

AbstractID: 13449 Title: Bedside SPECT Imaging with Pinhole Collimation

Purpose: The objective of this study is to evaluate the imaging performance of a mobile SPECT system with a pinhole collimator and compare the results with parallel hole collimators. The goal is to obtain both planar and tomographic performance measures with Tc-99m and F-18. This abstract presents the results using Tc-99m. **Method and Materials:** The system utilizes a small field of view camera with pixilated NaI crystal and position-sensitive photomultiplier tubes. The pinhole collimator is a tungsten knife edge with a hole diameter of 3mm, a focal length of 12.5cm, and an acceptance angle of 90 degrees. The parallel hole collimators have been previously described along with their imaging performance evaluation [1]. The following performance measures with the pinhole collimator were obtained and are presented here: count rate performance, energy resolution, flood field uniformity, system spatial resolution, system sensitivity. **Results:** The maximum count rate was calculated to be 1.58×10^5 cps corresponding to an activity of 161 μCi at 30cm. An energy spectrum from the flood acquisition demonstrated an energy resolution of 20% FWHM. Magnification corrected, system planar spatial resolution was 1.03 cm with a system sensitivity of 1.39 cps/ μCi at a source to collimator distance of 10 cm. **Conclusion:** The imaging performance of a mobile SPECT system with a pinhole collimator has been presented. In comparison to parallel hole collimation, the pinhole collimator provides superior spatial resolution and sensitivity at distances less than 5cm. However, at further distances, pinhole sensitivity declines while parallel hole sensitivity remains relatively constant.

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