Association between oral sodium phosphate bowel preparations and kidney injury: a systematic review and meta-analysis
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CRD summary
This review concluded that was not possible to discern whether there was an association between receipt of oral sodium phosphate and kidney injury. The possibility of error and bias in the review process, lack of validity assessment and possible inappropriate pooling mean these conclusions may not be reliable.

Authors' objectives
To investigate the association between oral sodium phosphate and kidney injury.

Searching
MEDLINE was searched (dates not reported). Search terms were reported. Bibliographies of retrieved articles, abstract lists from national gastroenterology meetings (2006 and 2007) and ClinicalTrials.gov were searched for additional studies.

Study selection
Controlled trials that examined the association between oral sodium phosphate use and kidney functional outcomes were eligible for inclusion. Patients who received sodium phosphate bowel preparations in anticipation of colonoscopy were of interest (although not explicitly stated in the inclusion criteria). Where reported, included studies were of patients with a mean age range of 55.1 to 68 years old. The proportion of men ranged from 33% to 98%. Ethnically, 27% to 86% were white. From 9.8% to 47% had diabetes. Baseline kidney requirements varied and colonoscopies were undertaken either on an out-patient or both in-patient and out-patient basis. Where reported, the oral sodium phosphate dose was delivered in 90mL sodium phosphate solution (in two doses) or a 32-tablet dose pack. Controls varied. Some studies reported a prescribed hydration regimen that ranged from 240mL to 3L. Follow-up ranged from 48 hours to nine years. The outcomes reported were percentage increase in serum creatinine and change in kidney function from normal to abnormal based on glomerular filtration rate.

The authors stated neither how studies were selected for the review nor how many reviewers performed the selection.

Assessment of study quality
The authors did not state that they assessed validity.

Data extraction
Odds ratios (ORs) and 95% confidence intervals (CIs) were calculated from effects estimates. The authors did not state how many reviewers performed data extraction.

Methods of synthesis
Odds ratios and corresponding 95% CIs were pooled using random-effects meta-analyses. Where two effect estimates were reported, separate meta analyses were conducted with the highest and lowest estimates. Sensitivity analyses were performed to assess the effects of adjusted versus non-adjusted estimates. Statistical heterogeneity was assessed using the I² test and Q statistic. Clinical heterogeneity was discussed in the text.

Results of the review
Seven studies were included (n=14,520): one randomised controlled trial (RCT) (n=415); five retrospective cohort studies (n=13,640); and one case control study (n=465).

Oral sodium phosphate was associated with greater kidney injury, but this was not statistically significant (OR 1.22, 95% CI 0.77 to 1.92 with highest estimates and OR 1.08, 95% CI 0.71 to 1.62 with lowest estimates). Significant heterogeneity was detected (I²=77.8% and 70.1%). Sensitivity analyses showed similar results.
Authors’ conclusions
It was not possible to discern whether there was an association between receipt of oral sodium phosphate and kidney injury.

CRD commentary
The review question was supported by inclusion criteria for study design, intervention and outcome. Only one database was searched and the authors did not report whether language restrictions were applied, so the risk of language bias was unknown. Unpublished studies were sought, which decreased the possibility of publication bias. No description of the review methods was reported (whether study selection and data extraction were performed in duplicate), so it was not known whether reviewer error and bias were possible. Study validity was not assessed, but most appeared to have weak study designs. Relevant study details (such as doses) were not reported in some studies. As there was significant clinical and statistical heterogeneity, meta-analysis may not have been appropriate and the results of pooling may not be reliable. The possibility of error and bias in the review process, lack of validity assessment and possible inappropriate pooling suggests the authors’ conclusions may not be reliable.

Implications of the review for practice and research
Practice: The authors stated that clinicians should use oral sodium phosphate with caution and according to guidelines.

Research: The authors stated that future studies should seek to clarify the roles of prophylactic hydration and baseline kidney function on any imposed risk and aim to maintain generalisability to the general population. Standardised definition of incident kidney injury would also be useful.

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.