

**Summits in Clinical Cardiovascular MRI: Cardiac
Acute and Chronic Ischemic Disease**

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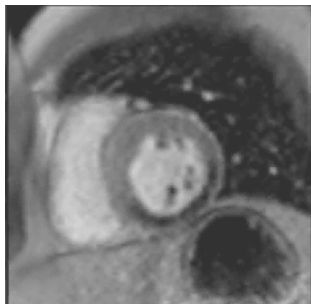
Cardiac Magnetic Resonance (CMR) has the capability to assess cardiac function, to visualize small myocardial lesions and to differentiate myocardial tissue changes. That's why CMR is of growing impact in clinical routine in different hospitals depending on availability and expertise. Beside characterization of tissue changes, CMR has the potential to differentiate prospectively reversible vs., irreversible and acute vs. chronic myocardial injuries. The changes can be monitored during follow-up. Whereas the non-invasive differentiation of myocardial injury is an ongoing diagnostic challenge in cardiology, there is a growing need. Echocardiography is a basic tool to assess wall motion abnormalities, but underlying etiologies of these functional abnormalities, Meanwhile, the indications of CMR in various cardiovascular disorders are steadily growing. The application of CMR in Coronary Artery Disease (CAD) is common in different CMR-centres depending on the experience of investigator and referring doctor.

The application of Late Gadolinium Enhancement (LGE)-Imaging is accepted world-wide as robust technique for the assessment of viability including risk assessment by detection of microvascular obstruction.^{1,2} The quantification of scar transmuralty offers the chance to assess myocardial viability and therefore it is useful in therapeutic decision making.^{3,4} Interestingly, the localization of LGE after Percutaneous Coronary Intervention (PCI) suggest that distal embolization of plaque material occurs in contemporary PCI of native coronary arteries. This may influence interventional strategies.⁵ It is well known that CMR is able to detect smaller myocardial infarctions than SPECT.⁶ Interestingly; also small defects are of prognostic value.⁷

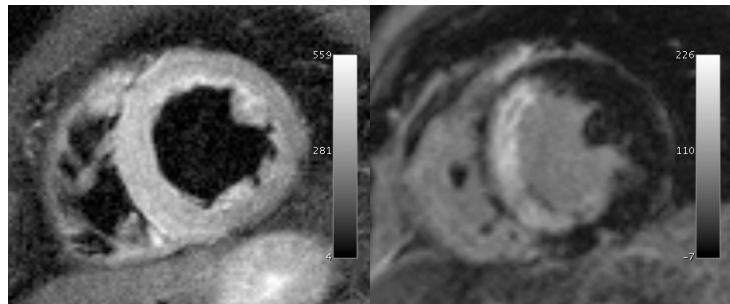
One of the unique properties of CMR is its capability of tissue differentiation by the application of several techniques. The combination of LGE and T2w-imaging allows the differentiation of acute and chronic myocardial infarction⁸ and therefore the assessment of the area at risk as shown in dogs⁹ and patients¹⁰.

In cardiology the assessment of ischemia plays an important role. Different parts of the ischemic cascade can be covered by CMR. The assessment of wall motion abnormalities applying dobutamine stress is well known and in case of impaired ultra-sound conditions of high impact.¹¹ New techniques will fasten the assessment of wall motion abnormalities with special impact for stress application applying dobutamine.¹² Furthermore, it is well known that a negative stress is of high prognostic relevance.¹³ Nevertheless, a unique chance of CMR is the assessment of myocardial perfusion at stress and rest. Recently, it could be shown in a multi-centre prospective trial, that adenosine-stress is not inferior in comparison to SPECT.¹⁴ Perfusion-imaging is not as robust as cine-SSFP and LGE-imaging, but is offering the chance to detect ischemia in a fast and safe protocol.¹⁵ Furthermore, several authors underlined the CMR-safety of stents early after implantation including drug-eluting devices.¹⁶

CMR today offers the unique possibility to differentiate myocardial injury in relation to functional changes, to understand the development of disease and therefore the potential to optimize therapy.



case 1
Perfusion defect inferior



case 2
Large acute myocardial infarction
Left T2w-image showing edema
Right LGE showing fibrosis

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