

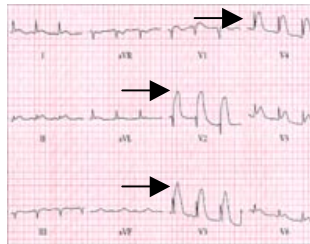
Heart attack injury revealed by magnetic resonance imaging and explained by computer models

Dr Colin Berry, University of Glasgow

Heart attack is the leading cause of premature ill health and death in Scotland and worldwide. It is a problem for doctors because the heart lies hidden within the chest and so heart injury is difficult to detect and quantify. Our research introduces new magnetic resonance imaging (MRI) techniques for the direct benefit of patients with heart problems in Scotland.

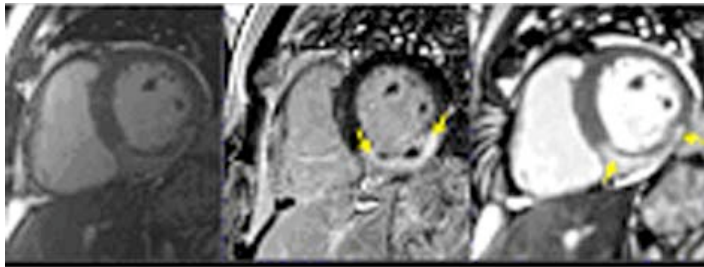
Our research team brings together expertise in heart imaging (cardiologists) and computer modelling (mathematicians) to develop computer models of the heart after heart attack. We aim to improve what is known about heart attack and how it should be treated.

ECG showing elevation of the ST segments (black arrows) of the heartbeat: this indicates an acute heart attack



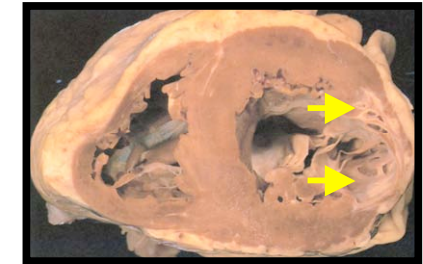
Magnetic resonance imaging (MRI) can provide images of the beating heart safely, including in patients whose hearts are damaged after having had a heart attack. Unlike CT scanning, MRI does not involve harmful X-rays, so it can be repeated.

Heart muscle bleeding is an adverse complication of heart attack. If bleeding into injured heart muscle could be detected in heart-attack survivors, then research could discover whether and how this bleeding increases the risk of subsequent heart failure or death. MRI could also be used to determine whether drug treatments might be developed to target high-risk patients.

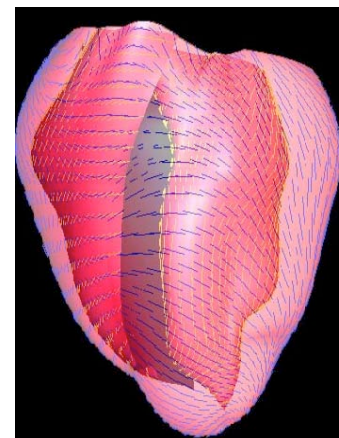


MRI images from a patient who survived a heart attack. The dark area between the yellow arrows shows severe injury, caused by the heart attack

Post-mortem image of scarred heart muscle after heart attack



Our research involves MRI and computer techniques designed to generate 3D images of models of both healthy and injured beating hearts. As well as using information from MRI scans of healthy beating hearts, we will be taking scans of heart-attack patients – two days, 3 months and then 1 year after their attack. The mathematicians in our research group will then create computer models, based on the information from the MRI scans.



3D computer-generated model of a healthy heart

I am a Consultant Cardiologist employed by the University of Glasgow. I work both as a doctor at the Golden Jubilee National Hospital, treating heart-attack patients and also at the BHF Glasgow Cardiovascular Research Centre, which houses our new MRI scanner. We gratefully acknowledge the research funding support from Medical Research Scotland, the Chief Scientist Office and the British Heart Foundation.

Cardiac magnetic resonance imaging: new pathological insights and functional significance in acute myocardial infarction:

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