

# Exercising recommendations for paroxysmal AF in young and middle-aged athletes (PAFIYAMA) syndrome

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We have recently described a new syndrome: strenuous endurance exercise-related atrial fibrillation (AF) under the acronym of ‘paroxysmal AF in young and middle-aged athletes’ (‘PAFIYAMA’). Provided that other risk factors for AF and underlying conditions have been excluded (1), the diagnostic criteria for this syndrome entail a number of conditions, classified as major and minor. An enhanced risk of AF has been clearly documented in endurance athletes (top-class, elite and recreational) (2-5), and such risk typically ranges between 1.2- to 15-fold compared to the general, sedentary population (the better cardiovascular fitness, the higher incidence of AF) (6-11). Anecdotally, the last author of this manuscript (F Sanchis-Gomar), a physician himself, was a competitive endurance cyclist for 10 years and a paradigm of PAFIYAMA syndrome. Briefly, he has suffered from left atrial enlargement and a first episode of paroxysmal AF early in life, at the age of 26 years. After 5 years of recurrent episodes, pulmonary vein isolation by trans-venous cryoablation seemed to be the only successful treatment. Although he has suffered no more AF episodes since then, high-intensity exercise would be no longer advisable.

The real incidence of PAFIYAMA syndrome may be much higher than expected, and the cases that have been diagnosed so far may only represent the “tip of the iceberg”. Nevertheless, the potential clinical implications and the impact on patients’ lifestyle at diagnosis are both meaningful, so that PAFIYAMA syndrome may soon

become a public healthcare issue if one considers the large number of subjects regularly performing endurance exercise (i.e., medium-distance running, cycling, mountain walking, etc.). In general, these patients have no information about the best management of their condition, and several doubts immediately emerge at diagnosis: Will I be able to continue training or practicing physical exercise? If yes, How? How much? What type, frequency and intensity? To date, exercising recommendations for these patients are totally lacking, so putting these subjects at large risk of developing cardiac rhythm disturbances needing to be managed by invasive therapies, i.e., oral anticoagulation, antiarrhythmic drug therapy (flecainide, propafenone, amiodarone or sotalol, among others) or ablation. Taking together the aforementioned considerations, and based on our previous experience, we purpose the following preliminary recommendations:

- ❖ The first and obvious recommendation is increasing public awareness of this syndrome;
- ❖ Do not allow that PAFIYAMA syndrome impedes you from exercising and living a fulfilling and active life;
- ❖ Modulation of physical exercise seems the best approach for significantly limiting the number and the intensity of the crises, particularly in those subjects with recent diagnosis of PAFIYAMA syndrome with atrial dilation;
- ❖ Regular exercise may be safe in patients with PAFIYAMA syndrome, although it depends of

individual circumstances, i.e., frequency, duration, precipitating factors, symptoms associated, modes of termination of AF, among others (cardiologist with sports medicine expertise should be consulted);

- ❖ Discussion with a cardiologist may be advisable about the “pill-in-the-pocket” strategy while exercising. Importantly, following the ESC Guidelines on AF (12), it should be kept in mind that patients should refrain from exercise while AF episode persist and/or resting for at least 6–8 hours after having taken the drug (i.e., two half-lives of the antiarrhythmic drug), either flecainide or propafenone;
- ❖ Light to moderate intensity endurance exercise has been shown to be even protective for chronic AF (13). Accordingly, a minimum of 150 min/wk of light to moderate-intensity aerobic exercise is beneficial, and hence, recommended;
- ❖ Aerobic exercise training program should be tailored regarding intensity, time (duration) and frequency. The intensity and the duration of exercise seems to be critical in exercise-induced atrial remodeling (14), i.e., more training, more atrial remodeling. Accordingly, we recommend adapting/reducing intensity, duration and frequency of aerobic training in those patients recently diagnosed. One option to easily calculate the optimal intensity is decreasing a step of those stages described below: light [ $<3$  metabolic equivalents (METs)], moderate (3–6 METs), and vigorous ( $>6$  METs). In any event, the training intensity should not exceed 85% of the peak heart rate (HR). As for duration (time) and frequency, 200 min/wk and 3–5 days/wk are the maximum recommended because its demonstrated benefits (15);
- ❖ Aerobic exercise should be performed in sessions of no less than 10 minutes of duration;
- ❖ A HR monitor should always be employed: if the pulse is too high, symptoms are more likely. A reliable approach to bring back the pulse rate should be identified;
- ❖ When exercise causes palpitations, chest pain, severe breathlessness or exhaustion, it may be better to cease physical activity and refer to a cardiologist;
- ❖ Muscle-strengthening activities involving the bulk of the muscles (legs, arms, back, chest, abdomen, and shoulders) are highly recommended (typically, 2 days/wk);
- ❖ Alcoholic and/or energy drinks consumption should be always avoided, especially during exercise. Both are

risk factors, alone or in combination;

- ❖ These recommendations may be obviously challenging and improbably (if not impossible) to be followed by professional athletes. In such cases, antiarrhythmic drug and/or ablation may be the first line therapy counseled.

Supranational collaborative studies should also be urgently planned to accurately defining the real incidence of PAFIYAMA syndrome in exercising subjects, meant to identifying reliable predictive factors and diagnostic biomarkers (16), which may help to timely identifying a subset of subjects at increased risk for this condition. This would ultimately allow to safeguard athletes' health and prevent unnecessary healthcare expenditures in a world with increasingly limited resources.

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## Footnote

*Conflicts of Interest:* The authors have no conflicts of interest to declare.

## References

1. Sanchis-Gomar F, Perez-Quilis C, Lippi G, et al. Atrial fibrillation in highly trained endurance athletes - Description of a syndrome. *Int J Cardiol* 2017;226:11-20.
2. Mont L, Sambola A, Brugada J, et al. Long-lasting sport practice and lone atrial fibrillation. *Eur Heart J* 2002;23:477-82.
3. Karjalainen J, Kujala UM, Kaprio J, et al. Lone atrial fibrillation in vigorously exercising middle aged men: case-control study. *BMJ* 1998;316:1784-5.
4. Molina L, Mont L, Marrugat J, et al. Long-term endurance sport practice increases the incidence of lone atrial fibrillation in men: a follow-up study. *Europace* 2008;10:618-23.
5. Baldesberger S, Bauersfeld U, Candinas R, et al. Sinus node disease and arrhythmias in the long-term follow-up of former professional cyclists. *Eur Heart J* 2008;29:71-8.
6. Grimsmo J, Grundvold I, Maehlum S, et al. High prevalence of atrial fibrillation in long-term endurance

- cross-country skiers: echocardiographic findings and possible predictors--a 28-30 years follow-up study. *Eur J Cardiovasc Prev Rehabil* 2010;17:100-5.
7. Andersen K, Farahmand B, Ahlbom A, et al. Risk of arrhythmias in 52 755 long-distance cross-country skiers: a cohort study. *Eur Heart J* 2013;34:3624-31.
  8. Aizer A, Gaziano JM, Cook NR, et al. Relation of vigorous exercise to risk of atrial fibrillation. *Am J Cardiol* 2009;103:1572-7.
  9. Thelle DS, Selmer R, Gjesdal K, et al. Resting heart rate and physical activity as risk factors for lone atrial fibrillation: a prospective study of 309,540 men and women. *Heart* 2013;99:1755-60.
  10. Drca N, Wolk A, Jensen-Urstad M, et al. Atrial fibrillation is associated with different levels of physical activity levels at different ages in men. *Heart* 2014;100:1037-42.
  11. Andersen K, Rasmussen F, Held C, et al. Exercise capacity and muscle strength and risk of vascular disease and arrhythmia in 1.1 million young Swedish men: cohort study. *BMJ* 2015;351:h4543.
  12. Kirchhof P, Benussi S, Kotecha D, et al. 2016 ESC Guidelines for the management of atrial fibrillation developed in collaboration with EACTS. *Eur Heart J* 2016;37:2893-962.
  13. Santos-Lozano A, Sanchis-Gomar F, Barrero-Santalla S, et al. Exercise as an adjuvant therapy against chronic atrial fibrillation. *Int J Cardiol* 2016;207:180-4.
  14. Sanz-de la Garza M, Grazioli G, Bijnens BH, et al. Acute, Exercise Dose-Dependent Impairment in Atrial Performance During an Endurance Race: 2D Ultrasound Speckle-Tracking Strain Analysis. *JACC Cardiovasc Imaging* 2016;9:1380-8.
  15. Elliott AD, Mahajan R, Pathak RK, et al. Exercise Training and Atrial Fibrillation: Further Evidence for the Importance of Lifestyle Change. *Circulation* 2016;133:457-9.
  16. Perez-Quilis C, Lippi G, Mena S, et al. PAFIYAMA syndrome: prevention is better than cure. *J Lab Precis Med* 2016;1:8.

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