

AbstractID: 7608 Title: Dosimetric comparison of planar and 3-dimensional methods of anatomic localization for breast lymphoscintigraphy

Purpose: To estimate the absorbed dose for a range of settings of CT topograms and scans to determine the best technique for node localization in breast lymphoscintigraphy while minimizing the dose to the patient.

Method and Materials: This study was performed with an anthropomorphic thorax phantom on a Symbia-T6® SPECT/CT to produce mechanically registered datasets [Siemens Medical Solutions USA, Hoffman Estates IL]. The data included a SPECT, anterior and lateral topograms, a CT, and static anterior and lateral emission scintigrams. CT topograms and scans were acquired at 80, 110, and 130 kVp with varied mAs settings to compare the quality of the images and dose estimates for lower dose settings. Scintigram and SPECT scans were fused to each topogram and CT, respectively, to allow for qualitative comparison of localization. Exposure measurements for topograms were acquired using an ion chamber at isocenter, and entrance skin doses were estimated for the CT topograms. A CTDI body phantom was used to acquire data for estimation of effective dose for the CT scans.

Results: The skin dose for a CT topogram ranges from 0.089 mGy to 0.235 mGy, and the effective dose for the CT scan ranges from 0.308 mSv (lowest dose settings) to 5.265 mSv (clinical scan setting). Qualitative comparison showed the 80 kVp, 20 mA topogram and 110 kVp, 10 mAs CT to be sufficient for localization. The skin dose is 0.089 uSv and the effective dose is 0.392 uSv for these techniques, respectively.

Conclusion: The absorbed dose to the patient can be substantially reduced for CT topograms and CTs that are to be used for localization. These do not have to be of diagnostic quality in order to provide enough anatomical information to localize the sentinel nodes in breast lymphoscintigraphy.

Conflict of Interest: Research sponsored by Siemens Medical Solutions USA.