Improving Weight Loss in Cardiac Rehabilitation

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In the current issue of Circulation, Philip Ades and his associates at the University of Vermont College of Medicine have provided us with an innovative and important article demonstrating the feasibility and benefits of an enhanced exercise option in cardiac rehabilitation.1 In this study, 74 patients were randomized to a standard cardiac rehabilitation exercise program versus a high-calorie-expenditure exercise program. All patients were provided with 16 hours of group dietary counseling and given a dietary target deficit of 500 calories per day. One group was given a standard exercise program typically used in cardiac rehabilitation (25 to 40 minutes, 3 times per week) and the other an enhanced program targeting 45 to 60 minutes, 5 to 7 times per week, or a total caloric expenditure of 3000 to 3500 kcal/week. The length of the intervention was 5 months, though 1-year data collection was also performed. Patients were of course followed up closely to promote compliance.

The primary outcome of the study was weight loss. Subjects in the high-calorie-expenditure exercise program lost more than twice as much total body weight (8.2±4 versus 3.7±5 kg) and fat mass (5.9±4 versus 2.8±3 kg). Waist circumference also decreased by a greater amount (7±5 versus 5±5 cm). The enhanced exercise program was also associated with a greater benefit on a number of coronary risk factors including insulin resistance, total/high-density lipoprotein cholesterol ratio, and metabolic syndrome. Most of the weight loss and the difference between the groups were retained at 1-year, though some weight regain occurred (1.3 kg for the enhanced exercise group and 0.9 kg for the standard exercise group).

Guidelines for the secondary prevention of coronary heart disease2 and for management of specific coronary risk factors3−4 emphasize the importance of lifestyle change, including weight loss, but a general perception exists that lifestyle change, especially weight loss, is difficult to promote in clinical practice. The experience of large randomized clinical trials tends to confirm this perception. For example, the recently conducted landmark Clinical Outcomes Utilizing Revascularization and Aggressive Drug Evaluation (COURAGE) study had protocols for intensive management of all coronary risk factors, but weight loss showed the poorest outcome.5 This was despite follow-up visits to review exercise and dietary compliance every 3 months during the first year and every 6 months thereafter.

A few studies have demonstrated that significant weight loss can be achieved but at high cost and effort, similar to what was entailed in the Ades study.1 The Finnish Diabetes Prevention Study employed an intensive 7-point intervention to try to prevent subjects with impaired glucose tolerance from converting to type 2 diabetes mellitus.6 The intensive intervention group lost 4.2±5.1 kg (versus 0.8±3.7 kg in the usual-care group) at 1 year, and this ultimately translated into a 58% relative decrease in the incidence of type 2 diabetes mellitus compared with usual-care. Subjects in the intensive intervention group received 7 hours of dietary counseling during the first year of the study in addition to individual exercise prescription and supervised circuit training sessions. Similar findings were described in the Diabetes Prevention Program, which compared an intensive lifestyle intervention to metformin for prevention of type 2 diabetes mellitus in subjects with impaired glucose tolerance.7 The intensive intervention included 16 individual counseling sessions focusing on both diet and exercise over the first 24 weeks of the intervention plus individual or group sessions on a monthly basis throughout the remainder of the study. Subjects in the intensive intervention group lost an average of 5.6 kg over the 3 years of the study (with weight loss of >6.5 kg at 1-year). Dietary caloric intake decreased an average of 450 kcal per day, and physical activity increased by approximately 8 MET-hours (roughly 2000 kcal) per week. The intensive intervention reduced the relative incidence of type 2 diabetes mellitus by 58% compared with a usual-care group that received 1-time dietary and exercise advice. Readers of the Ades article and the editorial are undoubtedly well aware of these 2 diabetes prevention studies.

One issue that Dr Ades and his coauthors address in the article1 is whether weight loss is actually desirable in patients with established coronary heart disease, given the various studies that have identified an apparent “obesity paradox” where coronary patients who are overweight or even obese have better outcomes compared with normal-weight patients.8 A full discussion of the obesity paradox is beyond the scope of this editorial. Briefly, however, it is clear that a difference exists between baseline weight and voluntary weight change as to how each might relate to long-term outcomes. Few data are available to date on how voluntary weight loss in patients with established coronary disease affects prognosis, though a recent article from our own experience here at Mayo Clinic suggests that any weight loss during cardiac rehabilitation offers favorable prognosis in terms of subsequent cardiovascular events.9 The benefit was independent of initial body-mass index.
Given the intensity of the interventions that have proven successful in terms of weight loss, it is not surprising that clinicians generally have poor experience with weight loss and are often pessimistic about lifestyle change as a means of controlling coronary risk factors. Individuals who have been successful at losing at least 10% of body weight and maintaining that weight loss (±4.5 kg) over at least 5 years employ multiple behavioral strategies to control caloric intake, perform at least 450 minutes of physical activity (including some activity that could be considered “vigorous”), and weigh themselves frequently.10 Most patients prove unwilling to adjust lifestyle to these levels over a long enough period of time to achieve and maintain significant weight loss. The promise of more rapid weight loss stimulated by the latest fad diet holds more appeal for most patients.

Physicians may have limited skills related to exercise prescription, may be unable to fully address patients’ technical questions about caloric (or specific nutrient) content of specific foods, and are generally not trained in behavioral techniques such as motivational interviewing. On the other hand, should someone need an advanced medical degree to tell patients that they need to reduce caloric intake and get more physical activity? Perhaps more important than whether or not physicians have developed skills specific to weight loss interventions, most clearly have little time for lifestyle counseling in the current medical-economic climate. Referring patients to other (nonphysician) healthcare providers is an option, but healthcare plans vary as to whether services provided by a dietitian, exercise physiologist, or other nonphysician doing lifestyle counseling are covered. Medicare pays for 3 medical nutritional therapy visits, far short of the number of sessions included in the program described in this issue of Circulation by Ades,1 or of the interventions described in the Finnish Diabetes Prevention Study6 or the Diabetes Prevention Program.7 Though occasional exceptions occur, most healthcare plans will not reimburse patients for home exercise equipment or gym memberships.

In this regard, Ades and colleagues have chosen a potentially good vehicle for weight loss: cardiac rehabilitation. Patients eligible for cardiac rehabilitation now include those with stable angina, recent myocardial infarction, percutaneous coronary intervention, bypass surgery, valve replacement, or cardiac transplantation, and they are approved for multiple sessions (up to 36 in most insurance plans). This provides the opportunity to deliver a structured intervention for weight loss such as designed by Ades and his colleagues. However, it would seem that incorporating the dietary guidelines and high-caloric exercise prescription into the billable cardiac rehabilitation sessions would be necessary, as opposed to having extra sessions as per the protocol described in the Ades article.1 Existing cardiac rehabilitation personnel would have to be trained to deliver the intervention, given that dietitians or exercise physiologists could not bill for all of the sessions required to provide the intervention. It would seem that this is a potentially accomplishable task. Weight control is in fact 1 of the specific outcomes for cardiac rehabilitation, so it is expected that cardiac rehabilitation personnel will have the skills appropriate for the task.11

Although incorporation of a weight loss intervention based on dietary counseling and high-calorie-expenditure exercise into standard cardiac rehabilitation programs would be an important step forward, many patients with established coronary artery disease are currently not served by cardiac rehabilitation. A survey of 427,267 Medicare beneficiaries who survived at least 30 days after hospital discharge in 1997 conducted by Suaya and associates showed that only 13.9% of patients with acute myocardial infarction and 31.0% of patients with coronary artery bypass surgery participated in cardiac rehabilitation.12 In addition, a time limit exists on when participation in cardiac rehabilitation may start; thus, an obese patient with a clinical event in the remote past is no longer eligible for cardiac rehabilitation unless he or she has developed recurrent angina. Patients with other forms of atherosclerotic vascular disease such as peripheral artery disease or cerebrovascular disease are not generally eligible for cardiac rehabilitation.

In the design of the study, Ades and colleagues set the relative intensity of the high-calorie-expenditure exercise intervention at 56% to 60% of peak VO2 compared with 65% to 70% for the standard cardiac rehabilitation program.1 No comment can be found in the Methods or Discussion as to whether that was done for any reason other than to insure that the longer exercise sessions could be completed by the subjects. A great many studies have been conducted employing various types of patients (in generally small numbers) who are performing exercise of various types at different intensities to determine if one particular type of exercise program is better than another for weight loss. To date, no “best” exercise program has emerged, and the reviewer considers it to be axiomatic that the total caloric expenditure during exercise is the key factor in determining how much weight will be lost.

In summary, Dr Ades et al have provided us with an important article on how to promote significant weight loss in the context of a cardiac rehabilitation program.1 A substantial amount of weight was lost—8.2 kg in 5 months (0.425 kg per week = roughly 1 pound per week in US units)—with most of the weight loss (84%) maintained at 1 year. Although this is a small study in terms of patient numbers (N = 74), the results are sufficiently worthwhile that serious consideration should be given to incorporating this research into standard clinical practice in cardiac rehabilitation. We will certainly consider this for our cardiac rehabilitation program at the Mayo Clinic, Rochester. Successful incorporation into clinical practice could be facilitated by creation of a training manual for cardiac rehabilitation personnel so that the high-calorie-expenditure exercise program—and adjunctive dietary counseling—can be delivered by personnel already working in cardiac rehabilitation.

Disclosures
None.

References
1. Ades PA, Savage PD, Toth MJ, Harvey-Berino J, Schneider DJ, Bunn JY, Audelin MC, Ludlow M. High-calorie-expenditure exercise: a new


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