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Circulating Osteoprotegerin as a Cardiac Biomarker for Left Ventricular Diastolic Dysfunction in Patients with Pre-Dialysis Chronic Kidney Disease: The KNOW-CKD Study

Sang Heon Suh[1], Kook-Hwan Oh[2], Soo Wan Kim[1]
[1]Department of Internal Medicine-Nephrology, Chonnam National University Hospital, Korea, Republic of
[2]Department of Internal Medicine-Nephrology, Seoul National University Hospital, Korea, Republic of

Objectives : Heart failure with preserved ejection fraction (HFpEF) is a major cause of mortality in patients with chronic kidney disease (CKD), and diagnosis is challenging. Moreover, no specific biomarker for HFpEF has been validated in patients with CKD. The present study aimed to investigate the association between serum osteoprotegerin (OPG) levels and the risk of left ventricular diastolic dysfunction (LVDD), a surrogate of HFpEF, in patients with pre-dialysis CKD.
Methods : A total of 2,039 patients with CKD at stage 1 to pre-dialysis 5 were categorized into quartiles (Q1 to Q4) by serum OPG levels. The study outcome was LVDD, which was operationally defined as the ratio of early transmitral blood flow velocity to early diastolic velocity of the mitral annulus (E/e') > 14. The association between serum OPG levels and the risk of LVDD was cross-sectionally analyzed.
Results : In the analysis of baseline characteristics, higher serum OPG levels were clearly related to the risk factors of HFpEF. A scatter plot analysis revealed a moderate correlation between serum OPG levels and E/e' ($R = 0.351$, $P < 0.001$). Logistic regression analysis demonstrated that the risk of LVDD in Q3 (adjusted odds ratio 2.576, 95% confidence interval 1.279 to 5.188) and Q4 (adjusted odds ratio 3.536, 95% confidence interval 1.657 to 7.544) was significantly higher than that in Q1. Penalized spline curve analysis showed a clear, linear association between serum OPG levels and the risk of LVDD.
Conclusions : Elevated serum OPG levels are associated with the risk of LVDD in patients with pre-dialysis CKD. The measurement of serum OPG levels may help the diagnosis of HFpEF in this population.

Figure 2.jpg

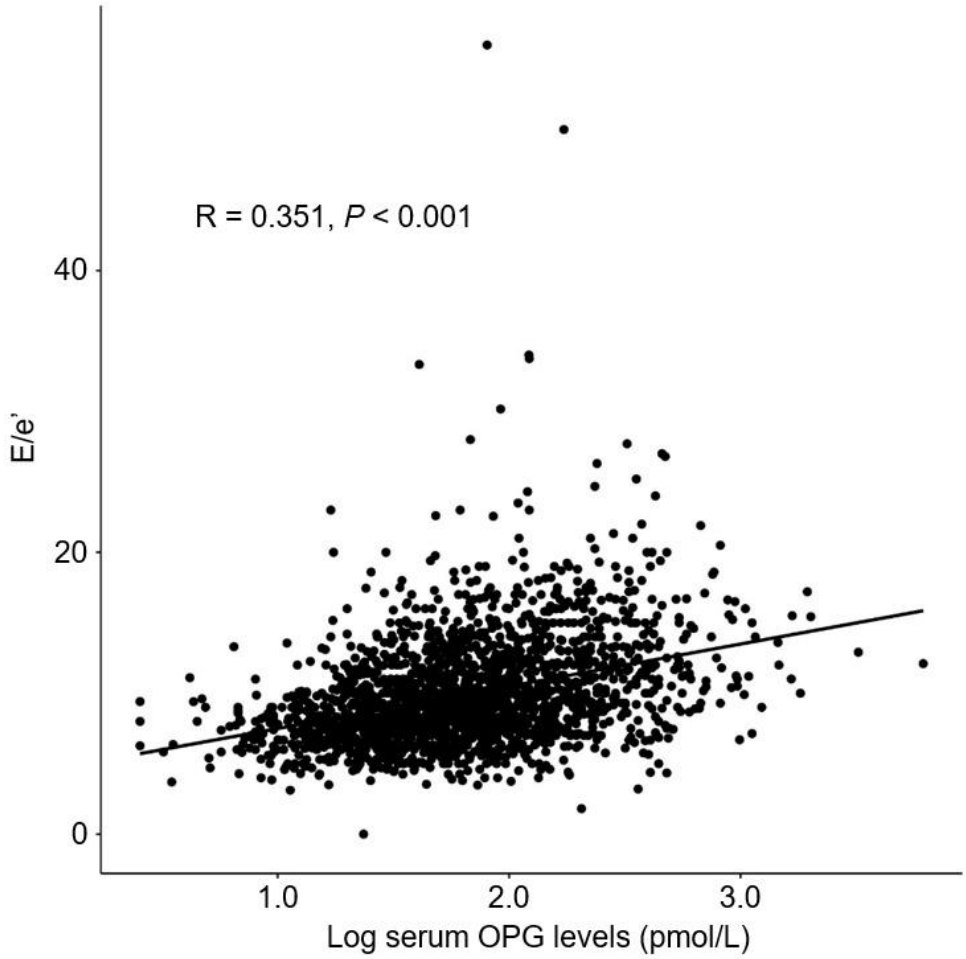
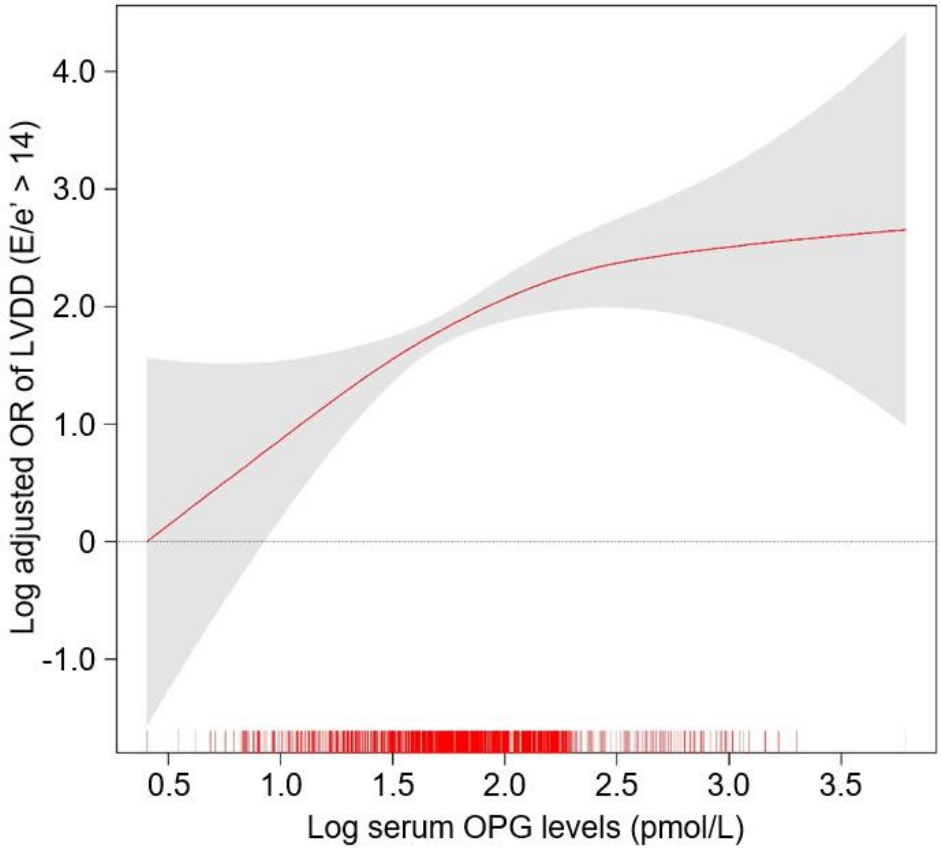


Figure 2.jpg


Log adjusted OR of LVDD (E/e' > 14)
4.0
3.0
2.0
1.0
0
-1.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
Log serum OPG levels (pmol/L)