Most People With Cancer Respond Well to COVID-19 Vaccines

Some people with blood cancers, however, may not be as well protected.

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Most cancer patients with solid tumors had good antibody responses after receiving COVID-19 vaccines, but the response rate was lower for those with blood cancers, such as leukemia or lymphoma, according to study findings published in Cancer Cell.

People with severe immune suppression, including cancer patients who use immune-suppressing therapy and transplant recipients who take immunosuppressive drugs to prevent organ rejection, are at risk for more severe complications and death due to COVID-19. They can also have slower and weaker immune responses after natural infection or vaccination.

Astha Thakkar, MBBS, of the Montefiore Health System in New York City, and colleagues measured antibodies against SARS-CoV-2, the coronavirus that causes COVID-19, in 200 cancer patients who were fully vaccinated. About a third were Black, 39% were Latino, 22% were white and 5% were Asian; the median age was 67 years. Most received two doses of the Pfizer-BioNTech or Moderna mRNA vaccines (115 and 62 people, respectively) while 20 received the single-shot Johnson & Johnson vaccine.

Overall, most people with cancer (94%) developed antibodies against the SARS-CoV-2 spike protein after vaccination, known as seroconversion. The antibody seroconversion rate was very high, at 98%, for the two thirds of patients with solid tumors. What's more, their antibody levels were similar to those seen in vaccinated people without cancer.

People with blood cancers, however, had a significantly lower seroconversion rate: 85% developed protective antibodies. They also had lower average antibody levels than people with solid tumors or people without cancer.

Patients on active cancer treatment had a slightly higher vaccine response rate than people not currently on treatment (96% and 93%, respectively), although the rate for those on cytotoxic chemotherapy fell to 92%. People who received checkpoint inhibitor immunotherapy or hormone therapy both had high response rates (97% and 100%, respectively). Recipients of immunosuppressive treatments, including stem cell transplants and anti-CD20 targeted therapies that kill off antibody-producing B cells had lower response rates (73% and 70%, respectively)—but

still, a majority were protected. However, none of the three patients who received CAR-T therapy seroconverted.

As seen in the general population, cancer patients who received one of the mRNA vaccines had a higher seroconversion rate (95% for Pfizer-BioNTech and 94% for Moderna) and higher antibody levels than those who received the Johnson & Johnson vaccine (85%). And patients who had prior natural SARS-CoV-2 infection reached higher antibody levels than those who did not. There was no observed difference in seroconversion rates according to race or ethnicity.

Interestingly, these seroconversion rates after vaccination are similar to rates seen after natural infection in a previous study by the same research team. As previously reported, overall, 92% of people with cancer produced antibodies, falling to 82% for blood cancer patients and about 60% for those who received anti-CD20 therapies or stem cell transplants.

The vaccines were generally safe and well tolerated for people with cancer, who experienced the same types of side effects—mainly injection site soreness and mild flu-like symptoms—as the general population.

Another study, published in JAMA Oncology, also saw a high response rate among people with solid tumors who received the Pfizer-BioNTech vaccine.

Amir Massarweh, MD, PhD, of Rabin Medical Center in Israel, and colleagues analyzed outcomes among 102 cancer patients currently undergoing treatment and 78 people without cancer. The most common malignancies were gastrointestinal, lung and breast cancer; 29% received chemotherapy alone, 22% received immunotherapy alone and 20% received combination treatment.

Twelve or more days after the second vaccine dose, 90% of the cancer patents and all of the people without cancer had an adequate immune response, although those with cancer had significantly lower antibody levels.

UPDATE: Another recent study confirms these findings. Dimpy Shah, MD, PhD, of the Mays Cancer Center in San Antonio, and colleagues looked at 131 cancer patients in San Antonio and Geneva, Switzerland, who received the Pfizer-BioNTech (29%) or Moderna (71%) vaccines. The median age was 63 year, and 80% were white. Here too, most people (94%) achieved SARS-CoV-2 antibody seroconversion three or four weeks after they received their second dose. However, seven patients did not have detectable antibodies. Again, people with blood cancers were less likely to respond to the vaccines than those with solid tumors, and none of the patients treated with rituximab (Rituxan or biosimilars)—a drug that targets antibody-producing B cells—within six months of vaccination responded.

“We observed a significant difference in response when two doses were given,” Shah said in a press release. “At least for patients with cancer, two doses are very important for robust antibody response.”

Likewise, two other studies published in the journal Blood confirmed the low vaccine response rates among blood cancer patients.

In the first study, Yair Herishanu, MD, of the Tel Aviv Sourasky Medical Center in Israel, and colleagues evaluated vaccine responses in 167 people with chronic lymphocytic leukemia. Overall, only 40% had an adequate antibody response after the second Pfizer-BioNTech vaccine dose. But this varied according to treatment status: about 15% for those vaccinated while undergoing cancer treatment, 55% for those who hadn't yet started treatment and 79% for those in remission after treatment. No one who started anti-CD20 therapy within a year of vaccination achieved an adequate response.

In the second study, Evangelos Terpos, MD, PhD, of the National and Kapodistrian University of Athens in Greece, and colleagues analyzed 48 older patients with multiple myeloma and 104 age-matched people without cancer. Only four myeloma patients (8%) developed adequate antibody levels after a single dose of the Pfizer-BioNTech vaccine, compared with 20% of people without cancer. All four were in remission and not currently on treatment. (This study did not report response rates after the second vaccine dose.)

Improving COVID-19 Protection

Taken together, these findings underscore the need for better protection against COVID-19 for a subset of people with cancer.

"These data demonstrate generally high immunogenicity of COVID-19 vaccination in oncology patients and identify immunosuppressed cohorts that need novel vaccination or passive immunization strategies," Thakkar and colleagues wrote.

A recent study in Nature Medicine highlights the fact that T-cell responses contribute to protection against SARS-CoV-2 even if antibody responses are impaired. Erin Bange, MD, of the University of Pennsylvania, and colleagues reported that 77% of blood cancer patients with COVID-19 had detectable SARS-CoV-2-specific T-cell responses. What's more, those with higher CD8 T-cell levels were more likely to survive—including those treated with B-cell-depleting anti-CD20 therapy.

"This is important when we think about how to improve the care of cancer patients with COVID," study coauthor Alexander Huang, MD, at Penn's Perelman School of Medicine said in a press release. "We need to maximize all the arms of the immune system, especially if we know that one particular arm of the immune system is down."

Fortunately, all three COVID-19 vaccines authorized in the United States produce T-cell responses as well as antibody responses.

Passive immunization refers to administration of antibody therapy, either in convalescent plasma from people who have recovered from COVID-19 or manufactured monoclonal antibodies. Recent studies have shown that this approach can help blood cancer patients with COVID-19 who do not mount an immune response on their own.

Another approach, which has shown promise in immunosuppressed organ transplant recipients, is to give a third booster dose of the Pfizer-BioNTech or Moderna vaccines.

While further research is underway, experts recommend that people with cancer should receive COVID-19 vaccines as soon as they can—and they should be prioritized if supplies are limited. The National Comprehensive Cancer Network advises that people receiving certain types of chemotherapy for blood cancers and those undergoing stem cell transplants or CAR-T therapy should wait until their immune cells recover, but everyone else should get vaccinated without delay.

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