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SYNOPSIS

Review of "Hospital admission and emergency care attendance risk for SARS-CoV-2 Delta (B.1.617.2) compared with Alpha (B.1.1.7) variants of concern: a cohort study"

09/07/2021

Article citation: Twohig KA, Nyberg T, Zaidi A, Thelwall S, Sinnathamby MA, Aliabadi S, et al. Hospital admission and emergency care attendance risk for SARS-CoV-2 Delta (B.1.617.2) compared with Alpha (B.1.1.7) variants of concern: a cohort study. Lancet. 2021 Aug 21 [ePub ahead of print]. Available from: https://doi.org/10.1016/S1473-3099(21)00475-8

One-minute summary

- The Delta variant (B.1.617.2) is associated with higher hospital admission or emergency care attendance (within 14 days of specimen collection) than the Alpha variant (B.1.1.7), in both vaccinated and unvaccinated populations.
    - **Vaccinated was defined as** 21 days or more since the first vaccination dose, with or without the second dose.
    - **Unvaccinated was defined as** not receiving any vaccine or less than 21 days since the first vaccination dose.
- The risk of Delta cases (196/8,682, 2.3%) being admitted to hospital was higher compared to Alpha cases (764/34,656, 2.2%) (adjusted hazard ratio [aHR] 2.26; 95% confidence interval [CI], 1.32 to 3.89).
    - Vaccinated hospital admission: vaccinated Delta cases versus vaccinated Alpha cases aHR was 1.94 (95% CI, 0.47 to 8.05).
    - Unvaccinated hospital admission: unvaccinated Delta cases were at higher risk versus unvaccinated Alpha cases (aHR, 2.32; 95% CI, 1.29 to 4.16).
- The risk of Delta cases (498/8,682, 5.7%) being admitted to hospital or attendance at emergency care was higher compared to Alpha cases (1,448/34,656, 4.2%) (aHR, 1.45; 95% CI, 1.08 to 1.95).
    - Vaccinated hospital admission or emergency care attendance: vaccinated Delta cases versus vaccinated Alpha cases aHR was 1.58 (95% CI, 0.69 to 3.61).

    - Unvaccinated hospital admission or emergency care attendance: unvaccinated Delta cases were at higher risk versus unvaccinated Alpha cases (aHR 1.43; 95% CI, 1.04 to 1.97).

- The aHRs were not significantly different between vaccinated and unvaccinated subgroups for either outcome (P = 0.82), which suggests that the increase in risk of either outcome from Delta infection compared to Alpha is similar for vaccinated and unvaccinated cases.

- The authors conclude that outbreaks of Delta in unvaccinated populations could contribute to greater health care system capacity strain than Alpha given the increased risk of hospitalization.

Additional information

- The study population included all patients with Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) infection in England between March 29 and May 23, 2021 who were identified by whole genome sequencing (WGS) as being infected by Alpha (34,656 patients) or Delta (8,682 patients).

    - Triggers for sampling for WGS was predominantly geographic-weighted population-level sampling of community cases, but also included targeted selection from international travellers, care homes, or National Health Service (NHS) diagnostic laboratories.

    - Adjusted for age, sex, ethnicity, deprivation, recent international travel, area of residence, calendar week, and vaccination status in a stratified Cox regression analysis to estimate HRs; where re-infection was suspected (sequenced specimen collection date was more than 14 days after the specimen collection date of the individual's first recorded positive test), patient data were excluded.

    - Stratified Cox regression allowed for the use of all potential matches rather than a fixed number of patients with the Alpha variant per patient with the Delta variant and confounders such as changing demographic profiles of participants by variant or local interventions over time were accounted for.

    - Maximum follow-up of 14 days from earliest Coronavirus Disease 2019 (COVID-19)-positive specimen until hospital admission or emergency care attendance date.

- Author's limitations include:

    - Precision was low for relative risk estimates in the vaccinated subgroup analyses due to the low number of hospital attendances, and the low precision was in part due to the statistical method chosen.

    - Confounding within hospital datasets included registration delays or other calendar-period-specific factors, which may have led to underestimates of HRs for recent Delta cases.

    - Reasons for hospital visit were often unclear so data flags such as injury-related attendance and International Classification Disease (ICD10) codes were used to define outcomes, but could lead to a misclassification that underestimates HRs.

- Linkage was not possible for 11.3% of cases: data exclusions included more Black and Asian than white patients and international travellers; meanwhile, Asian populations were likely overrepresented in the Delta patient data (37.8% Delta versus 14.8% Alpha).
- There was no available data on medical comorbidities, which are known to contribute to hospitalization risk.
- Conditions for WGS requires low cycle thresholds (< 30), which is more likely in patients with high viral load; therefore, patients infected with lower viral loads were not likely sequenced which might limit the generalizability of the findings.

PHO reviewer's comments

- A strength of this study is the inclusion of patients based on WGS.
- Authors defined vaccinated and unvaccinated differently than in Ontario, which affects applicability of results. In the study, people who received one dose of a two dose series were labelled "vaccinated" after 21 days, where they would be considered "partially vaccinated" in Ontario. Additionally, participants who received one dose less than 21 days prior were labelled "unvaccinated", where they would be considered "partially vaccinated" after 14 days in Ontario.
- Information regarding which vaccines were received by patients in the dataset were not available.

Citation

Ontario Agency for Health Protection and Promotion (Public Health Ontario). Review of "Hospital admission and emergency care attendance risk for SARS-CoV-2 Delta (B.1.617.2) compared with Alpha (B.1.1.7) variants of concern: a cohort study". Toronto, ON: Queen's Printer for Ontario; 2021.

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