Is the Clinical Condition Sovereign in the Post-COVID High-Performance Athlete? Decisions Based Only on Imaging studies?

Multiple publications offer guidance on post-COVID-19 assessments and return-to-sport schemes. Most of them have taken the severity of the virus into account to indicate medical tests and adequate periods of rest and activity.

Systematic training for this special group of high-performance athletes is a priority to achieve their goals. Recent medical research has drawn attention to magnetic resonance imaging (MRI) findings that suggest edema, inflammation, and nonischemic fibrosis in a large majority of patients who had the disease. (1) In another publication, 15% (4 out of 26) of competitive athletes presented with similar disorders in MRI imaging. (2) Beyond the criticism that could be made of those studies (this article is not intended to criticize), it is "reckless", or at least "hasty", that these studies have been taken up by mass media to express concern about the possibility that high-performance athletes suffer from serious events (sudden death) when they return to sports, or in the near future. Athletes have echoed this information, creating a situation of fear, and sometimes panic, that alters their quality of life.

Magnetic resonance imaging performed on athletes who had asymptomatic or mild symptom COVID-19 revealed edema in T2 sequence (time required to lose 63% of its transverse magnetization) and delayed enhancement of low magnitude. These findings, with normal volumes and no structural changes, have led to suggest myocarditis and encourage to take action regarding sports practice. This situation causes serious (physical, psychological, social and economic) difficulties in the athletes' lives.

We wonder if these imaging findings may indicate behaviors beyond the clinical condition, the resting and stress ECG, or the echocardiography. Is it exaggerated to take these findings as signs of myocarditis (they are not per se) in athletes and act accordingly? Will these alterations in T1 and T2 sequences be common with any other virus, in which case nobody would think of requesting an MRI? Would these athletes have abnormal late enhancement findings on a pre-COVID-19 MRI?

Only an adequate long-term follow-up can give us the answers. However, while experience is increasing, many athletes and sports can miss chances for growth. Let us think hypothetically what would happen if all post-COVID-19 athletes were indicated MRI and 78% (as described in JAMA's first paper) presented evidence of edema and/or fibrosis. Only 22% of athletes would be able to compete.

While opinions may vary as events unfold, we believe –at least for now– that returning to high-performance sports should be based on clinical aspects (including, when necessary, inflammatory markers), ECG, echocardiography, Holter, and exercise testing. Magnetic resonance imaging would be reserved, in asymptomatic athletes, as a second-level test, depending on the findings in the first assessment.

Conflicts of interest

None declared.

(See authors' conflicts of interest forms on the website/ Supplementary material)

Ethical considerations

Not applicable.

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A Possible Horizon in Heart Transplantation

The recently published opinion article The Challenge of Expanding the Boundaries of Heart Transplantation in Argentina, by Belziti and Marenchino, (1) evidences an old problem worldwide: the huge difference between the number of donors and the growing number of patients requiring transplantation. Heart transplantation is the gold standard for the treatment of end-stage heart failure, while the ideal number would be 6 transplantations per million inhabitants. (2) With a total number of 78,218 transplants between January 1992 and June 2017, the median survival rate is 13.9 years according to the International Society for Heart Lung Transplantation registry. (3)

Protocol recommendations for the selection of cardiac transplant candidates include conditions that were absolutely contraindicated some time ago, such as cancer, HIV, age > 65 years, and amyloidosis, among others. This increases the asymmetry between the number of recipients and potential donors. (4) Since

most donors come from road traffic accidents, there is a continuous reduction of the donor pool due to the efficiency of road safety measures. Such is the case of the European Union, reporting an average of 51 deaths in traffic accidents per million inhabitants in 2019, a 2% reduction since 2018 and a drop of 23% since 2010 (https://ec.europa.eu/commission/presscorner/detail/es/qanda_20_1004). Today, the global trend is to accept donors that would not have been accepted a few years ago, such as people with a history of cardiac arrest, high doses of inotropes, cocaine abuse, HIV-positive, and advanced age.. All of them are considered suboptimal donors, but with a correct evaluation, and considering the circumstances of the recipients, good results are achieved. In Argentina, even though we have followed the global trend of increasing the number of donors -taking risks that can be detrimental to the results of each health center- this has not been reflected in an increased number of transplants performed annually (120 in the past decade). (5) With this number of patients, it is difficult to push the limits when it comes to maintain positive outcomes.

In turn, other factors determine that more severe patients be transplanted. Delayed referral of patients to heart failure and transplant centers and socioeconomic reasons play a key role, in addition to prolonged time on the waiting list. As a result, candidates end up with high risk IMPACT and INTERMARCS I and II scores, which increase their early morbidity and mortality. In this context, transplantation outcomes may not reproduce those achieved in other countries, in terms of 30-day and 1-year survival.

The geographical extension of our country influences on the logistics to transfer the ablation equipment, so use of organ preservation and transport systems would be required to extend the ischemic time and improve preservation, in order to increase the pool of suboptimal donors. Programs for ablation after circulatory death require clear legislation, and funding to ensure continuity and sustainability. Definitively, the development of ventricular assist programs would not only allow the management of advanced heart failure as a bridge to transplantation, candidacy, recovery, in cases of primary graft failure or acute refractory rejection with hemodynamic compromise, but also the treatment of cardiogenic shock of various etiologies. There is evidence that patients with INTERMARCS I and II should be assisted with short-term devices, ECMO, or univentricular or biventricular axial flow centrifugal pumps as a bridge to transplantation. The industry has echoed this problem and developed different devices for every short, mid and long-term need. Although these devices have been improving generation after generation, the high costs make it difficult to implement them as needed.

In conclusion, we must redouble our efforts to improve organ-donor campaigns, encouraging the acceptance of suboptimal donors, and at the same time actively collaborate on legislation after circulatory death. Promoting the importance of incorporating these practices into the treatment of acute and chronic heart failure is essential in the medical community.

Conflicts of interest

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