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Adjuvant vitamin C in cardiac arrest patients undergoing renal replacement therapy: an appeal for a higher high-dose

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We read with interest the excellent review of Spoelstra-de Man et al. which focused on the potential benefit of adjuvant vitamin C (vit C) therapy in ischemia-reperfusion injury [1]. Following an exhaustive in-depth analysis of the impressive experimental, clinical, and safety record of vit C, the authors plead for a randomized controlled clinical trial assessing the effect of early, high-dose (i.e., at least 3 g/day), intravenous vit C administration in post-cardiac arrest patients.

About half of the patients may develop acute kidney injury stage ≥ 1 within 2 days after cardiac arrest and 20 to 60% will require renal replacement therapy (RRT) [2]. Vit C has a molecular weight of 176 Dalton and is thus exposed to significant clearance during RRT. Intermittent hemodialysis as well as continuous RRT (CRRT) are indeed associated with a 50% reduction of plasma ascorbate and vit C levels [3–5]. Diffusion and convection account for two-thirds and one-third, respectively, of the vit C loss [3]. A 3 g daily vit C dose, therefore, is by no means guaranteed to cover the acute need in post-cardiac arrest patients initiated on (C)RRT. Vasopressor-dependent subjects in particular may benefit from increased dosing because vit C has been shown to support endogenous vasoactive catecholamine synthesis. Awaiting solid pharmacological data, we propose to supplement post-cardiac arrest patients not treated with CRRT with 6 g vit C daily. If CRRT is running, the dose should be increased to 12 g. We fully agree with Spoelstra-de Man et al. to administer vit C as early as possible (i.e., before intensive care admission) and to continue treatment for a short period of time.

Abbreviations

CRRT: Continuous renal replacement therapy; RRT: Renal replacement therapy; Vit C: Vitamin C

Authors' contributions

PMH and HDS designed the paper. PMH, DDB, TP, SR, RA, and HDS participated in drafting and reviewing. All authors read and approved the final version of the manuscript.

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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