

AbstractID: 8515 Title: Prolonged Discrimination of Target Structures in CT and MR-Guided Therapies Using a Novel Contrast Agent

Purpose: To evaluate the performance of a liposome-based contrast agent in allowing for persistent discrimination of target and disease structures (tumor, invaded lymph nodes) using CT and MR imaging in tumor-bearing rabbits following a single intravenous administration.

Method and Materials: Five New Zealand White rabbits bearing VX2 sarcoma in their left lateral quadriceps received a single i.v. dose of liposomes (80 nm) encapsulating 250 $\mu\text{g/g}$ of iodine in the form of iohexol and 15 $\mu\text{g/g}$ of gadolinium in the form of gadoteridol. They were CT (80 kVp, 200 mA) and MR (3D FSPGR, TR/TE=9.8/4.3) imaged at 1 hour and 1, 2, 3, 5, 7, 10 and 14 days post contrast administration. Semi-automated contouring using MicroView v2.2 allowed for generation of volumes of interest consisting of kidneys, spleen, liver, tumor and the contralateral muscle, which were subsequently used for data analysis.

Results: Co-localized accumulation and clearance of the liposome contrast agent is visually detected over a two-week period in both CT and MR. In the tumor volumes, the mean HU increased following the administration of the contrast agent peaking at 3 days post-injection, while the mean HU measured on the contralateral muscle volumes remained steady. Furthermore, the distribution of the liposome agent is highly heterogeneous within the tumor volume. For a representative rabbit at three days post-injection, 29.6% of the tumor voxels measured between 115 and 290 HU. This liposome agent also proved to be able to target invaded lymph nodes (as confirmed by pathology). Specifically, 9 out of 10 iliac nodes from the 5 rabbits were enhanced.

Conclusion: These investigations demonstrated the ability of nano-sized liposomes encapsulating iohexol and gadoteridol to allow for persistent discrimination of disease structures and their potential for use in CT and MR-guided therapies.