MUGA Scan [1]

A multigated acquisition (MUGA) scan creates video images of the ventricles (lower chambers of the heart that hold blood) to check whether they are pumping blood properly. It shows any abnormalities in the size of the ventricles and in the movement of the blood through the heart. Other names for this test include cardiac blood pooling imaging, nuclear heart scan, nuclear ventriculography, and radionuclide ventriculography.

Some people with cancer who receive chemotherapy or other drugs may need this test before cancer treatment to identify preexisting heart conditions or during or after cancer treatment to identify chemotherapy-related heart damage. Survivors of childhood cancer who have had radiation therapy to the chest, spine, or upper abdomen; bone marrow/stem cell transplantation; or certain types of chemotherapy may need a MUGA scan as part of their follow-up care to identify heart-related late effects (side effects that occur more than five years after treatment). Learn more about late effects of childhood cancer [2].

Effects on the heart from drugs used to treat cancer

Some types of chemotherapy [3], such as anthracyclines, may damage the heart during cancer treatment. Examples of anthracyclines include daunorubicin (Cerubidine, Rubidomycin), doxorubicin (Adriamycin), and epirubicin (Ellence). Other drugs used to treat cancer, such as trastuzumab (Herceptin), can also cause heart problems. In some cases, heart damage from these drugs can cause congestive heart failure (CHF; a condition in which the heart does not pump enough blood to the rest of the body). People with CHF may experience swollen hands and feet, shortness of breath, dizziness, and arrhythmia (an irregular heartbeat). However, in many cases, the heart damage is mild and is only detected on MUGA scans or other heart tests [4].

The medical team

A MUGA scan is performed at the radiology department of a hospital or at an outpatient imaging center. It is performed by a nuclear medicine technologist who has been specially trained and certified to conduct the test. The technologist is supervised by a radiologist (a medical doctor who specializes in using imaging tests to diagnose disease) or a nuclear medicine physician. The scan results are interpreted by a radiologist.

Preparing for the procedure

When you schedule the examination, you will receive detailed instructions on how to prepare. These may include not eating or drinking for four to six hours before the test and avoiding caffeine and tobacco for up to 24 hours before the test. In addition, you may be asked to wear comfortable clothing if your test includes exercise.

Tell your doctor or nurse about all medications you are taking and ask whether you should take them on the day of the test. Heart medications, such as digoxin and nitrates, can affect the results of the MUGA scan. In addition, tell your health care provider if you have had recent nuclear tests, such as bone or thyroid scans.

If you are a woman, mention whether you are pregnant or breastfeeding because the small amount of radiation used in the test may harm a developing baby or pass through breast milk.

Other conditions that may prevent you from having a MUGA scan or affect the results of the test include a fast, irregular heartbeat, obesity, and an inability to lie flat or still.

Before the procedure, you will be asked to sign a consent form that states you understand the risks and benefits of the MUGA scan and agree to undergo the test. Talk with your doctor about any concerns you have about the MUGA scan. And check your insurance plan to find out what it covers and whether you will have any out-of-pocket costs associated with the MUGA scan.

During the procedure

When you arrive for your MUGA scan, you may need to remove your clothing from the waist up, as well as any jewelry or metal objects that could interfere with the scan.

The technologist will place stickers called electrodes on your chest to monitor your heart?s electrical activity during the test and inject a small amount of a radioactive material, called a tracer, into a vein in your arm. Sometimes the test is done by withdrawing a small amount of blood from your arm, mixing it with the tracer, and then putting that mixture back into your body through an IV (a tiny plastic tube inserted directly into a vein).

The radioactive material is like a dye, and it binds to your red blood cells (cells that carry oxygen throughout your body), making it easier to see how blood moves through your heart. The injection will feel like a small sting, but you will not be able to feel the tracer move through your body.

The technologist will then ask you to lie still on a table and place a special camera?which is about three feet wide and uses gamma rays to track the tracer?above your chest. As the tracer moves through your bloodstream, the camera will take pictures to see how well the blood is pumping through your body. The pictures will be taken from many different views, and each one lasts about five minutes.

In addition, you may be asked to exercise in between pictures. This helps the doctor see how your heart responds to the stress of exercise. You may also be asked to take nitroglycerin (multiple brand names; a drug that opens your blood vessels) during the test to see how your

heart responds to the medication.

The scan may take up to two to three hours to complete; however, it may take less time depending on how many pictures are needed.

After the procedure

After the MUGA scan, you will be able to leave the examination room, but the technician may ask you to wait in the hospital while the images are processed so that you can undergo the scan again if the images are blurry.

You can expect to return to your normal activities?including driving?immediately after the test.

Drink plenty of fluids and urinate frequently for one to two days after the MUGA scan to help the tracer leave your body.

Results of the procedure

The test monitors your ejection fraction (the amount of blood pumped out of the ventricles). A result of 50% or higher is considered normal, meaning that your heart is efficiently pumping blood throughout your body. On the other hand, an abnormal result may mean you have a blockage in an artery, poor pumping function, heart valve disease, or other disorder. If you have an abnormal result, your doctor may decide to switch treatments or give you a different type of chemotherapy.

Questions to ask your doctor

Before having a MUGA scan, consider asking your doctor the following questions:

- Why are you recommending this procedure?
- Who will perform the MUGA scan?
- What will happen during the procedure?
- How long will it take?
- What are the risks and benefits of having a MUGA scan?
- Who can I talk to about the costs (if any) of this test if I am responsible for paying?
- What will happen if I don?t have this procedure?
- When will I find out the results?
- Who will explain the results to me?
- If my results are abnormal, what is the next step?
- Will I need to repeat this test during my treatment?

More Information

Tests and Procedures [5]

Additional Resources

Medline Plus: Nuclear Ventriculography [6]

Links:

[1] http://www.cancer.net/navigating-cancer-care/diagnosing-cancer/tests-and-procedures/muga-scan
[2] http://www.cancer.net/node/24571
[3] http://www.cancer.net/node/24723
[4] http://www.cancer.net/node/24509
[5] http://www.cancer.net/node/24959
[6] http://www.nlm.nih.gov/medlineplus/ency/article/003822.htm