

## Recent Advances in Nuclear Cardiology

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A variety of new radiopharmaceutical agents have been introduced to probe myocardial function in vivo. Tc-99m perfusion imaging agents provide excellent myocardial perfusion images which may enhance diagnostic accuracy in the study of coronary artery disease. In addition, greater photon flux from the tracer permits simultaneous assessment of regional perfusion and function with use of ECG-gated SPECT. We applied gated perfusion SPECT both at rest and under low-dose dobutamine infusion to identify chronic ischemic myocardium. The findings in this study correlated well with those under low-dose dobutamine echocardiography and FDG-PET on the basis of detection of reversible ischemic myocardium. PET enables metabolic assessment in vivo. Preserved FDG uptake indicates ischemic but viable myocardium which is likely to improve regional dysfunction after revascularization. In addition, FDG-PET seems to be valuable for selecting a high-risk subgroup.

PET has a unique capability of quantitative assessment of tracer distribution in vivo. With use of suitable mathematical models and kinetic

study, it shows quantitative values of regional myocardial function. We have used PET and O-15 labeled water to estimate myocardial flow reserve under adenosine triphosphate and endothelial function under cold pressor test. Abnormal MFR with endothelial dysfunction was observed not only in ischemic artery disease but also patients with hyperlipidemia, chronic smokers, or post Kawasaki disease. Thus, such quantitative measurement may identify high-risk subgroup for future coronary artery disease.

New techniques in nuclear cardiology have provided early and accurate detection of coronary artery disease on the basis of regional perfusion and function, but more importantly, they will permit precise tissue characterization, including metabolic alteration and neuronal function. This important information will play a key role for estimating severity and prognosis, and for best strategy for managing these patients. Anyway, we are now on the start line for the upcoming new generation of nuclear cardiology. More clinical experiences of the new techniques are required to confirm these exciting results.