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Association serum calcium-to-magnesium ratio with coronary artery disease and cerebral vascular complications in dialysis patients: From ORCHESTRA Data

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Objectives: Cardiovascular disease is the most common complications and leading cause of death in dialysis patients. Low serum magnesium (Mg) and high serum calcium (Ca) have been reported as associated factors with cardiovascular disease and mortality. Recently, serum Ca-to-Mg ratio (Ca-Mg ratio) has been discussed. This study investigated the association serum Ca-Mg ratio with coronary artery disease and cerebral vascular complications in dialysis patients.

Methods:

We conducted a cross-sectional analysis using baseline data from a multicenter prospective cohort for dialysis patients in Korea. A total of 860 patients were divided into tertile groups according to serum Ca-Mg ratio; the low group (below 3.28), the middle group (3.28-3.87) and the high group (above 3.87). the prevalences of acute coronary syndrome (ACS) and cerebral vascular disease were assessed.

Results: The high Ca-Mg ratio group had higher prevalence of peripheral vascular disease and more patients taking anticoagulants than other groups. Serum albumin, phosphorus and Mg in the high Ca-Mg ratio group were lower than other groups. Serum potassium was higher in the low Ca-Mg ratio group than other groups. The prevalence of ACS showed significantly higher in the high Ca-Mg ratio group than in other groups ($P = 0.017$). The prevalence of cerebral infarction showed significantly higher in the high Ca-Mg ratio group than the low Ca-Mg ratio group ($P = 0.016$), although the overall prevalence of cerebral vascular disease did not differ between groups. Aortic artery calcification score and T-score of bone mineral density did not differ between groups. In multivariable logistic regression, higher Ca-Mg ratio was independently associated with the prevalence of ACS (Odds ratio 1.262, 95% confidential interval 1.063-1.499, $P = 0.008$).

Conclusions: A high Ca-Mg ratio was associated with the development of ACS. If the optimal cut-off level of Ca-Mg ratio is determined, it can be used as a predictive marker for ACS.