

CLINICAL UPDATE

The sodium-restricted DASH diet lowers blood pressure

Sacks FM, Svetkey LP, Vollmer WM, Appel LJ, Bray GA, Harsha D, et al. Effects on blood pressure of reduced dietary sodium and the Dietary Approaches to Stop Hypertension (DASH) diet. *N Engl J Med* 2001;344:3-10

Background: About 20% of adults in developed countries have hypertension, and the risk for cardiovascular diseases increases with progressive elevations in blood pressure, beginning even at normal levels. This explains the considerable interest in the effect of diet on blood pressure. The Dietary Approaches to Stop Hypertension (DASH) trial, completed in 1997, showed that a diet that emphasized fruits, vegetables and low-fat dairy products and that included whole grains and decreased amounts of saturated fat and cholesterol lowered blood pressure in people with established hypertension.¹ However, it remained unclear whether the DASH diet plus restrictions on the dietary intake of sodium would reduce hypertension further.

Question: What is the effect of the DASH diet plus sodium intake at 3 levels — high (typical in North America), intermediate (current recommended level) or low — on blood pressure?

Design: After a 2-week run-in period, healthy adults whose blood pressure exceeded 120/80 mm Hg, including those with stage 1 hypertension (systolic pressure 140 to 159 mm Hg or diastolic pressure 90 to 95 mm Hg), were given a high-sodium control diet similar to the typical North American diet. They were then randomly assigned to follow the DASH diet or the control diet. In a crossover design, participants ate their assigned diet at each of the 3 sodium levels, in random order, for 30 days (high sodium, 150 mmol/d [equivalent to 3.5 g]; intermediate, 100 mmol/d [equivalent to 2.3 g]; low, 50 mmol/d [equivalent to 1.2 g]). Each person's energy intake was adjusted to avoid changes in weight. Blood pressure was recorded using random-digit sphygmo-

manometers by staff blinded to the participants' diet assignments.

Results: Reducing sodium intake from the high to the intermediate level reduced systolic blood pressure by 2.1 mm Hg on average ($p < 0.001$) among participants following the control diet and by a further 1.3 mm Hg ($p < 0.05$) among those following the DASH diet. Further reductions in sodium from the intermediate to the low level resulted in even greater reductions in systolic blood pressure: by 4.6 mm Hg ($p < 0.001$) in the control diet group and by an additional 1.7 mm Hg ($p < 0.01$) in the DASH diet group.

Compared with the combination of the control diet and a high level of sodium, the DASH diet plus a low level of sodium reduced systolic blood pressure by 7.1 mm Hg among subjects who were normotensive and by 11.5 mm Hg among those with stage 1 hypertension ($p < 0.001$ in both subgroups). Diastolic readings also fell significantly.

Subjects who were labelled "black" (method of designation not described) had greater reductions in blood pressure than all other participants at the intermediate and low levels of sodium intake. In addition, women achieved greater reductions in blood pressure than men at the low level of sodium intake. Even normotensive subjects eating the typical North American diet had significantly reduced blood pressure at the intermediate and low sodium levels.

Commentary: The results achieved are significant clinically, statistically and from the viewpoint of public health. Compared with the control diet and the typical (high) North American sodium intake, the reductions in blood pressure achieved by the DASH diet and low sodium intake were 8.9 mm Hg (sys-

tolic) and 4.5 mm Hg (diastolic). These outcomes are similar in magnitude to those achieved by antihypertensive drugs.² In addition, from a population or community health perspective, even though the magnitude of the reductions in blood pressure were lower in the healthy normotensive subjects, a small drop in systolic and diastolic blood pressure could have important effects in lowering overall rates of hypertension, coronary artery disease and stroke.²

Practice implications: Physicians should encourage all patients to follow a healthy diet and to reduce salt intake. Furthermore, although it is desirable that patients adopt both the DASH diet and a low sodium intake, the diet alone, or moderate salt restriction alone, is beneficial.

Public health physicians and policy-makers should be encouraged by the study's results, as both diet and salt restriction will probably shift the bell curves of systolic and diastolic pressure to the desired left and thus result in lower rates of coronary artery disease and stroke. However, most of the salt in North American diets is derived from processed foods rather than salt added during cooking or at the table. For a public health policy to be successful, the food industry will have to find safe salt substitutes and promote the good taste of low-sodium foods, and perhaps their possible health benefits. Government policy-makers and regulators would be wise to encourage, not discourage, such behaviour and health claims. — *John Hoey, CMAJ*

The Clinical Update section is edited by Dr. Donald Farquhar, head of the Division of Internal Medicine at Queen's University, Kingston, Ont.

References

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2. Greenland P. Beating high blood pressure with low-sodium DASH. *N Engl J Med* 2001;344(1):53-4.

