

## DASH-ing Away from Heart Failure

Levitan EB, Wolk A, Mittleman MA. Consistency with the DASH diet and incidence of heart failure. *Arch Intern Med* 2009;169:851–7.

### Study Overview

**Objective.** To examine the association between adherence to the Dietary Approaches to Stop Hypertension (DASH) diet and the incidence of heart failure.

**Design.** Prospective cohort study.

**Setting and participants.** 36,019 women aged 49 to 83 years who participated in the Swedish Mammography Cohort. Patients who had baseline heart failure, previous myocardial infarction, or diabetes mellitus were excluded. Participants were asked to complete questionnaires asking about their frequency of consumption of 96 foods and beverages within the previous year. The degree to which participants adhered to the DASH diet was measured using 4 scoring systems to generate numeric scores.

**Main outcome measure.** The primary outcome was hospitalization or death from heart failure based on inpatient and cause of death registers between 1 January 1998 and 31 December 2004. Survey data produced 4 compliance scores: DASH diet as a whole, food goals, food and nutrient guideline adherence, and National Heart, Lung and Blood Institute (NHLBI) nutrient guidelines. Based on scoring, participants were separated into quartiles, with the highest quartile indicating greater adherence to the DASH diet and the lowest quartile indicating lesser adherence.

**Main results.** During the 7-year follow-up period, 443 (1.2%) participants developed heart failure (rate, 18.1 per 10,000 women per year). Greater adherence to the DASH diet was associated with a significantly lower incidence of heart failure (rate ratio [RR], 0.37; RR comparing top to bottom quartiles, 0.63 [95% confidence interval {CI}, 0.48–0.81]; *P* for linear trend < 0.001), even after adjusting for confounders, such as age, cigarette smoking, postmenopausal hormone use, hypertension, high cholesterol, and body mass index. Women in the top 10% of DASH diet adherence had half the incidence of heart failure compared with those in the lowest quartile (RR, 0.49 [95% CI, 0.34–0.71]). The association between heart failure and DASH adherence was linear across the range of scores (*P* for linear trend < 0.001).

**Conclusion.** Greater adherence to the DASH diet is associated with lower rates of heart failure.

### Commentary

The DASH diet is derived from the DASH trials sponsored by the NHLBI, which evaluated the effect of 3 dietary patterns on blood pressure [1]. DASH is designed to be a low-sodium diet and encourages consumption of more nuts, whole grains, fish, poultry, fruits, and vegetables while reducing consumption of red meat and sugars. Previous studies have found that adherence to the DASH diet can reduce heart disease and stroke and lower blood pressure [2,3]. The fact that the DASH diet has been shown to improve lipid profiles and reduce systolic blood pressure adds validity to this study's hypothesis that the DASH diet reduces the incidence of heart failure. The mechanism for the reduction in heart failure has been thought to be largely due to the effects of the DASH diet on lowering low-density lipoprotein cholesterol; however, other studies have found that the DASH diet can also lower high-density lipoprotein cholesterol and potentially raise triglycerides [4].

This study by Levitan et al benefitted from a prospective design, a large sample size, and a relatively long observation period. The use of the Swedish health registry system allowed for collection of comprehensive inpatient data for this patient population. The self-reported scores were standardized to American portion sizes to facilitate comparison with U.S. dietary recommendations. Each of the scoring rubrics was adapted from previously developed scales, with participant responses grouped into quintiles for analysis. Most of the results used the DASH diet component score as the primary unit of analysis. Although a 37% reduction in incidence of heart failure was seen in patients with greater adherence to the DASH diet, it remains unclear if this reduction is due to prevention of contributing coronary events, reduced sodium intake, or other mechanisms, such as estrogenic effects of phytochemicals.

This study has some limitations. The authors acknowledged that the use of only inpatient data may have missed a potentially large population of women in the outpatient setting who had heart failure. The population of Swedish women is less diverse as compared with countries such as the United States, where specific racial or ethnic groups

have different rates of heart failure and may have variable response to the strategies employed in DASH. In this study, only 20% of participants had baseline hypertension, and this was measured by self-report, not clinical measurement. In support of this study's findings, data from the Framingham heart study suggest that DASH-mediated reductions in blood pressure would reduce subsequent heart failure [5].

### **Applications for Clinical Practice**

The DASH diet has important potential benefits to patients, especially those with systolic or diastolic heart failure. This study builds on evidence that suggests that the DASH diet may be a better recommendation than a "low salt" or "low cholesterol" diet. Numerous free handouts, online tools, books, and other resources can help patients learn and adhere to this important health behavior; however, expecting patients to track diet adherence as done in this study would be extremely difficult. Adhering to the DASH diet may present a challenge to patients, and for most Americans it would involve significant dietary changes such as doubling daily fruit and vegetable portions. Previous studies of adherence among American patients found compliance rates as low as 20% [6].

—Review by Marc M. Triola, MD

Copyright 2009 by Turner White Communications Inc., Wayne, PA. All rights reserved.

### **References**

1. Appel LJ, Moore TJ, Obarzanek E, et al; DASH Collaborative Research Group. A clinical trial of the effects of dietary patterns on blood pressure. *N Engl J Med* 1997;336:1117–24.
2. Fung TT, Chiuve SE, McCullough ML, et al. Adherence to a DASH-style diet and risk of coronary heart disease and stroke in women [published erratum appears in *Arch Intern Med* 2008;168:1276]. *Arch Intern Med* 2008;168:713–20.
3. Folsom AR, Parker ED, Harnack LJ. Degree of concordance with DASH diet guidelines and incidence of hypertension and fatal cardiovascular disease. *Am J Hypertens* 2007;20:225–32.
4. Obarzanek E, Sacks FM, Vollmer WM, et al; DASH Research Group. Effects on blood lipids of a blood pressure–lowering diet: the Dietary Approaches to Stop Hypertension (DASH) Trial. *Am J Clin Nutr* 2001;74:80–9.
5. Haider AW, Larson MG, Franklin SS, Levy D; Framingham Heart Study. Systolic blood pressure, diastolic blood pressure, and pulse pressure as predictors of risk for congestive heart failure in the Framingham Heart Study. *Ann Intern Med* 2003;138:10–6.
6. Mellen PB, Gao SK, Vitolins MZ, Goff DC Jr. Deteriorating dietary habits among adults with hypertension: DASH dietary concordance, NHANES 1988–1994 and 1999–2004. *Arch Intern Med* 2008;168:308–14.