Metabolic reserve in normal myocardium assessed by positron emission tomography with C-11 palmitate

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Positron emission tomography (PET) with C-11 palmitate has been used in estimating the myocardial utilization of free fatty acid. To assess the metabolic reserve in normal subjects, a PET study was performed at control and during dobutamine infusion at 2 hour intervals in 5 normal subjects. Following monoexponential curve fitting of the time activity curve of the myocardium, the clearance half time (min) and residual fraction (%) were calculated as indices of β-oxidation of free fatty acid. A significant increase in the heart rate and systolic blood pressure were observed during dobutamine infusion (65±5 vs 100±29 bpm, p<0.05 and 119±12 vs 144±16 mmHg, p<0.01, respectively). The clearance half time and the residual fraction were significantly decreased (23.4±2.6 vs 15.8±2.3 min and 67.0±2.5 vs 58.6±4.0%, p<0.05, each). When the left ventricular myocardium was divided into 4 segments, these indices were similar at control and uniformly decreased without regional differences during dobutamine infusion. These data suggest that β-oxidation of free fatty acid may be uniformly increased in the left ventricular myocardium in relation to the increase in cardiac work in normal subjects. PET with C-11 palmitate at control and during dobutamine infusion is considered to be promising in assessing metabolic reserve in the myocardium.

Key words: emission computed tomography, C-11 palmitate, fatty acid metabolism, dobutamine