Prolonged SARS-CoV-2 Infection in a CAR T-Cell Therapy Recipient

In a recent case report, a team of physicians described an immunosuppressed patient with severe coronavirus disease 2019 (COVID-19) who was contagious for more than 2 months. Infectious virus was present in the patient’s endotracheal aspirate (ETA) 72 days after his COVID-19 diagnosis and 2 days before he died from the massive lung infection. The findings from the 73-year-old man, who had recently undergone chimeric antigen receptor T-cell (CAR-T) therapy, suggest that patients with COVID-19 who are severely immunosuppressed may need isolation for longer than the currently recommended 20 days.

The patient with treatment-resistant multiple myeloma was first admitted to the intensive care unit (ICU) for COVID-19 symptoms 25 days after a CAR-T-cell infusion, which was preceded by lymphodepletion. As a result, the patient had a diminished T-cell response and an almost nonexistent antibody response.

Despite receiving convalescent plasma and the antiviral remdesivir, the patient had high plasma levels of viral RNA throughout his illness, which required 2 ICU stays. He also had persistent positive results for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) on repeat nasopharyngeal swab polymerase chain reaction testing.

Genetic sequencing at day 4 detected viral sequences compatible with the type of virus then circulating in Pittsburgh, where he was hospitalized. Between days 13 and 72, however, the researchers found several additional viral genetic changes from the patient’s plasma and ETA, including some present in variants now widely circulating in the UK and South Africa.

The timing and number of genetic changes indicate that the virus evolved within the patient, arguing against reinfection or superinfection, the researchers said. Although still speculative, the findings raise the possibility that the concerning SARS-CoV-2 variants now widely circulating may have originated in patients with protracted infections, the team wrote in *Clinical Infectious Diseases*.

“...For patients with a high risk of prolonged infectivity, a ‘test-based’ strategy will help guide the duration of transmission-based precautions,” study senior author Ghady Haidar, MD, of the University of Pittsburgh School of Medicine, said in an email. “This is something we are actively working on, and I suspect we and other centers will continue to refine our strategies as data about this phenomenon emerge.”

Saliva Tests Comparable With Nasal Swabs for SARS-CoV-2 Detection

During the coronavirus disease 2019 (COVID-19) pandemic, polymerase chain reaction testing with nasopharyngeal swabs has been the standard diagnostic approach, but the method is uncomfortable and requires a trained health professional. Now, 2 meta-analyses have concluded that self-administered saliva tests are on par with nose and throat swabs for detecting severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).

The first analysis, published in the *Annals of Internal Medicine*, examined 37 studies with 7332 paired samples. It found that saliva tests’ sensitivity was 3.4 percentage points lower than that of nasopharyngeal swabs.

The second article included 16 studies involving 5922 patients. It determined the tests’ sensitivity and specificity to be almost identical. Considering saliva tests’ ease of use, comfort, and good performance, “testing centers should strongly consider adopting saliva as their first sample choice, especially in community mass screening programs,” the article’s authors, from Montreal’s McGill University and the US National Institutes of Health Clinical Center, wrote in *JAMA Internal Medicine*.


Cornell University researchers are developing a “liquid biopsy” that detects and quantifies injury to internal organs from coronavirus disease 2019 (COVID-19). The test profiles epigenetic changes in circulating cell-free DNA (cfDNA)—small fragments of genetic material from dead cells, including those killed off by infection or immune-related injury. The DNA chemical modifications are specific to different cell, tissue, and organ types, revealing the origin of injury.

In a recent study, published in *Med*, researchers analyzed cfDNA in 104 plasma samples from 33 patients with COVID-19 at 2 North American hospitals. They compared their cfDNA profiles with those from patients with other viral infections and a control group of healthy individuals.

In the COVID-19 group, cfDNA originating from the liver, lung, kidney, and red blood cell precursors called erythroblasts was substantially increased. What’s more, the total amount of cfDNA in plasma from patients with COVID-19 correlated with their World Health Organization clinical progression scores. Patients with scores of 7 or greater, which indicate the need for intensive care unit admission and mechanical ventilation, also tended to have sharp cfDNA increases.

A minimally invasive cfDNA assay could be used to broadly monitor internal injuries and to assess disease severity and predict outcomes, according to Cornell biomedical engineer Iwijn De Vlaminck, PhD, the study’s senior author. Scientists could also use the test to study COVID-19’s characteristic multiorgan involvement.

In an email, De Vlaminck said his team is now investigating the test’s utility for monitoring disease severity and multisystem inflammatory syndrome in children with COVID-19. – Jennifer Abbasi

Note: Source references are available through embedded hyperlinks in the article text online.