

Automated external defibrillator and emergency action plan preparedness amongst masters athletes: A commentary

Description

Sudden Cardiac Arrest/Death (SCA/D) is the leading medical cause of death in athletes [1,2]. Although exercise offers extensive health benefits, athletes may possess underlying cardiovascular risk factors for which vigorous exercise may transiently increase the risk of SCA/D [3,4]. Master athletes (those ≥ 35 years of age) are responsible for the vast majority of sports-related SCDs (80%-94%) [5-7]. A prospective study population showed that sports-related SCD was significantly higher among athletes aged 36 to 49 (6.64 per 100,000 person-years) compared to athletes aged 12-35 years (0.47 per 100,000 athlete person-years) [7]. Coronary artery disease is the most common cause of SCD amongst masters athletes, which is primarily driven by age [8]. Masters athletes are a growing population that demands attention to ensure their safe participation in exercise. The presence of an Emergency Action Plan (EAP) that allows for the timely access and usage of an Automated External Defibrillator (AED) remains the cornerstone for mitigating the risk of SCD [9].

Recently, we conducted a prospective cross-sectional study that investigated the perceived AED accessibility and EAP preparedness amongst a group of masters athletes [10]. Five hundred and one athletes completed a 40-item questionnaire. The majority of athletes participated in outdoor sports (57%), followed by indoor sports (22%) and field sports (21%). The predominant exercise settings were on the road or trails (41%) or in the gym (17%). These athletes spent most of their time participating in informal sporting sessions (71%), such as training activities, as opposed to formal competition events (29%). When inquired about AED availability, 66% of athletes reported an AED was present during indoor sports, but only 33% during outdoor sports. During formal sporting sessions, 40% reported that they noticed an AED to be present, and 52% reported that they were aware that a person with Cardiopulmonary Resuscitation (CPR) training was present. During informal sessions, the availability of an AED or personnel with CPR training was reported to be even lower, 28% and 23%, respectively. In summary, masters athletes predominantly spend their time participating in outdoor sports and in informal training sessions; both settings reported to have poor AED availability. Considering this, how do we best prevent and manage SCA/D in this high-risk population?

Cardiovascular screening of competitive athletes has been recommended by major medical organizations, including the American Heart Association (AHA), European Society of Cardiology (ESC), and Canadian Cardiovascular Society (CCS) [11-13]. The systematic medical evaluation of athletes may identify unsuspected cardiovascular conditions that predispose them to SCA/D [14,15]. Cardiovascular screening is recommended to consist of medical history and physical examination, although the

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use of Electrocardiography (ECG) for routine screening remains controversial. However, the role of screening in masters athletes currently remains undefined [16,17]. Nonetheless, targeted screening of athletes based on individuals' risk factors may be more appropriate. Routine history may reveal athletes with a family history of inherited cardiomyopathies, SCA/SCD, or symptomatic CAD and subsequently be recommended for further investigations. Further, we wonder if there is a role for Polygenic Risk Scores (PRS) to identify those individuals who are at the highest risk for a cardiac event. Recent studies have proposed PRS for atherosclerotic cardiovascular disease, cardiomyopathies, and rare channelopathies [18-20]. As these risk scores become more available, masters athletes may represent an ideal population for their incorporation as a screening tool. Currently, we recommend athletes and their physicians to undergo shared-decision making on the indication for cardiovascular investigations and the discussion surrounding possible sport restriction for certain cardiovascular conditions (e.g., hypertrophic cardiomyopathy, arrhythmogenic right ventricular cardiomyopathy, pathological dilated cardiomyopathy, and exercise-induced ventricular arrhythmias) [12,21]. Preventative health measures should also be emphasized in the form of educating masters athletes on their increased cardiovascular risks, the importance of promptly reporting new or concerning symptoms for medical evaluation, and the management of cardiovascular risk factors (e.g., smoking cessation, weight reduction, and screening and treatment of hypertension, dyslipidemia, and diabetes).

However, cardiovascular screening is not without limitations. Many underlying cardiovascular conditions that predispose athletes to SCD may not be readily detected by or clinically manifested during screening (e.g., pericarditis/myopericarditis, idiopathic ventricular fibrillation, concealed long QT syndrome, and commotio cordis). Therefore, the presence of an AED within exercise settings remains a valuable intervention for conditions undetected by screening. An observational study in Italy found that the presence of an on-site AED markedly improved neurologically-intact survival in exercise-related SCA victims; 93% in centres with an on-site AED, and 9% in centres without ($p < 0.001$) [9]. We recommend that athletes ensure emergency action plans are present to allow for timely access of AEDs. For exercise settings with inaccessible AEDs (i.e. trails, roads, mountains, oceans, or lakes), athletes should be encouraged to exercise in a group setting. Group members are encouraged to have CPR training or access to cell phones to ensure that a rapid emergency response is activated in the event of a medical emergency. This is particularly relevant to masters athletes who predominantly spend their time exercising

in outdoor settings. In athletes with known cardiovascular disease or of high cardiovascular risk, it may be pertinent for them to have activity modifications and to avoid exercise settings which may have limited cell phone service.

Conclusion

In conclusion, masters athletes are a growing population that are responsible for the vast majority of exercise-related SCDs. A significant proportion of masters athletes predominantly train in exercise settings that are reported to have poor AED access. Athletes and their physicians are encouraged to undergo shared-decision making to consider the indication and extent of cardiovascular screening, and to determine the optimal exercise protocol to maximize athletes' training goals while mitigating their risk for cardiovascular events.

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