EDITORIAL COMMENT

What Should Cardiologists Tell Their Patients About a Healthy Dietary Pattern?*

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A healthy diet is a powerful tool for the prevention and management of cardiovascular disease (CVD). Although much can be learned by studying single nutrients or specific foods, dietary pattern analysis offers a complementary approach to describe the overall quality of the diet by summarizing the interactive effects of multiple, correlated foods and nutrients (1). Because changes in intake of 1 food or nutrient may result in important substitution effects that have implications for disease outcomes (e.g., replacing saturated fat with refined carbohydrates versus a switch to monounsaturated or polyunsaturated fats or whole grains), public health guidance on the basis of the composite measure of diet offered by dietary pattern analysis may be more easily translated into behavioral changes that positively affect health. When counseling patients, health professionals and cardiologists should convey the message that the overall dietary pattern matters most for chronic disease prevention, rather than focusing on single nutrients (e.g., low fat or low carbohydrate) or single foods.

Indeed, the newly released 2015 to 2020 Dietary Guidelines for Americans (2) shifted recommendations away from a traditional focus on individual foods and nutrients and instead emphasized following "a healthy eating pattern across the lifespan," asserting that "people do not eat food groups and nutrients in isolation but rather in combination, and the totality of the diet forms an overall eating pattern. The components of the eating pattern can have interactive and potentially cumulative effects on health. These patterns can be tailored to an individual's personal preferences, enabling Americans to choose the diet that is right for them." Although data support a remarkable consistency in the characteristics of a healthy dietary pattern across a wide range of disease outcomes, the evidence base for reduced risk of CVD is particularly robust: in addition to a large number of prospective cohort studies, the PREDIMED (Prevención con Dieta Mediterránea) trial found that a Mediterranean-style diet supplemented with extra virgin olive oil or mixed nuts reduced cardiovascular events by 30%, and feeding studies such as DASH (Dietary Approaches to Stop Hypertension) demonstrated beneficial effects of a healthy dietary pattern on intermediate cardiovascular risk factors. Across these different study types, dietary patterns protective for CVD prominently feature fruits, vegetables, whole grains, nuts, legumes, low-fat dairy, and fish, and reduced consumption of red and processed meat. Many of these cardioprotective regimens are rich in fiber and potassium, and moderate consumption of alcohol and coffee can be included in a healthy dietary pattern. These diets are typically limited in the amounts of saturated fats, added sugars, and sodium.

In addition to a host of study designs for testing the efficacy of dietary patterns, there are multiple statistical methods for quantifying them. Such methods fall into 2 main categories: a posteriori or data-driven, and a priori or investigator-defined. Each class of methodology comes with strengths and limitations: for example, data-driven methods, such as cluster analysis, allow the investigator to explore existing patterns of consumption in the population. However, these

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may have weak associations with disease, may not reflect the ideal diet for CVD prevention, and are inherently population-specific, limiting generalizability. By contrast, investigator-defined patterns may reflect scientific consensus on which foods and nutrients protect against disease, but there may be no individual in the population that perfectly adheres to such a diet; further, the foods and nutrients that make up the dietary pattern may differ across populations (e.g., olive oil is a primary source of monounsaturated fat in Greece but not in the United States).

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In this issue of the *Journal,* Peñalvo et al. (3) use data-driven methods of dietary pattern analysis to describe the eating patterns of 4,052 middle-aged Spaniards. Participants were employed at Santander Bank and were free of known CVD. Applying factor and cluster analysis, the authors identified 3 dietary patterns; 2 were similar to patterns observed in other studies. The first, labeled a Mediterranean-style diet, was high in fruits and vegetables, whole grains, olive oil, low-fat dairy, lean meat, and fish, and was low in processed food. The second was a Western-style diet high in refined grains, dairy, sweets, red meats, and processed foods. The third, unique to this study and termed the "social-business eating pattern," was characterized by red meat, shellfish, pre-made foods, snacks, sugar-sweetened beverages, and excessive alcohol. The prevalence of subclinical atherosclerosis assessed via computed tomography was highest among participants whose intake was in line with the social-business eating pattern and was lowest among those consuming a Mediterranean-style diet.

This study added to the evidence that consuming a Mediterranean-style diet is cardioprotective, whereas consuming a dietary pattern rich in processed foods and beverages is potentially atherogenic. A major strength and novel feature of this study was the use of vascular imaging to assess subclinical atherosclerosis in a large number of participants. The authors will follow participants over time to observe incident cardiovascular events, but the current report consists of cross-sectional data. Thus, the timing of the diet's influence on atherosclerosis and whether this new social-business eating pattern remains stable or changes with tenure at the company cannot be determined. This highlights a challenge in nutritional epidemiology: diets are multidimensional and dynamic; they include complex combinations of foods and nutrients consumed in varying preparations and contexts that change with age, disease onset, and other life-course milestones. Further, diet can be difficult to separate from other life-style behaviors such as

smoking and physical activity. These challenges may be partially overcome as new, objective methods to repeatedly assess diet—as well as the context of eating—emerge and as existing methods for dietary pattern analysis are standardized. Already, there have been coordinated efforts to improve dietary pattern methodology to ensure comparability across studies (4).

What does the mounting evidence on dietary patterns mean in cardiology practice? Given their direct role in patient care, cardiologists are in a strong position to influence patient eating behaviors. Although the clinical visit is brief, physicians can take advantage of this prevention opportunity by referring patients to a dietician or steering them toward dietary patterns with demonstrated cardiovascular benefits, including the well-known and well-tested Mediterranean-style diet or DASH. Both styles of eating are rich in plant-based foods such as fruits, vegetables, whole grains, legumes, and nuts and seeds, but contain lower amounts of red and processed meats and sugar-sweetened beverages and foods. Varying amounts of seafood and reduced-fat dairy products are also included.

Of note, a healthy dietary pattern can be achieved in many ways and should be adapted to the individual patient's food and cultural preferences and health conditions. It is important for cardiologists to resist the temptation to prescribe overly simplified dietary advice such as low-fat or low-carbohydrate diets; diets defined by single nutrients ignore the fact that the types or quality of fat and carbohydrates are more important than the total amounts. Such a simple prescription also fails to consider the effects of food substitution on macronutrients and associated foods. For example, replacing saturated fat from meats and butter with unsaturated fats from vegetable oils, nuts, seeds, avocados, and seafood or high-quality carbohydrates, such as whole grains, helps prevent heart disease, but supplanting saturated fat with refined starch (e.g., white bread, potatoes and added sugar) is unlikely to confer health benefits (5).

In conclusion, analyzing and promoting dietary patterns offers a promising approach for informing dietary guidance for individual patients as well as for providing national dietary guidance for chronic disease prevention. The dietary pattern message is more complicated than merely recommending "low-fat" or "low-carbohydrate" diets; instead, such a message is grounded in solid science from observational studies and randomized clinical trials and is endorsed by evidence-based dietary guidelines. Improving the overall diet quality of individual patients will confer substantial, long-term reductions in chronic disease

JACC VOL. 68, NO. 8, 2016
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as well as improvements in quality of life. However, positive changes in dietary patterns or diet quality at the population level cannot rely solely on patient counseling. More importantly, we need to improve the food environment by making healthy food choices more accessible, affordable, and normative.

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KEY WORDS carbohydrate, cardioprotective, disease prevention, fat, nutrient