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Titel des Beitrags: [Experimental studies of the value of SPIO for MRI of bone marrow before and after whole body irradiation]

Abstract: PURPOSE: Evaluation of the value of superparamagnetic iron oxides (SPIO; Endorem) for MRI-derived quantifications of the permeability of the blood-bone marrow barrier and the phagocytic activity of reticuloendothelial system (RES) bone marrow cells before and after TBI.

METHODS: 12 New Zealand white rabbits underwent MRI of the lumbar spine and os sacrum using T1-weighted spinecho (SE) and T2-weighted Turbo-SE (TSE) sequences before and after injection of SPIO (Endorem). Four animals each were examined without irradiation, after 4 Gy total body irradiation (TBI), and after 12 Gy TBI. Changes in bone marrow signal intensities (SI) after contrast agent injection were quantified as delta SI(%) = SIpost-SIpre)/SIpre) x 100% and these data were correlated with bone marrow histopathology.

RESULTS: Histopathology of the bone marrow revealed a radiation-induced decline of all hematopoetic cell lines. SPIO were phagocytosed by bone marrow RES cells and caused a significant bone marrow signal decline on postcontrast T2-weighted images (p< 0.05). delta SI(%) data for T2-weighted images were significantly higher for the irradiated bone marrow as compared to non-irradiated controls (p< 0.05). Dynamic T1-weighted images directly after contrast medium injection were not able to characterize the permeability of the blood-bone marrow barrier. CONCLUSION:
Hematopoetic bone marrow can be labelled with SPIO. Irradiation does not impair the phagocytic activity of bone marrow RES cells. However, the bone marrow enhancement with SPIO is smaller as compared to previous results obtained by our group with USPIO.