

● **English Example:**

Absolute Tc99m Activity Quantitation in Cardiac Phantom Using A Commercialized SPECT/CT Scanner Capable of Rapid Multiple-phase Dynamic Acquisition

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Introduction: Dynamic SPECT (DSPECT) using rapid gantry rotation within 180° arc can provide complete sinogram datasets to perform dynamic 3D recon for measuring time activity curves in myocardium (M) and blood pool (BP). We employed a commercialized dual-head SPECT/CT system (Symbia T2) to absolutely quantify Tc99m activity concentration (AC) in cardiac phantom (CP).

Methods: A uniform phantom (UP, 2 liter) initially injected in 46.8 mCi Tc99m was scanned with DSPECT to verify dead-time count lost (DTCL) and to generate a calibration factor (CF) for converting pixel value (PV) to Bq/ml. A CP filled in 22.07 uCi/ml Tc99m in M with cold defects, 4.08 uCi/ml in torso (T) and left ventricle cavity (LVC), was scanned with rapid DSPECT as 15, 30, 60, 90 sec phases and a 900 sec phase from integration of 90 sec phases. All images were reconstructed with corrections for attenuation, scatter, collimator blur, decay and filtered with 10 mm FWHM Gaussian.

Results: In UP, no DTCL was observed up to 150 kCps. CF generated from slope of PV to AC ($PV=335172 \times AC$, $R=0.9999$) was 335172 (Bq/ml). Compared to true AC, correction coefficient for partial volume in M was 1.828 and 0.906 for spillover in LVC.

Conclusions: Dynamic SPECT/CT demonstrates the feasibility in absolute quantitation of Tc99m activity in cardiac phantom. Corrections for partial volume effect in myocardium and spillover effect in left ventricle cavity can also be derived from the quantitation process.