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Assessing the Reliability of Quantitative Imaging of Sm-153 HANNAH PONEK, Point Loma Nazarene University and Johns Hopkins University, MICHELLE CHEN, Point Loma Nazarene University, ERIC FREY, Johns Hopkins University — Samarium-153 is used for palliation of and recently has been investigated for therapy for bone metastases. Patient specific dosing of Sm-153 is based on quantitative single-photon emission computed tomography (SPECT) and knowing the accuracy and precision of image-based estimates of the in vivo activity distribution. Physical phantom studies are useful for estimating these in simple objects, but do not model realistic activity distributions. We are using realistic Monte Carlo simulations combined with a realistic digital phantom modeling human anatomy to assess the accuracy and precision of Sm-153 SPECT. Preliminary data indicates that we can simulate projection images and reconstruct them with compensation for various physical image degrading factors, such as attenuation and scatter in the body as well as non-idealities in the imaging system, to provide realistic SPECT images.

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