Srce i krvni sudovi 2023; 42(1): 14-16

Case report

The effect of alcohol on sports and recreation: should these pleasures be mixed?

Tamara Stojmenovic[1], Nenad Dikic[1], Vojislav Giga[2,3], Ivan Nikolic[4], Marina Ostojic[3], Ana Djordjevic Dikic[2,3], Nebojsa Mujovic[2,3], Ivana Nedeljkovic[2,3]

[1]Faculty of Sport and Management in Sport, Singidunum University, Belgrade, [2] Faculty of Medicine, University of Belgrade, [3]Clinic of Cardiology, University Clinical Center of Serbia, [4]Private practice "Family medica"- Belgrade

Abstract According to the recommendations, physical activity contributes to health and is both a preventive and therapeutic measure for a large number of diseases. However, there are factors that can lead to the appearance of atrial fibrillation (AF) even in healthy individuals. We presented a case of a young athlete who showed superior functional capacity during a routine ergospirometry examination, but during recovery had paroxysmal AF that was interrupted by medication. Laboratory, echocardiographic and 24 hours Holter monitoring findings were normal. Subsequent medical history indicated that he had consumed alcohol the previous night. This confirms that alcohol excess is a risk factor for paroxysmal AF.

This case indicates the importance of following the recommendations that insist on a detailed history, physical examination, and further examinations of athletes and recreationists in accordance with the existing algorithms.

Key words athletes, atrial fibrillation, alcohol intake

Case presentation

A 19 years old athlete who prefer freestyle skiing, came for a routine examination.

He was completely asymptomatic, without any limitation during the sport. Laboratory blood analyses were normal. He has a negative family history for family diseases or cardiac death and he was non-smoker. He denied the use of drugs, illegal substances, occasionally consumes alcohol, and does not take any medications.

According to the recommendations for routine testing of asymptomatic athletes, echocardiography is not recommended, so the first step was an ECG (Figure 1). ECG was without pathological changes, and ergospirometry (CPET) was performed. The test showed superior functional capacity with peak oxygen consumption (peakVO2) up to 53.5 ml/kg/min, with no signs of ventilatory limitation (which excludes diastolic dysfunction due to cardiomyopathies), and without ST segment changes and rhythm disturbances. Hemodynamic response during the test was normal (Table 1).

However, during the 1st minute of recovery phase, sudden dyspnea and palpitations occurred accompanied by the significant drop of blood pressure from 170/98 mmHg to 100/60 mmHg. ECG showed atrial fibrillation, with a ventricular response of about 100/min with premature ventricular beats (Figure 2).

According to guidelines this was the first time diagnosed AF as AF was not diagnosed before, irrespective of its duration or the presence/severity of AF-related symptoms. We administered i.v. Propafenone 120 mg (1.5 mg/kg over 10 min) which resulted in prompt termination of AF and restoration of normal sinus rhythm. We did not use anticoagulants as this was a paroxysmal AF in person with low risk of thromboembolic events (stroke). However, predischarge conversation with the patient disclosed that previous night the athlete was at a party and consumed a large amount of alcohol.

As a part of further assessment and prevention of the new onset of AF we performed echocardiographic examination which revealed a normal left ventricular morphology and function, as well as normal left atrial structure without dilatation and signs of increased pressure.

Also we performed 24 hours ECG monitoring which did not show rhythm or conduction disturbances. Control ergospirometry confirmed excellent functional capacity without the occurrence of rhythm disorders during exertion.

He was recommended to perform routine control examinations and to avoid use of alcohol and other proarhythmic substances.

Discussion

According to the recommendations, moderate, regular physical activity (PA) is beneficial to health and represents the cornerstone of prevention of cardiovascular diseases, including AF. It is not only the effect of PA on the state of fitness, but also through the modification

Address for correspondence: Ivana Nedeljković, Faculty of Medicine, University of Belgrade, Clinic for Cardiology, University Clinical center of Serbia Višegradska 26, 11000 Belgrade, E-mail: ivannanedeljkovic@yahoo.com

Figure 1. Baseline ECG: sinus rhythm, 61 bpm, incomplete right bundle branch block

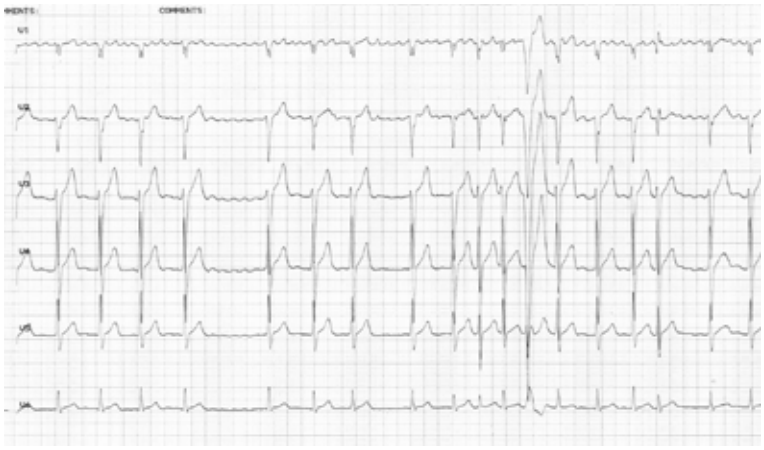

Figure 2. ECG during the 1st minute of recovery: atrial fibrillation, with a ventricular response of about 100/min with premature ventricular beats

Table 1. Hemodynamic changes during cardiopulmonary exercise test (CPET)

Rest HR (bpm)	61±12
Peak HR (bpm)	177±75*
Rest SBP (mmHg)	120±12
Peak SBP (mmHg)	170±25*
Rest DBP (mmHg)	70±12
Peak DBP (mmHg)	98±10*

***p<0.0001**
HR-heart rate; SBP-systolic blood pressure; DBP- diastolic blood pressure

of many of its predisposing factors[1-3]. Patients at risk of AF should therefore be motivated to exercise, but the dosing of PA is very important. AF is more common in active and former elite athletes as well as recreational athletes who perform high-intensity endurance training. This effect of sports on the occurrence of AF as well as other adverse events is described by the *U* curve. At the beginning of playing sports, in men, the risk of CV events decreases, but over time, with the length of the sports activity and proportionally with the intensity of the training, the risk of AF and atherosclerotic complications increases. This association was not confirmed in women [4,5]. There is relationship between AF and vigorous physical activity, mainly related to long-term or endurance sport participation. Based on these data, patients should be encouraged to undertake moderate-intensity exercise and remain physically active to prevent AF incidence or recurrence, but maybe avoid chronic excessive endurance exercise (such as marathons and long-distance triathlons, etc.), especially if aged >50 years[6].

Thus, in persons with paroxysmal AF it is important to recommend a moderate intensity of aerobic sports activity and a moderate level of strength exercises (with weight). In hypertensive athletes, physical activity is a measure of treatment and prevention of AF. In addition to other non-pharmacological measures including: restriction of salt intake, weight reduction if applicable, balanced diet (eg Mediterranean diet) and smoking cessation, there is a strong recommendation to avoid alcohol intake during exercise[1,7].

In persons with known AF, underlying structural heart disease or preexcitation should always be ruled out before advising sports activity. It is also important to exclude hyperthyroidism, (forbidden) drug use as well as alcohol abuse. Intensive sports should be temporarily stopped until the identified cause is eliminated (IA recommendation)[1,3]

Exercise recommendations for individuals with arrhythmias and implantable cardiac devices are also very clear. Prior to exercise, evaluation and management of structural heart disease, thyroid dysfunction, alcohol or drug abuse, or other primary causes of AF is recommended[1]. Alcohol abstinence reduced arrhythmia recurrence in regular drinkers with AF[6].

However at the same times there is some gaps in evidence in the terms of the threshold lifetime sports activity for increasing the risk of developing AF is unknown. It is also unknown whether ongoing participation in vigorous exercise at the same intensity after successful AF ablation is associated with a higher risk of AF recurrence[1]. Further trials will give more aswers.

Conclusion

Alcohol excess is a risk factor for incident AF. This case indicates the importance of following the recommendations that insist on a detailed history, physical examination, and further examinations of athletes and recreationists in accordance with the existing algorithms.

References

1. Pelliccia A, Sharma S, Gati S, et al. 2020 ESC Guidelines on sports cardiology and exercise in patients with cardiovascular disease The Task Force on sports cardiology and exercise in patients with cardiovascular disease of the European Society of Cardiology (ESC). Eur Heart J 2021;42(1):17-96.
2. Pathak RK, Elliott A, Middeldorp ME, Meredith M, et al. Impact of CARDIOrespiratory FITness on arrhythmia recurrence in obese

individuals with atrial fibrillation: the CARDIO-FIT Study. J Am Coll Cardiol 2015;66:985-996.
3. Kirchhof P, Benussi S, Kotecha, et al ESC Guidelines for the management of atrial fibrillation developed in collaboration with EACTS. Eur J Cardiothorac Surg 2016;50:e1-e88.
4. Mozaffarian D, Furberg CD, Psaty BM, et al. Physical activity and incidence of atrial fibrillation in older adults: the cardiovascular health study. Circulation 2008;118:800-807.
5. Aizer A, Gaziano JM, Cook NR, Manson JE, Buring JE, Albert CM. Relation of vigorous exercise to risk of atrial fibrillation. Am J Cardiol 2009;103:1572-1577.
6. Hindricks G, Potpara T, Dagres N, et al. 2020 ESC Guidelines for the diagnosis and management of atrial fibrillation developed in collaboration with the European Association for Cardio-Thoracic Surgery (EACTS) The Task Force for the diagnosis and management of atrial fibrillation of the European Society of Cardiology (ESC) Developed with the special contribution of the European Heart Rhythm Association (EHRA) of the ESC. Eur Heart J 2020;42:373-349.
7. Kwok CS, Anderson SG, Myint PK, Mamas MA, Loke YK. Physical activity and incidence of atrial fibrillation: a systematic review and meta-analysis. Int J Cardiol 2014;177:467-476.

Sažetak

Dejstvo alkohola na sport i rekreaciju: da li se ova dva zadovoljstva mogu kombinovati?

Tamara Stojmenović[1], Nenad Dikić[1], Vojislav Giga[2,3], Ivan Nikolić[4] , Marina Ostojić[3], Ana Đorđević Dikić[2,3], Nebojša Mujović[2,3], Ivana Nedeljković[2,3]

[1]Fakultet za sport i menadžment u sportu, Iniverzitet Singidunum, Beograd, [2]Medicinski fakultet, Univerzitet u Beogradu, [3]Klinika za kardiologiju, Univerzitetski Klinički centar Srbije, [4] Privatni fakultet "Family medica"- Beograd

Prema preporukama, fizička aktivnost doprinosi zdravlju i istovremeno je preventivna i terapijska mera za veliki broj bolesti. Međutim, postoje faktori koji mogu dovesti do pojave atrijalne fibrilacije (AF) čak i kod zdravih osoba. Prikazali smo slučaj mladog sportiste koji je tokom rutinskog ergospirometrijskog pregleda pokazao superiorni funkcionalni kapacitet, ali je tokom oporavka imao paroksizmalni AF koji je prekinut lekovima. Laboratorijski, ehokardiografski i 24-časovni nalazi Holter monitoringa bili su normalni. Naknadna medicinska istorija je pokazala da je prethodne noći konzumirao alkohol. Ovo potvrđuje da je višak alkohola faktor rizika za paroksizmalnu AF. Ovaj slučaj ukazuje na važnost poštovanja preporuka koje insistiraju na detaljnoj anamnezi, fizičkom pregledu, kao i daljim pregledima sportista i rekreativaca u skladu sa postojećim algoritmima.

Ključne reči: *sportisti, atrijalna fibrilacija, unos alkohola*