New study validates benefits of convalescent plasma for some COVID-19 patients

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Transfusions of blood plasma donated by people who have already recovered from infection with the pandemic virus may help other patients hospitalized with COVID-19, a new international study shows.

The treatment, known as convalescent plasma, is still considered experimental by the U.S. Food and Drug Administration (FDA). Plasma contains antibodies, blood proteins that are part of the immune system. Shaped so they can attach to the virus that causes COVID-19, SARS-CoV-2, antibodies glom onto and tag it for removal from the body, researchers say.

Led by researchers at NYU Grossman School of Medicine, the study showed that among 2,341 men and women, those who received an injection of convalescent plasma soon after hospitalization were 15% less likely to die within a month from COVID-19 than those who did not receive convalescent plasma or those who received an inactive saline placebo.

Notably, the researchers found that the biggest benefits for the therapy were among patients most at risk for severe complications because of pre-existing conditions, such as diabetes or heart disease. The treatment, which contains antibodies and other immune cells needed to fight the infection, also appears to benefit those with type A or AB blood.

"Our results show that, overall, patients hospitalized with COVID-19 may derive modest benefit from convalescent plasma, with some patient subgroups benefiting more than others," says study lead investigator and biostatistician Andrea Troxel, ScD. With respect to the groups most likely to benefit, the FDA on Dec. 28, 2021, revised the Emergency Use Authorization for convalescent plasma, limiting its use to patients with diseases that suppress their immune systems, or that receive medical treatments with the same effect.

"Patients with co-existing disease were most likely to show improvement from convalescent plasma, probably because they have the most difficulty producing antibodies to fight their infection," adds Troxel. "The infused plasma boosts their body's ability to fight the virus, but

only in the early stage of the disease and before the illness overwhelms their body."

The current study findings, published in the journal *JAMA Network Open* online Jan. 25, come from the pooling of patient information from eight recently completed studies in the United States, Belgium, Brazil, India, the Netherlands, and Spain on the effects of convalescent plasma for COVID-19.

These benefits of the treatment are only likely to become clear as more data from the trials become available, says Troxel, a professor in the Department of Population Health at NYU Langone. This is because the data from individual trials are too small to show the treatment's overall impact on subsets of patients, she says. Some individual studies have showed the therapy to be ineffective or of limited value.

Study co-investigator Eva Petkova, Ph.D., says the team is using its study data to create a scoring system of patient descriptors, including age, stage of COVID-19, and co-existing diseases, making it easier for clinicians to calculate who stands to benefit most from use of convalescent plasma.

"Our treatment benefit index is designed to serve as a quick and effective tool for physicians to use in deciding when to administer convalescent plasma for COVID-19," says Petkova, a professor in the Departments of Population Health and Child and Adolescent Psychiatry at NYU Langone. The index is freely available online at [COVID-convalescentplasma-tbi-calc.org].

For the study, researchers grouped all patient information from smaller, separate clinical investigations about convalescent plasma therapy, including trials at NYU Langone, Albert Einstein College of Medicine and Montefiore Medical Center, Zuckerberg San Francisco General

Hospital, and the University of Pennsylvania in Philadelphia. Researchers hoped any benefits or disadvantages in treatment would be easier to spot among the largest possible sample of patients. All trials were randomized and controlled, meaning that the patient had a random chance of being assigned to receive convalescent plasma or not to receive it.

Included in the analysis were data from another multicenter U.S. study published separately in December 2021 in *JAMA Internal Medicine*. That study in 941 patients hospitalized with COVID-19 showed that patients receiving high doses of convalescent plasma therapy and not on other medications, such as remdesivir or corticosteroids, were likely to benefit from the blood plasma treatment. Study co-primary investigator Mila Ortigoza, MD, Ph.D., an assistant professor in the Departments of Medicine and Microbiology at NYU Langone, says these initial results supported the idea that convalescent plasma could be a feasible treatment option, especially when other therapies are not yet available, as at the beginning of a pandemic.

In addition, convalescent plasma collected from previously infected and subsequently vaccinated donors (VaxPlasma) would contain antibodies in high enough quantities and diversity that could provide added protection against emerging viral variants, says Ortigoza. Viruses typically mutate genetically (acquire random changes in their DNA or RNA codes) over the course of any pandemic. For this reason, convalescent plasma has the potential to offer effective treatment more quickly after such mutations than treatment types that tend to become less effective with time and must undergo a re-design process to address a new variant, such as monoclonal antibody treatments.

More information: Effect of COVID-19 Convalescent Plasma on Clinical Status in Hospitalized Patients: A Real-Time Individual Patient Data Meta-Analysis of Randomized Clinical Trials,

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