Validation of noninvasive quantification of rCBF compared with dynamic/integral method by using positron emission tomography and oxygen-15 labeled water

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This study proposes a new solution for the quantification of rCBF pixel-by-pixel using PET and ^{15}O-H_2O. The method represents an application of weighted integration that uses PET image only, requiring no input function of arterial blood. It generates the rCBF image quickly and automatically. Simulation studies revealed that the calculation of rCBF was fairly stable as long as a relatively shorter scan frame time and longer scan time were selected. Calculated images of actual PET study by this method correlated significantly with those identified by the dynamic/integral method. Because this procedure could detect whole brain CBF change between different studies as accurately as by the dynamic/integral method, this procedure may be the most suitable for brain activation studies.

Key words: ^{15}O-labeled water, regional cerebral blood flow, positron emission tomography, noninvasive quantification