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Vitamin C dosing during continuous renal replacement therapy: The last word is not said!

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TO THE EDITOR

Pharmacokinetic and dose-response data suggest a vitamin C (vit C) dose largely exceeding 3 g daily in critically ill patients. We recently proposed higher vit C dosing in cardiac arrest patients who require continuous renal replacement therapy (CRRT).[1] In a reaction, Spoelstra-de Man *et al.* rebutted that increasing the vit C dose above 2 g/day during continuous veno-venous hemofiltration (CVVH) was unnecessary when normal plasma vit C concentrations are targeted. They based their standpoint on calculating less vit C removal during CVVH than by a normally functioning kidney.[2]

We want to warn for too much oversimplification! First, Spoelstra-de Man *et al.* used CVVH, which is a sheer convective technique as opposed to continuous veno-venous hemodialysis (CVVHD) and continuous veno-venous hemodiafiltration (CVVHDF). Being largely eliminated by diffusion, vit C will be more extensively cleared by CVVHD(F) than by CVVH.[3] Second, vit C plasma concentrations in the single CVVH-treated patient studied were approximately 200 μmol/L at CVVH initiation and were recorded for 48 h.[2] Vit C, however, is consistently deficient upon intensive care (IC) admission and levels continue to fall dramatically during the acute phase of surgery or critical illness.[4] In a patient with reduced vit C levels and normal renal function, the kidney will adapt and drive back vit C losses. In severely ill patients with low baseline or declining vit C levels, CRRT will continue to remove vit C regardless of plasma levels. Kamel *et al.* observed a pronounced vit C deficiency in 80% of patients receiving CRRT for a mean duration of 2 weeks despite a daily intravenous supplement of 500 to 1000 mg initiated within 7 days prior to measuring vit C levels.[5] At least one-third of the patients in this study were on CVVHD or CVVHDF. This underscores that more aggressive vit C supplementation is mandatory when CRRT runs for a prolonged time period and, in particular, when renal epuration modes that facilitate vit C elimination are applied. Third, vit C levels corresponding with a neat clinical effect in IC patients have not been determined. For instance, doubling target concentrations from 100 to 200 μmol/L would result in a daily CRRT-induced vit C loss of 1.7 g. Unless proven otherwise, we hold on to our recommendation to supplement up to 12 g vit C in patients undergoing CVVHD, CVVHDF or prolonged CVVH.

Conflict of Interests

The authors declare to have no competing interests.

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