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LETTER TO THE EDITOR

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Response Letter to: Correspondence regarding the article by Murugan et al on Precision net ultrafiltration dosing in continuous kidney replacement therapy: a practical approach

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To the Editor,

We read with interest the letter by Bellomo and colleagues in response to our recent article entitled "Precision net ultrafiltration dosing in continuous kidney replacement therapy: a practical approach" [1]. The authors state that we have misplaced the term continuous kidney replacement therapy (CKRT) instead of continuous renal replacement therapy. While we support the use of interchangeable terms such as "renal" and "kidney", the use of the term "kidney" is more precise and aligns with the Kidney Disease Improving Global Outcome nomenclature [2]. Moreover, several recent publications have used the term CKRT [3–6].

The authors also state that we have subverted the net ultrafiltration (UF_{NET}) rate definition we have previously proposed in several publications. Our current publication aims to expand the existing UF_{NET} rate definition by accounting for all intravenous/replacement/dialysate fluids given simultaneously to the patient, not just those administered within the dialysis machine. This is crucial because, as stated in our manuscript, net fluid removal is a form of controlled hypovolemia that leads to cardiovascular stress in the patient. Ignoring fluids administered outside the dialysis machine in the UF_{NET} rate calculation would overestimate the actual UF_{NET} rate dosing and the cardiovascular stress encountered by the patient during net fluid removal. In the recent consensus nomenclature published by the Acute Disease Quality Initiative [7], UF_{NET} in Table 1 is defined as "*Volume of fluid removed from the patient subtracted by volume of fluid infused to patient during a dialysis session*". Thus, in our calculation of the UF_{NET} rate, we subtracted the volume of fluids simultaneously infused into the patient during a dialysis session in addition to the dialysate and replacement fluids (which can also be given outside the dialysis machine) to determine the precise UF_{NET} rate. This method is more precise in determining the UF_{NET} rate and is currently used in a clinical trial comparing alternative UF_{NET} rate strategies for precision UF_{NET} dosing [8].

The authors also state that we did not consider the complex nature of fluid balance in critically ill patients, such as urinary and drain output, gastrointestinal losses, or nutritional input. We agree that fluid balance is complex. Therefore, we proposed including other fluids in

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the UF_{NET} rate calculation and provided a supplemental UF_{NET} rate calculator that accounts for various input fluids and output fluid losses. Specifically, our manuscript (Step 3) states, "*Enteral and oral feedings and gastrointestinal and drain losses can also be included in determining the precise* UF_{NET} *rate*." We acknowledge that the above UF_{NET} rate determination and dosing method is new and hypothesis-generating, hence our publication under this journal's "Hypothesis articles" section. We believe our method offers significant potential for improving UF_{NET} dosing accuracy.

Author contributions

RM drafted the response letter. KK and PMP contributed substantially to the intellectual content, revising it critically for important intellectual content and approving the final version of the letter.

Data availability

Not applicable.

Declarations

Competing interests

RM, KK, and PMP filed an international patent application for the method of fluid removal described herein (Patent no. PCT/US2023/012204). RM received research grants from NIDDK and consulting fees from Baxter Inc., AM Pharma Inc., Bioporto Inc. and La Jolla Inc., unrelated to this study. KK received research grants NIDDK and from, Philips Research North America, and Google, a speaker honorarium from Nikkiso Critical Care Medical Supplies (Shanghai) Co., Ltd, and consulting fees to Mayo Clinic and from Baxter Inc.; PMP received consulting fees and advisory committee fees from Durect, Health-Span Dx, and Novartis; served on a Data and Safety Monitoring Board for Baxter; served as a member of an endpoint adjudication committee for GE Healthcare.

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