AbstractID: 13825 Title: Estimate Absorbed Dose Using Micro PET Imaging of Rat Brain Tumor with I-124 Infusion followed by F-18 Injection

OBJECTIVE: This study was to estimate absorbed dose using micro PET imaging of the rat brain tumor with I-124 Infusion followed by F-18 Injection.

ME**THOD:** Two tumor-bearing rats were infused intratumorally with 2.1 uCi I-124 Gd Tagged Metallofullerenes. A 2-hour post I-124 infusion PET scan was performed on each animal to identify the infusion site and possible free I-124 distribution. Following I-124 imaging, 32 uCi and 182 uCi of F-18 FDG were administered respectively by IP injection to highlight brain anatomy at different image contrasts. Each animal was imaged for 5 minutes using a uPET scanner, 350 – 550 keV energy window, without transmission scanning. F-18 imaging started 5 and 45 minutes subsequently after the IP injection. Image reconstruction algorithms (FBP, 3D OSEM, 3D Re-Projection with or without Hanning Filter) were used for comparison. Image processing and analysis were conducted on ASIPro VM platform. The infusion site and tumor were measured by FWHM from Gaussian fit of count profiles. Absorbed dose was estimated using MIRD based on RoI counts from the PET images. **RESULT:** The post infusion PET scan showed high I-124 concentration in tumor and minimum free iodine in the rest of body. The 3D OSEM reconstruction improved spatial resolution and contrast compared with the FBP and 3DRP algorithms. The infusion site was 5.21 mm (FWHM). Tumor dose of I-124 (19.8 Gy) was accurate because of high contrast of I-124 image, and the dose for F-18 depended on the RoI definition. **CONCLUSION:** Radiation dosimetry using PET scan depends on image quantification which is affected by the reconstruction algorithm selected and the acquisition or processing protocol.

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