In preventive cardiology there is no 'One True Thing'

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ABSTRACT

Prescribing exercise, dietary changes, or stress management regimens separately and in the short term will ultimately fail to prevent coronary events or bring about regression of existing coronary disease. Only a multifactorial approach that focuses on permanent changes in all three areas works.

PURSUIT OF THE "One True Thing" has occupied preventive cardiologists for much of this decade. Some researchers focused on exercise. Others focused on low-fat diets. Some used potent statins to lower cholesterol. Still others emphasized stress management. Often researchers designed studies from the point-of-view of their pet intervention rather than as a multifactorial, multidisciplinary approach.

Fortunately, that is beginning to change. Cardiac rehabilitation programs that once featured exercise almost exclusively now include nutrition counseling and psychosocial support.[1] Preventive cardiology programs that began as lipid clinics now offer stress management, an exercise program, and smoking cessation as part of a complete package.

Yet before effective, long-term multidisciplinary programs can be implemented, reimbursement systems will have to change. And as we will see, when it comes to exercise, diet, and stress management, Americans have a long way to go.

EXERCISE IS IMPORTANT BUT NOT ADEQUATELY EMPHASIZED

Americans do not like to exercise. This is unfortunate, because exercise training has a substantial and statistically significant impact on mortality.[2] Among its physiologic benefits, exercise reduces resting and exercise peak heart rates, blood pressure, and oxygen consumption, even when performed at submaximal levels. It also increases plasma volume, myocardial contractility, peripheral venous tone, endothelium-dependent vasodilation, fibrinolytic activity, and parasympathetic tone.

In addition, exercise affects coronary risk factors such as body mass index, body fat percentage, and functional capacity. It raises high-density lipoprotein (HDL) cholesterol levels in both men and women. (Women enjoy the benefit of the HDL response indefinitely, but it seems to diminish over time in men.)

Americans have a long way to go in exercise, diet, and stress management

Benefits of exercise in existing coronary artery disease

Ample clinical evidence indicates that patients with coronary artery disease who perform regular aerobic exercise programs can:

- Increase their functional capacity by 15 to 30%
- Increase their peak oxygen uptake by 30%
- Decrease their resting heart rate by 6 beats/minute
- Increase their exercise time 15% to 20%
- Reduce the frequency and severity of anginal episodes, even if they cannot undergo revascularization or if revascularization fails to achieve optimal reperfusion.[3,4]

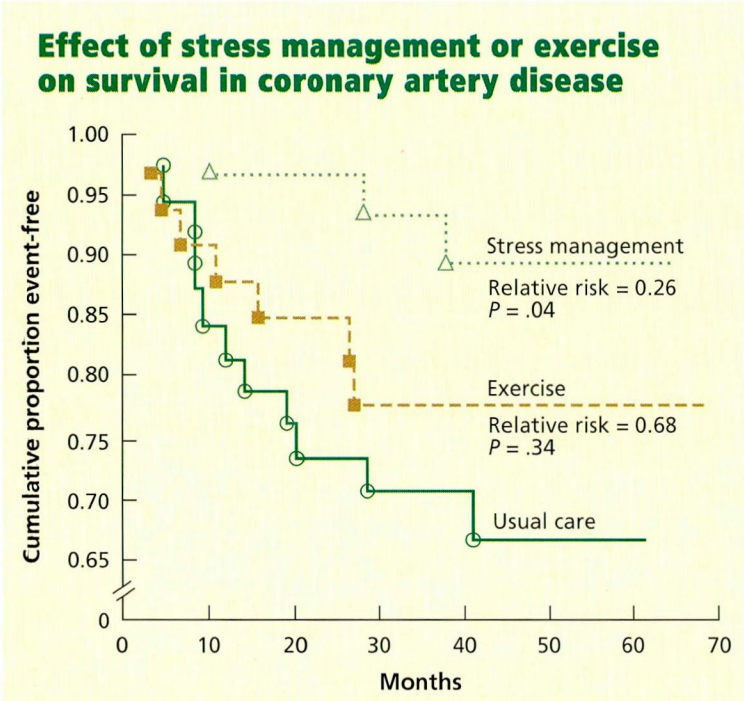

FIGURE 1. Event-free survival among patients with coronary artery disease randomly assigned to undergo a program of stress management (n = 33), exercise training (n = 34), or usual care (n = 40) in a study at Duke University Medical Center.

FROM BLUMENTHAL JA, JIANG W, BABYAK MA, ET AL. STRESS MANAGEMENT AND EXERCISE TRAINING IN CARDIAC PATIENTS WITH MYOCARDIAL ISCHEMIA: EFFECTS ON PROGNOSIS AND EVALUATION OF MECHANISMS. ARCH INTERN MED 1997; 157:2213–2223.

Current rehabilitation exercise regimens fall short

Most cardiac rehabilitation programs in the United States and Canada today provide 8 to 12 weeks of exercise training after an acute event. Unfortunately, even if patients adhere faithfully to the program, less than 12 weeks of exercise does not make a great deal of difference. Indeed, even 12 to 52 weeks of exercise barely makes a statistically significant impact on mortality—patients must continue to exercise regularly for at least 3 years.[5]

DIETARY CHANGES, STATINS, AND LDL LOWERING

Ornish's study of multiple interventions

In a famous study by Ornish et al,[6] 28 patients with coronary artery disease underwent a program of lifestyle changes that included:

- A very low-fat diet (< 10% fat as calories)
- Stress management (including stretching and breathing, progressive relaxation, focused imagery, and meditation)
- Moderate regular exercise (at least 3 hours per week of aerobic activity on a stationary bicycle or low-impact aerobic dance)
- Group psychosocial support.

At 1 year, 22 patients remained in the program. Remarkably, on angiography, these patients showed a mean regression of their coronary artery lesions of 16.5%, from 40.0% stenosis at baseline to 37.8% afterward. In contrast, patients in a control group showed a 15.5% increase in lesion size. However, the regression was not uniform among the patients: those who were most adherent to the diet had a regression, while people who were least adherent had little if any change.

Although this was a multidisciplinary study, the Ornish study changed diet in America. Fat in the diet has become an American obsession. Unfortunately, this is a very socioeconomically discriminating type of program because it is much more expensive and time consuming to find and prepare the appropriate food than it is to buy and prepare high-fat convenience foods.

Role of statins

More recently, HMG-CoA reductase inhibitors or "statins" appear to be as close to the One True Thing as we can get. Study after study has shown marked reduction in coronary events and mortality with the use of statins. It is fortunate that Ornish published his study prior to the current enthusiasm for statins, otherwise many people would argue that LDL reduction would be impossible without statins.

Nonetheless, statins and LDL lowering are not the whole story. For example, in the Scandinavian Simvastatin Survival Study,[7] use of a statin in a high-risk population resulted in a 41% reduction in coronary mortality over 5.4 years. But what about the other 59% of mortality? The fact remains that 111 (5%) of 2,221 patients died of coronary disease even though they were taking simvastatin.

Although LDL lowering is important, something else is going on here. That is why we cannot say that statins are the One True Thing. They may, however, be the best thing that we have so far.

DOES STRESS MANAGEMENT MATTER MORE THAN WE THOUGHT?

Some research suggests that stress management is also important to reducing risk for coronary artery disease. In one study, Blumenthal and colleagues[8] randomly assigned patients with myocardial ischemia to undergo a program of either aerobic exercise (45 minutes three times a week) or stress management (weekly sessions). Each program lasted 16 weeks. Another group, who lived far from the medical center, received usual care and served as a nonrandomized control group.

Although the sample size was small (N = 107), 5 years later, patients in the stress management group had suffered significantly fewer cardiac events (death, myocardial infarction, or revascularization) than those in the usual care group (relative risk 0.26, $P = .04$; FIGURE 1). The relative risk in the exercise-only group was 0.68, which was not statistically significant.

The stress management group also scored higher than the other groups on a questionnaire that measured general well-being, lower on a questionnaire that measured hostility, and had less-severe wall motion abnormalities by echocardiography during mental stress testing. Yet, the exercise group had a greater lowering of LDL cholesterol and total cholesterol than the stress management group. For HDL cholesterol and triglycerides, the exercise and stress management groups had comparable changes.

EXAMPLE OF A MULTIFACTORIAL APPROACH

The Stanford Coronary Risk Intervention Project (SCRIP)[9] demonstrates the belief of researchers that prevention of coronary disease must be multifactorial and tailored to the individual.

In this study, 300 patients with angiographically proven coronary artery disease were randomly assigned to receive usual care or undergo multifactorial risk reduction. A nurse met with each patient in the risk reduction group to devise a personalized program. TABLE 1 outlines the minimum goals. If the patient failed to reach target levels, or if the HDL might be amenable to drug intervention, then drugs were prescribed. In fact, drugs were prescribed immediately if the patient appeared unlikely to achieve the cholesterol goals within 1 year. The investigators maintained close contact with the patients by phone. The program did not, however, include any stress reduction.

At 4 years, when patients again underwent angiography, the researchers found that coronary artery lesions had progressed in both groups, but only by approximately half as much in the intervention group (0.024 vs 0.045 mm/year; $P < .01$). In addition, there

TABLE 1

Minimum goals for risk factor intervention: The Stanford Coronary Risk Intervention Project (SCRIP)

Diet	
Dietary fat, % calories	< 30
Saturated fat, % calories	< 10
Dietary cholesterol, mg/day	< 250
Ratio of polyunsaturated to saturated fat	≥ 1.0
Dietary sodium, mg/day	3,000
Cigarette smoking, no. per day	< 10
Physical activity	
Duration, minutes	15–30
Frequency	Every other day
Percent of maximum heart rate	50–75
Metabolic equivalents	> 8 (men) > 7 (women)
Aerobic calories per day	> 200
Physiologic goals	
Body weight, % ideal	≤ 110
Systolic blood pressure, mm Hg	< 140
Diastolic blood pressure, mm Hg	< 90
Total cholesterol, mg/dL	< 220
LDL cholesterol, mg/dL	< 140
HDL cholesterol, mg/dL	> 45
Triglycerides, mg/dL	< 160
Fasting glucose, mg/dL	< 110

ADAPTED FROM HASKELL WL, ALDERMAN EL, FAIR JM, ET AL. EFFECTS OF INTENSIVE MULTIPLE RISK FACTOR REDUCTION ON CORONARY ATHEROSCLEROSIS AND CLINICAL CARDIAC EVENTS IN MEN AND WOMEN WITH CORONARY ARTERY DISEASE. THE STANFORD CORONARY RISK INTERVENTION PROJECT (SCRIP). CIRCULATION 1994; 89:975–990.

were 25 hospitalizations due to cardiac events in the intervention group, vs 44 in the usual care group ($P = .05$).

Multifactorial programs like this seem to be the most potentially effective means we have of preventing coronary events, and should become the standard of care—until researchers succeed in finding the One True Thing.

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CME ANSWERS

Answers to the CREDIT TEST on page 223 of this issue

1 **E** 2 **A** 3 **C** 4 **D** 5 **A** 6 **E** 7 **D** 8 **C** 9 **A** 10 **E**
11 **A** 12 **A** 13 **D** 14 **B** 15 **B**