

# Myocarditis, COVID-19 and mRNA vaccines: Is there a connection?

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A small number of reports of myocarditis (inflammation of the heart muscle) have appeared in young adults not long after COVID-19 vaccination, but experts say the cases are mild and the link is unclear. Credit: Unsplash/CC0 Public Domain

Myocarditis, an inflammation of the heart muscle, is a medical condition you may not have heard much about—until recently. The Centers for Disease Control and Prevention (CDC) is monitoring a small number of cases of myocarditis that have arisen in teens and young adults not long after mRNA COVID-19 vaccination.

In May, the Advisory Committee on Immunization Practices COVID-19 Vaccine Safety Technical (VaST) Work Group, a special panel that advises the CDC, reported that the cases were identified "predominantly in adolescents and young adults" and in more males than females, arising about four days after vaccination.

Myocarditis can be caused by a variety of common viruses, explains Jeremy Asnes, MD, chief of pediatric cardiology at Yale Medicine and co-director of the Yale New Haven Children's Hospital Heart Center. "Examples include viruses that

cause typical colds or gastrointestinal illnesses.

Myocarditis can also be caused by certain medications, as well as by some autoimmune diseases," he says. "And, though rare, myocarditis can be caused by an immune response to a [vaccine](#) such as the smallpox vaccine, which was the most successful vaccine in world history."

At this point, it's too early to tell what may be causing the recently reported myocarditis cases. As with any [medical intervention](#), physicians and agencies—including both the Food and Drug Administration (FDA) and CDC—continually monitor the use and side effects of vaccines, which is why they're looking into these cases.

Still, doctors are reassuring patients and families. "This is an incredibly rare event," says Dr. Asnes. He added that patients seem to get better quickly. "I think that the most important message at this point is that we are still recommending kids older than 12 follow the vaccine recommendations from the CDC," he says. "While we are taking these reports of myocarditis very seriously, we—along with the CDC—continue to feel that the benefits of being vaccinated against COVID-19 far outweigh the very small risk, if any, of getting myocarditis related to the vaccine itself."

Right now, it's not clear whether or not the cases are related to receiving an mRNA COVID-19 vaccine. "We don't even know if it's an effect of the vaccine," he says. "It seems to be occurring in temporal relationship to the vaccine, but we don't know anything about causality," Dr. Asnes says.

What's comforting to know, he notes, is that "the cases seen thus far have been very mild."

## What is myocarditis?

Quite simply, "Myocarditis is inflammation of the heart muscle," says Erica Spatz, MD, MHS, a Yale Medicine cardiologist, "and there's a range of

different symptoms and levels of severity of myocarditis. Most often the inflammation is mild, and we treat it with anti-inflammatory medications, such as ibuprofen or a prescription medication called colchicine," she says. "Myocarditis, in most cases, gets better on its own without medical intervention." In rare cases, it can cause arrhythmia or weakness of the heart.

Myocarditis can occur in both children and adults.

### **What causes myocarditis?**

With myocarditis, there is often no identifiable cause. Sometimes, however, the triggering event can be a common [virus](#). "We know some viruses are more likely to cause myocarditis," Dr. Spatz says, such as the flu, adenovirus, parvovirus (Fifth Disease) or Coxsackie (hand, foot, and mouth disease). But patients who didn't have an obvious viral infection are also diagnosed with myocarditis. Some might report having had an upper respiratory infection in the previous few weeks, she says.

### **Does myocarditis occur with COVID-19 infection?**

There have been some case reports of myocarditis after COVID-19 infection. Some were in college athletes, which initially raised concerns among doctors. "That number was originally thought to be really high," says Yale Medicine cardiologist Rachel Lampert, MD. "But in subsequent publications, reporting on studies with tens of thousands of athletes, the actual incidence of myocarditis in [college athletes](#) with COVID is much lower than had been originally thought. In a recent study of over 19,000 athletes who underwent COVID testing, 3,018 had COVID, and of these, just 0.7% had cardiac involvement."

The fact that the condition itself has a range of known and unknown causes makes it especially difficult to understand right now. Doctors have observed that myocarditis sometimes follows COVID-19 infection. But "Whether the virus itself infects the heart, or whether it's the immune reaction to the virus that causes the myocarditis, is one of the things we don't know," Dr. Lampert says.

Another unknown is whether or not SARS-CoV-2, the virus that causes COVID-19, is more likely to cause myocarditis than other viruses. "Whether myocarditis was actually more common with COVID than with other viruses, we don't really know. We know that some people with COVID got myocarditis. But there was a lot of COVID at one time, and we may have been more tuned into these cases as compared with sporadic cases due to other viruses that are less prevalent," says Dr. Lampert. "It's one of the many questions we don't know the answer to."

### **What are the signs of myocarditis?**

Chest pain is the most common symptom of myocarditis, and the discomfort is typically more noticeable and pronounced when lying down rather than when sitting up. The pain is caused by inflammation, which can be found in the heart muscle, as well as in the pericardium, which is the sac the heart sits in, explains Dr. Asnes.

Adds Erin Faherty, MD, a pediatric cardiologist at Yale Medicine, "The pain is typically sharp and persistent versus brief pain that only lasts a couple of minutes. The patients we have seen all presented with persistent chest discomfort."

If you or a loved one experiences chest or heart pain after vaccination (or at any other time), seek medical attention. It's always a good idea to have it checked out by a doctor.

While physicians are waiting for more information and guidance from the CDC—and to learn more about this manifestation of myocarditis—it may put minds at ease to know that cardiologists find that "in general, if the heart has a temporary inflammation, it gets better," says Dr. Lampert.

Provided by Yale University

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