Effects of the Dietary Approaches to Stop Hypertension (DASH) Diet on the Pressure-Natriuresis Relationship

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Summary

Hypotensive mechanisms of dietary approaches to stop hypertension (DASH) diet, rich in fruits, vegetable and low-fat dairy foods, were analyzed based on the pressure-natriuresis relationship.

Participants (n=375) were randomly assigned to control or DASH diet by using a parallel-group design. They then ate their assigned diet for 3 consecutive 30-day intervention feeding periods, during which sodium intake varied among the 3 levels by a randomly assigned sequence. Urinary sodium excretion rate and mean arterial pressure were measured at the end of each sodium intake level, and the pressure-natriuresis relationship was drawn by plotting urinary sodium excretion rate on the ordinate and mean arterial pressure on the abscissa for control and DASH diets.

Pressure-natriuresis relationship was linear, and mean arterial pressure was changed in consequence of altering sodium intake. DASH diet steepened the slope of the relationship (29.5 ± 3.4 vs 64.9 ± 13.1 [mmol/day]/mmHg, $p=0.0002$) without significantly shifting the x-intercept (94.1 ± 0.5 vs 93.2 ± 0.6 mmHg, ns) of the relationship. The increase in the slope by DASH diet was independent of the steepness of the slope during control diet, indicating the hypotensive action of DASH diet was stronger in participants whose slopes were shallower and blood pressure was sensitive to the changes in sodium intake. The hypotensive effect of DASH diet on a high sodium diet correlated positively with both the hypotensive effect of sodium restriction ($r=0.84$, $p<0.01$) and the increase in the slope by DASH diet ($r=0.83$, $p<0.02$).

Thus, DASH diet lowers blood pressure especially in participants with high sodium sensitivity mainly by making blood pressure sodium insensitive through its diuretic action.