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## Re: Association Between Serum Magnesium and Risk Factors of Cardiovascular Disease in Hemodialysis Patients

Dear Editor,

We read with great interest the recently published article in the esteemed *Iranian Journal of Kidney Diseases*, by Khatami and colleagues, entitled "Association Between Serum Magnesium and Risk Factors of Cardiovascular Disease in Hemodialysis Patients."<sup>1</sup> They aimed to explore the associations of serum magnesium level with various risk factors of cardiovascular disease and atherosclerosis, such as lipid profile, serum albumin, C-reactive protein, serum phosphorus, parathyroid hormone, and diabetes mellitus in hemodialysis patients. The study was conducted on 103 patients with end-stage renal disease on maintenance hemodialysis. They found no significant differences in serum magnesium levels between patients with low and high values of high-density lipoprotein cholesterol, triglycerides, low-density lipoprotein cholesterol, and blood pressure. Also, they found no correlation between apoprotein(a) and serum levels of magnesium and lipids.<sup>1</sup>

I would like to note a few points about the association of magnesium with serum lipids. Previously, we conducted a study on the association of serum magnesium with serum lipids in a group of stable hemodialysis patients.<sup>2</sup> We found a significant positive correlation between serum magnesium and lipoprotein(a) and also a positive correlation between serum magnesium with triglyceride level, too.<sup>2</sup> In agreement with our findings, recently Ansari and coworkers conducted a study on 50 patients with end-stage kidney disease on

maintenance hemodialysis treatment, from India. They found significant positive correlations of serum magnesium with serum lipoprotein(a) ( $r = 0.40$ ,  $P = .007$ ), serum high-density lipoprotein cholesterol ( $r = 0.31$ ,  $P = .01$ ), and serum triglyceride ( $r = 0.35$ ,  $P = .005$ ).<sup>3</sup> There was no significant correlation between serum magnesium and serum low-density lipoprotein cholesterol or serum total cholesterol, which was in accordance with our findings too.<sup>3</sup> It is clear that one of the factors involved in accelerated atherosclerosis in hemodialysis patients is dyslipidemia.<sup>4-8</sup>

Elevated serum magnesium level can also be a problem in patients on maintenance hemodialysis.<sup>1-3</sup> While, the kidneys are the major route of excretion of magnesium from the body, increased serum magnesium would be expected in patients with renal insufficiency.<sup>2,3</sup> Magnesium can be normal or even decreased in dialysis patients, which is probably due to decreased dietary intake in association with impaired intestinal absorption.<sup>3</sup> It is well documented that magnesium deficiency has a possible role in the perturbation of lipid metabolism in the nonuremic population.<sup>9</sup> Magnesium does not increase the lipoprotein synthesis.<sup>2</sup> It may involve in the regulation of some enzymes responsible for lipoprotein synthesis. In our study, we concluded that the correlation of serum magnesium with serum triglycerides can be due to changes in hepatic triglyceride metabolism.<sup>2</sup> Lipoprotein(a) is a nontraditional factor of premature atherosclerosis and its association with serum magnesium in our

study and the study conducted by Ansari and coworkers<sup>3</sup> needs more attention in hemodialysis patients. Indeed, the association of dyslipidemia with serum magnesium level is not clearly understood, and further large clinical studies are needed to understand this association better.

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