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Experimental Induced Myocarditis In Rat Can Be Detected and Monitored By Clinical 3T Cardiac Magnetic Resonance.

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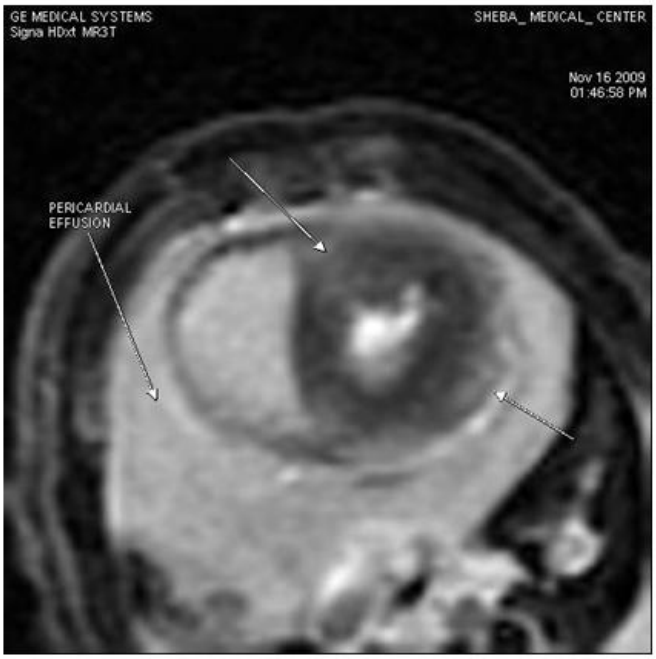
Background: We aimed to compare cardiac magnetic resonance (CMR) imaging, using a clinical whole body 3T scanner (Signa HDX version 15 GE healthcare), with histopathological measurement as a method for the quantitative evaluation of the extent of myocardial involvement and function in a rat model of autoimmune myocarditis.

Methods and Results: Male Lewis rats (n=11) were subjected to myosin immunization and developed autoimmune myocarditis. Approximately 3 weeks later, rats with myocarditis underwent CMR examination and subsequently, histopathological evaluation. Rats with myocarditis showed pericardial thickening, effusion, and LV wall motion abnormalities with septal hypokinesis (Figure). Short axis views showed patchy delayed enhancement of epicardial segments, with distribution mainly located within the inferolateral LV wall including the septum. This increased signal/hyperenhancement ratio defines focal areas of myocardial fibrosis and/or necrosis, highly suggestive of inflammation. Additionally, the presence of large pericardial effusion provides supportive evidence for the existence of peri- myocarditis. Positive correlation was found between CMR examination results and histological findings.

Conclusions: Experimental myocarditis in rat can be detected and monitored by CMR performed on a clinical 3.0 T scanner. The overall advantages of CMR, mostly its high measurement accuracy and reproducibility, make it an ideal technique for monitoring myocarditis and pre-clinical evaluation of novel therapies.



Short axis view with inversion recovery with TI 300msec on 3Tesla CMR, post Gadolinuim injection, showing a large pericardial effusion, and patchy delayed enhancement of epicardial myocardial segments (arrows), compatible with myocarditis.