Summary

Measurement of Myocardial Blood Flow Increase Rate at Exercise with ^{99m}Tc-Tetrofosmin Radionuclide Angiography

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We developed new method to calculate myocardial blood flow increase rate at exercise (MBF-IR) with ^{99m}Tc-tetrofosmin (TF) radionuclide (RN) angiography and myocardial perfusion SPECT and assessed its feasibility using clinical data. *Method*: Fifteen patients who were suspected to have coronary artery disease underwent TF RN angiography and SPECT at exercise and at rest. Seven patients had coronary stenosis and eight patients had no significant coronary stenosis in coronary angiography. MBF-IRs were calculated by the following equation:

$$MBFIR = \frac{C_e \cdot \int_0^\infty c_r(t)dt}{C_r \cdot \int_0^\infty c_e(t)dt},$$

where C_r = regional myocardial count at rest, C_e = regional myocardial count at exercise $\int_0^\infty c_r(t)dt$ = the area under ventricular time activity curve at rest and $\int_0^\infty c_e(t)dt$ = the area under ventricular time activity curve at exercise. *Result*: Rate pressure product (RPP) was similar in patients with and without coronary stenosis (24509±6701.9 vs. 27196±4862.4, p = 0.39). MBF-IR was 1.88±0.73 in the area covered by stenosed coronary artery, 2.53±0.75 in unstenosed coronary artery in patients who have significant coronary stenosis and 2.97±0.77 in normal coronary patients. MBF-IRs in the area covered by stenosed coronary arteries were significantly smaller than that of normal coronary artery patient (p = 0.037). Interobserver and intraobserber reproducibility were good (r = 0.96, 0.95 respectively). There was strong positive correlation between MBF-IR and RPP in normal patients (r = 0.69, p = 0.0018), suggesting MBF increase depends on the cardiac workload. *Conclusion*: MBF-IR can be estimated by the combination of TF RN angiography and SPECT at exercise and at rest.

Key words: Coronary flow reserve, ^{99m}Tc-tetrofosmin, Myocardial blood flow, Coronary artery disease, Myocardial scintigraphy.