

Myocardial FDG-PET examination during fasting and glucose loading states by means of a one-day protocol

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We propose a new method to measure the myocardial FDG uptake during fasting and glucose loading in one day, a myocardial FDG-PET one-day protocol, with both 2- and 3-dimensional data acquisition (2D and 3D) without background activity subtraction. To confirm it, we evaluated the effect of scatter correction in the 2D and 3D modes of a PET scanner both in phantom and patient studies. In the phantom study, we used a cardiac phantom with six divided chambers and two cylindrical phantoms placed as the activity outside the field of view. Each chamber was filled with a different concentration of F-18 solution. Regions of interest (ROI) were placed on a polar map generated from reconstructed images and were compared to the concentration of the solution in each chamber in both 2D and 3D. In the patient study, 10 non-diabetic patients with coronary artery disease were studied. Each patient received a myocardial FDG study during fasting (F) and glucose loading (L). L images with background subtraction (Lsub(+)) and without background subtraction (Lsub(-)) were compared by polar map analysis. The ROI counts for the true activity in 2D and 3D demonstrated a linear relationship, and quite similar slopes were observed (0.72 in 2D, 0.69 in 3D). The background fraction in Lsub(-) was $3.59 \pm 1.83\%$. There were significant differences between Lsub(-) or Lsub(+) and F in both normal and ischemic myocardium. Scatter correction was successfully performed in both 2D and 3D modes. Background activity is thought to be negligible and this proposed method is simple to use in measuring the myocardial FDG uptake in one day.

Key words: FDG-PET, fasting, glucose loading, 3-dimensional data acquisition