

HIGH VERSUS LOW DIALYSATE SODIUM CONCENTRATION IN CHRONIC HAEMODIALYSIS PATIENTS: A SYSTEMATIC REVIEW OF 23 STUDIES

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Introduction

What is the best dialysate sodium (DNa⁺) prescription in chronic haemodialysis patients is a timely and highly debated issue. Different options are currently available such as fixed or tailored concentrations, modeling strategies or real-time adjustments to plasma conductivity. However, the question as to whether an optimal DNa⁺ exists is still unanswered. We conducted a systematic review to evaluate the benefits and harms of different fixed DNa⁺ concentrations.

Methods

MEDLINE and CENTRAL databases were searched for English-language articles without time or follow-up restriction. We included any trial (randomized controlled trials – RCTs - or non-RCTs), prospective or retrospective observational study comparing chronic haemodialysis patients treated with at least 2 different DNa⁺ prescriptions (defined as “high” or “low” content). Outcomes of interest were mortality, blood pressure (BP), inter-dialytic weight gain (IDWG), plasma sodium, hospitalizations, use of anti-hypertensive agents and intradialytic complications.

Results

From a pool of 390 articles retrieved, a total of 366 citations were excluded because not matching our study inclusion criteria. Amongst the 23 studies reviewed (76.635 subjects), eight were observational studies including six with an overall prospective study design and two retrospective reports. Eight studies had a quasi-interventional design. Seven studies were clinical trials, of which three were randomized. One more RCT is currently ongoing. There was high heterogeneity among studies in the number of patients analyzed (8 to 29.593), overall study quality, duration of follow-up (1 week to 30 months), DNa⁺ prescriptions (133 to 145 mmol/L) and even in the definition of “high” or “low” DNa⁺ content (high content being defined in most cases as DNa⁺ ≥ 140 mmol/L). In the only three studies looking at mortality (all observational), the risk of death was mostly dependent on the plasma-DNa⁺ gradient, rather than on a fixed low or high DNa⁺ concentration. BP control (either as pre- or post-dialysis BP or ambulatory blood pressure monitoring values) was on overall not affected by dialyzing against high or low DNa⁺, with only few exceptions. Patients treated with high DNa⁺ prescriptions had significantly higher IDWG as compared to those with low DNa⁺. Three studies reported a significant increase in intra-dialytic hypotensive episodes in patients receiving low DNa⁺. Data on hospitalizations and use of anti-hypertensive agents were sparse and mostly limited to single studies.

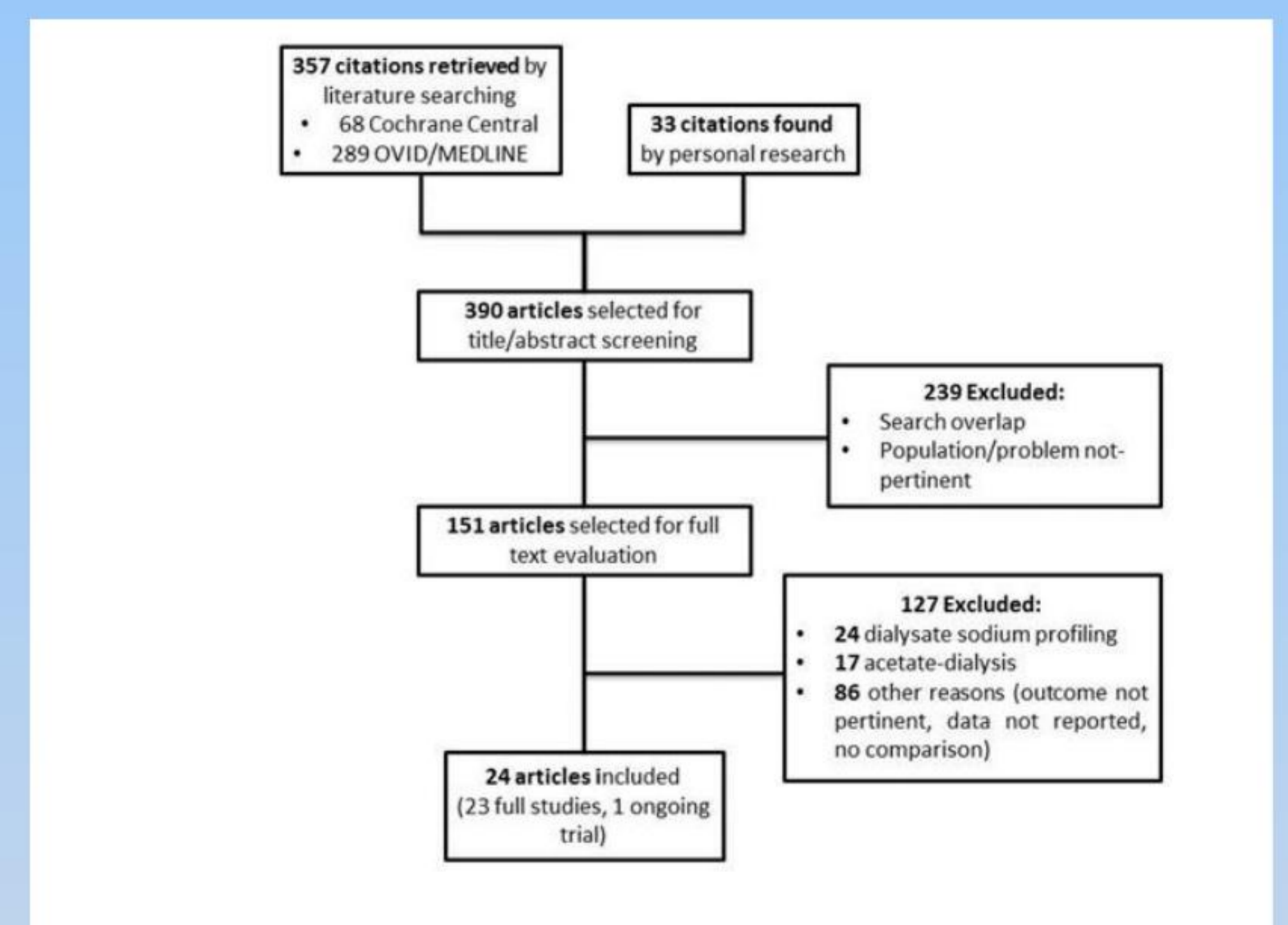


Figure 1: Study selection flow

Conclusions

There is currently sparse and incongruent evidence proving the superiority of a fixed (high or low) DNa⁺ prescription in terms of benefits on hard or surrogate outcomes in maintenance haemodialysis patients. Future trials adequately powered to evaluate the impact of different DNa⁺ concentrations on mortality or other patient-centered outcomes or comparing fixed to individualized or real-time modeled DNa⁺ prescriptions are needed.

