Letter to the Editor

Blood Purification

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Pre- versus Post-Dilution CVVH

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Sir,

We read with great interest the article entitled 'Filter run time in CVVH: pre- versus post-dilution and nadroparin versus regional heparin-protamine anticoagulation' by van der Voort et al. [1], because a general lack of information and scientific evidence concerns the management of continuous renal replacement therapies. Nonetheless, a few points of the study might require some clarification in order to further increase their potential utility in current practice and routine extracorporeal treatments.

The first issue we would like to point out is the calculation of clearance: the authors computed it as 'total blood volume cleared' (TBVC) by using the formula: TBVC = CC*FRT, where CC is the creatinine clearance obtained by treatment and FRT is the filter run time. This computation was finalized to the analysis of blood cleared *per filter*, but in our opinion it did not highlight the clearance obtained in terms of the *daily efficiency* of treatments. The authors compared each CRRT cost for 24 h of treatment and the hypothetical cost for 100 liter of plasma to be cleared, assuming that for an equivalent amount of creatinine removed, the pre-dilution hemofiltration would cost more. However, unfortunately, they did not analyze whether pre-dilution treatments, which last significantly longer than post-dilution and are so advantaged by reduced downtimes, would lead to a similar daily or weekly creatinine removal [2]. Furthermore, it is possible that the pre-dilution technique, reducing protein layer formation and fiber clotting, maintained a higher sieving coefficient for creatinine with respect to post-dilution, especially in the case of longer sessions. Creatinine sieving coefficients should be examined over time in the course of FRT.

Moreover, we acknowledge that this study was not targeted to examine CCs relative to the patients' body weight and to evaluate creatinine raw blood levels apart from clearance. In the light of these data, from a merely clinical point of view, it would have been interesting to evaluate if the authors' prescribed dose of 3 liters/h would have been adequate for smaller patients even when delivered in the pre-dilution mode [3].

Secondly, in the method section the authors state, 'Sessions that ended for other reasons than a high transmembrane pressure, for instance catheter problems, were not included in the analysis'. We agree with the authors that catheter-related troubleshooting is often able to completely alter RRT sessions, as well as FRTs and evaluation of solute clearance. Nonetheless, in our opinion, this delicate argument might deserve a further specification: low access or high return pressures are strictly related, as a cause or as an effect, to rheologic intrafilter dynamics, they frequently present in the course of treatment, and they substantially affect TMP and filter clotting [4]. Catheters can be considered as a whole part of the dialysis circuit, and so they might be included in circuit lifespan analysis, unless, for example, the 'catheter problems' are standardized for predetermined access/return pressure cutoffs in the first hour of treatment.

Finally, the authors correctly state that during pre-filter blood dilution, the theoretical concentration gradient that arises between plasma and erythrocyte, leads to a *urea* shift from the intracellular to the extracellular space. However, this is not true for *creatinine* that is not present inside erythrocytes, this being consistent with the observed significant reduction in CC induced by the pre-dilution mode.

In conclusion the authors must be applauded for undertaking this kind of 'current practice studies' in CRRT management, since only little scientific literature is available on this topic, in spite of its highest potential utility and enormous clinical relevance.

References

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