kidney and dialysis

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Opinion

Evidence from Studies of Patient-Reported Outcomes Supports a Policy of Using a Dialysate Sodium Concentration of 140 mEq/L for the Majority of Patients

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Abstract: The best evidence available to guide a policy for prescribing the dialysate sodium concentration, [DNa], comes from large randomly selected observational studies, such as the Dialysis Outcomes and Practice Patterns Study (DOPPS). These show that, after adjustment for differences in demographics and comorbidity, using a [DNa] lower than 140 mEq/L is associated with patients taking longer to recover after a dialysis treatment, worse symptoms of kidney failure, a higher score for the burden of kidney disease and worse mental and physical health-related quality of life. It is also associated with greater risks of being admitted to hospital and dying. These outcomes are more important than any medically determined surrogate outcome, such as the control of blood pressure or interdialytic weight gain. The most appropriate policy for prescribing the dialysate sodium concentration is to use a [DNa] of 140 mEq/L for the majority of patients.

Keywords: patient-reported outcomes; patient-centred care; recovery time; hemodialysis

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There is no definitive evidence that any particular dialysate sodium concentration, [DNa], improves patient survival [1]. For this reason, when defining a policy for the prescription of [DNa], our main aim should be to improve the quality of patients' lives. This is more important than any medically determined surrogate outcome, such as the control of blood pressure or interdialytic weight gain, which can be addressed through assessment of fluid volume and target post-dialysis weight.

In the absence of an adequately powered randomized controlled trial, we should derive evidence from the best observational studies available. One 'natural experiment' that can be employed is based upon the way patients are allocated to different maintenance dialysis facilities.

The choice of a patient's dialysis facility is determined largely by geographical convenience rather than clinical indications. Patients, therefore, are allocated to a dialysis unit's [DNa] policy in a quasi-random manner.

In some facilities, the [DNa] is adjusted individually according to patient factors. In others, a fixed [DNa] is set for the large majority of patients. By studying those patients who receive dialysis in facilities with a fixed [DNa] policy and adjusting for their demographic and comorbid factors, we can create a quasi-randomized observational study design that compares patient outcomes according to [DNa].

One important outcome that greatly affects patients' quality of life is the time it takes for them to recover after a dialysis treatment—the 'dialysis recovery time'. This is an extremely useful outcome to study as it is of intrinsic importance to patients, can be measured easily with one simple question, varies widely between patients from zero to more than 12 h and correlates with other measures of quality of life.

In a study of 6040 patients participating in the DOPPS, among patients treated in dialysis facilities that used a fixed [DNa] for ≥90% of patients, the adjusted odds ratio of a longer recovery time was 1.72 (95% CI, 1.37–2.16) comparing [DNa] < 140 vs. 140 mEq/L [2]. In other words, a lower [DNa] is associated with longer dialysis recovery time.

In the same study, a longer recovery time was correlated with worse symptoms of kidney failure, a higher score for the burden of kidney disease and worse mental and physical health-related quality of life.

Dialysis recovery time is also a guide to objective outcomes such as hospitalization and death. Using Cox regression and adjusting for potential confounders not influenced by recovery time, recovery time was associated positively with the risk of first hospitalization (adjusted HRs for recovery time > 12 vs. 2–6 h = 1.22 (95% CI, 1.09–1.37) and mortality (adjusted HRs for recovery time > 12 vs. 2–6 h = 1.47 (95% CI, 1.19–1.83)). This is consistent with results from an earlier DOPPS study showing that lower [DNa] was associated with a higher risk of hospitalization and mortality [3].

Until we have evidence from adequate randomized controlled trials, in my opinion, a policy of using a dialysate sodium concentration of 140 mEq/L for the majority of patients is most appropriate. In the minority of patients with symptoms of cramping and/or intradialytic hypotension that does not respond to an increase in target post-dialysis weight and lowering of dialysate temperature, [DNa] may be adjusted upwards by 2 or 4 mEq/L [1,4].

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