



# Sports and Exercise Cardiology Highlights from the American Heart Association Scientific Sessions 2019

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## Expert Analysis

The American Heart Association Scientific Sessions, held in Philadelphia, featured a joint session with the American College of Cardiology dedicated to the 'Care of the Athletic Heart' as well as a number of sports and exercise cardiology related research. Below we provide a summary of the key data presented at the Sessions.

### 1. *Safety of exercise in patients with Hypertrophic Cardiomyopathy (HCM)*

There were a number of presentations on the role of exercise in patients with HCM. Dr. Sharlene Day summarized the recent European Society of Preventive Cardiology recommendations for intensive exercise programs and competitive sports participation in patients with HCM.<sup>1</sup> Specifically, she emphasized that generalized restriction from competitive sport in all patients with HCM is probably unjustified. Rather, a more liberal approach to sports participation is reasonable with consideration of whether conventional risk factors for sudden cardiac death (SCD) are present. Importantly, she highlighted the importance of shared decision making and delivering the right message to the hypertrophic cardiomyopathy community. While it is unclear whether high intensity exercise and competitive sports participation in patients with HCM increases the risk of SCD, many patients with this disease are sedentary due to fear of sudden death from any level of exercise. It is therefore important to convey the message that the majority of patients with HCM should not be deprived of the benefits of regular recreational exercise.

### 2. *Response to exercise training in patients with HCM*

Dr. Katrin Dias discussed the training response of patients with HCM. She noted that maximal aerobic exercise capacity (VO<sub>2</sub>max) is often reduced in patients with HCM compared to the general population, and this is driven by a reduction in stroke volume reserve.<sup>2</sup> Interestingly, patients with HCM also

demonstrate a lower training-induced increase in VO<sub>2</sub>max compared to the general population. Finally, Dr. Dias outlined her current research that examines the safety and effectiveness of high intensity interval training on increasing exercise capacity in patients with HCM (**High Intensity Exercise for Increasing Fitness in Patients With Hypertrophic Cardiomyopathy** [↗](#)). These results will help form future exercise training guidelines for patients with HCM.

### 3. *Arrhythmias in endurance athletes*

Dr. Jonathan Kim discussed common arrhythmias encountered in endurance athletes including the management of premature ventricular contractions (PVCs). He highlighted the importance of obtaining a thorough history including the consumption of caffeinated beverages and emphasized that *symptom-limited* exercise tests should be performed in the evaluation of PVCs in athletes. With regards to management, typically reassurance and lifestyle counselling is efficacious. On the rare occasions in which conservative management fails, detraining is helpful and ablation may be considered in those with a high burden of PVCs who are symptomatic. It should be noted, however, that there are no data to demonstrate that the presence of isolated PVCs in athletes portends a poorer prognosis, and as such, these management recommendations are based on expert opinion only.

Atrial fibrillation (AF) is also commonly encountered in veteran endurance athletes. Dr. Kim cited recent work by Svedberg. *et al.* which examined the risk of stroke among cross-country skiers with AF.<sup>3</sup> In this specific cohort of skiers, previous studies showed an increase in AF in a dose-dependent relationship (those that competed most frequently and achieved higher positions had a higher risk of atrial fibrillation).<sup>4</sup> This more recent analysis demonstrated that skiers with AF had a lower risk of stroke compared to matched nonskiers with AF. However, skiers with AF had a higher risk of stroke compared to nonskiers without AF. Taken together, while exercise may provide some protection against stroke in individuals with AF, it is important to use traditional risk stratification scores and determine the need for anticoagulation, even in competitive athletes.

### 4. *Etiology of sudden cardiac death (SCD) and the utility of ECG screening programs*

Dr. Rachel Lampert finished the Care of the Athletic Heart session with a review of the etiology of SCD in athletes and the utility of electrocardiogram (ECG) screening programs. She showed the paradigm shift in our understanding of the etiology of SCD in young athletes. While HCM was previously considered the leading cause of SCD, autopsy data from the National Collegiate Athletic Association (NCAA), UK, and military reveal that

most young athletes with SCD have a negative autopsy, identified as sudden arrhythmic death syndrome.<sup>5</sup> These data have important implications for the debate regarding the effectiveness of ECG screening in athletes to prevent SCD. While ECG screening in athletes continues to be fiercely debated, many NCAA teams use ECG as part of their screening process. It is therefore important that cardiologists and those interpreting athlete ECGs have an understanding of the electrical changes expected with athletic remodeling. Dr. Lampert used case examples of athlete ECGs to help the audience discern normal electrical changes observed in athletes versus abnormal ECG patterns consistent with underlying cardiomyopathy.

A review of the key data and arguments for and against ECG screening in athletes can be found [here](#).

5. *Poster presentation: Routes and Barriers to Return to Play in Athletes with Cardiac Disease*

There were several Sports and Exercise Cardiology related poster presentations at the Sessions. Dr. Kayle Shapero and colleagues identified barriers young athletes with cardiac disease encounter when returning to play competitive sports.<sup>6</sup> Their data show that the vast majority of athletes are required to see multiple physicians and many meet with school administrators, counselors, social workers, and lawyers in order to return to play. Overall the lack of familiarity with exercise safety in inherited cardiac disease was a major barrier to sports participation. The authors hope that the recent revision of the European guidelines liberalizing sports participation in individuals with inherited cardiomyopathies, specifically HCM, will lead to more athletes with cardiomyopathy returning to regular exercise.

6. *Poster presentation: Athletes Performing Extraordinary Physical Activity at No Greater Risk of All-cause or Cardiovascular Disease Mortality*

It is well established that low to moderate levels of physical activity improve all-cause mortality in a dose-response fashion.<sup>7</sup> However, the relationship between high levels of exercise and cardiovascular disease remains uncertain. Some studies suggest a relative decline in mortality benefit and even an uptick in mortality with high levels of exercise.<sup>8-10</sup> Beyond the inability to discern causation and the presence of confounding variables in these observational data, they were underpowered to assess the risk of mortality in those who perform extraordinary levels of exercise. Dr. DeFina and colleagues sought to evaluate the association between all-cause mortality or cardiovascular disease with extraordinary levels of physical activity. The study included 66 individuals who self-reported exercise  $\geq 10,000$  MET-minutes/week. After an average of

ten-years follow up, there were no cardiovascular deaths, and two of the 66 individuals died from non-cardiac causes. There were no significant differences in coronary artery calcium scores, cardiorespiratory fitness or VO<sub>2</sub>max between individuals who exercised  $\geq 10,000$  versus those who exercised 3000-9999 MET-minutes/week. Taken together, these data imply that those who undertake extraordinary levels of physical activity are not at an increased risk of cardiovascular mortality, although most cardiovascular benefit can be derived from lower levels of exercise.

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