

Effects of scatter correction on regional distribution of cerebral blood flow using I-123-IMP and SPECT

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The transmission dependent convolution subtraction method which is one of the methods for scatter correction of SPECT was applied to the assessment of CBF using SPECT and I-123-IMP. The effects of scatter correction on regional distribution of CBF were evaluated on a pixel by pixel basis by means of an anatomic standardization technique. SPECT scan was performed on six healthy men. Image reconstruction was carried out with and without the scatter correction. All reconstructed images were globally normalized for the radioactivity of each pixel, and transformed into a standard brain anatomy. After anatomic standardization, the average SPECT images were calculated for scatter corrected and uncorrected groups, and these groups were compared on pixel by pixel basis. In the scatter uncorrected group, a significant overestimation of CBF was observed in the deep cerebral white matter, pons, thalamus, putamen, hippocampal region and cingulate gyrus as compared with scatter corrected group. A significant underestimation was observed in all neocortical regions, especially in the occipital and parietal lobes, and the cerebellar cortex. The regional distribution of CBF obtained by scatter corrected SPECT was similar to that obtained by O-15 water PET. The scatter correction is needed for the assessment of CBF using SPECT.

Key words: scatter correction, SPECT, I-123-IMP, anatomic standardization