Am J Nephrol. 2012;35(6):540-7.

Short- and long-term effects of alkali therapy in chronic kidney disease: a systematic review.

Susantitaphong P, Sewaralthahab K, Balk EM, Jaber BL, Madias NE.

BACKGROUND:

Clinical practice guidelines recommend alkali therapy in patients with non-dialysis-dependent chronic kidney disease (CKD) and metabolic acidosis to prevent complications from metabolic acidosis. We systematically reviewed the effect of sodium bicarbonate on benefits and harms in patients with CKD.

METHODS:

We searched for randomized controlled trials in MEDLINE (through July 2011), Cochrane Central Register of Controlled Trials, ClinicalTrials.gov, and scientific abstracts. We included trials that compared sodium bicarbonate to standard-of-care therapy or placebo that reported on kidney-related outcomes. We performed random-effects model meta-analyses to compute net changes (for continuous variables) and risk ratios (for binary variables).

RESULTS:

Two short-term (≤ 7 days) crossover trials and 4 long-term (≥ 2 months) parallel-design randomized controlled trials met eligibility (312 patients). All 6 trials prescribed sodium bicarbonate in the alkali-treated group. In the long-term studies, alkali therapy was associated with a net decrease in serum creatinine (-0.07 mg/dl, 95% CI -0.09, -0.05; $p < 0.001$; $I(2) = 0$), a net improvement in GFR (3.2 ml/min/1.73 m(2), 95% CI 1.6, 4.7; $p < 0.001$; $I(2) = 0$), and a lower incidence of dialysis initiation (risk ratio 0.21, 95% CI 0.08, 0.54; $p = 0.001$; $I(2) = 0$). No benefit was observed on the serum creatinine or GFR in short-term studies. Alkali therapy was not associated with a higher likelihood of initiating or escalating anti-hypertensive medications.

CONCLUSIONS:

Alkali therapy is associated with an improvement in kidney function, which may afford a long-term benefit in slowing the progression of CKD. However, differences in study protocols and small sample sizes preclude definitive conclusions.