

Recent advances in nuclear cardiology in the study of coronary artery disease

Nagara TAMAKI,* Eiji TADAMURA,** Takashi KUDOH,**
Naoya HATTORI,** Masayuki INUBUSHI** and Junji KONISHI**

*Department of Nuclear Medicine, Hokkaido University School of Medicine

**Department of Nuclear Medicine, Kyoto University Faculty of Medicine

A variety of new radiopharmaceutical agents have been introduced to probe myocardial function *in vivo*. This review will introduce these new techniques which have recently been available in Japan. 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 first-pass angiography or ECG-gated acquisition. Positron emission tomography 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. Recently I-123 BMIPP, a branched fatty acid analog, has been clinically available in Japan. Less uptake of BMIPP than thallium is often observed in the ischemic myocardium. Such perfusion metabolic mismatch which seems to be similarly observed in FDG-PET is identified in the stunned or hibernating myocardium with regional dysfunction. Both of them are likely to recover afterwards. Severe ischemia is identified as reduced BMIPP uptake at rest, suggesting its role as an ischemic memory imaging. I-123 MIBG uptake in the myocardium reflects adrenergic neuronal function *in vivo*. In the study of coronary artery disease, neuronal denervation is often observed around the infarcted myocardium and post ischemic region as well. More importantly, reduced MIBG uptake in these patients can identify high risk for ventricular arrhythmias and assess severity of congestive heart failure. These new techniques will provide insights into new pathological states in the ischemic heart disease and enable to select optimal treatment in these patients.

Key words: emission computed tomography, ischemic heart disease, myocardial perfusion, BMIPP, MIBG