

Simple method to quantify myocardial glucose metabolism from MB ratio in myocardial FDG PET

Jun-ichi NISHIKAWA,* Tohru OHTAKE,* Ikuo YOKOYAMA,** Toshiaki WATANABE,*
Toshimitsu MOMOSE* and Yasuhito SASAKI*

**Department of Radiology and **Second Department of Internal Medicine,
Faculty of Medicine, University of Tokyo, Tokyo, Japan*

To provide a simple means of quantifying myocardial glucose metabolism, we tried to estimate the K complex (KC) from the myocardium to background ratio (MB ratio), which was obtained with a single static FDG scan and single venous sampling.

In 48 fasting subjects and 74 subjects under oral glucose loading or insulin clamp, the reference KC was obtained from Patlak analysis by using an input function. We compared the reference KC with the MB ratio at 35 min 45 sec, 45 min 45 sec, and 55 min 45 sec, and with the FDG uptake index (FUI) reported by Tamaki. The correlation between KC and each index was very close during fasting ($r = 0.97, 0.98, 0.98$ and 0.97 , respectively $n = 48$), and clinically acceptable during oral glucose loading and insulin clamp ($r = 0.92, 0.91, 0.90$ and 0.93 , respectively $n = 74$). The average differences between the reference KC and KC estimated from the simple method were 13%, 10%, 8%, and 13%, respectively, during fasting, and 15%, 14%, 14%, and 16%, respectively, during oral glucose loading and insulin clamp.

Both the MB ratio and FDG uptake index can be used for the simple estimation of myocardial glucose metabolism not only during fasting but also during oral glucose loading and insulin clamp, although the MB ratios at 45 min and at 55 min were slightly better than MB that at 35 min and the FDG uptake index during fasting.

Key words: fluorine-18 FDG, positron emission tomography (PET), heart, myocardial glucose metabolism, K complex, quantitative analysis (MB ratio)