aneurysm just after labeled SMC seeding. Hypointense signal areas were present up to 28 days after cell transplantation. Perls staining and fluorescent histological analysis confirm the presence of iron-labeled cells in contact with the lumina at day 0. At longer times, parallel to intima formation, labeled cells were observed within intima and media up to day 28. Immunohistological studies confirmed the presence of iron-labeled smooth muscle cells. High-field \textit{in vivo} MR imaging (9.4 T) showed a well-defined hypointense signal layer in gradient-echo sequences which correlates with histological Perls staining.

Conclusions: This study showed the potential of these magnetic nanoparticles as a cell label for long-term MRI \textit{in vivo}. Labeled cells are easily detected even after 1 month. All data confirmed the integration of SMC within the aneurysm aortic wall, allowing intima development and stabilization of aneurysm lesions.

References

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\textbf{In vivo} MR tracking of magnetically labeled dendritic cells: first clinical experience

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\textbf{Rationale and Objectives:} Anticancer immunotherapies using dendritic cells (DCs) are currently being explored in the clinic. For these therapies, accurate delivery to target organs is essential. Correct delivery and subsequent migration of vaccinated DCs to regional lymph nodes (LN) is of paramount importance for effective stimulation of the immune system. Using magnetically labeled DCs, we investigated the potential of magnetic resonance imaging (MRI) for cell tracking to monitor DC therapy.

\textbf{Methods:} Autologous monocyte-derived DCs were labeled with the clinically approved superparamagnetic iron oxide (SPIO) formulation Endorem (Guerbet, Paris, France) and \textsuperscript{111}In oxine separately and co-injected into the draining LNs of stage III melanoma patients (n = 8) under ultrasound guidance. Two days after vaccination, patients were monitored by scintigraphy and MRI at 3 T.

\textbf{Results:} We showed that \textit{in vivo} MR tracking of magnetically labeled cells is feasible in humans for detecting very low numbers of DCs in conjunction with detailed anatomical information. In contrast to scintigraphic imaging, MRI allowed the assessment of accurate DC delivery and inter- and intra-nodal migration patterns. SPIO-labeled cells were detected in the injected LN, but also in following LNs [e.g. see Fig. 1(A)]. The LNs were then resected and monitored by MRI at 7 T [Fig. 1(B)]. The presence of SPIO-labeled cells in the LN was confirmed by histology of the resected nodes [Fig 1(C)]. Moreover, histochemistry revealed that SPIO-labeled DC had migrated into the T-cell areas [Fig. 1(D)] of the injected and following LNs. SPIO-labeled cells in the T-cell area were still positive for the DC maturation marker CD83 and negative for the macrophage marker CD68 [Fig. 1(E)].

Conclusion: MRI cell tracking using iron oxides appears clinically safe and extremely well suited to monitor cellular therapy in humans.

Session 11: Iodinated agents: Tolerance—Allergy

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Radiodiagnostic examinations with iodinated contrast media may result in severe DNA damage resulting in cellular radiosensitization

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\textbf{ABSTRACTS}

\textbf{Contrast Media & Molecular Imaging}

\textbf{CMR 2005: 9.07} \textbf{In vivo} MR tracking of magnetically labeled dendritic cells: first clinical experience

\textbf{Figure 1.} (A) MRI (3 T) of a patient injected with SPIO-labeled DC. Arrows indicate the injected LN (1) and one of four following LNs (2) to where SPIO-DC had migrated. (B) MRI (7 T) of resected lymph node 2 days after injection of SPIO-labeled DC. (C–E) Histology of same LN as in B. Blue, iron; red, nuclei. (D) Detail of the T cell area of an LN to which SPIO-labeled DC had migrated. (E) Immunohistochecemistry of SPIO-labeled cells in T-cell area of LN. Brown, CD68; in inlet, CD83