



Role of MRI in Diagnosing Cardiovascular Diseases

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DESCRIPTION

Cardiovascular diseases are the group of diseases that affects the heart and blood vessels of the body. These diseases may be symptomatic or asymptomatic. Different cardiovascular diseases include heart valve disease, abnormal heart rhythms, heart squeezing and relaxation difficulties etc. Arrhythmia, coronary artery disease, heart failure, congenital heart disease, deep vein thrombosis are different conditions of cardiovascular disease. There are different tests like electrocardiogram, echocardiogram, stress tests, blood tests, cardiac MRI, cardiac catheterization, ambulatory monitoring.

In order to check the blood flow to the heart, cardiac MRI test is used. To get the image, a small amount of MRI dye called gadolinium is injected into a vein in resting stage as well as after receiving the medication. As the gadolinium dye passes through the heart muscle, the MRI scanner takes the picture. This creates computer images of heart to review.

A cardiac MRI is a common test used to assess and diagnose several conditions like congenital heart defects, damage from a heart attack, coronary heart disease, heart failure, heart valve defects, pericarditis (inflammation of the membrane around the heart). It will take about 45 minutes to complete the process of MRI scan and up to two hours in the cardiovascular imaging lab.

A cardiac MRI helps in evaluating the anatomy and function of the heart chambers, heart valves, size of and blood flow through major vessels. It helps in:

- Diagnosing a variety of cardiovascular (heart and/or blood vessel) disorders such as tumors, infections, and inflammatory conditions.
- Evaluating the effects of coronary artery disease such as limited blood flow to the heart muscle and scarring within the heart muscle after a heart attack.
- Planning a patient's treatment for cardiovascular disorders.
- Monitoring the progression of certain disorders over time.
- Evaluating the effects of surgical changes, especially in patients with congenital heart disease.

MRI does not use radiation unlike x-ray and Computed Tomography (CT). Instead, radio waves re-align hydrogen atoms that naturally exist within the body which in turn does not cause any chemical changes in the tissues. The hydrogen atoms emit

different amounts of energy as they reach to their usual alignment depending on the type of tissue they are in. The scanner captures this energy and creates a picture using this information.

The magnetic field is produced by passing an electric current through wire coils in most of the MRI units whereas the other coils are present inside the machine. In some cases, they are placed around the part of the body being imaged. The coils are meant for receiving radio waves, producing signals that are detected by the machine. The electric current does not come into contact with the patient.

The signals are processed by a computer and a series of images are created where each of which shows a thin slice of the body. The images are studied from different angles by the radiologist.

MRI is often able to tell the difference between diseased tissue and normal tissue better than x-ray, CT and ultrasound.

There are only few side effects and no risks for an MRI as this test does not use ionizing radiation. Till date there are no side effects from the radio and magnetic waves it uses. The allergic reactions due to the MRI dye used are rare. If there is any pacemaker or metal implant from previous surgeries or injuries, MRI cannot be used as it uses magnets. It is not suitable for the people who are claustrophobic or having a hard time in enclosed spaces.

High-quality images depend on your ability to remain perfectly still and follow breath-holding instructions while the images are being recorded. If you are anxious, confused or in severe pain, you may find it difficult to lie still during imaging. In certain types of MRI machines, a person who is large cannot be fit into it. There are weight limits on the scanners. There could be a disturbance in clarity of the images if there are any implants and other metallic objects. Patient movement can have the same effect. The quality of the images can also be affected by anirregular heartbeat because of some techniques time the imaging based on the electrical activity of the heart. The constant motion of the heart creates challenges in obtaining clear images. These challenges can be overcome by various techniques including synchronizing the imaging with ECG tracing, synchronizing the imaging with breathing, or having you perform repeated short breath holds during imaging.

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Received: 28-Mar-2022, Manuscript No. JCRB-22-16460; **Editor assigned:** 01-Apr-2022, Pre QC No. JCRB-22-16460 (PQ); **Reviewed:** 18-Apr-2022, QC No JCRB-22-16460; **Revised:** 27-Apr-2022, Manuscript No. JCRB-22-16460 (R); **Published:** 06-May-2022, DOI: 10.35248/2155-9627.22.13.414.

Citation: Watson E (2022) Role of MRI in Diagnosing Cardiovascular Diseases. J Clin Res Bioeth. 13:414.

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