The impact of predictability of coronary flow reserve for non-cardiovascular mortality, all-cause mortality, cardiovascular mortality in dialysis population

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Background: In the clinical setting, ischemic heart disease (IHD) is a major problem not only in general patients but also in regular hemodialysis (HD) patients. ¹³N-ammonia positron emission tomography (¹³NH₃PET) is an established and excellent diagnostic test for IHD. We have reported about the predictability of coronary flow reserve (CFR) in poor prognosis in HD population. Some prior studies show that low CFR predicts poor prognosis for not only cardiovascular event but also all-cause mortality. Although it is well-known that CFR is an important predictor, there are limited data about predictability of CFR for non-cardiovascular (non-CV) mortality. We investigated the prognostic predictability of all-cause mortality, cardiovascular (CV) mortality and non-CV mortality.

Methods: In total 1020, patients who underwent NH₃+PET suspected of ischemic heart disease from May 2013 to May 2022 were included. They are divided into two groups according to CFR cut off value (CFR<2.0). 465 patients were included into low CFR group and 555 patients were included into high CFR group. We collected all-cause mortality, cardiovascular (CV) mortality and non-CV mortality. CV mortality was defined death from myocardial infarction, sudden death, stroke, heart failure, arrhythmia and ischemic colitis. We have followed them in 1282 days (median, 1st-3rd quartile was 510-2116).

Results: We found any cause death were 285 cases (the high CFR group vs the low CFR group; 165 (35.5%) vs 118 (21.3%), p<0.001), CV death were 121 cases (52 (9.4%) vs 68 (14.6%), p=0.010) and non-CV death were 164 cases (66 (11.9%) vs 97 (20.9%, p<0.001)). Kaplan-Meier curve analysis and Cox regression model shows the low CFR groups shows poor prognosis for all-cause mortality (log rank; p<0.001, hazard ratio (HR); 1.9964, 95% confidential interval (CI); 1.576-2.529), CV mortality (log rank; p=0.0009, HR; 1.834, 95% CI; 1.278-2.633) and non-CV mortality (log rank; p=0.0001, HR; 2.213, 95%CI; 1.555-2.907). Furthermore, multivariate cox regression model shows the continuous value of CFR is an independent predictor for both all-cause mortality (HR0.180, 95%CI 0.074-0.435, p=0.0001) and non-CV mortality (HR0.553, 95% CI0.397-0.769, p=0.0004).

Conclusion: In dialysis population, CFR is an important predictor for all-cause mortality, CV mortality and non-CV mortality. In addition, CFR would predict non-CV death in HD population even though CFR is an index for IHD.