

Evaluation of the relationship between physiological FDG uptake in the heart and age, blood glucose level, fasting period, and hospitalization

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Objective: Positron emission tomography (PET) with fluorodeoxyglucose (FDG) is widely used for evaluation of cancer and ischemic heart disease. Recently, increased myocardial FDG uptake has been reported to be related to some types of heart disease, such as sarcoidosis. However, the physiological increased FDG uptake in the heart often mimics the abnormal high uptake in these cases. In this study, we investigated the relationships between myocardial uptake and age, blood glucose level, fasting period, and hospitalization status (inpatient vs. outpatient). **Methods:** A total of 159 non-diabetic patients were enrolled in the present study. Patients were imaged on a PET/CT scanner, and a three-dimensional region of interest (ROI) was drawn on the fused PET/CT image to measure the maximum standardized uptake value (SUV_{max}) of the whole left ventricle. **Results:** No significant relationships were observed between myocardial uptake and age or fasting period. Blood glucose level showed a significant relationship ($p = 0.025$) with myocardial uptake, but the R-square was extremely small ($r^2 = 0.03$). With an SUV_{max} threshold of 3.0, there was no significant difference between inpatients and outpatients. However, outpatients showed a significantly higher frequency of myocardial uptake over SUV_{max} of 5.0 (χ^2 test: $p = 0.046$). **Conclusion:** It is difficult to predict the degree of physiological uptake in the heart from data regarding age, fasting period, or blood glucose level. Outpatients tend to show higher myocardial uptake than inpatients, which may make it difficult to detect abnormally increased uptake in the heart. A long fasting period, such as overnight fasting, is an inadequate means to reduce the physiological uptake of FDG in the heart.

Key words: FDG, heart, myocardium, fasting