Physical Activity and Structured Exercise for Patients With Stable Ischemic Heart Disease

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EXERCISE WAS RECENTLY DESCRIBED AS "A MIRACLE drug" that can benefit every part of the body and substantially extend lifespan."[1] The authors suggested that the cardioprotective and systemic health benefits of regular exercise are underestimated by many clinicians, who often fail to emphasize the importance of regular physical activity, as well as the harms of physical inactivity, even though they routinely counsel patients about other modifiable cardiovascular risk factors, such as cigarette smoking, elevated cholesterol levels, and hypertension.

If exercise is a central and indispensible component of a comprehensive strategy for the primary prevention of coronary artery disease, the mantra "exercise is medicine" may be even more valid and is too often undervalued as a critical element in secondary prevention. However, many patients with heart disease who qualify for and require exercise training as an essential part of their recovery process are not receiving this therapy, often because of a lack of awareness by patients, health care professionals, and payers of the necessity, appropriateness, and effectiveness of this intervention.[2] This gap between scientific evidence and clinical practice is the focus of this Viewpoint, which discusses the importance of structured exercise and increased physical activity for patients with stable ischemic heart disease and the need to highlight the poor prognosis associated with being in the least fit, least active cohort (bottom 20%) for the 12 to 13 million US residents who comprise this population.

One of the most puzzling aspects of the medical community's failure to recommend regular exercise for patients with stable ischemic heart disease may be the fundamental simplicity and affordability of this intervention, particularly compared with other widely accepted preventive measures. For instance, the Clinical Outcomes Utilizing Revascularization and Aggressive Drug Evaluation (COURAGE) trial[3] showed no difference in clinical outcomes in patients with stable ischemic heart disease (eg, death, myocardial infarction, hospitalization for unstable angina) during a mean 55-month follow-up between those who underwent percutaneous coronary intervention (PCI) and optimal medical therapy (including both risk-reducing and symptom-reducing therapies) and those treated with optimal medical therapy and lifestyle modification. Anginal symptoms were reduced in both groups, and there was no significant difference in health status between the groups, demonstrating that optimal control of risk factors could favorably affect outcomes. Despite clinical guideline recommendations that, among patients with stable ischemic heart disease, revascularization may be deferred until the effects of optimal medical therapy and lifestyle modification have been assessed and validated,[4] more than half of the 1.3 million annual PCI procedures in the United States are performed electively for patients with stable ischemic heart disease,[5] and only about 45% of these patients receive optimal medical therapy prior to their procedure.[6] Equally concerning is that many of these patients do not participate in medically supervised or home-based exercise training programs, even after revascularization.

Increased exercise or physical activity and cardiorespiratory fitness appear to mitigate cardiovascular disease progression. Exercise has antiatherosclerotic, antithrombotic, anti-ischemic, antiarrhythmic, and positive psychological effects, and secondary prevention exercise training regimens in conjunction with optimal medical therapy have been shown to reduce total mortality by 20%, cardiac mortality by 26%, and nonfatal myocardial infarction by 21%.[7] Cardiorespiratory fitness may be expressed as metabolic equivalents (METs), for which 1 MET is approximately 3.5 mL of oxygen per kilogram of body weight per minute (mL/kg/min), which is equivalent to the energy requirement for basal homeostasis. Multiples of this value are often used to quantify relative levels of energy expenditure. Each 1-MET increase in exercise capacity is associated with an 8% to 35% (median, 16%) reduction in mortality,[8] which compares favorably with the survival benefit conferred by low-dose aspirin, statins, β-blockers, and angiotensin-converting enzyme inhibitors after acute myocardial infarction.

Current guidelines recommend 30 to 60 minutes of moderate-intensity aerobic activity at least 5 days a week for patients with stable ischemic heart disease to augment peak oxygen uptake and modify cardiovascular risk factors, as well as complementary resistance training at least 2 days a week to increase weight-carrying tolerance and skeletal muscle strength.[9] Resistance training also attenuates the rate-

See also p 141.

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pressure product when any given load is lifted and may reduce cardiac demands during daily activities such as carrying packages or lifting moderate-to-heavy objects. However, patients who are limited by anginal symptoms may be intimidated by these exercise recommendations. For such individuals, more modest goals may be proposed initially (10-15 minutes of moderate exercise 2-3 times a day), but these patients should be encouraged to work toward the optimal levels of exercise demonstrated to improve clinical outcomes. Even modest increases in physical activity reduce morbidity and mortality and create an aggregate conditioning effect that improves functional capacity and quality of life. Importantly, the greatest health gains are based on the first 15 to 29 minutes a day of exercise in previously inactive individuals.[1]

Despite these robust data of proven clinical benefit, many subsets of cardiac patients with ischemic heart disease, including women, older patients, patients with a limited education, those living in rural areas, or non-English speakers are not routinely referred to clinic-based training programs, or, if referred, may find such programs unsuitable to their needs, which leads to nonadherence.[2] As a public health imperative for patients who lack time, access, insurance, or will to attend clinic-based programs, home-based exercise training is a reasonable alternative. Such programs have been successfully implemented and can be supervised or monitored in a variety of ways, including via telephone and the Internet.

Patients with stable ischemic heart disease are among those for whom exercise is most important and for whom failure to exercise is potentially most harmful. Yet fear of developing exercise-induced angina often deters symptomatic patients from undertaking moderate-to-vigorous physical activity. However, studies continue to show a low risk of cardiovascular events in the rehabilitation setting. A study involving 3 Norwegian cardiac rehabilitation centers found rates of complications (such as fatal and nonfatal cardiac arrest) of 1 per 129 456 hours of moderate-intensity exercise.[10] Physicians and allied health professionals must take every opportunity to explain to concerned patients that moderate physical activity will not exacerbate cardiovascular disease and that the danger to health is not in exercise but in failure to exercise. Because patients with stable ischemic heart disease are frequently concerned that physical activity may provoke anginal symptoms, they can be reassured that such symptoms can be prevented by the prophylactic use of short-acting nitrates, an underappreciated and underused yet highly effective and safe preemptive strategy. Thus, for patients with stable ischemic heart disease, modest levels of exercise plus prophylactic nitrates can be a powerful and synergistic therapeutic approach for bolstering confidence in exercise and achieving greater degrees of health promotion and wellness.

The importance of regular physical activity as a cornerstone of disease prevention and treatment may not be sufficiently emphasized in contemporary medical education because little time is devoted to it. Most importantly, medical and allied health professionals should realize that allowing patients to remain physically inactive is as detrimental as cigarette smoking or not reducing other well-recognized cardiovascular risk factors. Physicians and other caregivers must view physical inactivity as a major modifiable risk factor. As an important corollary, exercise should be viewed as an integral part of the therapeutic armamentarium, an intervention that provides independent and additive benefits for patients' cardiovascular health and one that can elicit meaningful long-term improvements in anginal symptoms, functional capacity, and overall quality of life.

In an era of spiraling health care expenditures, structured exercise regimens, increased physical activity, or both, may be the ultimate low-cost therapy for achieving improved health outcomes. If the "exercise is medicine" adage is to be applied and optimized, the prescription at present remains underfilled for too many patients with stable ischemic heart disease. Thus, the medical community should embrace this clinically effective and cost-effective strategy as a first-line therapy, thereby enabling patients to realize the health benefits from a lifestyle intervention that must become more mainstream in US medical practice.

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