A ‘Lingering Mystery’ of Postdialysis Serum Bicarbonate Concentration.

MUDr. Jan Havlíč, Ph.D.,
Department of Internal Medicine

Letter To the Editor:

After reading Lisawat and Gennari’s teaching case, we would like to raise the following points.
First, the ‘lingering myster’ of lower postdialysis serum bicarbonate concentration compared to dialysate bicarbonate concentration can be explained by the difference between plasma and plasma water concentration and by the Gibbs-Donnan effect. Proteins and lipids in plasma ordinarily occupy ~7% of total plasma volume. After correcting plasma to plasma water concentration (using a coefficient of 0.93) and taking into account the Donnan distribution coefficient (0.96, because plasma proteins carry a net negative charge), the postdialysis serum bicarbonate level can be predicted to be 33 mEq/L, given a dialysate bicarbonate concentration of 37 mEq/L. This value of 33 mEq/L corresponds to that observed in the patient described by Lisawat and Gennari.

Second, we agree that the minimal decrease in the patient's interdialytic bicarbonate concentration is a result of low endogenous acid production due to malnutrition, but in our opinion, there is no reason to enhance predialysis alkalosis with a high dialysate bicarbonate concentration. We think this is especially true for patients with hypoalbuminemia, which facilitates alkalosis, or with hypotension, in which alkalosis-mediated vasodilatation may contribute to intradialytic hypotension.

We believe that pre- and postdialysis serum bicarbonate concentrations should be in the lower and upper limits of the reference range. To eliminate unnecessary alkalinization, dialysate bicarbonate concentration should be tailored strictly to each patient by evaluating pre- and postdialysis acid-base status, especially if there is only a weak association between dialysate and predialysis serum bicarbonate concentrations (as evidenced by Tentori et al). The interdialytic acidification can be reduced by oral intake of sodium bicarbonate with respect to the patient's interdialytic weight gain and by dietary acid reduction.

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