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Editorial

Exercise and heart. In medium virtus est?☆

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Regular aerobic moderate-vigorous physical activity (e.g., brisk walking) provides numerous cardiovascular benefits [1], and even jogging only 5–10 min/day reduces all-cause and cardiovascular mortality risk [2]. Resistance exercise (e.g., weight lifting) also has associated benefits on cardiovascular health [3].

More controversial, however, are the effects of very high amounts of strenuous endurance exercise (e.g., marathon or cross-country running, or cycling tour races). In this respect, the concept of cardiac overuse injury has been introduced to refer to the potential deleterious consequences of repeated exposure to this type of exercise on the heart [4]. Possible adverse effects include post-exertional (usually transient) right ventricular dysfunction and the chronic development of cardiac fibrotic patches. Strenuous endurance exercise, at least in veteran athletes, is also associated with an increased risk for atrial fibrillation [5,6].

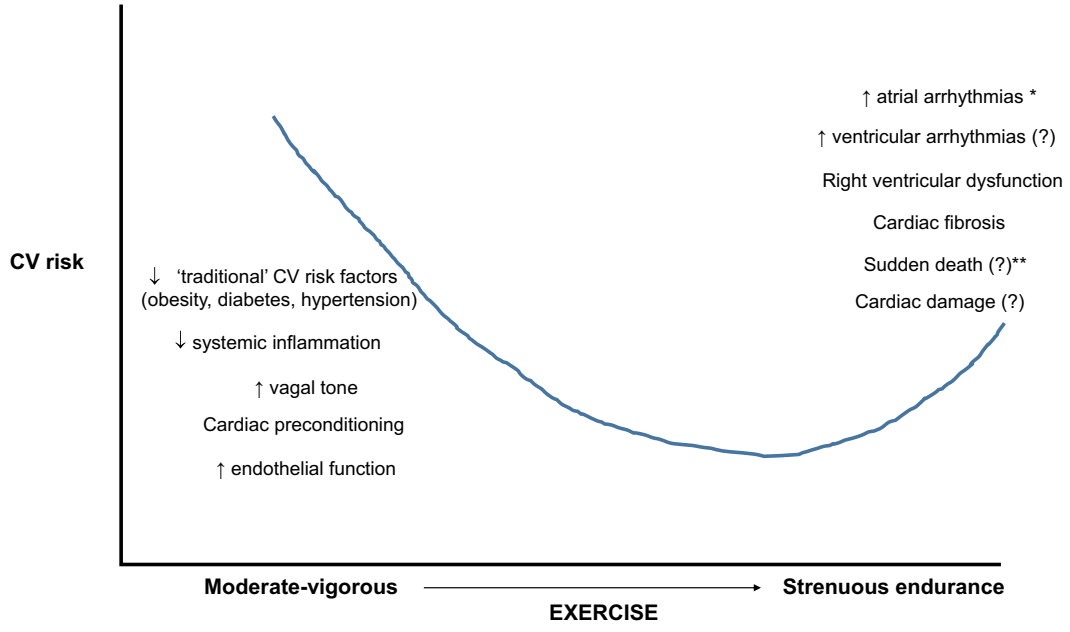

Fig. 1. Mechanisms of the possible reverse J-shaped association between cardiovascular risk and levels of exercise. Of note, the long-term clinical consequences of possible strenuous endurance exercise-induced cardiac alterations remain to be elucidated. See Fiuza-Luces et al. [9] for a recent review on the cardiovascular benefits of exercise. CV cardiovascular; * especially in veteran athletes; ** in those with a preexisting cardiac condition; ↑ increase; ↓ decrease.

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In this issue of *International Journal of Cardiology*, Wundersitz and colleagues present data on the impact of ultra-endurance exercise in the heart of recreational cyclists. The authors analyzed biochemical markers, echocardiography, and 24-hour Holter electrocardiography before and after cycling a mean of 167 km/day during 21 days (quite similar to a *Tour de France* without the mountain stages). It is important to note that the mean training background averaged ~10 h/week in the months leading up to the event. This is an interesting study, as cardiovascular complications have been observed more frequently in cycling than in other sports [7]. In accordance with previous results [8], no relevant changes were found in echocardiography, and this was also the case for biochemical markers, although the authors did not measure natriuretic peptides – which are known to increase after strenuous endurance exercise in professional road cyclists [8]. The authors did, however, find a considerable increase in arrhythmias, with a ten-fold rise in ventricular arrhythmias. This phenomenon was particularly evident in participants aged ≥45 years, with a 150-fold increase in bigeminal cycles.

Aerobic physical activity is very safe, has numerous cardiovascular benefits, and should be recommended at the individual and population levels [9]. However, a reverse J-shaped association could exist between cardiovascular risk and exercise (Fig. 1). That being said, even in the case of strenuous endurance exercise, the overall benefits are likely to outweigh the possible negative cardiovascular effects. Moreover, when present, it is important to note that the potential deleterious cardiovascular effects of this type of exercise affect a rather small subset of the physically active population, and individual counseling regarding potential increases in cardiovascular risk might be necessary. Previous data do not support a significant increase in the risk of sudden death with professional cycling, which is arguably the paradigm of strenuous endurance exercise [10]. Nevertheless, at these levels of extreme exercise activity, an in-depth cardiovascular evaluation including 24-hour Holter electrocardiography could be recommended in some cases, particularly in veteran athletes.

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