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Sirtuin 1 as a biomarker for cardiovascular and mineral bone disease in hemodialysis patients

Su Woong JUNG[1], Eun Ji PARK[2], Da Rae KIM[1], Jin Sug KIM[2], Tae Won LEE[2], Chun Gyoo IHM[2], Sang Ho LEE[3], Ju-Young MOON[3], Yang Gyun KIM [3], *Kyung Hwan JEONG [2]

[1]Department of Medicine , Graduate School, Kyung Hee University , Korea,South, [2]Division of Nephrology, Department of Internal Medicine , Kyung Hee University Medical Center, Korea,South, [3]Divison of Nephrology, Department of Internal Medicine , Kyung Hee University Hospital at Gangdong , Korea,South

Objectives : The cardiovascular and bone disease are the major complications that lead to poor quality of life and higher mortality in hemodialysis patients. It was known that both fibroblast growth factor 23 (FGF-23) and parathyroid hormone (PTH) are closely related to ischemic vascular disease and bone disease in chronic kidney disease. Recently, sirtuin 1 (SIRT1) emerged as cardiovascular and renal protective biomarkers having an anti-inflammatory, anti-fibrosis and anti-oxidative effects. However, its clinical implications in end-stage renal disease are still in uncertain area.

Methods : In this study, baseline biomarkers and clinical characteristics including SIRT1, FGF-23, soluble α-klotho, PTH, Kt/V and the degree of calcification in aortic arch have been evaluated from 2011 to 2012. Since then, the patients were observed for cardiovascular events and all-cause mortality during a mean follow-up of 50.4 months. We analyzed the relationship between each variables and its association with cardiovascular events and mortality.

Results : A total of 86 patients with end-stage renal disease (ESRD) on maintenance hemodialysis patients (mean age, 58.5 years; 60.5% men; median duration of previous dialysis, 45 months) were included in this study. The median value of SIRT1, FGF-23, and soluble α-klotho was 0.8 ng/ml, 1605.3 pg/ml, and 535.1 pg/ml, respectively. There were no significant differences in SIRT1 level regarding age, FGF-23, soluble α-klotho, Kt/V and previous duration of dialysis. A lower SIRT1 level was associated with decreased levels of PTH and calcium-phosphate product ($p<0.05$). The all-cause mortality was significantly higher in the group showing moderate to severe degree of aortic arch calcification compared with minimal to mild one (23.1% and 6.9%, $p<0.05$). The cardiovascular events were not statistically affected by SIRT1, soluble α-klotho, PTH, hs-CRP, and Kt/V.

Conclusions : Low SIRT1 may be one of risk factors for low PTH level in ESRD patients. However, there is no correlation between SIRT1 levels and cardiovascular events in this study. The biologic mechanism of SIRT1 for bone disease is an area of future investigation.

Keywords : sirtuin, parathyroid hormone, cardiovascular event