568. Comparison of Humoral Immune Response to the SARS-CoV-2 BNT162b2 Vaccine Between Solid Organ Transplant Recipients and Healthy Controls

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Session: P-25. COVID-19 Vaccines

Background. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is associated with increased morbidity and mortality in immunocompromised individuals, including solid organ transplant recipients (SOTR). Despite being excluded from phase 1-3 SARS-CoV-2 vaccine clinical trials, SOTR were identified as high-risk populations and prioritized for vaccination in public health guidelines. We aimed to evaluate the antibody response to two doses of the BNT162b2 (Pfizer-BioNTech) vaccine in SOTR as compared to healthy controls (HC).

Methods. SOTR and HC scheduled to receive two doses of BNT162b2 vaccine and able to complete required follow-up visits were enrolled. Blood specimens were collected from participants before receiving the first and second doses and 21-42 days after the second dose. Enzyme-linked immunosorbent assay (ELISA) was used to detect immunoglobulin G (IgG) to the SARS-CoV-2 spike receptor-binding domain (RBD). Generalized estimating equations with a working independence correlation structure were used to compare anti-RBD IgG levels between SOTR and HC at each study visit and within each group over time. All models were adjusted for age, sex, and pre-vaccination seroreactivity in the ELISA.

Results. A total of 54 SOTR and 26 HC were enrolled, with mean (SD) ages of 72 (3.6) and 62 (6.7) years, 61% and 35% were male, and 91% and 88% were white, respectively. The most common organ transplant types were kidney (41%) and liver (37%). All SOTR were receiving calcineurin inhibitors. The median time post-transplantation was 7 years. SOTR had markedly lower mean anti-RBD IgG levels when compared to HC with adjusted mean differences of -0.76 (95%CI: [-1.04, -0.47]; p < 0.001) ELISA units (EU) and -1.35 (95%CI [-1.68, -1.01]; p < 0.001) EU after the first and second doses, respectively (Figure 1). Both groups had a significant increase in anti-SARS-CoV-2 IgG levels after the second dose. However, the magnitude was lower in SOTR, 0.49 (95%CI [0.31, 0.69]; p < 0.001) EU than in HCs, 1.08 (95% CI [0.91, 1.24]; p < 0.001) EU.

Figure 1.

ELISA: RBD
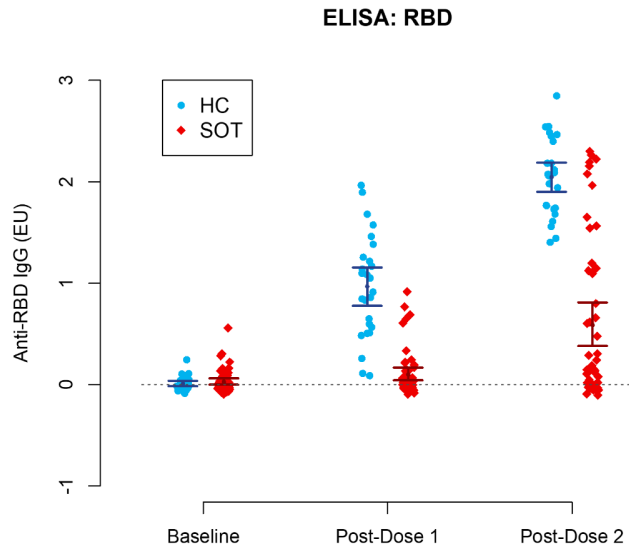
Anti-SARS-CoV-2 RBD IgG levels in solid organ transplant recipients and healthy controls before receiving the BNT162b2 vaccine (baseline), post-vaccine dose 1, and post-vaccine dose 2.

Conclusion. Our study showed SOTR mounted weaker humoral immune responses than HC to SARS-CoV-2 vaccines. Given a lower response, SOTR should continue to practice social distancing and masking until data on vaccine efficacy are available in this vulnerable population.

569. Characterization of COVID-19 Vaccine Breakthrough Infections in Metropolitan Detroit

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Background. Although COVID-19 vaccines are very effective, vaccine breakthrough infections have been reported, albeit rarely. When they do occur, people generally have milder COVID-19 illness compared to unvaccinated people. A total of 10,262 (0.01%) SARS-CoV-2 vaccine breakthrough infections had been reported as of April 30, 2021. The objective of this study was to evaluate the effectiveness of COVID-19 vaccines and characterize breakthrough infections in our patient population.

Methods. This was a retrospective review of all consecutive COVID-19 vaccine breakthrough infections at Henry Ford Health System (HFHS) in metropolitan Detroit, Michigan, from December 17, 2020 to June 7, 2021. Centers for Disease Control (CDC)'s breakthrough infection definition (detection of SARS-CoV-2 RNA or antigen in a respiratory sample ≥14 days after completion all recommended doses of COVID-19 vaccine) was used to identify cases. Vaccination status was extracted from the electronic medical records using Epic™ SlicerDicer.

Results. A total of 228,674 patients, including healthcare workers (HCW), were fully vaccinated in our healthcare system. We evaluate 299 patients for breakthrough infection but only 179 (0.08%) patients met the definition; 108 (60%) were female with median age of 59, 60 (33%) were HCW, and 11 (6%) were immunocompromised. The majority (92%) were asymptomatic (62 or 35%) or had mild/moderate illness (102 or 57%); 14 (8%) had severe or critical illness. The status of one patient was unknown. Of those who were symptomatic, 24 (13%) required hospitalization, and 3 (2%) required intensive care unit. One patient admitted for heart failure exacerbation died unexpectedly prior to being discharged. Nine had previous COVID-19 within 4 months but only one was symptomatic; this likely represented residual shedding in the asymptomatic patients.

Conclusion. COVID-19 vaccine was very effective among our patients and breakthrough infections were rare. Moreover, the vaccine reduced disease severity and mortality. Efforts should aim to increase vaccine uptake.

Disclosures. **All Authors**: No reported disclosures

570. Prioritized Access to COVID-19 Vaccines Among Vulnerable Communities Increases Vaccination Rates

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Session: P-25. COVID-19 Vaccines

Background. Based on national recommendations,[1] Beth Israel Lahey Health (BILH) in Eastern Massachusetts (MA) prioritized vulnerable communities in our distribution of COVID-19 vaccines. We hypothesized that creating prioritized access to appointments for patients in these communities would increase the likelihood vaccination.

Methods. The BILH health system sent vaccine invitations first to patients of two clinics in vulnerable neighborhoods in Boston (Wave 1), followed by other patients from vulnerable communities (Wave 2) up to 1 day later, and then by all other patients (Wave 3) after up to 1 more day later. To identify whether early access/prioritization increased the likelihood of receipt of vaccine at any site or a vaccine at a BILH clinic, we compared patients in Wave 1 in a single community with high cumulative incidence of COVID-19 (Dorchester) to patients in Wave 2 during a period of limited vaccine access, 1/27/21-2/24/21. Each wave was modeled using logistic regression, adjusted for language and race. By taking the difference between these two differences, we are left with the impact of early vaccination invitation in Wave 1 for a subset of our most vulnerable patients (termed difference-in-differences; Stata SE 16.0).

Results. In our study of Waves 1 and 2, we offered vaccinations to 24,410 patients. Of those, 6,712 (27.5%) scheduled the vaccine at BILH (Table 1). Patients in Wave 1 were much more likely to be vaccinated at BILH than patients in Wave 2. Patients offered the vaccine in Wave 1 and living in Dorchester were 1.7 percentage points more likely to be vaccinated at all (p=0.445) and 9.4 percentage points more likely to be vaccinated at BILH than another site in MA (p-value = 0.001), relative to patients living outside of Dorchester and offered the vaccine in Wave 2 (Table 2).