

## Brain perfusion SPECT study with $^{99m}\text{Tc}$ -bicisate: Clinical pitfalls and improved diagnostic accuracy with a combination of linearization and scatter-attenuation correction

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To evaluate the usefulness of a combination of linearization and scatter-attenuation correction on  $^{99m}\text{Tc}$ -bicisate (ECD)-single photon emission tomographic (SPECT) images, both cerebral blood flow (CBF)-positron emission tomographic (PET) images and ECD-SPECT images from fifteen patients with chronic cerebral infarction were acquired. We measured radioactivity counts in regions of interest (ROIs) on all sets of both images and obtained a 2D scattered graph between ECD-SPECT and CBF-PET data. To evaluate diagnostic accuracy, the sensitivity, specificity and accuracy of ECD-SPECT images were calculated by means of discriminant analysis. The same analysis was also performed on the ECD-SPECT images corrected by a combination of linearization and scatter-attenuation correction. An overall nonlinear relationship was observed between ECD-SPECT and CBF-PET. The sensitivity, specificity, and accuracy of ECD-SPECT images were 69.6%, 91.4% and 73.0%, and those of ECD images corrected by the combination of linearization and scatter-attenuation correction were 79.5%, 95.7% and 82.0% respectively. The clinically diagnostic accuracy of ECD-SPECT images corrected by the combined method apparently increased. So that the linearization with the scatter-attenuation method is useful for improving the diagnostic accuracy of ECD-SPECT images.

**Key words:**  $^{99m}\text{Tc}$ -bicisate (ECD)-SPECT, CBF-PET, linearization, scatter-attenuation correction.