COVID-19 Evidence Digest 01/13/21

Neutralization of N501Y Mutant SARS-CoV-2 by BNT162b2 Vaccine-Elicited Sera (bioRxiv – pre-print)

Bottom Line: Blood samples from 20 individuals who had received the Pfizer-BioNTech vaccine during clinical trials were exposed to a lab-engineered SARS-CoV-2 variant with a mutation to the spike protein that is observed in the B.1.1.7 and 501.V2 variants now proliferating globally; levels of neutralizing antibodies were equivalent, suggesting currently available vaccines targeting the spike protein may be effective against these variants.

Details: Proliferation of two SARS-CoV-2 variants (B.1.1.7 and 501.V2, first identified in the UK and South Africa) that are more infectious than previously circulating variants has raised concerns that currently available vaccines targeting the virus' spike protein may not confer protection against them. Both variants have mutations in key targets of neutralizing antibodies against the virus generated following vaccination, including changes to the virus' spike protein that allow it to bind more effectively with the angiotensin converting enzyme 2 (ACE2), allowing for easier entry to host cells. In this small study, blood samples from 20 patients who received the Pfizer-BioNTech vaccine, taken 2-4 weeks post-vaccination of full 2 dose series, were exposed to a lab-engineered SARS-CoV-2 variant containing mutations similar to the South African variant. Neutralizing antibody levels were measured using the plaque reduction neutralization test. They found that levels of neutralizing antibodies were equivalent in response to exposure to the variant with spike protein mutations, suggesting that currently available vaccines targeting the spike protein may be effective against these variants.

Key Takeaways:

- Though findings support equivalent neutralizing antibody levels, results come from a small sample and the study has not yet been peer-reviewed; continuous monitoring of changes to the virus that would necessitate a change in the vaccine strain is needed.
- An important limitation noted by the authors is that the lab-engineered SARS-CoV-2 variant used in this study does not contain the full set of spike protein mutations found in the UK or South African variants.

6-Month Consequences of COVID-19 in patients Discharged from Hospital: A Cohort Study (Lancet)

Bottom Line: In this study of long-term consequences associated with COVID-19 among patients charged from a hospital in Wuhan, reported issues included difficulty sleeping, muscle weakness and fatigue, anxiety, and depression; patients with more serious illness had more severely impaired lung function and abnormal chest imaging issues.

Details: This study sought to describe issues associated with COVID-19 (long-term sequelae) among a cohort of patients 6 months after being discharged from a hospital in Wuhan. Enrolled patients were those who had been discharged from the hospital between 1/7-5/29/20. Excluded patients included those who died before follow-up (follow-up period was 6/16-9/3/20), those with conditions that precluded follow-up, those with mobility issues, those who declined to participate or could not be reached, those living in

nursing/welfare homes, and those living outside of Wuhan. Participants completed symptom and quality of life questionnaires, physical exams, and a 6 minute walking test, and had blood tests. Patients were grouped according to severity of COVID-19 illness (patients who did not require supplemental oxygen, patients who did require supplemental oxygen, and patients who required more intense oxygen, including invasive mechanical ventilation). Those with greater disease severity during hospitalization also received a CT scan of the chest, ultrasonography, and a pulmonary (lung) function test. Associations between disease severity and long-term health issues were evaluated. 1733 patients were enrolled, with an average follow-up time after symptom onset of 186 days. 52% of participants were men, and the median age was 57. Six months after acute COVID-19 disease, 76% of participants continued to experience symptoms; the most commonly reported issues were fatigue/muscle weakness (63%) and trouble sleeping (26%), followed by anxiety/depression (23%), hair loss (22%), difficulty with smell and taste (11% and 9%, respectively), and mobility difficulties (7%). Compared to patients who did not require supplemental oxygen, those with the most severe COVID-19 disease were 2.7, 2.6, and 2.5 times more likely to report fatigue/muscle weakness, chest pain, and mobility issues, respectively. Patients with more severe COVID-19 disease had more impaired lung function and higher median CT scores. Disease severity and female gender were the strongest predictors of long-term issues associated with COVID-19.

Key Takeaways:

- Over three-quarters of patients hospitalized with COVID-19 experienced symptoms 6 months after being discharged, which included both self-reported symptoms, radiographic findings, and lung function tests. Underlying mechanisms require further investigation.
- Disease severity and female gender were the strongest predictors of long-term issues associated with COVID-19.

Incidence and Secondary Transmission of SARS-CoV-2 Infections in Schools (Pediatrics)

Bottom Line: In this study of North Carolina school districts open for 9 weeks of in-person instruction in the fall of 2020, secondary transmission of SARS-CoV-2 within schools was extremely rare.

Details: This study describes contract tracing efforts to ascertain secondary transmission of SARS-CoV-2 in 11 North Carolina K-12 school districts for the first 9 weeks of in-person instruction in the fall of 2020 (8/15-10/23/20). The 11 participating school districts represented over 90,000 students and staff; among this group, 773 SARS-CoV-2 infections were identified and determined to be acquired in community (not school) settings by local health departments. Health department staff identified an additional 32 infections acquired within schools, with no instances of child to adult transmission.

Key Takeaways:

- Within school districts representing over 90,000 students and staff, 773 SARS-CoV-2 infections were acquired via community settings.
- An additional 32 infections were determined to be acquired within schools; none of these infections were determined to have been spread from children to adults.