SCBT•MR
Society of Computed Body Tomography & Magnetic Resonance

2013 Scientific Sessions
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1:00 – 5:00 p.m.

Presenter: Sandeep Hedgire, MD

Title of Abstract: **Evaluation of renal T2* changes on MRI following administration of ferumoxytol as a T2* contrast agent.**

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Modality: MR

Organ System: GU

Intro: Ferumoxytol is an ultrasmall paramagnetic iron oxide nanoparticle that can be used as a negative contrast agent on T2*-weighted imaging. It is currently approved in North America and Europe as an iron replacement therapy in adults with chronic kidney disease. The use of this drug as a kidney blood pool agent and for imaging renal inflammatory conditions has been previously proposed, but baseline human data is lacking.

Purpose: To evaluate changes in regional T2* maps of physiologically normal kidneys following intravenous administration of ferumoxytol.

Methods Used: Nineteen individuals with normal kidney function and without known kidney disease underwent T2*-weighted magnetic resonance imaging of the kidney before, immediately after, and 48 hours after intravenous administration of ferumoxytol at a dose of 4mg/kg (group-A, n=7) and 6mg/kg (group-B n=12). T2* imaging was performed using single shot, monopolar, multiecho gradient echo (TE = 4.8–24.8, TR = 169 ms, thickness = 4 mm) at 3T field strength with an 8-channel body array coil. T2* values were statistically analyzed using two-tailed paired t test

Results of Abstract: In group A, the percentage change from baseline to immediate post and baseline to 48 hrs was 86% and 65.6% respectively for the cortex and 94.4% and 69.9% respectively for the medulla. In group B, the percentage change from baseline to immediate post and baseline to 48 hrs was 85.2% and 73.3% respectively for the cortex and 94.5% and 74% respectively for the medulla. This difference was significant for both group A and B ($p<0.0001$). Comparing group A and B showed significant difference in the cortex ($p=0.009$) at 48 hrs time points.

Discussion: This study reveals significant uptake of ferumoxytol in both renal cortex and medulla as demonstrated by drop in the T2* values with differential enhancement of renal cortex and medulla in physiologically normal kidneys at 4mg and 6mg doses although a consensus on imaging time points is lacking at this time. Differential ferumoxytol enhancement may offer the ability to interrogate renal cortex and medulla with possible clinical applications in medical renal disease and transplant organ assessment. The signal drop immediately following enhancement could also be used to evaluate renal tumor angiogenesis.

Scientific and/or Clinical Significance? Evolution of T2* changes following ferumoxytol administration can provide insight into image based non-invasive diagnosis of renal diseases.

Relationship to existing work The development of a noninvasive test that better differentiates underlying disease states would have tremendous impact on the management of kidney disease, facilitating diagnosis and treatment.