

A new method to improve contrast-enhanced MRI by suppressing blood pool signal

Unmet Need

In magnetic resonance imaging (MRI), contrast agents are often used to enhance the difference between diseased and normal tissue. Images taken with contrast agents allow to identify myocardial infarction, stroke, tumors, atherosclerosis, tissue necrosis, and other diseased states. However, administration of contrast also leads to high levels of contrast agents in the blood, thus complicating detection of abnormal tissue adjacent to blood. Traditional “black blood” techniques used to null signal from flowing blood and highlight static anatomy are not designed for imaging with the use of contrast media. More recent methods of blood pool suppression in contrast-enhanced MRI rely on changing magnetization of blood before it flows into the imaged region. However, in all these methods blood signal suppression depends on the speed of blood flow with low suppression for slow moving blood and no suppression for stagnant blood pools. To overcome these limitations, new techniques allowing blood pool suppression techniques are needed.

Technology

Duke researchers have developed a novel technique that allows visualization of tissue contrast enhancement while simultaneously suppressing blood-pool signal. In this method, after intravenous administration of a contrast agent, a radio frequency (RF) pulse sequence is applied that includes a preparatory section designed to modify the organ tissue signal differently than the blood pool signal, followed by an inversion RF pulse. Then the magnetic resonance (MR) signals are allowed to evolve permitting signals from tissue and from blood separate due to their different relaxation times, after

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Patent Information

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Publication(s)

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External Link(s)

• [From the lab of Dr. Raymond Kim](#)

which MR data is acquired and reconstructed resulting in suppressed blood pool signal. This technique has been successfully demonstrated in patients with both ischemic and nonischemic heart disease and was shown to provide superior diagnostic performance for the detection of myocardial infarction compared with conventional contrast-enhanced MRI. This technology is only available for non-exclusive licence.

Advantages

- Suppresses of blood pool signal and enhances the tissues of interest
- Insensitive to the movement of blood.
- Allows improved decision making and risk management in contrast-enhanced MRI-based diagnosis

