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Original Article

Evaluation of Attenuation Correction Process in Cardiac SPECT Images

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Abstract:

Introduction: Attenuation correction is a useful process for improving myocardial perfusion SPECT and is dependent on activity and distribution of attenuation coefficients in the body (attenuation map). Attenuation artifacts are a common problem in myocardial perfusion SPECT. The aim of this study was to compare the effect of attenuation correction using different attenuation maps and different activities in a specially designed heart phantom.

Methods: The SPECT imaging for different activities and different body contours were performed by a phantom using tissue-equivalent boluses for making different thicknesses. The activity was ranged from 0.3-2mCi and the images were acquired in 180 degree, 32 steps. The images were reconstructed by OSEM method in a PC computer using Matlab software. Attenuation map were derived from CT images of the phantom. Two quality and quantity indices, derived from universal image quality index have been used to investigate the effect of attenuation correction in each SPECT image.

Results: The result of our measurements showed that the quantity index of corrected image was in the range of 3.5 to 5.2 for minimum and maximum tissue thickness and was independent of activity. Comparing attenuation corrected and uncorrected images, the quality index of corrected image improved by increasing body thickness and decreasing activity of the voxels.

Conclusion: Attenuation correction was more effective for images with low activity or phantoms with more thickness. In our study, the location of the pixel relative to the associated attenuator tissues was another important factor in attenuation correction. The more accurate the registration process (attenuation map and SPECT) the better the result of attenuation correction.

Keywords:

[Attenuation correction](#) . [Myocardial perfusion](#) . [SPECT](#)

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