

## A new subtraction method for obtaining myocardial perfusion images with oxygen-15 water and positron emission tomography

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The myocardial positron emission tomograms which are obtained during the perfusion phase following bolus injection of O-15 water ( $H_2^{15}O$ ) intravenously require subtraction of the blood pool activity overlaid upon the myocardium. Subtraction has been carried out using the blood pool images obtained in the same position following single inhalation of O-15 labeled carbon monoxide gas ( $C^{15}O$ ). However, because a difference in activity exists between the left ventricular (LV) cavity and the right ventricular (RV) cavity, simple subtraction of the LV cavity activity using  $C^{15}O$  blood pool images induced significant over-subtraction in the right-side heart including the interventricular septum and RV wall. We developed a new method, "two-component subtraction," in which the  $C^{15}O$  blood pool images were decomposed into the right-side and left-side components using the early phase images of the  $H_2^{15}O$  dynamics under the assumption that the whole activity of that phase was distributed in the right-side heart homogeneously. Thus we subtracted the blood pool spillover from RV and LV separately. This method provided myocardial perfusion images of high quality which were well correlated with N-13 ammonia images.

**Key words:** Positron emission tomography, Myocardial perfusion, O-15 labeled water, Subtraction