (ECG or EKG) is a recording of the electrical activity of the heart. (Each heartbeat starts with an electrical impulse that causes the heart to squeeze.) For this test small, sticky patches or suction cups are placed on your chest, wrists, and ankles. These electrode patches are connected to a machine that records the electrical activity of your heart. The recording is printed on paper for your healthcare provider to interpret.

An ECG gives information about the electrical activity of the heart, whereas an echocardiogram shows the structure of the heart and its valves.

## **Exercise stress test**

Many people with narrowing of the coronary arteries have symptoms only when they are physically active. The heart works harder during exercise and needs more blood than when you are resting. If the supply of blood to the heart cannot keep up with the amount of blood the heart needs, there will be changes in the electrocardiogram. Recording the electrocardiogram before, during, and after exercise shows these changes. The exercise test helps check for narrowing in your arteries.

You will be asked not to eat for about 2 hours before the test. Small sticky patches or suction cups are placed on your back and chest for the electrocardiogram. Your blood pressure and an electrocardiogram are recorded while you are resting. You then start a slow walk on a treadmill or peddle a stationary bicycle. The treadmill or bicycle will make you have to walk faster or peddle harder every couple of minutes. The electrocardiogram and blood pressure continue to be recorded while you exercise and just after the test.

### **Event monitor and Holter monitor (ambulatory electrocardiogram)**

Ambulatory electrocardiographic monitoring (AEM) is a way to record a continuous electrocardiogram for up to several weeks.

Event monitors come in many shapes. They are small devices that you keep with you. When you have pain or other symptoms, you push a button and the monitor stores a record of your heart rhythm at that time. You may then transmit the recordings over the telephone. These recordings are sent to your healthcare provider. You may be asked to use the recorder for a month or longer.

Holter monitors record the electrical activity of your heart on a tape cassette or digital memory device. Several sticky patches are placed on your chest. Small plastic wires are snapped on to these patches and connected to a monitor. You will keep this device on for 24 to 48 hours. You also may need to keep a diary of your symptoms and activities.

AEM is mostly used to observe and record your heart rhythm, including any changes in rhythm that you might have.

### **Magnetic resonance imaging (MRI)**

Magnetic resonance imaging (MRI) produces pictures of the heart and blood vessels. You lie on a special table inside the opening of an MRI unit. Radio waves in a strong magnetic field create the images. The MRI is painless. MRI images are very sharp and detailed. They are used to check the structure and function of the heart.

If you have a pacemaker, permanent pacemaker lead, or implantable cardiac defibrillator (ICD), you should not

have an MRI.

### **Magnetic resonance angiography (MRA)**

MR angiography (MRA) is an MRI study of the blood vessels. It uses magnetic resonance technology to detect, diagnose, and aid the treatment of heart disorders, stroke, and blood vessel diseases.

### **Multigated graft acquisition (MUGA) scan**

A MUGA scan shows how well the heart is pumping. It measures the amount of blood that is pumped with each heartbeat, and the flow of blood into the pumping chamber. A MUGA scan also gives information about the size of the pumping chambers of the heart and the strength of the heart muscle. This test is also called a radionuclide ventriculogram (RVG) or a gated blood pool scan.

The scan uses an injection of a radioactive chemical, which temporarily highlights your red blood cells. A camera linked to a computer follows the blood moving through the heart. Information from several hundred heartbeats is collected and analyzed.

### **Positron emission tomography (PET) scan**

A PET scan measures chemical changes that occur before signs of disease can be seen on CT and MRI images.

PET scans use a small amount of a radioactive chemical that is attached to a substance that is used by heart cells. The radioactive substance is injected into a vein. A special camera is then used to take pictures of the heart. The PET scan shows how different parts of the heart use the substance. It can identify decreased blood flow and problems with the heart muscle.

### **Radioisotope stress test**

A radioisotope stress test uses radioactive tracers that allow blood flow patterns to be seen on a camera. These tracers are not harmful to you. This test is done along with an exercise stress test on a treadmill or bicycle. An echocardiogram (ultrasound images of the beating heart) is done just before and just after exercise.

Sometimes the stress is provided by medicine instead of by exercise.

If there is good blood flow through the arteries, the pictures will show heart muscle that picks up the tracer. If there is decreased or no blood flow through an artery, the pictures will show heart muscle that is not picking up the tracer.

[Related Topics ]

Angiograms  
Cardiac Electron Beam (Ultra-Fast) Computed Tomography  
Echocardiogram  
Exercise Test  
Holter Monitor  
Transesophageal Echocardiogram

Developed for RelayHealth

Published by RelayHealth.  
© 2008 RelayHealth and/or one of its affiliates. All Rights Reserved.

This content is reviewed periodically and is subject to change as new health information becomes available. The information is intended to inform and educate and is not a replacement for medical evaluation, advice, diagnosis or treatment by a healthcare professional.