

MRI Heart (Cardiac MRI) Heart Structure Scan

Consumer Information

Contributors:

Dr Brett Lorraine

MBBS, FRANZCR

Dr Charles Lott, Ms Ann Revell, Dr Christine Walker,
A/Prof Stacy Goergen

What is an MRI Heart Structure Scan?

Magnetic resonance imaging (MRI) uses a high strength magnet and radiowaves to scan the body and produce pictures or images. MRI does not use radiation, required for many other types of imaging, and is not known to have any long term harmful effects.

An MRI Heart Structure Scan is designed to demonstrate both the anatomy (the structure) of the heart and how it works. Possible reasons to have this MRI study include investigation of children born with heart abnormalities, assessing masses of tissue in the heart (tumours or lumps), and evaluation of blood flow through major vessels.

The heart has four chambers. Blood is pumped through the chambers with the help of four heart valves that open and close to let the blood flow in one direction. The study will give your doctor an understanding of how well the heart is functioning and pumping blood around the body.

An MRI Heart Structure Scan may occasionally involve the injection of a special dye (usually called a contrast medium or contrast agent) during the scan. The contrast is useful in highlighting the blood vessels to demonstrate both their anatomy and any abnormalities, such as blood vessel narrowing.

How do I prepare for an MRI Heart Structure Scan?

No special preparation is required. You will be asked to complete a questionnaire prior to the examination to ensure that it is safe for you to enter the MRI machine and be exposed to the magnetic field.

If you have a history of kidney disease your doctor may wish to do a blood test before the scan, to ensure that the contrast medium (known as "gadolinium chelate") can be safely given, if required (see [Gadolinium Contrast Medium \(MRI Contrast agents\)](#) for more information).

What happens during an MRI Heart Structure Scan?

You can wear your normal clothing to the examination but may need to remove some clothing prior to the scan. This is to eliminate any metallic objects that may interfere with the magnetic field

inside the scanning room, and to allow easy access for leads that will be placed on your chest to monitor your heart beat. You will be offered a hospital gown.

You will be positioned on the scanner bed by a radiographer, who is specially trained to perform MRI scanning. The leads to monitor your heart beat will then be placed on your chest. If an injection of contrast medium (gadolinium chelate) is required, a small needle will be placed in a vein in your arm. A special set of detectors encased in plastic, which work in conjunction with the main magnet to receive the radiowave signal to produce the images, will be rested on your chest like a blanket.

Once ready, you will be placed inside the MRI machine, which is like going into a short tunnel. You will be aware of humming and knocking noises going on around you, which indicates that the scanner is running. It is normal to feel a little warm during the scan. You will be asked to hold your breath from time to time during the scan, to help produce the best images possible.

The MRI machine can be noisy, so you will be provided with headphones and you can listen to music (you are welcome to bring your own CD) and speak with the radiographer performing the scan. You will also be given a squeeze ball to hold in your hand during the scan. Squeezing the ball will make the radiographer aware that you wish to speak. A microphone is located within the MRI machine.

Once you are comfortable and positioned, the radiographer will return to the control console, leaving you in the MRI machine. From here the radiographer will control the scanner to instruct the machine which part of the body to examine, and which views to perform to best investigate your particular condition. You will be able to communicate with the radiographer at all times.

A radiologist (specialist doctor) who will supervise the procedure may require injection of contrast medium (gadolinium chelate) during the scan. The contrast medium can assist in identifying slight changes within the heart muscle, and to highlight the blood vessels. If required, the injection is performed while you are inside the scanner, using the small needle which may have been placed in your arm at the beginning of the study. The injection is given through an extension tube connected to the needle.

The gadolinium chelate is very safe, but as with all medications, allergic reactions can occur (see [Gadolinium Contrast Medium \(MRI Contrast agents\)](#)). The hospital radiology department or radiology practice where you are having the scan is equipped to deal with this on the rare occasions that it arises.

Are there any after effects of an MRI Heart Structure Scan?

Usually there are no after effects. You will be free to continue the day you have planned once the scan is complete.

How long does an MRI Heart Structure Scan take?

The examination uses very different technology to a normal X-ray, and does take more time to perform. Depending on the problem being investigated the scan time can vary from 20 to 45 minutes. Particularly complex heart conditions can require up to an hour of scanning.

What are the risks of an MRI Heart Structure Scan?

MRI machine

Once you have completed the pre-scan questionnaire and have been assessed as safe to enter the MRI machine, there are no significant risks from the MRI machine itself.

Most people are suited to this examination, although there are some restrictions due to the strength of the magnet and its possible effects on devices or implants such as pacemakers.

Contrast medium

If a contrast medium (gadolinium chelate) injection is required for the scan there is a very small risk of allergic reaction.

Recently, a condition called nephrogenic systemic fibrosis (NSF) has been identified as a rare but significant side effect of contrast injection. This complication is more likely to occur in those people with very poor kidney function, including people who are already on dialysis (a process that filters the blood of patients whose kidneys are not functioning properly using a kidney machine). This rare but serious reaction takes weeks to months to develop. For more information on NSF see the information item on [Gadolinium Contrast Medium \(MRI Contrast agents\)](#).

What are the benefits of an MRI Heart Structure Scan?

MRI scans avoid the need for exposure to potentially harmful radiation (X-rays). This is of particular benefit to all patients who are assessed as being able to have an MRI, especially young patients, and those who will require repeat scans through their life to monitor their condition.

MRI scans have an advantage over X-rays in their ability to show clear images of the soft tissues of the body, and the scan can be specifically tailored to show complex anatomy (areas of the body). The scan is unique in its ability to calculate blood flow through the arteries and blood vessels. Blurring of the image due to movement of the heart and blood vessels can be overcome by scanning in time with the heart beat.

Who does the MRI Heart Structure Scan?

The scan is performed by a [radiographer](#) specially trained in MR scanning, under the supervision of a [radiologist](#) (a specialist doctor). A cardiologist (heart specialist) may also be involved.

Where is an MRI Heart Structure Scan done?

The examination is a highly specialised test, and is not available at all hospitals or radiology practices. Your doctor is likely to be able to refer you to the hospital or radiology practice nearest to you offering these scans.

When can I expect the results of my MRI Heart Structure Scan?

The time that it takes your doctor to receive a written report on the test or procedure you have had will vary, depending on:

- the urgency with which the result is needed
- the complexity of the examination
- whether more information is needed from your doctor before the examination can be interpreted by the radiologist
- whether you have had previous X-rays or other medical imaging that needs to be compared with this new test or procedure (this is commonly the case if you have a disease or condition that is being followed to assess your progress)
- how the report is conveyed from the practice or hospital to your doctor (in other words, email, fax or mail)

Please feel free to ask the private practice, clinic, or hospital where you are having your test or procedure when your doctor is likely to have the written report.

It is important that you discuss the results with the doctor who referred you, either in person or on the telephone, so that they can explain what the results mean for you.

Please note:

This information is of a general nature only and is not intended as a substitute for medical advice. It is designed to support, not replace, the relationship that exists between a patient and his/her doctor. It is recommended that any specific questions regarding your procedure be discussed with your family doctor or medical specialist

The QUDI Program is managed by the Royal Australian and New Zealand College of Radiologists and funded by the Australian Commonwealth Department of Health and Ageing.

Publication Date: May 1st 2009

The RANZCR is not aware that any person intends to act or rely upon the opinions, advices or information contained in this publication or of the manner in which it might be possible to do so. It issues no invitation to any person to act or rely upon such opinions, advices or information or any of them and it accepts no responsibility for any of them.

The RANZCR intends by this statement to exclude liability for any such opinions, advices or information. The content of this publication is not intended as a substitute for medical advice. It is designed to support, not replace, the relationship that exists between a patient and his/her doctor. Some of the tests and procedures included in this publication may not be available at all radiology providers.

The RANZCR recommends that any specific questions regarding any procedure be discussed with a person's family doctor or medical specialist. Whilst every effort is made to ensure the accuracy of the information contained in this publication, The RANZCR, its officers, councillors and employees assume no responsibility for its content, use, or interpretation. Each person should rely on their own inquiries before making decisions that touch their own interests.