Effectiveness of COVID-19 Vaccines Against Hospitalization and Death With the SARS-CoV-2 Delta Variant in Solid Organ and Islet Transplant Recipients

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Callaghan et al[1] recently reported coronavirus disease 2019 (COVID-19) vaccine effectiveness (VE) in solid organ and islet transplant (SOT) recipients in England. Vaccination was not associated with a reduction in the risk of testing positive for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) during the Delta variant-dominant period, but 2 doses of ChAdOx1-S vaccine were associated with a significantly reduced risk of death after infection across Alpha and Delta variant surges. Questions remain regarding VE against hospitalization and death during the period of infection with the more virulent Delta variant. Therefore, we further assessed the real-world effectiveness of the BNT162b2 and ChAdOx1-S vaccines against hospitalization and death in SOT recipients in England during the Delta variant-dominant period.

The Emergency Care Dataset was linked to the Transplant Registry for all patients in England who received an SOT. The Emergency Care Dataset includes all nonelective hospital admissions via an emergency care department in England. Methods followed were the same as those described by Callaghan et al[1] except that events were taken as the first positive SARS-CoV-2 RNA tests that were followed by a noninjury hospitalization within 14 d or death within 28 d, and analysis was performed in STATA V.14.2 using Poisson regression. Adjustments were the same as in the study by Callaghan et al[1] except that 5 age groups were used instead of 2.

The cohort study was conducted from June 1, 2021, to August 31, 2021, and comprised 1408 individuals, of whom 85 remained unvaccinated during the study period. During the study period, the SARS-CoV-2 Delta variant was dominant in England.[2] There were 266 noninjury hospitalizations within 14 d of a first positive SARS-CoV-2 RNA test and 117 deaths in SOT recipients within 28 d (Table 1).

VE against hospitalization after 2 doses of BNT162b2 vaccine was 43.5% (95% confidence interval, 9.5%-64.7%) at 14 d after the second dose and 35% (–2% to 58.6%) with 2 doses of ChAdOx1-S vaccine. Hospitalizations and deaths following a first SARS-CoV-2 RNA–positive test were combined into a single outcome of any severe disease, and the VE for 2 doses of both vaccines was similar (ChAdOx1-S 37.2% [4.1%-58.9%]; BNT162b2 38.8% [5.2%-60.5%]).

The VE against severe disease in SOT recipients is less than that seen in the general population of England, with estimates of VE in the general population against hospitalization for Delta variant of 96% (86%-99%) for 2 doses of BNT162b2 and 92% (75%-97%) for 2 doses of ChAdOx1-S.[3] Against death, VE in the general population was estimated to be >90% for 2 doses of both BNT162b2 and ChAdOx1-S vaccines.[4]

SOT recipients receiving immunosuppressive therapy at the time of vaccination are recommended to receive 3 doses of COVID-19 vaccine as their primary course, as evidence demonstrates that they may not mount a good immune response after 2 doses and remain at risk of serious illness.[5] This study demonstrates modest VE against severe disease after 2 doses of COVID-19 vaccine for all SOT recipients during the Delta surge and supports SOT recipients receiving a 3-dose primary course of COVID-19 vaccine, with additional protective measures, including further vaccine doses, needed.

Received 28 January 2022.

Accepted 30 January 2022.

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The authors declare no funding or conflicts of interest.

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ISSN: 0041-1337/20/1066-e310

DOI: 10.1097/TP.0000000000004104

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TABLE 1.

Vaccination status and VE against hospitalization and against hospitalization or death

Vaccination status (vaccine, days after the second dose)	Person years	Hospitalizations within 14 d of SARS-CoV-2 RNA positive, n	Deaths within 28 d of SARS-CoV-2 RNA positive, n	Hospitalizations within 14 d or deaths within 28 d of SARS-CoV-2 RNA positive, n	Adjusted VE against hospitalization within 14 d of SARS-CoV-2 RNA positive[a] (95% confidence interval)	Adjusted VE against hospitalization within 14 d or death within 28 d of SARS-CoV-2 RNA positive[a] (95% confidence interval)
Unvaccinated	13.4	26	6	29		
ChAdOx1-S, 14+	126.9	149	58	176	35% (–2% to 58.6%)	37.2% (4.1%-58.9%)
BNT162b2, 14+	79.4	84	46	110	43.5% (9.5%-64.7%)	38.8% (5.2%-60.5%)

[a]Adjusted for month of test, age group (16–29, 30–49, 50–64, 65–79, ≥80 y), transplant type, sex, ethnicity, NHS region, and time since transplant (<90 d, 90 d–1 y, ≥1 y).
NHS, National Health Service; SARS-CoV-2, severe acute respiratory syndrome coronavirus 2; VE, vaccine effectiveness.

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