

Tracking of Intramuscular Stem Cells by Magnetic Resonance Diffusion Weighted Imaging

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Abstract : Introduction: Stem Cell Imaging is a challenging field since the advent of Stem Cell treatment in humans. Series of research on tagging and tracking the stem cells has not been very effective. The present study is an effort by the authors to track the stem cells injected into calf muscles by Magnetic Resonance Diffusion Weighted Imaging. Materials and methods: Stem Cell injection deep into the calf muscles of patients with peripheral vascular disease is one of the recent treatment modalities followed in our institution. 5 patients who underwent deep intramuscular injection of stem cells as treatment were included for this study. Pre and two hours Post injection MRI of bilateral calf regions was done using 1.5 T Philips Achieva, 16 channel system using 16 channel torso coils. Axial STIR, Axial Diffusion weighted images with $b=0$ and $b=1000$ values with back ground suppression (DWIBS sequence of Philips MR Imaging Systems) were obtained at 5 mm interval covering the entire calf. The invert images were obtained for better visualization. 120ml of autologous bone marrow derived stem cells were processed and enriched under c-GMP conditions and reduced to 40ml solution containing mixture of above stem cells. Approximately 40 to 50 injections, each containing 0.75ml of processed stem cells, was injected with marked grids over the calf region. Around 40 injections, each of 1ml normal saline, is injected into contralateral leg as control. Results: Significant Diffusion hyper intensity is noted at the site of injected stem cells. No hyper intensity noted before the injection and also in the control side where saline was injected conclusion: This is one of the earliest studies in literature showing diffusion hyper intensity in intramuscularly injected stem cells. The advantages and deficiencies in this study will be discussed during the presentation.

Keywords : stem cells, imaging, DWI, peripheral vascular disease

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