

Application of MRI in Radioembolization Imaging and Dosimetry

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Abstract : Yttrium-90 (90Y) radioembolisation(RE) is increasingly used for the treatment of patients with unresectable primary or metastatic liver tumours. Image-based approaches to assess microsphere distribution after RE have gained interest but are mostly hampered by the limited imaging possibilities of the Isotope 90Y. Quantitative 90Y-SPECT imaging has limited spatial resolution because it is based on 90Y Bremsstrahlung whereas 90Y-PET has better spatial resolution but low sensitivity. As a consequence, new alternative methods of visualizing the microspheres have been investigated, such as MR imaging of iron-labelled microspheres. It was also shown that MRI combines high sensitivity with high spatial and temporal resolution and with superior soft tissue contrast and thus can be used to cover a broad range of clinically interesting imaging parameters. The aim of the study in this article was to investigate the capability of MRI to measure the intrahepatic microsphere distribution in order to quantify the absorbed radiation dose in RE.

Keywords : radioembolisation, MRI, imaging, dosimetry

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