

Heart scan could replace angiogram for some patients

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A study published today in the journal [Circulation](#) showed that a cardiac magnetic resonance (CMR) scan is as accurate as an angiogram in diagnosing the causes of heart failure in patients with dilated cardiomyopathy. The scan causes less pain and discomfort and is also more cost-effective.

Dilated cardiomyopathy (DCM) affects more than 350,000 people and is one of the leading causes of heart failure. Different treatments are used depending on whether the patient's symptoms are caused by [coronary artery](#) disease, or a number of other conditions that can make the heart pump less effectively.

The standard test to detect coronary artery disease – an [angiogram](#) – is very accurate but can cause more complications than a simple scan. Patients receive a local anaesthetic, before a catheter is directed into the heart. The patient is then X-rayed in order to see whether there are any narrowed areas or blockages in the artery, which can cause heart failure.

The new study assessed whether CMR could be used to exclude coronary artery disease from a diagnosis without using an angiogram. The cost of a CMR scan is around half that of an angiogram procedure, and the patient does not need a catheter or an anaesthetic. The patient is injected with a contrast agent that allows the scanner to produce clear images of the heart and blood vessels. They then lie on a couch which is moved into the open-ended scanner. The scan takes about an hour.

In the study, 120 patients with heart failure were assessed with both an angiogram and CMR. Two separate panels of doctors made a diagnosis using the two different methods, and a “gold standard” panel made a diagnosis using all of the data. CMR produced a correct diagnosis in 97 per cent of patients and angiography in 95 per cent of patients.

If CMR had been used first to rule out coronary artery disease, only 33 patients would have required an angiogram as well. This method of diagnosis would have led to a 26 per cent cost saving on using an angiogram alone on all patients.

The research was funded by the British Heart Foundation and the cardiovascular Biomedical Research Unit (BRU), awarded to Imperial and the Royal Brompton & Harefield NHS Trust by the National Institute for Health Research.

Dr Sanjay Prasad, consultant cardiologist at Royal Brompton and part of the National Heart and Lung Institute at Imperial, said: "Understanding the causes of heart failure is hugely important because it dictates the treatment you give patients. An angiogram can show up the blocked arteries which can cause heart failure, but for patients with DCM who have unobstructed arteries this won't help to diagnose and treat the condition.

"Using CMR, we were able to identify a pattern of scarring to the heart tissue caused by DCM in patients who have early onset heart failure. Scanning can both accurately diagnose heart failure and collect information about what is happening to the heart muscle. We can develop the best possible treatment and support, including identifying who would benefit from having an angiogram. It means we are moving patients from diagnosis to treatment as quickly and comfortably as possible."

Professor Dudley Pennell, director of the cardiovascular BRU, consultant at Royal Brompton Hospital and professor of cardiology at the National Heart and Lung Institute at Imperial, said: "This work shows how research into new technology can be translated into better patient healthcare. It also helps us to make important savings by improving the accuracy of diagnosis and guiding appropriate treatment."

Dilated [cardiomyopathy](#), which is responsible for around a third of heart failure cases, can be inherited or caused by a virus. There is scarring of the heart wall and damage to the heart muscle, which causes it to become weakened and enlarged, preventing the heart from pumping efficiently. The angiogram fails to identify these detailed causes of the patient's heart failure, as scar tissue cannot be seen with this screening method.

The team at Imperial and Royal Brompton worked in partnership with doctors at several sites in southeast England and are now looking to expand their research to assess the value of CMR nationally.

Professor Peter Weissberg, Medical Director at the British Heart Foundation, said: "A big problem for doctors is finding out the root cause of [heart failure](#) in patients, which is an essential step in working out how to treat them. The most important question is whether or not they have underlying coronary artery disease. Until now this question could only be answered by a test called an angiogram, which uses x-rays and can cause complications and discomfort for the patient.

"The discovery means that some patients may no longer need to undergo an angiogram, so this research could have a big impact on the way thousands of [patients](#) are tested in the future."

More information: R.G. Assomull et al. '[The Role of Cardiovascular Magnetic Resonance as a Gatekeeper to Invasive Coronary Angiography in Patients Presenting with Heart Failure of Unknown Etiology.](#)'

Circulation, 6 September 2011.

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