

MEETING ABSTRACT

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Do carotid MR surface coils affect PET quantification in PET/MR imaging?

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To evaluate the effect of surface coils for carotid MR imaging on PET quantification in a clinical simultaneous whole-body PET/MR scanner. A cylindrical phantom was filled with a homogeneous 2L water-FDG mixture at a starting dose of 301.2MBq. Clinical PET/MR and PET/CT systems were used to acquire PET-data without a coil (reference standard) and with two carotid MRI coils (Siemens Special Purpose 8-Channel and Machnet 4-Channel Phased Array). PET-signal attenuation was evaluated with Osirix using 51 (PET/MR) and 37 (PET/CT) circular ROIs. Mean and maximum standardized uptake values (SUVs) were quantified for each ROI. Furthermore, SUVs of PET/MR and PET/CT were compared. For validation, a patient was scanned with an injected dose of 407.7MBq on both a PET/CT and a PET/MR system without a coil and with both coils. PET/MR underestimations were -2.2% (Siemens) and -7.8% (Machnet) for SUV_{mean}, and -1.2% (Siemens) and -3.3% (Machnet) for SUV_{max}, respectively. For PET/CT, underestimations were -1.3% (Siemens) and -1.4% (Machnet) for SUV_{mean} and -0.5% (both Siemens and Machnet) for SUV_{max}, respectively using no coil data as reference. Except for PET/CT SUV_{max} values all differences were significant. SUVs differed significantly between PET/MR and PET/CT with SUV_{mean} values of 0.51-0.55 for PET/MR and 0.68-0.69 for PET/CT, respectively. The patient examination showed that median SUV_{mean} values measured in the carotid arteries decreased from 0.97 without a coil to 0.96 (Siemens) and 0.88 (Machnet). Carotid surface coils do affect attenuation correction in both PET/MR and PET/CT imaging. Furthermore, SUVs differed significantly between PET/MR and PET/CT.

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