

Exhibit 262

Vaccine-Induced Antibody Dependent Enhancement

<https://journal.chestnet.org/action/showPdf?pii=S0012-3692%2822%2901866-9>

Chest Infection

SESSION TITLE: Issues After COVID-19 Vaccination Case Posters

SESSION TYPE: Case Report Posters

PRESENTED ON: 10/19/2022 12:45 pm - 01:45 pm

VACCINE-INDUCED ANTIBODY DEPENDENT ENHANCEMENT IN COVID-19

PRIYANKA SRIDHAR AVINASH SINGH NADIM SALOMON AND DAVID J. STEIGER

INTRODUCTION: Antibody dependent enhancement(ADE) after COVID vaccination can increase the severity of SARS-COV-2 infection. We present a case of acute respiratory failure where ADE secondary to COVID vaccination may have played a role in the patient's fatal illness.

CASE PRESENTATION: A 74 year old female with asthma presented with two weeks of increasing shortness of breath treated with high flow nasal cannula and BiPAP. COVID-19 nasal swab PCR and respiratory bio-fire panel were negative, and chest X-ray showed diffuse opacities. A chest CT three days later demonstrated extensive bilateral reticular patchy ground-glass densities. Bacterial and fungal infectious work-up as well as SARS COV-2 PCR were persistently negative. The patient was intubated for respiratory failure on hospital day thirteen. Differential diagnoses included atypical pneumonia, cryptogenic organizing pneumonia, acute interstitial pneumonia and acute respiratory distress syndrome(ARDS) in the context of recent BNT162b2 mRNA COVID vaccination one week before admission. COVID-19 IgM and IgG were positive on hospital day thirteen. Despite extensive antibiotic and anti-fungal coverage, ICU stay was complicated by hypotension and acute kidney injury managed with continuous veno-venous hemofiltration. The patient developed refractory shock and died on hospital day twenty.

DISCUSSION: The case represents a patient with multi-system organ failure with serological evidence of SARS COV-2 IgM and IgG elevation who received BNT162b2 mRNA COVID vaccination one week before admission. It is possible that the patient developed ADE following COVID vaccination having recently acquired COVID-19 infection. Two proposed mechanisms for ADE include (a) sub-neutralizing antibodies binding to Fc-gamma receptor II a expressing phagocytic cells increasing viral entry into and replication within cells (1),(2) and (b) SARS COV-2 forms immune complexes between sub-neutralizing antibodies and the virus which bind to C1q receptor on airway epithelial cells activating immune cells with production of pro-inflammatory cytokines (1),(2) which can cause diffuse alveolar damage(DAD) in COVID-19(3). The patient's autopsy revealed focal acute and proliferative phases of DAD and pulmonary emboli, all described in autopsies following COVID. In support of ADE was a history of vaccination with BNT162b2 mRNA pre hospitalization, possible infection with COVID-19 suggested by IgM and IgG antibodies and CT consistent with COVID-19 despite persistently negative SARS COV-2 PCR. Evidence against ADE includes negative SARS COV-2 PCR and it is unclear if observed IgM and IgG antibodies were produced against spike protein or nucleocapsid protein of the virus- the latter only produced in response to infection and not vaccination.

CONCLUSIONS: In patients recently vaccinated against COVID-19 and admitted with COVID-19 related ARDS, we must consider ADE as a cause for multi-systemic illness.

Reference #1: Lee, W.S., Wheatley, A.K., Kent, S.J. et al. Antibody-dependent enhancement and SARS-CoV-2 vaccines and therapies. *Nat Microbiol* 5, 1185–1191 (2020).

Reference #2: Sánchez-Zuno GA, Matuz-Flores MG, González-Estevez G, et al. A review: Antibody-dependent enhancement in COVID-19: The not so friendly side of antibodies. *International Journal of Immunopathology and Pharmacology*. January 2021. doi:10.1177/20587384211050199

Reference #3: Batah SS, Fabro AT. Pulmonary pathology of ARDS in COVID-19: A pathological review for clinicians. *Respir Med*. 2021;176:106239. doi:10.1016/j.rmed.2020.106239

DISCLOSURES: No relevant relationships by Nadim Salomon, value=Honoraria

Removed 04/03/2022 by Nadim Salomon

No relevant relationships by Nadim Salomon, value=Honoraria

Removed 04/03/2022 by Nadim Salomon

No relevant relationships by Nadim Salomon, value=Honoraria

Removed 04/03/2022 by Nadim Salomon



No relevant relationships by Nadim Salomon, value=Honoraria

Removed 04/03/2022 by Nadim Salomon

No relevant relationships by Nadim Salomon, value=Ownership interest

Removed 04/03/2022 by Nadim Salomon

No relevant relationships by Avinash Singh

No relevant relationships by Priyanka Sridhar

No relevant relationships by David Steiger

DOI: <https://doi.org/10.1016/j.chest.2022.08.506>

Copyright © 2022 American College of Chest Physicians. Published by Elsevier Inc. All rights reserved.