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UPDATE ON GLOBAL DEVELOPMENTS ON COVID-19

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Summary

- No association was seen between Acute Respiratory Distress Syndrome (ARDS) and higher systemic inflammation in COVID-19.
- Hong Kong reported the first confirmed case of COVID-19 reinfection after being clear of the virus for four and half months, indicating acquired immunity may be short lived.
- The World Health Organization is leading an initiative, COVAX, to ensure equitable access of vaccine for COVID-19. Ethiopia is reported to be eligible for support.
- China reported to roll out experimental coronavirus vaccine for public use, saying it began inoculating high-risk groups in late July.
    - However, scientists are still expressing concerns of safety and efficacy regarding the rush for issuing of vaccine and recommending to work on not only single-vaccine trials but also a multivaccine trial.
- Re-use of face masks (disposable medical masks, surgical masks, and KN95-grade) can be maintained after soaking in hot water at a temperature greater than 56°C for 30 min and drying using an ordinary household hair dryer for 10 minutes. Authors indicated that this method can be done up to 10 cycles.

Recommendations

- The evidence from this update highlights the need for vigilance regarding vaccine. While the current rush to produce a vaccine is understandable, the potential risk of a non-effective or unsafe vaccine can be considerable.

Update on pathogenesis

- A recent study in UK revealed that Acute Respiratory Distress Syndrome (ARDS) due to COVID-19 was not associated with higher systemic inflammation and it's less prevalent in COVID-19 than in previous ARDS cohorts. The study was conducted among 39 patients with ARDS due to COVID-19 who were admitted in two ICUs between March 17 and April 25, 2020. The probability of hyper inflammatory phenotype in COVID-19 was compared between these patients and 539 controls with ARDS due to other causes. Plasma samples were analysed for interleukin-6 (IL-6), soluble tumour necrosis factor receptor superfamily member 1A (TNFR1) and bicarbonate levels. The study reported that;

- Prevalence of the hyper inflammatory phenotype was between 10 -21% of 39 patients which is lower than the proportion of patients with the hyper inflammatory phenotype in the control cohort (35% of 539).
- Levels of IL-6 were similar between the two groups, whereas soluble TNFR1 was significantly lower in patients with COVID-19-associated ARDS.
- Mortality at day 28 was higher in both phenotypes; five (63%) of eight patients with the hyper inflammatory phenotype and 12 (39%) of 31 with the hypo inflammatory phenotype died.
- At the end, the researchers recommended further studies on pathophysiology for poor outcomes in patients with COVID-19-associated ARDS [Sinha, P., et al, 2020].

- A similar prospective study was conducted in Italy with the primary aim of comparing the functional and morphological features of COVID-19-associated ARDS and ARDS due to other causes. In this study, a total of 301 patients with COVID-19 who met the Berlin criteria for ARDS and who were admitted in seven ICUs between March 9 and March 22, 2020 were included and compared with 2,548 controls with classical ARDS. Static respiratory system compliance, the ratio of partial pressure of arterial oxygen to fractional concentration of oxygen in inspired air, ventilatory ratio, and D-dimer concentrations were measured. The major findings of the study are summarized as follows;
  - Median static compliance was 41 mL/cm H_2O (33–52), which was 28% higher than cohort of patients with ARDS unrelated to COVID-19 (32 mL/cm in the H_2O [25–43].
  - Total lung weight was similar between the two groups.
  - 15 (94%) of 16 patients with D-dimer concentrations greater than the median had bilateral areas of hypo perfusion, consistent with thromboembolic disease.
  - Patients with static compliance ≤ the median and D-dimer concentrations > the median had markedly increased 28-day mortality (40 [56%] of 71) compared to the other subgroups (proportion ranges between 22 - 35%) [Grasselli, G., et al, 2020].
- According to BMJ news published on August 26th, the first confirmed case of COVID-19 reinfection was reported in Hong Kong. A 33-year-old man acquired the first infection in March and he had very mild symptoms and tested positive for COVID-19. After three weeks of admission, he was totally recovered and discharged from the hospital after two negative test results. Since that time, he was very well for four and half months and tested again when he returned back from Spain. He was asymptomatic but still tested positive with high viral load. The researchers stated that the patient's two episodes were caused by virus strains with clearly different genome sequences. A total of 24 nucleotides differed between the viruses from the first and second episode. The findings suggest that acquired immunity

after natural infection may be short lived and vaccination should be considered for those with previous infection [Parry 2020].

Update on Vaccine

- The World Health Organization is leading an initiative, COVAX, to ensure that when the vaccine is ready, those who are at a greater risk of infection are the first to receive it. The COVAX initiative is co-led by the Coalition for Epidemic Preparedness Innovations (CEPI), GAVI, and the WHO. It is aimed at ensuring equitable access to COVID-19 vaccines across the world, once the vaccines are licensed and approved. The initiative is part of a larger plan, called the Access to COVID-19 Tools (ACT) Accelerator. As of now, nine CEPI-supported candidate vaccines are included under the initiative. Further, nine other candidates are under evaluation, and procurement conversations are also underway with additional vaccine producers who are not receiving research and development (R&D) funding through COVAX at the moment. According to the WHO, COVAX has the world's "largest and most diverse COVID-19 vaccine portfolio." COVAX aims to accelerate the development of vaccines against COVID-19 by pooling funds from wealthier nations and guarantee fair and equitable access for every country in the world. The initiative has set a goal of delivering two billion doses of safe and effective vaccines that have passed regulatory approval and/or WHO prequalification by the end of 2021. The initiative involves partnerships with developed and developing country vaccine manufacturers. The WHO said 172 countries are currently engaged in discussions to potentially participate in COVAX. 80 potentially self-financing countries have submitted non-binding expressions of interest to the COVAX facility, but only 43 have been named publicly including the United Kingdom, Singapore, Canada, New Zealand, Brazil, United Arab Emirates, etc. Earlier in July, the Gavi board had agreed on 92 economies, including low income and lower-middle income countries, which will be supported by the COVAX Advance Market Commitment (AMC). Ethiopia is among those eligible for support as a lower-middle income nation (WHO 2020).
- Washington post reported that china is claiming to roll out an experimental coronavirus vaccine for public use, saying it began inoculating high-risk groups in late July. Beijing health officials said they began dosing some medical workers and state-owned enterprise employees with an experimental coronavirus vaccine in late July under "urgent use" protocols. China's coronavirus vaccine development program, said that "urgent use" of Sinopharm trial vaccines were launched on July 22, with initial use for medical workers and

some state-owned enterprises. This came a month after China's military began inoculating troops with an experimental vaccine (Eva Dou 2020).

- A comment published in lancet discusses on issues that need to be taken into consideration in COVID 19 vaccine trials. According to the article, three issues are crucial in planning COVID-19 vaccine trials: The first issue is whether to demand not only proof of some vaccine efficacy but also proof of worthwhile efficacy; Deployment of a weakly effective vaccine could actually worsen the COVID-19 pandemic if authorities wrongly assume it causes a substantial reduction in risk, or if vaccinated individuals wrongly believe they are immune, hence reducing implementation of, or compliance with, other COVID-19 control measures. The second issue is whether the initial trials of vaccine against placebo should prioritise not only single-vaccine trials but also a multivaccine trial; In comparison with individual trials for each of the many different vaccines, a global multivaccine trial with a shared control group could provide more rapid and reliable results. Additionally, its continuous use of established clinical trial infrastructure could save time and effort, accelerating the needed discovery of several safe and effective vaccines. And the last one is whether to assess safety, protection against severe disease, and duration of protection by continuing blinded follow-up of the vaccine and placebo groups after definite evidence of short-term efficacy has emerged, but before an effective vaccine has been deployed locally in the general population (Krause, Fleming et al. 2020).

Update on personal protective equipment

Face mask use

- In one article from China, hot water decontamination was reported as a very simple approach for the decontamination of masks for multiple re-use during the COVID-19 pandemic. Based on a recommended method to kill COVID-19 virus by the National Health Commission of the People's Republic of China, three kinds of typical used masks (disposable medical masks, surgical masks, and KN95-grade masks) were soaked in hot water at a temperature greater than 56°C for 30 min. Three kinds of containers, including a household aluminum basin, a polypropylene plastic lunch box, and a stainless steel thermos cup, were used in the experiments. The masks were then dried using an ordinary household hair dryer for 10 minutes to recharge the masks with electrostatic charge to recover their filtration function (referred as ''hot water decontamination + charge regeneration" method). It was

noted that the filtration efficiencies of the regenerated masks were almost maintained and met the requirements of the respective standards, retaining a similar waterproof property, microstructure, and filterability in comparison with the respective new masks. It was also revealed that the essential performance of the masks was maintained even after decontamination for up to 10 cycles. The authors also mentioned one company applied this method to enable their workers to extend the use of masks and mask use at the company was reduced from one mask per day per person to one mask every three days per person (Wang et al., 2020).

Reference list

- Eva Dou. (2020, 24/08/2020). "China says it began public use of coronavirus vaccine a month ago, bypassing clinical trials." Retrieved 24/08/2020, from https://www.washingtonpost.com/world/asia_pacific/china-coronavirus-vaccine-bypass-clinical-trials/2020/08/24/1813779a-e5be-11ea-bf44-0d31c85838a5_story.html.
- Grasselli, G., Tonetti, T., Protti, A., Langer, T., Girardis, M., Bellani, G., Seccafico, C. (2020). Pathophysiology of COVID-19-associated acute respiratory distress syndrome: a multicentre prospective observational study. The Lancet Respiratory Medicine. doi: 10.1016/s2213-2600(20)30370-2.
- Krause, P., T. R. Fleming, I. Longini, A. M. Henao-Restrepo, R. Peto, N. E. Dean, M. E. Halloran, Y. Huang, T. R. Fleming, P. B. Gilbert, V. DeGruttola, H. E. Janes, P. R. Krause, I. M. Longini, M. C. Nason, R. Peto, P. G. Smith, A. X. Riveros, P. S. Gsell and A. M. Henao-Restrepo (2020). "COVID-19 vaccine trials should seek worthwhile efficacy." The Lancet.
- Parry, J. (2020). Covid-19: Hong Kong scientists report first confirmed case of reinfection, Bmj, p. m3340. Available from: https://www.bmj.com/content/bmj/370/bmj.m3340.full.pdf
- Sinha, P., Calfee, C. S., Cherian, S., Brealey, D., Cutler, S., King, C., Szakmany, T. (2020). Prevalence of phenotypes of acute respiratory distress syndrome in critically ill patients with COVID-19: a prospective observational study. The Lancet Respiratory Medicine. doi: 10.1016/s2213-2600(20)30366-0.
- WANG, D., SUN, B. C., WANG, J. X., ZHOU, Y. Y., CHEN, Z. W., FANG, Y., YUE, W. H., LIU, S. M., LIU, K. Y., ZENG, X. F., CHU, G. W. & CHEN, J. F. 2020. Can Masks Be Reused After Hot Water Decontamination During the COVID-19 Pandemic? *Engineering (Beijing)*.

- WHO. (2020, 24/08/2020). "172 countries and multiple candidate vaccines engaged in COVID-19 vaccine Global Access Facility." Retrieved 27/08/2020, 2020, from https://www.who.int/news-room/detail/24-08-2020-172-countries-and-multiple-candidate-vaccines-engaged-in-covid-19-vaccine-global-access-facility.