COVID-19 Evidence Digest 02/26/21

Neutralizing Activity of BNT162b2-Elicited Serum — Preliminary Report (NEJM)

Bottom Line: In a preliminary report of the effectiveness of the BNT162b2 (Pfizer-BioNTech) mRNA vaccine on the South African variant of Covid-19 (B.1.351 lineage), the BNT162b2 mRNA vaccine may be effective in reducing Covid-19 cases and severity.

Details: This article is a preliminary report of a randomized controlled trial looking at the effectiveness of the BNT162b2 mRNA vaccine against the South African variant of Covid-19 (B.1.351 lineage). They examined the neutralizing antibody titers against an early SARS-CoV-2 strain (USA-WA1/2020), the globally dominant variant (D614G substitution), and the newer South African strain (B.1.351 lineage). Compared to the USA-WA1/2020 strain and D614G substitution, the newer B.1.351 lineage had neutralizing antibodies titers that were two-thirds lower. It is not clear yet what the effect of the reduced number of antibodies has in the protection against the South African variant. However, the lower number of neutralizing antibodies may still be effective in reducing Covid-19 cases and disease severity. Additional research is needed to fully understand the full protection the BNT162b2 mRNA vaccine offers against these newer variants.

Key Takeaways:

- Even though the BNT162b2 mRNA vaccine resulted in fewer antibodies against the South African Covid-19 variant, it still may be effective in reducing cases of Covid-19 and severity of disease.
- Additional research is needed to understand how effective the BNT162b2 mRNA is against the South African variant.

Serum Neutralizing Activity Elicited by mRNA-1273 Vaccine — Preliminary Report (NEJM)

Bottom Line: In a preliminary report of the effectiveness of the mRNA-1273 (Moderna) vaccine on the South African (B.1.351 lineage) and the United Kingdom (B.1.117) variants, the mRNA-1273 vaccine may be effective in reducing Covid-19 cases and severity.

Details: This article is a preliminary report of a randomized controlled trial looking at the effectiveness of the mRNA-1273 vaccine against the South African variant of Covid-19 (B.1.351 lineage) and the United Kingdom variant (B.1.117). They examined the neutralizing antibody titers of the South African and United Kingdom variant against the original Wuhan variant (D614G). Neutralizing antibody titers were not significantly affected by the United Kingdom variant compared to the original Wuhan variant. Neutralizing antibody titers were reduced by a factor of 6.4 with the South African variant. However, the number of antibodies in the South African variant may still be high enough to reduce Covid-19 cases and disease severity. Additional research is needed to fully understand the full protection the mRNA-1273 vaccine offers against these newer variants.

Key Takeaways:

- The mRNA-1273 vaccine may be effective in reducing Covid-19 cases and severity of disease with the newer United Kingdom and South African variants even though the vaccine against the South African variant resulted in fewer antibodies.
- Additional research is needed to understand how effective the mRNA-1273 is against these newer variants.

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Maximizing Fit for Cloth and Medical Procedure Masks to Improve Performance and Reduce SARS-CoV-2 Transmission and Exposure, 2021 (MMWR)

Bottom Line: Wearing a cloth mask over a medical procedure mask (also known as double masking) and knotting the ear loops of medical procedure masks results in increased source control and reduced exposure.

Details: While universal masking is a CDC recommended prevention strategy, given its ability to decrease the amount of exhaled respiratory droplets and aerosols from infected individuals and reduce exposure to uninfected individuals who are wearing a mask, side gaps in the mask may limit efficacy.

Given concerns about loose fitting cloth and surgical masks, the CDC conducted experiments in January 2021 to assess the efficacy of different combinations of masks. Combinations include a cloth mask over a medical procedure mask, which is referred to as double masking, and knotting the ear loops of a medical procedure mask where they attach to the edges of the mask and flattening extra material to fit the contour of the wearer's face, which is referred to as a knotted mask.

The first study assessed the amount of emitted particles after a simulated cough, comparing a three-ply medical procedure mask alone, a three-ply cloth cotton mask alone, and a three-ply cloth mask covering a three-ply procedure mask. The double mask configuration was most efficacious, blocking 85.4% (SD =2.4) of emitted particles.

The second experiment assessed the efficacy of different combinations of cloth and medical procedure masks, with procedure masks being knotted or unknotted during simulated breathing. Unmasked individuals experienced decreased exposure when a source wore a double mask (82.2% [SD=0.16]) as well as a knotted medical procedure mask (62.9% [SD=0.08]). An unmasked source resulted in decreased exposures for recipients wearing a double mask (83.0% [SD=0.15]) or knotted mask (64.5% [SD=0.03]).

Key Takeaways:

- Mask fit is important consideration when gauging efficacy in preventing particles from infected individuals and protecting uninfected individuals.
- Double masking recommendations may further decrease exposure to SARS-CoV-2 viral particles.

Tocilizumab in patients admitted to hospital with COVID-19 (RECOVERY): preliminary results of a randomised, controlled, open-label, platform trial (medRxiv)

Bottom Line: Hospitalized patients with hypoxia (<92%) and inflammation (CRP ≥75mg/L) due to COVID-19 who received tocilizumab were less likely to die compared to those who did not. This is a preprint, and has not been peer-reviewed.

Details: In a randomized, controlled, open-label trial evaluating multiple possible treatments for COVID-19 among hospitalized patients in the UK, participants with oxygen saturation < 92% on room air or supplemental oxygen and C-reactive protein (CRP) ≥75mg/L were eligible to be randomized to standard of care (SOC) vs. SOC plus tocilizumab (with option for 2nd dose 12-24 hours later). A total of 2022 patients received tocilizumab compared to 2094 who received SOC

alone. The mortality rate at 28 days was 29% among patients who received tocilizumab compared to 33% of those who did not (RR 0.86, p=0.007). Patients who were not mechanically ventilated at baseline who received tocilizumab were less likely to reach a composite endpoint of invasive mechanical ventilation or death compared to those who did not receive tocilizumab. A total of 82% of patients were receiving systemic steroids at the time of randomization and subgroup analyses showed a stronger mortality benefit among those receiving corticosteroids. The effects of tocilizumab on mortality were similar among those randomized ≤ 2 days or > 2 days after hospitalization (interaction p=0.86). This is a preprint, not yet peer-reviewed.

Key Takeaways:

- Among hospitalized COVID-19 patients with oxygen saturation < 92% and CRP ≥75 mg/L, those who received tocilizumab had lower risk of death compared to those who did not.
- The mortality benefit held up regardless of time since hospitalization when tocilizumab was received.

Interleukin-6 Receptor Antagonists in Critically Ill Patients with Covid-19 – Preliminary report (medRxiv)

Bottom line: Critically ill patients with COVID-19 who received tocilizumab within 24 hours of requiring end organ support (respiratory support or vasopressors) in an intensive care setting were less likely to die than similar patients who did not receive tocilizumab. This is a preprint, not yet peer-reviewed.

Details: In an international multifactorial adaptive randomized trial evaluating multiple different interventions to treat COVID-19, adult patients who were within 24 hours of requiring organ support in an ICU were randomized to receive tocilizumab or sarilumab vs. standard of care. A total of 353 patients were randomized to receive tocilizumab (8mg/kg with an option to re-dose 12-24 hours later), 48 to sarilumab (400mg once), and 402 received standard of care. Mortality was 28% in those receiving tocilizumab compared to 35.8% in the control group (odds for survival 1.64 [95% CI 1.25, 2.14]). Mortality for sarilumab was 22.2% (odds for survival 1.76 [95% CI 1.17, 2.91]). Notably 93.3% of all patients received steroids within 48 hours of enrollment. This is a preprint, and has not been peer-reviewed.

Key Takeaways: Among critically ill patients with COVID-19, those who received tocilizumab within 24 hours of requiring organ support in an ICU setting were less likely to die.

IDSA Guidelines for Tocilizumab Updated:

The infectious disease society of America recently changed their guidelines related to possible COVID-19 treatments due to the results from the above 2 studies (REMAP-CAP and RECOVERY), and are now recommending that hospitalized patients with progressive severe (defined as 02 </= 94% on room air) or critical COVID-19 who have elevated systemic inflammatory markers be given tocilizumab in addition to standard of care (which includes steroids).