

Put your heart in the right place

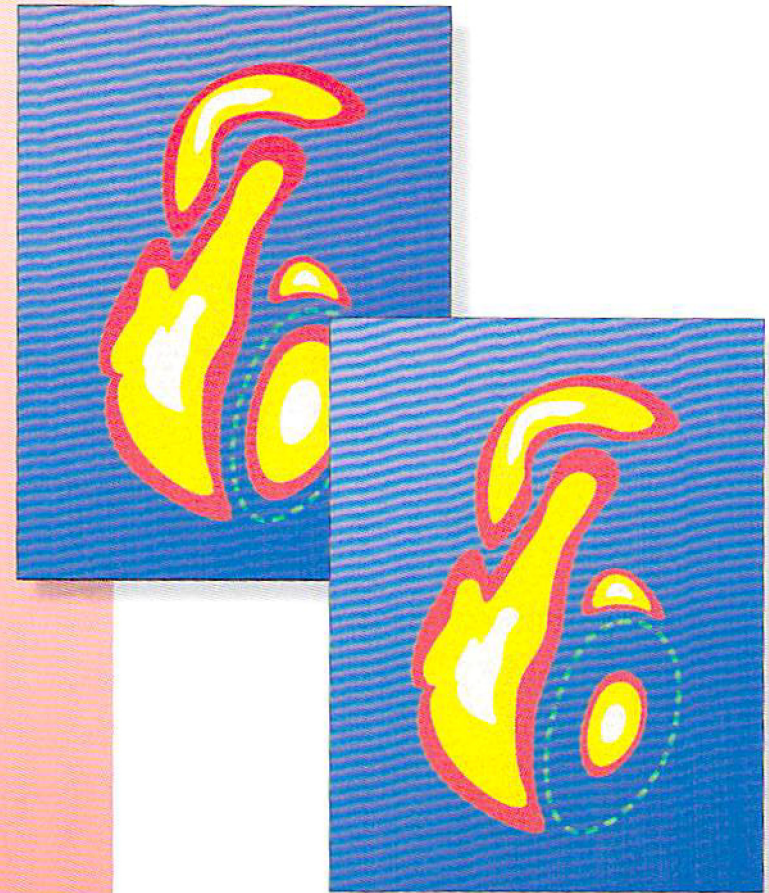
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## MUGA Scan



**A Patient's Guide**

## What Is a MUGA Scan?

A **m**ultiple **g**ated **a**cquisition (MUGA) scan is a test that uses a radioactive substance, called a **tracer**, to assess how well your heart is pumping blood.

(*Other terms* often used to describe the MUGA scan include: cardiac blood pool imaging, radionuclide angiography, and nuclear ventriculography.)

## How Does It Work?

During a MUGA scan, a small amount of radioactive tracer is injected into a vein in your arm. The tracer “tags” or “labels” your red blood cells by attaching to them for a few hours.

The tagged red blood cells distribute evenly in your blood. As these cells travel through the heart, the tracer gives off a small amount of radiation that can be detected with a **scanning camera**. A computer processes the information and produces images that show how radioactivity is distributed in the heart.

The camera is linked to an electrocardiogram (ECG). Your heart’s electrical signals trigger the camera to take a series of pictures at precise moments during the heartbeat cycle. This is called “**gating**.”

Gating creates images that are sharp and clear. It also produces moving images that show the left and right lower chambers, or **ventricles**, as they contract and pump blood.

A MUGA scan is usually done while you are at rest. In some cases, it may be done while you exercise.

## How Long Does It Take?

A rest MUGA scan usually takes less than an hour. If the test also includes an exercise scan, it may take up to 3 hours.

After the test, you can resume your normal activities, including driving.

## Is the Test Safe?

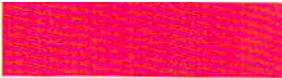
The radiation exposure during a scan is small, and the doses used are safe. However, if you are pregnant, suspect you may be, or are a nursing mother, be sure to let your doctor know.

The exercise test is also safe. A small amount of risk does exist, however, because the heart is stressed. Possible *rare* complications include abnormal heart rhythms and a heart attack. Trained personnel are there to handle any emergency.

## Your Test Results

Your doctor will discuss the results of the test with you during a future office visit. The results help the doctor accurately diagnose your condition and develop a treatment plan that’s best for you.





### ■ Exercise MUGA Scan

In some cases, you may undergo an exercise scan in addition to a rest scan. The exercise scan allows doctors to learn how well your heart works when it is made to beat faster and harder.

During the exercise portion of the test, you are asked to lie on a table equipped with pedals. As you pedal, images are taken with the scanning camera. Pedaling is easy at first, then it gets harder.

The exercise scan is particularly useful in diagnosing coronary heart disease. Normally, all areas of the left ventricle pump harder during exercise. If an area of the ventricle does not pump as well as it should during exercise, it may not be receiving enough blood because of a narrowed or blocked artery.

The exercise scan can also help diagnose heart failure, cardiomyopathy, and valve disease. If the ventricle cannot pump harder with exercise, this may be a sign that it is weakened.

### What Does It Show?

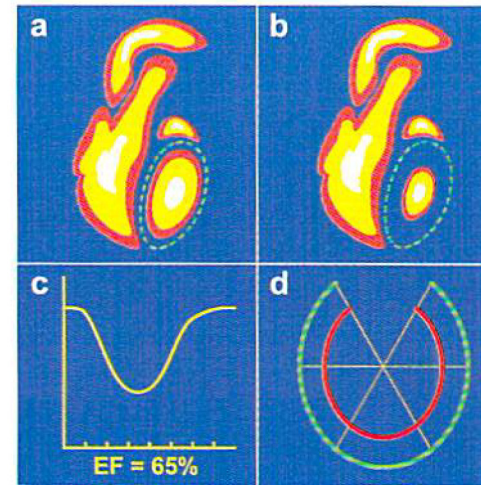
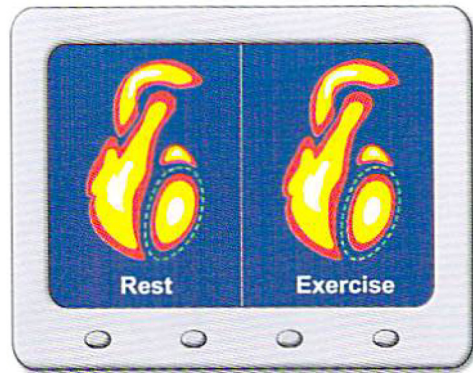
The MUGA scan is especially useful for assessing the *size and pumping strength of the ventricles*. In people with heart failure, for example, the scan images often show enlarged and weakened ventricles.

The *ejection fraction* is a commonly used measure of your heart's pumping strength. The ejection fraction is the proportion of blood that is pumped from the left ventricle (the main pumping chamber) with each heartbeat. A normal ejection fraction is greater than 50 percent. Patients with heart failure often have an ejection fraction of less than 40 percent.

The MUGA scan also provides information about *heart wall motion*. In people who have had a heart attack, for example, the scan images often show poor wall movement in the area of the heart muscle that was damaged and scarred.

#### Exercise MUGA Scan

The rest and exercise images are compared side by side on a monitor screen. This allows doctors to determine the size, pumping strength, and wall motion of the ventricles during both rest and exercise.



#### MUGA Scan Images

The two upper panels show scan images of the left ventricle: (a) just before it pumps blood, and (b) just after it is done pumping blood (but before it begins to fill with blood again).

The two lower panels show diagrams that represent: (c) the ejection fraction, and (d) the wall motion of the left ventricle.



## Why Is a MUGA Scan Done?

A scan may be done in the following cases:

- after a heart attack, to assess how much damage was done to the heart muscle
- in patients with heart failure and/or heart muscle disease (cardiomyopathy), to assess the size and pumping strength of the ventricles
- during chemotherapy for cancer, to monitor the ventricles' pumping strength (some cancer drugs can be harmful to the heart muscle)
- an *exercise* MUGA scan may be done to detect poor blood flow to the heart muscle, which often indicates coronary heart disease

### PREPARING FOR A MUGA SCAN

- If you are scheduled for a *rest* MUGA scan, no special preparation is necessary.
- If you are scheduled for an *exercise* MUGA scan, you'll be instructed not to eat, drink, or smoke for at least 3 hours before the test.
  - If you take heart medications, check with your doctor. You may be asked to stop certain medications a day or two before the test.
  - Wear comfortable clothing and shoes that are suitable for exercise.
  - The procedure will be explained to you and you will be asked to sign a consent form.

## What Happens During the Test?

A MUGA scan is usually performed at a hospital, test center, or clinic. Your doctor may order either a rest or an exercise MUGA scan.

### ■ *Rest MUGA Scan*

Several **electrodes** (small sticky patches) are placed on your chest and connected to an ECG, which records the electrical activity of your heart.

An **intravenous (IV) line** is then inserted into a vein in your arm, and the radioactive tracer is injected into the line. (Sometimes, the tracer may be injected directly into the vein).

Next, you lie flat on a special table under a large scanning camera. During **imaging**, the camera moves slowly in an arc over the front of your chest, taking pictures of your heart from multiple angles. *Remain still while the pictures are being taken.*

