Parallel Session 1: Combating COVID-19

T1c - Long-term Longitudinal Comparisons of Health Status and Immune Responses in Convalescent COVID-19 and Vaccinated Cohorts in Hong Kong

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Objectives: 1. To examine the health status and immune responses of COVID-19 patients who have recovered from different levels of disease severity. 2a. To investigate the SARS-CoV-2 specific cellular and humoral immune responses and 2b. To identify the early signatures associate to these responses from community subjects who have received different types of COVID-19 vaccines. 3. A booster study also conducted for subjects who have had poor antibody response despite having received 2 doses of CoronaVac.

Methodology: The health conditions of adults (N=400) who recovered from varying severity of COVID-19 are being assessed and their blood are collected at 6, 12, 24 and 36 months after discharge. The assessment package includes: lung function tests, 6-min walk distance (6MWD), chest radiographs/CT, and SF36 questionnaire. Blood samples from community cohorts are collected from before and serially up to 36 months after receiving one of the 2 COVID-19 vaccines (N=350 in each group of Biontech vs CoronaVac). The kinetics of SARS-CoV-2 specific humoral and cellular immune responses from both convalescent and vaccinated cohorts are determined by neutralization assay and by measuring specific T cell responses upon stimulation of SARS-CoV-2 specific peptide library respectively. The antiviral level of the human plasma with various neutralization titer collected from different vaccinated cohorts will be tested in mouse model and ADCC assay.

Results:

a) The majority of patients have normal spirometry but their 6MWD and SF 36 response were lower than the general population. Because the rate of antibody waning slows with time, we fitted lines of decay to 115 sera from 62 convalescent patients collected beyond 90 days after symptom onset and estimate that PRNT50 antibody will remain detectable for around 1,717 days after symptom onset and that levels conferring 50% protection will be maintained for around 990 days post-symptom onset, in symptomatic patients (Lau E, et al. EClinicalMed 2021).
b) Through the head-to-head comparison, vaccination with BNT162b2 (n=49) induces significantly higher levels of SARS-CoV-2 specific binding and neutralizing antibody responses when compared to CoronaVac (n=49) at 1 month post second dose. CoronaVac induces higher CD4+ and CD8+ T cell responses to the structural protein than BNT162b2 (Mok C, et al. Respirology 2021).
c) Our RCT study has shown that BNT162b2 booster dose (n=40) for 80 community subjects who have poorly responded to 2 doses of CoronaVac is significantly more immunogenic than a CoronaVac booster (n=40). BNT162b2 also elicits high level of SARS-CoV-2 specific neutralizing antibody to different variants of concern. The adverse reactions were only mild and short-lived (to be submitted).

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