Iodinated contrast agents for improving tumor imaging and quantification in rodents

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Purpose: This study was designed to evaluate the time-course of contrast enhancement to improve imaging and quantification of subcutaneous tumors in rodents using different contrast agents for Computed Tomography imaging.

Procedures: 4 SCID mice received subcutaneous injection of human bladder carcinoma cells in the right flank. Tumors were imaged 4 weeks after inoculation with a small-animal CT-scanner using two different iodinated contrast agents: FenestraTM-VC and Iopamiro-300R. Two types of studies were performed: a dynamic-planar study during the first 10 minutes after the injection of the contrast agent [8 shots/second during 200 seconds and 1 shot/second during 400 seconds]; and a static tomographic studies at time points 15, 30 and 50 minutes. Images were reconstructed using a modified FDK-algorithm. Regions of interest (ROIs) were drawn in the dynamic planar study over tumor and liver. On the static tomographic studies the following ROIs were drawn: tumor, right ventricle, liver, kidney, spleen, muscle, bladder and air.

Results: No significant differences in contrast enhancenment between contrast agents were observed in the dynamic planar study. However, significant signal increases were observed in tumor, liver, kidney, spleen, muscle and bladder with Iopamiro in the static tomographic studies. Tumor peak enhancement occurred 15 min after the iopamiro injection, with an observed density increase of 158 HU. In the case of Fenestra, tumor peak

enhancement occurred at 30 min with a density increment of 27 HU. The HU in air remained constant. Results about the correlation between iopamiro enhancement and vasculature enhancement provided by Fenestra are in progress.

Conclusions: Differences in contrast enhancement at different tissues are due to the different properties of the contrast agent. Iopamiro diffused rapidly from the vascular into the extravascular space, while Fenestra remained in the vascular space. These two behaviours may facilitate the characterization of experimental tumors in rodents using Computed Tomography.