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**Title**

*A Author\*1, B Second2,*

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**Purpose:**

**Methods:**

**Results:**

**Conclusions:**

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**Example:**

**Calibration of a SPECT/CT camera for quantitative SPECT with 99mTc**

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**Purpose:** While quantitation is the norm in PET, it is not widely available yet in SPECT. This work’s aim was to calibrate a commercially available SPECT/CT system to perform quantitative SPECT. Counting sensitivity, dead-time (DT) constant and partial volume effect (PVE) of the system were assessed.

**Methods:** A dual-head Siemens SymbiaT6 SPECT/CT camera equipped with low energy high-resolution collimators was studied. 99mTc was the radioisotope of interest because of its wide usage in nuclear medicine. First, point source acquisitions were performed (activity: 30-990MBq). Further acquisitions were then performed with a uniform Jaszczak phantom filled with water at high activity (25–5000MBq). PVE was studied using 6 hot spheres

(diameters: 9.9-31.2 mm) filled with 99mTc (2.8MBq/cc) in the Jaszczak phantom, which was: (1) empty, (2) waterfilled and (3) water-filled with low activity (0.1MBq/cc). The data was reconstructed with the Siemens’s Flash3D iterative algorithm with 4 subsets and 8 iterations, attenuation-correction (AC) and scatter-correction (SC). DT modelling was based on the total spectrum counting rate. Sensitivity was assessed using AC-SC reconstructed

SPECT data.

**Results:** Sensitivity and DT for the sources were 99.51±1.46cps/MBq and 0.60±0.04s. For the phantom, sensitivity and DT were 109.9±2.3cps/MBq and 0.62±0.13s. The recovery-coefficient varied from 5% for the 9.9mm, to 80% for the 31.2mm spheres.

**Conclusions:** With our calibration methods, both sensitivity and DT constant of the SPECT camera had little dependence on the object geometry and attenuation. For small objects of known size, recovery-coefficient can be applied to correct PVE. Clinical quantitative SPECT appears to be possible and has many potential applications.