VIA MEDICA

LETTER TO THE EDITOR

Cardiology Journal
2018, Vol. 25, No. 2, 287–288
DOI: 10.5603/CJ.2018.0040

ISSN 1897–5593

Exercise dose in clinical practice: Right is better than more

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Heterogeneity in physical activity habits is relevant to clinical cardiovascular (CV) practice on a patient-by-patient basis. Routine physical activity is an effective way to increase longevity and to reduce the risk of CV disease (CVD). It is now the standard of care to counsel sedentary or inadequately active patients to increase physical activity for both the primary and secondary prevention of CVD. In addition, recent data suggesting that high levels of physical activity may lead to significant CV consequences have led highly active patients and their clinicians to question the risk/benefit ratio of high exercise dose exposure.

Higher levels of physical activity are associated with a lower risk of CV events [1, 2] and elite athletes live longer than the general population [3]. Nevertheless, there is debate on the dose-response relationship of exercise and CVD outcomes [4, 5] and whether high volumes of exercise may accelerate coronary atherosclerosis [6, 7]. Nonetheless, CV prevention is in the first instance preferable by lifestyle changes, and many studies have shown an inverse association between physical activity level and the incidence of CVDs suggesting low aerobic fitness as a strong predictor for future CVD and all-cause mortality in both healthy and CVD patients [8, 9].

We read with great interest the very informative and well-performed landmark editorial from Kaleta et al. [10] recently published on 'Cardiology Journal' and the presented paper completely concurs with the authors. A growing segment of the global population chooses to participate in high levels of strenuous exercise for a myriad of reasons, including athletic performance, socialization, and weight management. Epidemiological data examining prior elite athletes, a group that by definition engages in exceptionally high exercise doses with respect to frequency, duration, and intensity during their first few decades of life, consistently document desirable late-life outcomes. On the contrary, there has been more recent concern that high levels of strenuous exercise may do more harm than good. It has been suggested that at the upper end of the exercise dose–response curve for mortality may be reverse J or even U shape with the highest exercise doses reducing or completely eliminating the tangible health benefits afforded by lower doses; it must be reminded that assessment of mortality risk for the upper end of exercise dose is hindered by the fact that most population-based cohort studies have relatively few individuals who exercise at doses that substantially exceed physical activity recommendations. Furthermore, although it remains unclear whether vigorous, long-term endurance exercise may accelerate atherosclerosis or cause adverse cardiac remodeling in some people, it is well-established that acute bouts of

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Received: 22.05.2017 Accepted: 12.07.2017

physical exercise transiently increase the risk of sudden death. These findings emphasize the potential importance of conservative exercise dose recommendations among patients with established CVD in secondary prevention clinical settings, also advocating cardiac rehabilitation programs to provide a useful resource for starting and tailoring an exercise program in patients with established CVD.

Current exercise specific dose recommendation of 150 min of moderate-intensity weekly exercise is based on the observation that 2 h to 2.5 h of moderate-intensity physical activity appeared to be the minimum amount required to reduce the all-cause mortality rate and supported by strong literature. In the common clinical cardiology practice we encounter an entirely broad range of physical activity levels, from completely sedentary patients to highly active elite athletes who seek care in the presented sports cardiology program. Consequently, the assessment of physical activity habits and exercise dose exposure with each patient must be performed on a routine basis, and the use of physical activity vital signs that capture each element of exercise doses, including intensity, duration, and frequency should be endorsed.

Patients who routinely exceed physical activity recommendations are increasingly common both in general CV practice and in specialized sports cardiology programs. These patients often present with distinct psychosocial profiles, medical concerns, and atypical disease presentation. In this patient population, atypical symptoms and small but significant decrements in exercise capacity are frequently indicators of evolving CVD; it is therefore incumbent to avoid the tendency to minimize the importance of subjective complaints, particularly those of exertional symptoms and relative reductions in exercise, among patients who endure high levels of exercise. Moreover, patients who chose to exercise at high doses often do not uniformly adapt other healthy lifestyle choices, with a consequent critical need to encourage active screening for unhealthy dietary intake, excessive alcohol consumption, and unchecked exposure to psychological stress, as would be recommended in any other patient population.

As a result, exercise and physical activity, much like medication used in clinical practice, are best measured and prescribed in consideration of dose, which is a function of intensity, duration, and frequency. Physical activity guidelines are based on a solid epidemiological foundation, and numerous randomized controlled trials are addressed to delineate the mechanisms by which exercise leads to health and longevity. In clinical CV practice, exercise dose and physical activity habits can and should be addressed with each patient with an ultimate goal of individualized counselling and exercise prescription. Even if progress has been made, there is much to be learned. Refinements in understanding of how exercise dose across the spectrum affects CV health are needed. Future gains can best be accomplished by the use of complementary strategies that include prioritized scientific funding, widespread application of technology designed to measure exercise dose both in clinical trials and in real-world living, and focused translational work geared toward delineating cellular and biochemical responses to exercise.

It seems mandatory to confirm, extend and amplify the brilliant remarks of the authors: there is complete agreement contained herein that it is unknown whether more intensive physical exercise enhances the CV system, whether thresholds exist, and which sports activities may not be beneficial. Given that this issue becomes more urgent due to the mass popularity of sport activities and the increasing engagement in extreme forms of endurance exercise, a specific counselling with open discussion about both theoretical and data-driven risks and benefits should emphasize that exercising at the extreme high end of the exercise dose spectrum is not a prerequisite for health optimization.

Conflict of interest: None declared

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