

Characteristics of myocardial ^{18}F -fluorodeoxyglucose positron emission computed tomography in dilated cardiomyopathy and ischemic cardiomyopathy

Hitoshi YAMAGUCHI,* Shinji HASEGAWA,* Jun YOSHIOKA,* Toshiisa UEHARA,* Katsuji HASHIMOTO,***
Hideo KUSUOKA,**** Tsunehiko KUZUYA,** Masatsugu HORI** and Tsunehiko NISHIMURA*

*Division of Tracer Kinetics, Biomedical Research Center, Osaka University Graduate School of Medicine

**Department of Internal Medicine and Therapeutics, Osaka University Graduate School of Medicine

***Cardiovascular Division, Osaka National Hospital

****Institute for Clinical Research, Osaka National Hospital

Myocardial ^{18}F -fluoro-2-deoxyglucose (FDG) positron emission tomography (PET) has been used to assess myocardial ischemia and viability, but few studies have conducted on FDG-PET for dilated cardiomyopathy (DCM). We investigated myocardial FDG uptake in patients with DCM in comparison with ischemic cardiomyopathy (ICM). Twenty-four patients with heart failure were included in this study. Fourteen of them were diagnosed as DCM and the other 10 were ICM. All of them underwent myocardial FDG-PET at fasting and after glucose loading the same day. FDG uptake was quantified by the ratio of the counts at the heart to those at the liver (H/L ratio). Left ventricular (LV) function was measured by echocardiography. We classified FDG distribution patterns in the myocardium in the fasting state into 3 types (faint uptake, regional uptake and diffuse uptake). In DCM patients, 5 had faint uptake, 7 had regional uptake, and the other 2 had diffuse uptake. On the other hand, all ICM patient had regional uptake ($p < 0.05$). In DCM, there were no significant relationships between the patterns and LV functions. On the other hand, there were close correlation between the H/L ratio after glucose loading and the left ventricular ejection fraction ($r = 0.680$, $p < 0.01$). The changes in PET images caused by glucose loading were classified into 2 types (non-reversing and reversing patterns). DCM significantly showed a non-reversing pattern (86%, 12 of 14 patients) whereas ICM showed mainly a reversing pattern (70%, 7 of 10 patients; $p < 0.05$). In conclusion, myocardial FDG uptake after glucose loading may indicate a myocardial viable mass although FDG uptake at fasting was not evidently related to LV function. The change in the pattern of the FDG image from fasting to glucose loading may be useful in differentiating DCM from ICM.

Key words: positron emission tomography, ^{18}F -fluorodeoxyglucose, heart failure, dilated cardiomyopathy, ischemic cardiomyopathy

INTRODUCTION

^{18}F -fluorodeoxyglucose (FDG) was developed as an analog of glucose to assess myocardial glucose utilization.

Received July 26, 1999, revision accepted November 4, 1999.

For reprint contact: Tsunehiko Nishimura, M.D., Ph.D., Division of Tracer Kinetics (D9), Biomedical Research Center, Osaka University Graduate School of Medicine, 2-2 Yamadaoka, Suita, Osaka 565-0871, JAPAN.

E-mail: nisimura@tracer.med.osaka-u.ac.jp

FDG positron emission tomography (PET) has been mainly applied to ischemic heart disease, and is helpful in evaluating the severity of ischemic injury¹⁻⁴ or residual viability of myocardial infarction,⁵ but there are few reports on heart failure patients such as those with dilated cardiomyopathy (DCM) because of the complexity of the pathology in DCM.

In this study, myocardial FDG accumulation was investigated in those patients who had heart failure due to DCM and ischemic cardiomyopathy (ICM). The relationship between myocardial FDG accumulation and severity