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- Past-Chairman of the Working Group EuroCMR of the European Society of Cardiology
- Board Member of the Society of Cardiovascular Magnetic Resonance (SCMR)
- Co-Chairman of the European Chapter of the Society of Cardiovascular Magnetic Resonance
- Board Member of the “Education Committee” of the European Society of Cardiology
- Principal Investigator of the „MR-IMPACT“ Programme: largest programme worldwide to compare the diagnostic performance of CMR vs other modalities in the work-up of suspected coronary artery disease.
- Founding member of the European Council of Cardiac Imaging – the common platform for the european cardiologists, radiologists and nuclear physicians.
- Editor of the standard reference: CMR-Update
- Associate Editor of the European Heart Journal and other cardiology journals

## The Risk of Unknown Coronary Artery Disease

- In the industrialized countries, about half of all cardiac deaths occur before the patient reaches a hospital to obtain adequate treatment, i.e. catheter-based reopening of the occluded vessel (Statistics USA 2005/2008). This indicates, that patients at risk are not adequately detected, i.e. before a heart attack occurs!
- A myocardial infarct is deadly in about 40% of cases (Statistics USA 2005/2008)
- 50% of men and 64% of women do not experience cardiac symptoms before the occurrence of a heart attack. (Statistics USA 2005)
- In current medical practice, a work-up is initiated primarily in patients with symptoms, such as chest pain (angina pectoris), dyspnea or arrhythmias. In a large percentage of patients, however, the first heart attack (infarction) occurs without any warning symptoms.



**Coronary Artery Disease:  
A Dangerous Disease, If Unrecognized - But Easy To Treat If Detected !**

If an obstruction of a cardiac vessel (coronary artery) is detected, this lesion can be treated relatively easily with a percutaneous intervention (based on a balloon technique, typically combined with implantation of a stent to keep the vessel open). This intervention can be done on an out-patient basis or during a short hospital stay.

**The Pivotal Question**

How can we detect a future heart attack in a high-risk patient free of symptoms?

## The Answer

Magnetic resonance imaging of the heart, called Cardiac MR, is the latest invention in the diagnostic repertoire for the diagnostics of the cardiovascular system. Cardiac MR features some unique advantages over other imaging modalities of the heart:

- Cardiac MR has been evaluated in the largest world-wide studies to detect coronary artery disease and has proven highest sensitivity to detect this disease (MR-IMPACT programme and others).
- Cardiac MR does not need any ionizing x-rays and can therefore be repeated whenever needed.
- Cardiac MR utilizes conventional MR contrast media, which are very safe and which do not harm the kidneys.
- Cardiac MR is a comfortable examination of about 45-60 minutes duration during which you can listen to your favorite music. You are under constant monitoring by an experienced cardiologist with whom you can communicate whenever you wish.
- The Cardiac MR examination also includes a check of the great vessels in the body and measurements of the classical risk factors.
- To obtain excellent Cardiac MR results a profound knowledge of the MR physics is required together with an expert knowledge in cardiology, a combination you find at our center.

## What Does a Cardiac MR Study Look Like ?

- Before starting the examination, you have to deposit any metallic objects like coins, credit cards, keys etc. For the ECG tracings, electrodes will be attached to your chest and two intravenous lines will be placed at your arms. At this moment, we will also draw some blood to measure the classical risk factors (lipids and blood sugar among others).
- In the MR machine, you will be able to hear your favorite music through headphones. These are also used to have you holding your breath for periods of 10-15 seconds during which we acquire images of the heart. During the first part of the examination of 15-20 minutes, the heart's volumes and function are determined.
- During the second part of the study, you are outside the magnet to get an infusion of a drug, that slightly increases the heart rate typically towards 90 per minute. After 3 minutes of infusion during which you also feel a warmth in the body, you re-enter the scanner for another breathhold to measure the perfusion of the heart muscle. The drug is then switched off and the symptoms disappear within seconds.
- Finally, some additional images will be acquired during another 10-15 minutes. The total length of the study is about 1 hour.
- The bore of the magnet is rather small – if you use escalators without problems, then a Cardiac MR study is not a problem. If you are claustrophobic, you should discuss this point with our cardiologist, so he can adequately prepare you (including the prescription of a tranquilizer if needed).





## The Result of The Cardiac MR Examination – The Consequences

- If we do not detect any perfusion abnormalities in your heart and if the other results are normal as well, you can feel safe and no treatment is required. If cardiovascular risk factors are present, it will be important to treat them to avoid development of coronary artery disease.
- If a perfusion abnormality is detected in your heart, this finding will be explained and discussed with you by our cardiologist. In addition to drug treatment, an invasive treatment will be typically recommended to „repair“ the narrowed vessel before it develops complete occlusion, i.e. a heart attack. In most situations, this invasive treatment can be performed by a percutaneous approach, which can be performed on a out-patient basis or during a short stay in your preferred hospital.
- Coronary artery disease is a chronic disease with progression or stable phases over many years and decades. Therefore, the heart should be checked repeatedly, e.g. every 1-2 years. As Cardiac MR is not utilizing any ionizing x-rays, Cardiac MR can be repeated whenever needed.

## A Patient After Infarction – CMR Is The Most Accurate Method To Detect The Consequences of Infarctions

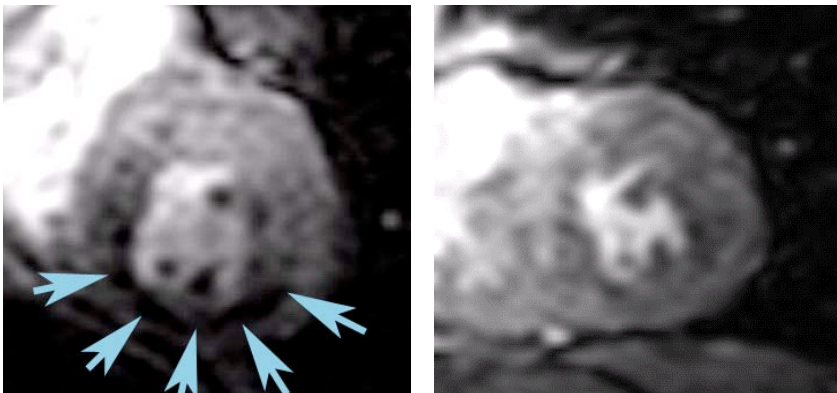


This Cardiac MR examination shows a patient after a heart attack. Normal cardiac muscle appears black. A scar after infarction has developed (white tissue, red arrows). In addition a thrombus (dark mass, yellow arrow) is attached to the infarcted region. A drug treatment will dissolve the thrombus in order to prevent a cerebrovascular stroke.

This heart attack was survived by the patient. However, the ultimate goal is to prevent the occurrence of an infarct.

## An Asymptomatic Patient at Risk – CMR Is The Most Sensitive Method To Detect Coronary Artery Disease

In the 58-years old patient below, asymptomatic, but with several risk factors, Cardiac MR detects a perfusion abnormality in the inner layer of the cardiac muscle (light blue arrows) – this region will correspond to the infarcted muscle in the case of complete obstruction of the vessel.



As the perfusion territory is large, the vessel was treated by percutaneous stenting – the control Cardiac MR after the intervention (image to the right) demonstrated complete restoration of blood flow to the heart.

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