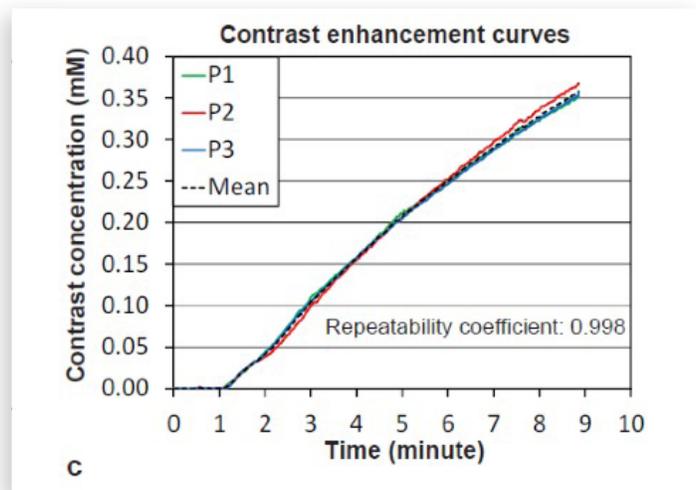
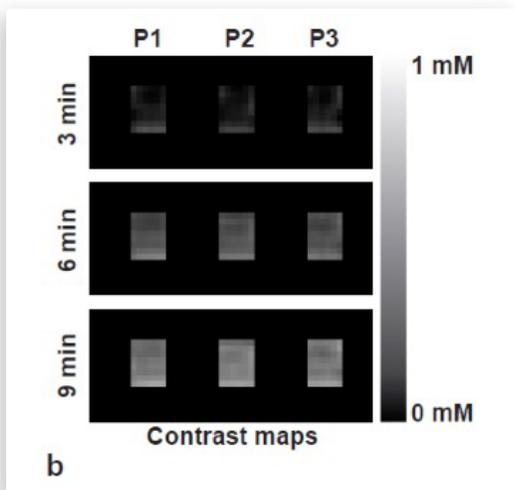


Calibration Phantom for Dynamic Contrast Enhancement MRI

ALLIANCE FOR INNOVATIVE MEDICAL TECHNOLOGY – AIMTECH / RADIOLOGY



Contrast concentration changes in the phantom over time (three replicates)

This technology provides an imaging standard (“phantom”) that is used to normalize quantitated DCE-MRI patient values. The phantom provides a constant perfusion parameter that has been shown to have an intra-class correlation coefficient value of 0.996. The device is small to allow concurrent imaging with each patient, and enables better intra-patient data comparisons as well as facilitating multi-institutional clinical trials employing quantitative DCE-MRI to evaluate malignancies and disease processes.

■ Technical Readiness Level

TRL 6 (System/subsystem model or prototype demonstration in a relevant environment) Prototype tested ex-vivo and an early phase clinical trial. Additional clinical trials are in progress.

■ Intellectual Property Status

Patent application filed (PCT/US2016/54822).

■ Inventor

- Harrison Kim, PhD
- UAB Department of Radiology

■ Competitive Advantages

Standardization of DCE-MRI (Dynamic Contrast Enhanced-Magnetic Resonance Imaging) quantification is challenging due to variability that occurs between different MR scanners and post-imaging methods. This variability makes cross-comparisons between imaging sites difficult and has hindered the implementation of DCE-MRI in large

multicenter clinical trials. The new technology offers a tool and strategy for minimizing the variability of DCE-MRI values. Unlike traditional MR phantoms, this device is small and portable and can be imaged simultaneously with each patient. The technology, therefore, serves as a built-in standard that is used to normalize patient values, resulting in more consistent and reproducible quantitative data that permits comparisons between patients. From an end-user’s perspective, there are no extra steps for the technician to perform, and the device is anticipated to be disposable.

■ Market Overview

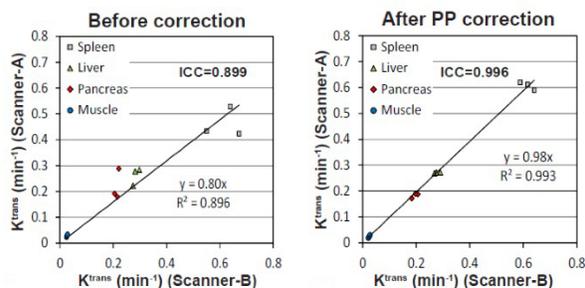
Dynamic Contrast Enhanced-MRI is an imaging technique that can be used to noninvasively assess vascular structure and function. DCE-MRI is the most useful technique for noninvasively evaluating vascular permeability, which is an important end-point for determining therapeutic efficacy of anti-angiogenic pharmaceuticals. MRI-based biomarkers are currently qualitative evaluations due to the variability that occurs between MR scanners and post-imaging methods.

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An internal calibration method may enable the use of DCE-MRI to demonstrate therapeutic efficacy in clinical trials of anti-angiogenic drugs. There are an estimated 80,000 DCE-MRI scans annually in the U.S. and 400,000 scans worldwide for cancer.



K^{Trans} of three volunteers calculated from two separate scanners prior to phantom correction and after phantom correction

Publications

Kim, H., Mousa, M., Schexnaider, P., Hergenrother, R., Bolding, M., Ntsikoussalabongui, B., Thomas, V. and Morgan, D. E. (2017), Portable perfusion phantom for quantitative DCE-MRI of the abdomen. *Med. Phys.*, 44: 5198–5209. doi:10.1002/mp.12466



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