

Title: Long COVID syndrome: A case-control study

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Background/Introduction: Cardiovascular complications are rapidly emerging as a major threat in COVID-19 in addition to respiratory disease. Nonetheless, the mechanisms underlying the disproportionate effect of SARS-CoV-2 infection on patients with cardiovascular comorbidities remain incompletely understood

Purpose: To assess whether COVID-19 has an adverse clinical outcome at medium-term follow-up.

Methods: A case-control study was performed. Cases were subjects who were diagnosed with Covid-19 infection following nasopharyngeal swabbing; controls were age- and gender-matched subjects who were not found to be infected with Covid-19 following swabbing and were negative on testing for COVID IgG antibodies. All participants were submitted to a standardized questionnaire regarding past medical history. Baseline blood investigations were taken including NT-proBNP and troponin levels. hsCRP was taken as marker of inflammation while vWF was used as marker of endothelial dysfunction.

Results: 270 subjects were recruited, comprising 174 cases and 96 controls. Of the latter, 21 were found to be COVID IgG positive and were thus excluded from the analysis. The study cohort thus comprised 174 cases and 75 controls. The mean age of the participants was 46.1 ± 13.8 years. The median follow-up was of 173.5 days (IQR 129-193.25 days). There was no statistically significant difference in the baseline demographics between cases and controls with regards age, gender as well as cardiovascular risk factors and underlying medical conditions. With regards symptomatology at follow-up, there was a statistically significant difference between the groups with regards deterioration in general condition ($p < 0.001$), shortness of breath ($p = 0.008$), fatigue ($p = 0.044$), arthralgia ($p < 0.001$), abnormal taste of food ($p < 0.001$) as well as anosmia ($p < 0.001$), such that the cases were adversely affected. With regards blood investigations at follow-up, only hsCRP was statistically significant higher in cases as compared to controls ($p = 0.03$). Correlation analysis consequently revealed a negative correlation with regards both troponin ($p = 0.013$, $r = -0.19$) and vWF ($p = 0.026$, $r = -0.169$) with time. Finally, the association between cases experiencing shortness of breath and blood investigations at follow-up was assessed. Multivariate analysis revealed that cases experiencing shortness of breath has significantly higher white cell count (OR 1.22, 95% CI 1.02-1.46, $p = 0.029$) and troponin levels (OR 1.15, 95% CI 1.02-1.29, $p = 0.015$) and lower haemoglobin levels at follow-up (OR 0.66, 95% CI 0.5-0.86, $p < 0.002$).

Conclusion(s): COVID-positive subjects have persistent symptomatology at medium-term follow-up. The role of troponin together with markers of inflammation and endothelial dysfunction at long-term follow-up merit further investigation.