

عنوان مقاله:

Evaluation of iterative reconstruction method and attenuation correction on brain dopamine transporter SPECT using anthropomorphic striatal phantom

محل انتشار:

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خلاصه مقاله:

Objective(s): The aim of this study was to determine the optimal reconstruction parameters for iterative reconstruction in different devices and collimators for dopamine transporter (DaT) single-photon emission computed tomography (SPECT). The results were compared between filtered back projection (FBP) and different attenuation correction (AC) methods.Methods: An anthropomorphic striatal phantom was filled with 123I solutions at different striatum-tobackground radioactivity ratios. Data were acquired using two SPECT/CT devices, equipped with a low-to-mediumenergy general-purpose collimator (cameras A-1 and B-1) and a low-energy high-resolution (LEHR) collimator (cameras A-2 and B-2). The SPECT images were once reconstructed by FBP using Chang's AC and once by ordered subset expectation maximization (OSEM) using both CTAC and Chang's AC; moreover, scatter correction was performed. OSEM on cameras A-1 and A-2 included resolution recovery (RR). The images were analyzed, using the specific binding ratio (SBR). Regions of interest for the background were placed on both frontal and occipital regions.Results: The optimal number of iterations and subsets was 10i10s on camera A-1, 10i5s on camera A-2, and 7i6s on cameras B-1 and B-2. The optimal full width at half maximum of the Gaussian filter was 2.5 times the pixel size. In the comparison between FBP and OSEM, the quality was superior on OSEM-reconstructed images, although edge artifacts were observed in cameras A-1 and A-2. The SBR recovery of OSEM was higher than that of FBP on cameras A-1 and A-2, while no significant difference was detected on cameras B-1 and B-2. Good linearity of SBR was observed in all cameras. In the comparison between Chang's AC and CTAC, a significant correlation was observed on all cameras. The difference in the background region influenced SBR differently in Chang's AC and CTAC on cameras A-1 and B-1.Conclusion: Iterative reconstruction improved image guality on all cameras, although edge artifacts were observed in images captured by cameras with RR. The SBR of OSEM with RR was higher than that of FBP, while the SBR of OSEM without RR was equal to that of FBP. Also, the SBR of Chang's AC varied with .different background regions in cameras A-1 and B-1

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