Exercise as Cardiovascular Therapy

To the Editor:

Drs Shephard and Balady\(^1\) discuss the potential dangers of excessive exercise and the appropriate dose of physical activity. They cite 2 reports showing that in healthy persons, prolonged exercise can cause myocardial fatigue with a temporary depression of myocardial function.\(^2\,3\) In addition, recent research demonstrates that prolonged aerobic exercise may cause subclinical myocardial necrosis in individuals with no risk factors for cardiovascular disease.\(^4\,5\) Evidence also exists that apparently healthy individuals who are not active enough to meet a traditional exercise prescription (structured vigorous activity) are at a high risk for subclinical myocardial damage caused by prolonged strenuous exercise.\(^6\)

These findings may be of some importance: a recent well-conducted, randomized trial demonstrated that a lifestyle approach to increasing participation in physical activity among previously sedentary persons can be effective and that it has effects on cardiorespiratory fitness, body composition, and blood pressure similar to those of a traditional structured exercise program.\(^7\) On the basis of this report, a recent editorial concluded that physicians can prescribe physical activity using either a structured or lifestyle approach at moderate or vigorous intensity and be assured that they are making a sound recommendation.\(^8\) However, recent research\(^9\) supports the argument that moderate amounts of activity (eg, lifestyle approach) are not equally effective in protecting against exercise-induced myocardial necrosis.\(^8\) Thus, physical activity counseling must be tailored to the needs and circumstances of the individual, thereby increasing the likelihood of success and decreasing the risk of myocardial injury during vigorous exercise.\(^6\)

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Response

We appreciate both the interest of Dr Koller in our recent review article and the opportunity to comment on the issue of whether subclinical myocardial necrosis is induced by a prolonged bout of exercise, such as a triathlon event.

Dr Shephard\(^1\) drew attention to the association between participation in a bout of very vigorous physical activity and the immediate risk of myocardial infarction many years ago, and others\(^2,3\) have since confirmed this relationship. Thus, it seems quite possible that there may be a parallel increase in the risk of subclinical myocardial necrosis during or immediately after vigorous exercise. However, in our view, the experimental evidence supporting the latter hypothesis is still weak.

Dr Koller offers only 2 brief abstracts,\(^4,5\) neither of which have yet blossomed into full-fledged reports. His own observations on 19 participants in a Berlin marathon run found one participant with mild increases in serum levels of cardiac troponin T and cardiac troponin I, but he could not perform a cardiological examination of this individual.\(^4\)

Rifai et al\(^3\) examined 23 participants in the Hawaii Ironman triathlon event. Two showed marked increases of cardiac troponin T and cardiac troponin I, 4 had mild increases of cardiac troponin T only, and the remainder had normal resting levels of cardiac troponin. In this data set, there was some suggestion of an association with an echocardiographic index of myocardial dysfunction (the respective increments of score for the 3 categories of the participants were 6.5, 2.3, and 1.4, respectively).

One immediate issue in both articles is the potential cross-reactivity between test reagents for cardiac and skeletal muscle troponin. The 2 reports make a 100-fold difference in their estimate of this cross-reactivity. It also remains to be clarified whether skeletal muscle contains and can release significant amounts of the “cardiac” isoform of troponin. Finally, there is, as yet, no basis for determining which individuals will develop certain do not think that everyone should go out and run a triathlon, but in the absence of procedures to detect the vulnerable, we find it hard to envision how any “tailoring” of excessive exercise by physicians or physiologists can reduce such risks.

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