

AbstractID: 7254 Title: Scatter Correction in Camera Specific Attenuation Measurements for Image Quantification in I-131 Radionuclide therapy

Objective: This project was aimed to generate quantitative data to be used to estimate radiation dose for radionuclide therapy with I-131 labeled compound, for example, TM-601 (TransMolecular, Inc.) for patients with recurrent or refractory somatic and/or cerebral metastatic solid tumors. **Method:** A 200 uCi I-131 in 50 ml vial, a 0.1 uCi I-131 standard in 10 ml vial, and ten 1" thick Lucite blocks were used for sensitivity and attenuation measurements on Siemens dual head camera with HEGP collimators. Three windows were set; photopeak at 365 keV (14%), 326 keV (8%) and 403 keV (6%) for lower and upper Compton scatter. Whole body sensitivity scan was performed at 7.5 cm/min over 180 cm. Two series static images of 5 sets each for I-131 attenuation were acquired using a stack of 10, 8, 4, 3 and 2 Lucite blocks in 5, 4, 3, 2 and 2 minutes, respectively. TEW (Triple Energy Window) and DEW (Dual Energy Window) were employed to compensate for Compton scattering. Measured attenuation coefficient was obtained from scatter corrected images. Initial dose estimate was also conducted using the DEW method. **Results:** The I-131 attenuation scan yielded count rate as: 39 cps up to 220 cps when Lucite blocks reduced from 10 to 2 for un-corrected photopeak image; 10 cps up to 110 cps; and 21 cps up to 153 cps for the TEW and for the DEW scatter corrected images, respectively. The I-131 photopeak camera sensitivity was 244 cps/Bq/ml. Attenuation coefficients were 0.0849, 0.1173 and 0.0987, respectively. **Conclusion:** The DEW correction underestimated and the TEW method over estimated scatters. More attenuation effect was observed on scatter corrected images due to higher scattering when increasing the thickness of the Lucite blocks.