Rush University Cancer Center

COVID-19 Infection in Hematopoietic Cell Transplantation: Age, Time From Transplant and Steroids Matter

During the early days of the COVID-19 pandemic, Ankur Varma, MD, MPH, Rush bone marrow transplant and cellular therapy physician, says four of his patients became infected with the virus. One was in serious condition and remained in the ICU for an extended period of time. He was looking for more information about how COVID-19 affects stem cell transplant patients and realized there weren't any studies for this population. Varma, along with Celalettin Ustun, MD, The Coleman Foundation Chair of Hematology/BMT and Director of the Section of BMT/Cell Therapy, decided to study this in a much larger group of patients and initiated a study in partnership with other researchers at The University of Chicago, Northwestern University and Mount Sinai in New York.

"Cancer patients with COVID-19 infection have an increased risk of death when compared to non-cancer patients. Hematological malignancy patients, especially stem cell transplant recipients among all cancer patients, are a unique risk group due to their immune dysregulation and delayed immune reconstitution," says Varma.

The team's study, **COVID-19 Infection in Hematopoietic Cell Transplantation: Age, Time From Transplant and Steroids Matter**, which was published in ***Leukemia***, measures two important outcomes: the number of stem cell transplant recipients with COVID who required ICU care and mortality rate among them. There were 34 patients in the study. Some of the findings from the research were that stem cell transplant patients are at greater risk of mortality compared to the general population, and COVID infection within one year from transplant, older age (>60 years) patients and patients on steroids at the time of COVID-19 diagnosis were at higher risk of mortality.

"We found that COVID-19 infection within one year of transplant was associated with an increased ICU admission rate and mortality. Patients who were on steroids at the time of diagnosis of COVID also did poorly," says Varma.

Twenty-one percent of patients in the study died. Those who had mild or moderate COVID-19 were 5 percent likely to die, while patients with severe COVID-19 were 43 percent likely to die. More information on this study can be found **here**.

However, Varma says that steroids by itself were likely not the problem and he believes that the underlying conditions like graft versus host disease (GVHD) requiring steroid treatment were the cause.

Ustun added, “Within time we have learned more on COVID-19 virus infection from our own patients that recurrence of symptoms characterized with severe inflammation is a very unexpected, but common serious problem in these patients. Supporting our suspicion (mentioned above), steroids perhaps are the key medication to save these patients. We are now preparing this very unique experience for publication, so that providers and patients can be aware.”

COVID-19 Antibodies

After publishing his work on stem cell transplant patients, Varma expanded his research to focus on COVID antibodies in all cancer patients. Varma along with his mentor, Celalettin Ustun, MD, and other researchers at Rush partnered with Abbott Laboratories to examine the incidence of IgG antibodies to COVID-19, specifically to the receptor binding domain of the nucleocapsid protein.

“We are looking at how many cancer patients have COVID IgG antibodies,” says Varma.

The study titled **Evaluation of Cancer Patients for Evidence of SARS-CoV-2 IgG Seroconversion** is open to any cancer patient who wants to get tested for the antibody, irrespective of their COVID-19 infection history. The study will help researchers understand the true prevalence of COVID-19 infection (symptomatic and asymptomatic) among cancer patients. The study intends to follow these patients over one year and determine the duration of persistence of these antibodies and their effect, if any, in prevention of reoccurrence of COVID-19 infection.

Currently, the clinical significance of COVID-19 antibodies is not known and hopefully this study will help answer that question among cancer patients. The study’s strengths are its research questions, long-term follow-up and the design. The time course to appearance of COVID antibodies is thought to be different in immunocompetent and immunocompromised patients.

“Keeping this in mind, we designed the study in such a way where we will test all patients for COVID antibodies again three months later, even if they were negative for antibodies the first time,” says Varma. The study includes two groups of patients, those who have antibodies and those who don’t. Patients who don’t have any antibodies will be followed for the first three months and then after 12 months they will take a questionnaire to see if they have been infected over the last year. Patients who have COVID antibodies will be followed for the entire 12 months to see if they have been infected with COVID-19 again over the last year.

At the end of their research, they hope to reveal how many patients have antibodies for COVID, how long the antibodies persisted, and the factors associated with persistence or disappearance of antibodies.

The first patients were enrolled in the study in August 2020. To date, over 290 patients have been enrolled and more continue to sign up. The goal is to have 500 patients enrolled.

“People want to know if they’ve had COVID, so patients are still enrolling,” says Varma.

More information on this study can be found **here**.