

Effect of vaccination on post-acute COVID-19 sequelae (PACS): A cross sectional study

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Introduction

About 10-30% of SARS-CoV-2 infected patients experience persistent or new symptoms post initial recovery. This condition is called as **Post-acute COVID-19 sequelae (PACS)**. COVID-19 vaccination can alter the severity and duration of acute COVID-19 infection, buts it effect on PACS is still unclear.

Objective

To investigate the effect of COVID-19 vaccination on clinical and inflammatory markers in PACS patients.

Methods

- 91 PACS patients defined by WHO long-COVID guidelines were recruited.
- · PACS patients were recruited at varying timepoints post-COVID infection (median length of time post recovery: 10 months) with confirmed PCR+ infection.
- Symptoms and patient reported outcomes (PROs), validated quality-of-life questionnaires: 1)St. George's Respiratory Questionnaire (SGRQ), Fatigue Assessment Scale (FAS), Leicester Cough Questionnaire (LCQ), and COPD Assessment Test (CAT), post COVID-19 Functionality Status Scale (PCFS) and physiological test parameters of 6-min walk test (6MWT) were collected.
- Matched blood and sputum samples were collected to assess inflammatory markers (Ella[™], BioTechne, MN, USA) and autoantibodies using the Anti-Nuclear Antibody Line Immunoassay (HUMAN Diagnostics, Germany).
- Statistical test was performed by unpaired Mann Whitney Test with significance set to p<0.05. The figure was plotted using GraphPad Prism (version 9, La Jolla, CA, USA).



Results Table 1. Patient demog	raphics at baseline (V	'ISIT 1 data)	
	Pre-vaccination N=61	Post-vaccination N=30	p value
Age, years	47.28 ± 12.38	47.10 ± 13.69	0.9916
Sex, female	42 (68.85%)	25 (83.33%)	0.1406
BMI, kg/m2	31.47 ± 8.056	28.00 ± 7.071	0.0254
Weight, kg	89.68 ± 23.44	79.89 ± 26.19	0.0156
Months since recovery	11	6.5	<0.0001
Hospitalised, non-ICU	10 (16.39%)	2 (6.89%)	0.2644
Hospitalised, ICU	2 (3.27%)	0 (0.0%)	-
Home recovery	49 (80.33%)	27 (93.1%)	-
Lymphocytes	2.100 ± 0.6589	1.721 ± 0.4924	0.0112*
Leukocytes	7.309 ± 2.230	6.172 ± 1.646	0.0150*
Neutrophils	4.448 ± 1.859	3.748 ± 1.489	0.1004
Eosinophils	0.1661 ± 0.1297	0.1345 ± 0.0897	0.3481
Monocytes	0.5286 ± 0.1659	0.4552 ± 0.1744	0.0247*
Hematocrit	0.4246 ± 0.0358	0.4128 ± 0.0345	0.0467*



Figure 1: Effect of vaccination on physiological parameters: 6-minute walk test (6MWT) parameters are plotted. The pre-vaccination cohort (those with not a single dose of COVID-19 vaccine at the time of infection) had higher pre-, post- systolic blood pressure, pre- diastolic blood pressure and post- heart rate during the 6MWT evaluation in addition to reporting higher post-exertion dyspnoea. Dotted lines present normal reference range.

140 -130 -120 -120 -

Conclusions

- Despite greater times post acute infection, the unvaccinated group (median length post-recovery 11 months) showed higher systemic inflammatory markers and cardiovascular symptom burden than vaccinated group (median length post-recovery 6.25 months). Vaccination prior to SARS-CoV-2 infection reduces PACS inflammatory burden but not patient reported-symptom burden
- Future analysis will focus on the effect of vaccination on PACS patients >12 months post-recovery.





ure 2: Effect of vaccination on health outcomes. Vaccinated had comparable PACs nptoms and quality-of-life outcomes compared to unvaccinated.



Figure 3: Effect of vaccination on molecular parameters: Pro-inflammatory cytokines, coagulation mediators and anti-nuclear/extractable-nuclear antibodies are plotted between unvaccinated versus vaccinated patients. Immunoglobulins were comparable between the two groups. Dotted lines present normal reference range.



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