

Coronavirus and heart inflammation in athletes: What we know about myocarditis

August 17 2020, by Marie McCullough, The Philadelphia Inquirer



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A small but growing body of evidence shows that COVID-19 can damage the heart, sometimes fatally, even in a previously healthy young athlete.

This frightening fact is shrouded in so many unknowns that even expert medical groups can offer only limited guidance. That's why collegiate athletic conferences, professional sports leagues, and high school teams are debating what to do. The Big Ten Conference's debate ended with a decision to err on the side of caution.

"We just believed, collectively, there's too much uncertainty," Big Ten commissioner Kevin Warren said Tuesday in explaining why the conference decided to suspend all fall sports competition.

Here are some of the questions medical and sports authorities are grappling with.

What is myocarditis? Myocarditis is inflammation of the [heart](#) muscle, or myocardium, usually triggered by infection with a virus, including germs that cause the common cold. The inflammation is generally mild and goes away with rest. But it can also cause temporary or permanent heart problems, notably abnormal rhythms, progressive heart failure, even sudden [cardiac death](#).

How does the coronavirus damage the heart? The exact mechanisms are unclear, but studies suggest an immune system overreaction or an autoimmune response (a self-destructive attack on healthy tissue), or both.

It is also possible that the virus directly invades heart cells in the same way it invades the lungs, by binding to a protein called ACE2 on the surface of cells. This direct attack was seen in patients with MERS, a previous disease caused by a new coronavirus, but so far the evidence on COVID-19 is scant.

Are athletes at risk of COVID-19-related heart damage? They clearly are, but no one knows the level of risk.

In hospitalized COVID-19 patients, myocarditis is relatively common—affecting 7% to 23% of [intensive care patients](#), studies suggest—and dramatically increases the risk of death.

A disturbing finding is that heart inflammation can persist after recovery from [coronavirus](#) infection. A study conducted in Germany and published in July in *JAMA Cardiology* evaluated 100 recovered patients; 60% had evidence of ongoing myocarditis.

In athletes, myocarditis—whatever the cause—is rare, yet studies suggest it is a significant cause of sports-associated sudden cardiac death in players under age 35, accounting for 9% of these shocking cases.

During the pandemic, there have been [news reports](#) linking COVID-19 to cardiac damage or death in athletes. Michael Ojo, a 27-year-old former Florida State basketball player, collapsed and died last week during training in Serbia. He reportedly had tested positive for COVID-19 and recovered. Myocarditis has been found in at least five Big Ten athletes and several players in other conferences, according to ESPN.

"Whether or not it's 1% or 10%, it's still important," Jonathan Drezner, director of the University of Washington Medicine Center for Sports Cardiology and a consultant to the NCAA, told ESPN.

How is myocarditis diagnosed in athletes? Some colleges have started screening athletes for the condition, but their methods vary, and diagnosis can be difficult.

Athletes may have mild or no symptoms of heart inflammation until it's too late. They may have mild or no symptoms of COVID-19 infection even as it injures their hearts.

"There are reported cases of sudden cardiac death in non-hospitalized COVID-19-positive individuals with only mild symptoms," the European Society of Cardiology wrote in a recent paper on returning to sports after COVID-19 infection.

A blood protein called troponin is elevated in people with heart inflammation, but it can also rise with intense exercise.

"COVID-19-associated injury and its long-term consequences in athletes could be significantly underestimated if the assessment is defined merely by the presence of elevated troponin," the society advised.

Tests including an electrocardiogram and an echocardiogram can help with diagnosis.

How is myocarditis treated? In many cases, myocarditis improves on its own with rest. However, it can be unpredictable, and even before the pandemic, it posed treatment challenges.

In patients hospitalized with the condition, rigorous studies have shown steroids and other immune-suppressing drugs do not help.

Standard heart-failure drugs and supportive care such as pain relievers are the mainstay of treatment, but even with these, patients "can clinically deteriorate or develop end-organ dysfunction," researchers wrote in an article on COVID-19 and myocarditis published last month in the journal CJC Open.

Can athletes return to sports after COVID-19 infection? That may be the only question tougher than whether to suspend sports in the first place to avoid an outbreak among players.

In May, three sports cardiology specialists offered "a game plan" for

return to play that was published in *JAMA Cardiology* and endorsed by the American College of Cardiology's sports and exercise cardiology council.

In a nutshell, the plan recommends that athletes with asymptomatic, mild, or moderate COVID-19 be monitored for heart problems and swear off exercise for at least two weeks. Players who need hospitalization and develop myocarditis that does not resolve should follow existing guidelines for athletes with cardiovascular abnormalities.

The experts acknowledged that their proposed approach is subject to change, "given the clinical uncertainty" and unanswered questions.

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Citation: Coronavirus and heart inflammation in athletes: What we know about myocarditis (2020, August 17) retrieved 27 April 2024 from <https://medicalxpress.com/news/2020-08-coronavirus-heart-inflammation-athletes-myocarditis.html>

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