

Reduced sodium intake lowered blood pressure and need for antihypertensive medication

Appel LJ, Espeland MA, Easter L, et al. Effects of reduced sodium intake on hypertension control in older individuals. Results from the Trial of Nonpharmacologic Interventions in the Elderly (TONE). Arch Intern Med 2001 Mar 12;161:685-93.

QUESTION: In older adults with hypertension, is a reduced dietary sodium (RS) intervention more effective than usual lifestyle (UL) in controlling blood pressure and preventing cardiovascular events?

Design

Randomised {allocation concealed*}†, blinded (outcome assessors)*, controlled trial with 30 months follow up.

Setting

4 clinical centres in the US.

Patients

681 patients who were 60-80 years of age (mean age 66 y, 53% men) and had systolic blood pressure (SBP) <145 mm Hg and diastolic blood pressure (DBP) <85 mm Hg while taking 1 antihypertensive medication (AM). Exclusion criteria were use of AM for conditions other than hypertension, myocardial infarction (MI) or stroke in the previous 6 months, angina pectoris, congestive heart failure (CHF), serum creatinine concentration >176.8 µmol/l, blood glucose concentration >14.4 mmol/l, or average alcohol intake >14 drinks per week. Follow up was 90% to 93%.

Intervention

Patients were allocated to RS (n=340)‡ or UL (n=341)‡. RS group patients attended weekly to biweekly individual and group sessions with a registered dietitian to achieve and sustain an RS lifestyle and a 24 hour dietary sodium intake of ≤80 mmol/l. UL group patients attended regular meetings with discussions on topics unrelated to BP, cardiovascular disease, or nutrition. Patients in both groups began withdrawal of AM 90 days after the first RS intervention session.

Main outcome measures

The primary end point was the need for or resumption of AM. The end point was reached when any of the following occurred: increased BP (SBP ≥190 mm Hg and DBP ≥110 mm Hg at 1 visit); AM required for a condition other than increased BP or cardiovascular event; or a cardiovascular event (MI, angina, CHF, or stroke) or procedure.

Main results

Patients in the RS group had greater reductions in BP from baseline than patients in the UL group (p≤0.001) (table). Between group differences were seen for SBP for all subgroups defined by sex, ethnicity, age, and weight except the 70 to 80 year old group. More patients in the RS group remained end point free than patients in the UL group (p<0.001) (table). The groups did not differ for cardiovascular events.

Conclusion

In older adults with hypertension, an intervention aimed at reducing sodium intake lowered blood pressure and the need for antihypertensive medication.

*See glossary.

†Information provided by the author.

‡Whelton PK, Appel LJ, Espeland MA, et al. JAMA 1998;279:839-46.

Reduced sodium (RS) v usual lifestyle (UL) at 30 months§

Outcomes	RS	UL	Difference in mean decrease (95% CI)	Relative hazard ratio (CI)	NNT (CI)
Change from baseline in SBP (mm Hg)	-4.6	-0.4	4.3 (2.5 to 6.0)		
Change from baseline in DBP (mm Hg)	-2.2	-0.2	2.0 (0.8 to 3.2)		
End point free	36%	21%	0.68 (0.56 to 0.82)	8 (5 to 17)	

§DBP = diastolic blood pressure, SBP = systolic blood pressure. Other abbreviations defined in glossary; NNT and CI calculated from data in article.

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COMMENTARY

In the study by Appel *et al*, an average net reduction in sodium intake of 40 mmol/24 hours lowered BP by 4.3/2 mm Hg. This magnitude of change in BP is similar to that found in a review of the effect of age on the response to sodium.¹ Clinicians may not be impressed with such reductions in BP, but they may translate into substantial reductions in cardiovascular disease.² Still, there is no clinical trial evidence that low-sodium diets decrease morbidity and mortality. However, 2 cohort studies showed a substantive direct relation between sodium intake and cardiovascular disease, at least in overweight people.^{3,4}

Prescribing a restriction in sodium intake can be unpopular with patients because most processed foods have high sodium content and the average sodium intake in western countries is about 150 mmol/d. The addition of table salt to cooking accounts for only 20% of daily intake and thus simply eliminating table salt is not sufficient to achieve the sodium-restricted diet described in this study. Patients will need to prepare almost all their food including low-salt bread in order to restrict their sodium intake to the required level. Still, the human palate rapidly acclimates to different levels of sodium intake.

I would have to agree with others who suggest that patients try weight loss, reduced alcohol intake, and regular moderate exercise before prescribing sodium restriction (unless the patient is motivated enough to try) as non-pharmacological therapy for hypertension.⁵

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1 Law MR, Frost CD, Wald NJ. *BMJ* 1991;302:811-5.

2 Collins R, Peto R, MacMahon S, et al. *Lancet* 1990;335:827-38.

3 He J, Ogden LG, Vupputuri S, et al. *JAMA* 1999;282:2027-34.

4 Tuomilehto J, Jousilahti P, Rastenyte D, et al. *Lancet* 2001;357:848-51.

5 Nicholls MG, Richards AM. *Med J Aust* 1999;170:178-80.