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Effect of different thickness of material filter on Tc-99m spectra and performance parameters of gamma camera (Conference Paper)

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Abstract

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This study aimed to investigate the effects of material filter technique on Tc-99m spectra and performance parameters of Phillip ADAC forte dual head gamma camera. Thickness of material filter was selected on the basis of percentage attenuation of various gamma ray energies by different thicknesses of zinc material. A cylindrical source tank of NEMA single photon emission computed tomography (SPECT) Triple Line Source Phantom filled with water and Tc-99m radionuclide injected was used for spectra, uniformity and sensitivity measurements. Vinyl plastic tube was used as a line source for spatial resolution. Images for uniformity were reconstructed by filtered back projection method. Butterworth filter of order 5 and cut off frequency 0.35 cycles/cm was selected. Chang's attenuation correction method was applied by selecting 0.13/cm linear attenuation coefficient. Count rate was decreased with material filter from the compton region of Tc-99m energy spectrum, also from the photopeak region. Spatial resolution was improved. However, uniformity of tomographic image was equivocal, and system volume sensitivity was reduced by material filter. Material filter improved system's spatial resolution. Therefore, the technique may be used for phantom studies to improve the image quality. © Published under licence by IOP Publishing Ltd.

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