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ORIGINAL ARTICLE

The association of fasting triglyceride variability with renal dysfunction and proteinuria in medical checkup participants

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Abstract

Background The association between the variability of triglyceride (TG) and chronic kidney disease (CKD) progression remains unclear. We examined whether intraindividual variability in fasting TG was associated with the exacerbation of CKD.

Methods We conducted a retrospective and observational study. 18,339 participants, who went through medical checkups and had checked their estimated glomerular filtration rate (eGFR) and semi-quantitative proteinuria by urine dipstick every year since 2017 for 4 years were registered. Variability in fasting TG was determined using the standard deviation (SD), and maximum minus minimum difference (MMD) between 2017 and 2021. The primary end point for the analysis of eGFR decline was eGFR < 60 mL/min/1.73 m^2. The secondary end point for the analysis of proteinuria was the incidence of proteinuria ≥ (±) by urine dipstick.

Results The renal survival was lower in the higher-SD, and higher-MMD groups than in the lower-SD, and lower-MMD groups, respectively (log-rank test $p < 0.001$, and < 0.001, respectively). Lower SD and lower MMD were significantly associated with renal survival in the adjusted model (hazard ratio (HR), 1.12; 95% confidence intervals (CI), 1.04–1.21, and HR, 1.13; 95% CI 1.05–1.23, respectively). The non-incidence of proteinuria was lower in the higher-SD, and higher-MMD groups than in the lower-SD, and lower-MMD groups, respectively (log-rank test $p < 0.001$ and < 0.001, respectively).

Conclusion Fasting TG variability was associated with CKD progression in participants who went through medical checkups.

Keywords eGFR decline · Proteinuria · Renal dysfunction · Triglyceride variability · Fasting triglyceride

Introduction

The number of chronic kidney disease (CKD) patients, who need renal replacement therapy, such as hemodialysis and kidney transplant has been increasing worldwide [1, 2]. Especially, CKD is one of the serious risk factors to lead to cardiovascular diseases and death. CKD has various risk factors, and especially hypertension and diabetes mellitus (DM) are the most established factors. In addition, it has been reported that the variability of blood pressure and blood glucose levels is also associated with renal dysfunction [3–6]. However, others are emerging, and yet unknown. Thus, identification and treatment of modifiable risk factors are the best ways to prevent and delay CKD development [7].

Hypertriglyceridemia has been implicated in the development and progression of renal damage [8–10]. Indeed, the abnormal deposition of lipids within the intrarenal vascular bed has been shown to contribute to glomerular injury by mechanisms involving increased oxidative stress and the production of proinflammatory cytokines as well as the hyperactivity of growth factors [11, 12].

We reported that postprandial triglyceride (TG) variability was suggested to be a risk factor for estimated glomerular

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