THE EFFECT OF LANTHANUM CARBONATE ON CALCIPROTEIN PARTICLES IN HEMODIALYSIS PATIENTS

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Introduction and Aims: Fetuin-A is a serum protein that inhibits precipitation of calcium phosphate (CaPi) in the extra-osseous tissues. Fetuin-A can absorb numerous CaPi nuclei to prevent their growth into large precipitates. The resulting CaPi-laden fetuin-A molecules aggregate to become nanoparticles called calciprotein particle (CPP), which are dispersed as colloidal particles in the serum and eventually phagocytosed by reticuloendothelial cells. Previous studies have shown that the serum CPP levels are increased with CKD progression and associated with chronic inflammation, vascular stiffness, and vascular calcification. Because CPPs have the ability to induce innate immune response, CPPs may function as a “pathogen” causing poor prognosis in CKD. In this study, we tested whether the serum CPP levels would be reduced by treatment with calcium carbonate or lanthanum carbonate in hemodialysis (HD) patients.

Methods: Twenty-four (24) end stage renal disease patients undergoing HD (50% men, age: 68 ± 12 years, dialysis period: 6.2 ± 4.8 years, Kt/v: 1.74 ± 0.34) were treated with calcium carbonate during the 0th - 8th week, followed by lanthanum carbonate during the 9th - 16th week. Serum CPP levels were measured at beginning of the study (the 0th week) and the end of the calcium carbonate treatment (the 8th week) and the lanthanum carbonate treatment (the 16th week) to test for correlation with serum calcium (Ca), phosphorus (P), intact-PTH, FGF23, Klotho, fetuin-A, aortic calcification index (ACI), LDL-cholesterol, and hs-CRP at the same time points.

Results: The CPP levels were positively correlated with the P, Ca × P, and LDL-cholesterol levels at any time points. The switch from calcium carbonate to lanthanum carbonate did not change Ca and P, but significantly reduced CPP. The reduction of CPP was negatively correlated with the CPP level before the switch (at the 8th week). ACI and hs-CRP were not significantly correlated with CPP in these patients.

Conclusions: The serum CPP levels were decreased by switching the phosphate binder from calcium carbonate to lanthanum carbonate in HD patients. These results may explain why non-calcium-containing binders are associated with better clinical outcomes than calcium-containing binders.