Effect of EEG Leads on SPECT and F-18 FDG PET/CT Cerebral Perfusion: Phantom Study

Dr. Lulu Zhang¹, Kristin Willis¹, Dr. George Thomas², Dr. Stephanie Yen¹, Dr. Marc Seltzer¹, Dr. Vijay Thadani², Dr. Alan Siegel¹.

¹Dartmouth Hitchcock Medical Center, Department of Radiology, ²Dartmouth Hitchcock Medical Center, Department of Neurology

Introduction and Objectives: Cerebral perfusion SPECT and F-18 FDG PET/CT are important modalities for surgical treatment planning of patients with epilepsy. Patient’s interictal state must confirmed by EEG just prior to the scan. EEG leads causes streak artifacts which are assume to degrade image quality and diagnostic accuracy. However, the placement and removal of EEG leads can cause work flow delays. We wanted to test if the EEG leads would affect image quality of PET/CT and SPECT/CT.

Methods: Hoffman 2D brain phantom was used for both modalities. For SPECT/CT 185 MBq of technetium-99m pertechnetate was used with 15 minute consecutive scans without EEG leads, with MR/CT compatible leads, and standard EEG leads. For PET/CT 185 MBq of F-18 FDG were used with 8 minute acquisitions with the same leads configuration. Three experienced nuclear medicine physicians were asked to independently rank the quality of the attenuation corrected functional images and CT images. The readers were then asked to rate randomized images from each scan against the no lead scans as control.

Results/Discussion: For both SPECT and PET exams all three readers saw no perceptible differences between studies with no leads, MR/CT compatible leads, and standard leads, even when given no lead control. All three readers identified the CT scan with standard EEG leads as degraded, however, no perceptible changes in the final attenuation corrected PET and SPECT images was seen. Findings suggest the diagnostic accuracy of cerebral perfusion studies would not be affected by the presence of EEG leads, whether standard or MR/CT compatible.