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USE OF MAGNETIC RESONANCE IMAGING AND Gd-DTPA CONTRAST ENHANCEMENT TO IDENTIFY EXPERIMENTAL MYOCARDIAL INFARCTION AND CARDIAC REJECTION. T. Nishimura and T. Kozuka. Dept. of Radiology, National Cardiovascular Center and Dept. of Radiology, Osaka University, Osaka.

Gated magnetic resonance imaging (MRI) is a noninvasive modality that provides high resolution images of the cardiovascular system. Besides anatomic information, myocardial tissue characterization is possible by measuring T1 and T2 relaxation time. This study was undertaken to identify experimental myocardial infarction and cardiac rejection using gated MRI and Gd-DTPA contrast enhancement.

(1) Myocardial infarction: In 15 adult mongrel dogs, the LAD was surgically ligated. In 6 dogs, the LAD was later reperfused and in 9 dogs, the LAD remained occluded. Gd-DTPA (0.5mM/kg) was injected intravenously. A Magnetom unit (1.5 Tesla) was used. Transverse sections were obtained using spin-echo technique with TEs of 35 to 70 msec and TRs ranging from 0.2 to 0.6 sec. The signal intensity of the infarcted region was much higher than that of normal myocardium whether reperfused or not. In the excised heart, MRI with Gd-DTPA showed shorter T1 relaxation time in infarcted myocardium than normal. The infarct size as determined by pathological findings correlated well with Gd-DTPA enhancement of the infarcted region.

(2) Cardiac rejection: Six heterotopic

heart transplantation model in the peritoneal cavity was prepared and gated MRI of the donor heart was carried out with Gd-DTPA. The pulse sequence used was the same as protocol (1). High signal intensity was observed at rejected myocardium on 5-6th postoperative days and Gd-DTPA contrast enhancement was clearly observed in all dogs.

From above experiments, myocardial tissue characterization is possible by gated MRI and Gd-DTPA contrast enhancement. Although T1 and T2 prolongation was observed at myocardial injuries without Gd-DTPA, Gd-DTPA contrast enhancement may improve the detection of infarcted and rejected myocardium. As for the former, clinical application may have supplemental role in the evaluation of myocardial infarction.