Vaccine Booster Dose Appears to Reduce Omicron Hospitalizations

The COVID-19 mRNA vaccines’ 2-dose primary series appeared to provide less protection against hospitalization from Omicron variant infections than Alpha and Delta infections, according to a recent study. A booster dose, however, was associated with increased effectiveness against Omicron hospitalizations at the same high levels achieved against earlier variants with 2 doses.

The study included data from 11,690 adults admitted to 21 US hospitals from March 11, 2021, to January 14, 2022, about half of whom had laboratory-confirmed COVID-19. The other half served as a control group. To calculate vaccine effectiveness, researchers compared the odds of vaccination between the 2 groups. In the COVID-19 group, SARS-CoV-2 variants were determined using whole-genome sequencing or were classified based on the predominant variant at the time of hospitalization. Sequencing results were available for 45.4% of the 572,857 SARS-CoV-2 infections.

The effectiveness of 2 vaccine doses against hospitalization was 85% during the periods of the study when Alpha and Delta dominated but 65% during the Omicron period—late December 2021 through mid-January 2022. The effectiveness of 3 vaccine doses during the Omicron phase was 86%.

Regardless of which strain was circulating at the time, COVID-19 severity, based on the World Health Organization clinical progression scale, was lower for vaccinated than for unvaccinated patients. Vaccination, including 2 or 3 doses, was 76% effective for preventing progression to invasive mechanical ventilation or death with the Alpha variant and around 45% effective with Delta or Omicron infections. The findings appeared in the BMJ.

Large US Study Examines First 6 Months of COVID-19 Vaccine Safety Data

During the first 6 months of the US COVID-19 vaccination campaign, most adverse events reported to surveillance systems were mild and short-lived, researchers from the Centers for Disease Control and Prevention reported in The Lancet Infectious Diseases. The study examined safety data collected through the new v-safe surveillance system and the Vaccine Adverse Event Reporting System (VAERS).

Nearly 300 million mRNA vaccine doses were administered in the US between December 14, 2020, and June 14, 2021, of which about 167 million were BNT162b2 (Pfizer-BioNTech) and 132 million were mRNA-1273 (Moderna). The VAERS received 340,522 reports during this time: 92.1% were classified as nonserious; 6.6% as serious, not resulting in death; and 1.3% were deaths. The most common serious reports aside from deaths were shortness of breath, fever, fatigue, and headache.

COVID-19 vaccines were administered under Emergency Use Authorization (EUA) during the study period, and providers were required to report all serious postvaccination adverse events, including deaths, even if they were unlikely to have been associated with vaccination. The most common causes of death were heart disease and COVID-19, according to death certificates and autopsy reports that were available for about 18% of 44,711 deaths. The authors noted that they “found no unusual patterns in cause of death among the death reports received.”

For v-safe participants, transient reactions were more common after mRNA-1273 than BNT162b2 and were more frequent after the second dose than the first dose of either vaccine. Following their second dose, about 21% of v-safe participants who received BNT162b2 and about 33% of those who received mRNA-1273 reported they were unable to do normal activities. There were more reports of reactions and health effects involving females and people younger than 65 years than males and older people.

The researchers concluded that the findings from both surveillance systems were consistent with the pre-EUA vaccine clinical trials.

Scientists Convert Blood Type A Donor Lungs Into Neutral Lungs

Scientists treated human donor lungs with enzymes that converted them from blood type A into universal blood type lungs. The technique removed the A antigen that distinguishes blood type A red blood cells, leaving behind neutral lungs.

When paired, the enzymes convert group A (ABO1) red blood cells to group O (ABO3). In a study described in Science Translational Medicine, the researchers used nor-mothermic ex vivo lung perfusion (EVLP) to treat 8 ABO1 human lungs with the enzymes. Within 4 hours, the technique removed 97% of endothelial A antigen, with no sign of acute toxic effect related to the treatment. In an experiment involving control lungs and 3 of the converted lungs, the treated lungs had less antibody-mediated damage after being exposed to type AB03 plasma, a proxy for circulation in a transplant recipient with type O blood.

Because AB03 organs are compatible with all blood groups, lung transplant candidates with AB03 blood type typically wait the longest for donor lungs and are more likely to die while waiting than people with other blood types. The authors wrote that creating ABO-agnostic organs “may greatly improve access and fairness of organ allocation.”

Next they plan to study the approach in transgenic mice. – Jennifer Abbasi

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