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SARS-CoV-2 associated cardiac abnormalities in elite athletes: results from the prospective, longitudinal COMMIT cohort

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Background/Introduction: Active myocarditis is regarded as an absolute contra-indication to competitive sports. Subclinical SARS-CoV-2 myocarditis/myocardial damage has been demonstrated 2-5% in athletes. However, the prognosis in elite athletes after SARS-CoV-2 cardiac involvement, with potentially detrimental effects on recovery, is currently unknown.

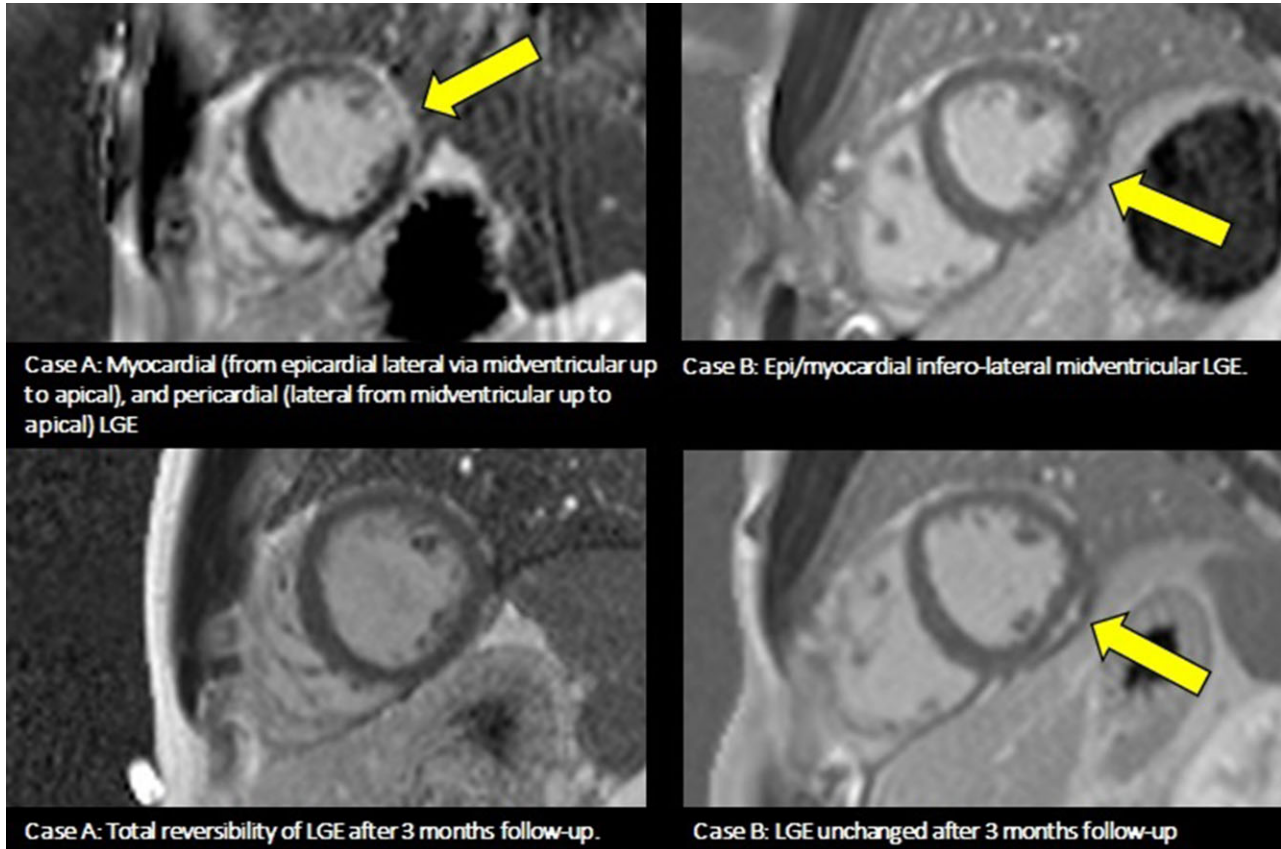
Purpose: We aimed to investigate the prevalence and clinical course of cardiac abnormalities in elite athletes after SARS-CoV-2 infection.

Methods: We retrospectively and prospectively included elite athletes in the COMMIT (COVid-19 Myocardial Manifestations in Intensive Top-level sports) cohort. Outcomes of interest were 1) incidence and clinical course of cardiac abnormalities on CMR, defined as reduced EF, increased EDV, presence of late gadolinium enhancement (LGE) (excluding hinge point fibrosis), increased T1 and/or T2 time); 2) clinically important arrhythmias defined as premature ventricular complex, (non-)sustained ventricular tachycardia on exercise ECG or 4-8 days Holter monitoring; 3) cardiac- symptoms/ events. SARS-CoV-2 infection was diagnosed with a positive- PCR or antibody test if unvaccinated.

Results: We included 85 elite SARS-CoV-2 recovered athletes (34% women), mean age 26.5 (± 7) years, with main athletic disciplines (≥ 10 hours/week) football (27%), cycling (12%), water polo (9%), field hockey (9%), and rowing (8%). Mean time between infection and CMR was 2.6 months (± 3). Mean CMR LVEDV/BSA was 120.6 ml/m² (± 21), LVEF 57.3% (± 5), RVEDV/BSA 126.2 ml/m² (± 22), RVEF 54% (± 4), and 1/85 (1.2%) showed increased T1 time after infection. In 4/85 (4.7%) myocardial LGE was present (Figure 1 and 2). In cases with LGE, after 11 (± 2) months of follow-up, one demonstrated complete resolution (i.e. no LGE present) after 3 months. One case showed persistent inflammation on three sequential CMRs (1, 3, 6 months post-COVID-19); at 9 months CMR demonstrated no inflammation, but persistent LGE. Two elite athletes had unchanged LGE, one at 3 months, and one at 5 and 9 months. No clinically important arrhythmias were found in athletes with LGE. At a mean follow-up of 7.8 (± 3.3) months, no symptoms/events were reported, and all had returned to sports. Pre-/post-SARS-CoV-2 infection CMR was available in 13/85 athletes; in this subgroup, no pathologic LGE or clinically important changes in ventricular volumes/function were found.

Conclusion: This longitudinal cohort of elite athletes demonstrates that infection with SARS-CoV-2 is associated with 4.7% of myocardial abnormalities, with varying clinical courses. There were no important arrhythmias, and we found no evidence of deleterious effects of sports after COVID-19. Prospective studies with comprehensive arrhythmia monitoring and long-term follow-up are needed to establish whether intensive sports is associated with long-term deleterious cardiac effects.

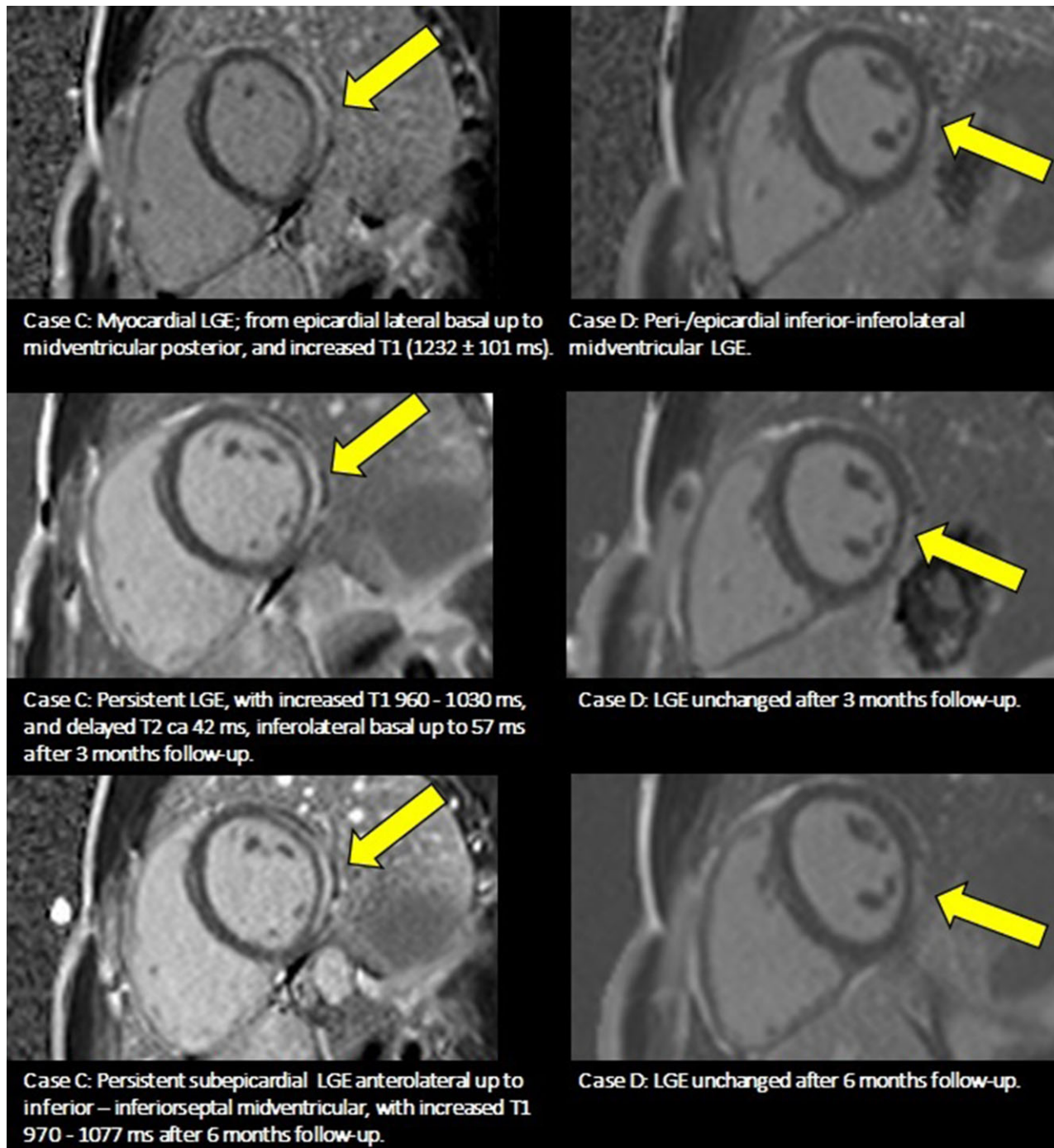
34.3.5 - Pre-Competition Screening and Sports Eligibility



Case series of post-SARS-CoV-2 infection, and follow-up CMR after 3 months in 2 cases (A and B) with Late Gadolinium Enhancement (LGE) after infection.

Figure 1.

34.3.5 - Pre-Competition Screening and Sports Eligibility



Case series of post-SARS-CoV-2 infection, and follow-up CMR after 3 and 6 months in 2 cases (C and D) with Late Gadolinium Enhancement (LGE) after infection.

Figure 2.