Combined assessment of coronary microvascular dysfunction and left ventricular diastolic dysfunction can stratify prognosis of patients with nonobstructive coronary artery disease

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Background: Previous studies reported that coronary microvascular dysfunction (CMD) and left ventricular diastolic dysfunction (LVDD) were associated with adverse cardiovascular events. To date, the relationship between coronary flow reserve (CFR), left ventricular diastolic function and future cardiovascular risk is unknown.

Methods and results: This study included 214 patients undergoing intracoronary physiological assessment with CFR for suspected myocardial ischemia without significant stenosis in the epicardial coronary artery at Yokosuka Kyosai Hospital from December 2019 to June 2021. Of 214 patients (female: N=55 [29%], age: 72±9 years), 94 (44%) had CMD (CFR<2.5) and 75 (35%) had LVDD (E/e’>14). Patients were classified into 4 groups based on the cut-off values of CFR and E/e’: group 1 (no CMD nor LVDD, n=88); group 2 (only LVDD, n=39); group 3 (only CMD, n=51) and group 4 (both CMD and LVDD, n=36).

The primary endpoint was major adverse cardiovascular events (MACE) including all-cause death, myocardial infarction, any revascularization, hospitalization for heart failure or arrhythmia. The secondary endpoint was all cause hospitalization including cerebrovascular events and infectious diseases.

During a median follow-up of 572 days, the cumulative MACE-free survival rate at 1 year were 97.5%, 97.2%, 91.3% and 72.8% in groups 1 to 4. Group 4 showed significantly higher risk of MACE and all cause hospitalization at 1 year compared with group 1 (hazard ratio [HR] 5.17; 95% confidence interval [CI] 1.91-13.98; p<0.001, and HR 5.49; 95% CI 2.35-12.85; p=0.001, respectively). Group 2 and 3 had significantly higher risk of all cause hospitalization than Group1 (HR 3.10; 95% CI 1.25-7.72; p=0.010 and HR 2.53; 95% CI 1.04-6.11; p=0.033, respectively).

Notably, Group 4 showed the highest incidence of hospitalization due to heart failure (6 [16.7%]) than other 3 groups (1 [1.1%] p<0.001, 0 [0%] p<0.001 and 0 [0%] p<0.001, Group 1 to 3 respectively).

Conclusion: Patients with both CMD and LVDD showed significantly higher risk for MACE, especially for heart failure requiring hospitalization. The combined classification based on CFR and diastolic function would identify the high-risk patients for MACE as well as all cause hospitalization.