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A Study to Assess the Effectiveness of Cycling on the Heart Function

Mr.Sudheer Babu.N[1], Prof.Dr.Manila Jain[2]

[1]Research Scholar Malwanchal University, Indore
[2]Research Supervisor ,Malwanchal University, Indore

Introduction

Activity-induced cardiac fatigue (EICF) is a condition that may develop after a bout of severe, sustained exercise. Imaging techniques and cardiac biomarkers, notably echocardiography, might be used to diagnose EICF. Numerous research, mostly involving male athletes, find that acute sustained hard exercise modifies cardiac biomarkers and/or systolic and diastolic functional indicators. Alterations in speckle tracking derived parameters of diastolic function seem to be followed by modifications to traditional indicators of systolic function in the EICF, suggesting a cascade effect in echocardiographic assessment. However, this EICF was short-lived in the vast majority of instances. The heart's function and biomarkers did normalise within 24 to 48 hours.

Athletes often benefit from short recuperation intervals between phases, unless in the event of multi-day intense activity. Therefore, it is reasonable to assume that the cumulative decrease in cardiac function caused by the physiological stress exerted on the myocardial during repeated and protracted exertion may slow down the recovery process. Many investigations looking at the effects of extended exercise over many days failed to find evidence of this accumulated cardiac exhaustion.

Athletes were the primary or secondary participants in these research. On the other hand, more and more women are taking part in these multi-day affairs, and some of them are even designated for them alone. Most women participate in these sports at a lower intensity than men do because their primary goals are satisfaction of basic human needs like enjoyment and social connection rather than victory.

The cardiovascular response of women to this kind of exercise has received less attention.

In a prior research on highly trained female cyclists, we showed that HR and HRV parameters changed during the course of the event in proportion to daily physical activity. However, it is still unclear what impact these kind of occurrences have on certain measures of heart function in female athletes. The purpose of this case study was to examine the effects of a moderate-intensity cycling stage race on the heart function of highly trained young female riders using both standard and two-dimensional speckle-tracking echocardiographic markers.

Methodology

The design opted for the study was case study design.100 male and female healthy cyclist were selected as sample.The settings were selected areas of indorecity.Simple random sampling was opted for the study. Each competitor was checked out by a doctor both before and after the bicycle competition, which was held 48 hours earlier. An incremental maximal cardiopulmonary exercise test (CPET) was performed on an electronically braked cycle ergometer in addition to a physical examination and a resting electrocardiogram (ECG). We followed the incremental protocol recommended by the French Cycling Federation, which consists of a warm-up phase, followed by a series of gradually increasing loads till exhaustion.The event was run in a noncompetitive manner, with the only objective being to cycle the whole 100 kilometres. The athletes stayed together throughout the flat stages but raced alone in the mountains. Due to the length of the stages, riders had to eat and drink often while racing. During this time between acts, participants were also permitted to drink as much water as they needed.

Results

They averaged 5.0 10.0 years of cycling experience and 100 km per week of training every week. In it, you can see their baseline CPET findings as well as anthropometric and physiological data. At rest, individuals were capable of consuming 52112.0 mL.min.kg1 of oxygen and producing 282.918.0 W of aerobic power.Within around (160 hours), with a mean stage length of 432 minutes, all competitors successfully completed the whole

circuit (100 km with 20 stages and 1 day of respite) (8hours and 10 minutes).

Overall, the average percentage of maximum HR maintained throughout all stages ranged from 68% to 79% (62%). Maximal aerobic power production typically ranged from 33% to 51%, with a mean of 51%. (normalized power). Finally, the RPE ranged from 1 to 9, with a mean of 4.5. After 20 days of cycling, the mean body weight decreased dramatically from 54.1 8.1 kg to 50.3 10.6 kg ($p = 0.01$). We found that the CPET taken 72 hours after the conclusion of the event showed a substantial increase in maximum aerobic power production without any change in maximal oxygen absorption. There was no change from pretreatment levels in either EF or tissue doppler peak velocity, and GLS values were also unchanged. No changes were seen in RV systolic function when measured by tissue Doppler, strain, Doppler echocardiography, or fractional area change in the tricuspid annular plane. For the atria, we saw no change in how the LA and RA worked. There were no changes to the reservoir, pipes, or pumps during the whole occurrence.

Conclusion

Our findings suggest that prolonged moderate-intensity stage cycling events do not lead to changes in heart function. Given the growing popularity of ultra-endurance competitions, our findings should provide some comfort to the medical community and athletes. However, given the limitations of such a small research, we must proceed with caution when interpreting the results. In order to fully conclude this case study, more research on a much bigger sample is required.

Reference

1) Douglas PS, O'Toole M, Rimm E, Ginsburg GS. Cardiac troponin T and I, echocardiographic [correction of electrocardiographic] wall motion analyses, and ejection fractions in athletes participating in the Hawaii Ironman Triathlon. Am J Cardiol. 1 avr 1999;83(7):1085–9.
2) Shave RE, Dawson E, Whyte G, George K, Ball D, Gaze DC, et al. Evidence of exercise-induced cardiac dysfunction and elevated cTnT in separate cohorts competing in an ultra-endurance mountain marathon race. Int J Sports Med. oct 2002;23(7):489–94. pmid:12402180
3) Shave R, George KP, Atkinson G, Hart E, Middleton N, Whyte G, et al. Exercise-induced cardiac troponin T release: a meta-analysis. Med Sci Sports Exerc. déc 2007;39(12):2099–106. pmid:18046180
4) Scharhag J, Herrmann M, Urhausen A, Haschke M, Herrmann W, Kindermann W. Independent elevations of N-terminal pro-brain natriuretic peptide and cardiac troponins in endurance athletes after prolonged strenuous exercise. Am Heart J. déc 2005;150(6):1128–34. pmid:16338248
5) Middleton N, Shave R, George K, Whyte G, Hart E, Oxborough D, et al. Altered left ventricular diastolic filling following a marathon is a reproducible phenomenon. Int J Cardiol. 31 oct 2007;122(1):87–9. pmid:17222472
6) La Gerche A, Connelly KA, Mooney DJ, MacIsaac AI, Prior DL. Biochemical and functional abnormalities of left and right ventricular function after ultra-endurance exercise. Heart. juill 2008;94(7):860–6. pmid:17483127
7) Neilan TG, Ton-Nu TT, Jassal DS, Popovic ZB, Douglas PS, Halpern EF, et al. Myocardial adaptation to short-term high-intensity exercise in highly trained athletes. J Am Soc Echocardiogr. oct 2006;19(10):1280–5. pmid:17000368
8) Charton M, Kervio G, Matelot D, Lachard T, Galli E, Donal E, et al. Exercise-Induced Cardiac Fatigue in Soldiers Assessed by Echocardiography. Front Cardiovasc Med. 2021;8:785869. pmid:34988130
9) Shave RE, Dawson E, Whyte G, George K, Gaze D, Collinson P. Effect of prolonged exercise in a hypoxic environment on cardiac function and cardiac troponin T. Br J Sports Med. févr 2004;38(1):86–8. pmid:14751955
10) Whyte GP, George K, Sharma S, Lumley S, Gates P, Prasad K, et al. Cardiac fatigue following prolonged endurance exercise of differing distances. Med Sci Sports Exerc. juin 2000;32(6):1067–72. pmid:10862531
11) Morville T, Rosenkilde M, Mattsson N, Dela F, Helge JW, Rasmusen HK. 2706 km cycling in 2 weeks: effects on cardiac function in 6 elderly male athletes. Phys Sportsmed. sept 2018;46(3):263–8. pmid:29770745
12) Williams K, Gregson W, Robertson C, Datson N, Whyte G, Murrell C, et al. Alterations in left ventricular function and cardiac biomarkers as a consequence of repetitive endurance cycling. European Journal of Sport Science. 1 mars 2009;9:97–105.