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Mini Review

Relationship Between Arrhythmias and Level Activity of Athlete's-Role of HRMs

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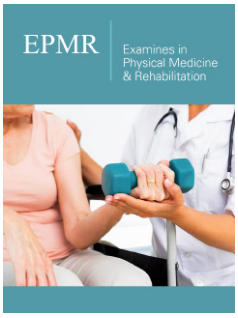

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Introduction

Among all papers devoted to the relationship between arrhythmias and endurance training, the study Andersen et al. is particular value [1]. The study includes all Swedish citizens completing the famous Swedish skiing event "Vasaloppet," enduring 90 kilometers of strenuous cross-country skiing. The participants are ranging from elite to recreational athletes and their training status (measured as maximal oxygen consumption) is closely related to their finishing time. The authors completed data about more than 4,400 participants of this strenuous ski marathon during the period 1989-1998.

Accounting for age, socioeconomic status and education, they observed a higher incidence of arrhythmias in cross-country skiers with a long history of endurance training [1]. Compared to those who had completed only one single race, those who had completed 7 or more races had a 29% higher risk of a subsequent arrhythmia. Further, elite athletes finishing at 100-160% of the winning time had a 37% higher risk of arrhythmias than recreational athletes finishing at more than 241% of the winning time. The associations were mainly driven by the most common types of arrhythmia: atrial fibrillation and brady arrhythmias. The authors did not find any significantly increased incidence of potential lethal ventricular arrhythmias with any of the exposures.

In another paper published in 2015 in BMJ, Andersen and co-workers presented a very unique analysis about the associations of exercise capacity and muscle strength in late adolescence with the risk of vascular disease and arrhythmia based on long-term observation of 1.1 million young Swedish men who participated in mandatory military conscription between 1972 and 1995. During a median follow-up of 26 years, more than 26,000 vascular disease events and more than 17,300 arrhythmia events were recorded. The study revealed that exercise capacity and muscle strength in late adolescents are independently associated with a lower risk of vascular disease and arrhythmia. Exercise capacity had a U-shaped association with risk of arrhythmia driven association with risk of atrial fibrillation and a U-shaped with bradyarrhythmia. Thus, the benefit of a lower risk of vascular events with higher exercise capacity (hazard ratio for vascular events of 0.67) was not outweighed by a higher risk of arrhythmia [2, 3].

Other risk factors of arrhythmias in athletes comprise age, exercise intensity and above all-exercise duration. A threshold for the increased risk of atrial fibrillation is 1500 hours of exercise per life. Atrial volume is a strong predictor of AF (athletes with AF have a larger leftatrial volume than those without) in older athletes (39±9 years old) and in veterans [4-7].The etiology and pathophysiology of AF in athletes are not clear. Increased activity of the parasympathetic vagal system is the most important modulator and trigger of AF in athletes, whereas a substrate has still been a subject of debate. Structural remodeling of atrial myocardium in response to permanent pressure and volume overloading ("overtraining syndrome"), inflammation and fibrosis are the most probable causative factors [8].

Ventricular tachyarrhythmias, identified in elite athletes without cardiovascular abnormalities, are frequent expressions of the "Athlete's Heart Syndrome" (up to 70%), though they are not related to the presence or magnitude of training-induced LV hypertrophy [9]. Brief deconditioning (5-6 months) usually results in the resolution of arrhythmias in athletes without organic heart disease [9]. Many authors of older and recently published original papers and reviews agreed that Supra Ventricular Tachyarrhythmias (SVT) in sportsmen are rare and usually benign. This kind of benign arrhythmia may appear with palpitations, weakness, lightheadedness, and even syncope. Frequent SVT may impair athletic performance. Sinus node reentry tachycardia is an uncommon finding in athletes. The average heart rate is between 130 and 140bpm. Atrial tachycardia is extremely rare in athletes. The atrial rate is generally between 150 and 200bpm [10-12].

The widespread use of sport Heart Rate Monitors (HRMs) contributes to the "catching" of an increasing number of tachyarrhythmias among both symptomatic competitive athletes and amateurs [13]. Especially in the case of "professionals" it can be a life-saving factor [14]. Although heart rate monitors do not recognize the type of arrhythmia, their worrying indications in conjunction with clinical symptoms allow for a fairly preliminary diagnosis [15]. In the future, the technological development of sport heart rate monitors will definitely provide further solutions for athletes allowing to determine the type of arrhythmias if they appear in sports training [16].

References

1. Andersen K, Farahmand B, Ahlbom A, Held C, Ljunghall S, et al. (2013) Risk of arrhythmias in 52 755 long-distance cross-country skiers: A cohort study. Eur Heart J 34(47): 3624-3631.
2. Andersen K, Rasmussen F, Held C, Martin N, Per T, et al. (2015) Exercise capacity and muscle strength and risk of vascular disease and arrhythmia in 1.1 million young Swedish men: Cohort study. BMJ 351: h4543.
3. Hoogsteen J, Bennekers JH, Wall EE, Hemel NM, Wilde AA, et al. (2004) Recommendations and cardiological evaluation of athletes with arrhythmias: Part 1. Neth Heart J 12(4): 157-164.
4. Nielsen JR, Wachtell K, Abdulla J (2013) The relationship between physical activity and risk of atrial fibrillation-A systematic review and meta-analysis. J Atr Fibrillation 5(5): 789.
5. Everett BM, Conen D, Buring JE, Moorthy MV, Lee IM, et al. (2011) Physical activity and the risk of incident atrial fibrillation in women. Circ Cardiovasc Qual Outcomes 4(3): 321-327.
6. Eijsvogels TM, Fernandez AB, Thompson PD (2016) Are there deleterious cardiac effects of acute and chronic endurance exercise?. Physiol Rev 96(1): 99-125.
7. Hong KL, Glover BM (2018) The impact of lifestyle intervention on atrial fibrillation. Curr Opin Cardiol 33(1): 14-19.
8. Olshansky B, Sullivan R (2014) Increased prevalence of atrial fibrillation in the endurance athlete: Potential mechanisms and sport specificity. Phys Sportsmed 42(1): 45-51.
9. Biffi A, Maron BJ, Giacinto B, Porcacchia P, Verdile L, et al. (2008) Relation between training-induced left ventricular hypertrophy and risk for ventricular tachyarrhythmias in elite athletes. Am J Cardiol 101(12): 1792-1795.
10. Biffi A, Maron BJ, Verdile L, Fernando F, Spataro A, et al. (2004) Impact of physical deconditioning on ventricular tachyarrhythmias in trained athletes. J Am Coll Cardiol 44(5): 1053-1058.
11. Viitasalo MT, Kala R, Eisalo A (1984) Ambulatory electrocardiographic findings in young athletes between 14 and 16 years of age. Eur Heart J 5(1): 2-6.
12. Verdile L, Maron BJ, Pelliccia A, Spataro A, Santini M, et al. (2015) Clinical significance of exercise-induced ventricular tachyarrhythmias in trained athletes without cardiovascular abnormalities. Heart Rhythm 12(1): 78-85.
13. Gajda R (2019) Extreme bradycardia and brady arrhythmias at athletes. What will technology development bring as a help to diagnosis them? Res Inves Sports Med 5(4).
14. Gajda R, Biernacka EK, Drygas W (2018a) Are heart rate monitors valuable tools for diagnosing arrhythmias in endurance athletes?. Scand J Med Sci Sports 28(2): 496-516.
15. Gajda R, Biernacka EK, Drygas W (2019) Atrial Fibrillation in athletes-easier to recognize today? Res Inves Sports Med 5(4).
16. Gajda R, Biernacka EK, Drygas W (2018b) "The problem of arrhythmias in endurance athletes: are heart rate monitors valuable tools for diagnosing arrhythmias?", Horizons in World Cardiovascular Research. Nova Science Publishers, New York, USA 15: 1-64.