High levels of IL-1β, TNF-α and MIP-1α one month after the onset of the acute SARS-CoV-2 infection, predictors of post COVID-19 in hospitalized patients

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Abstract

The pandemic caused by SARS-CoV-2 infection has left behind a new symptomatology called post COVID-19. The pathophysiological mechanisms still remain controversial; however, a link between persistent inflammation and these sequelae has been suggested. Herein, we longitudinally assessed up- and downstream molecules of the NLRP3 inflammasome's pathway in three study groups: healthy donors (HC, n=14) and donors with a confirmed SARS-CoV-2 infection who had been hospitalized, the latter divided into post COVID-19 (PC, n=27) and non-post COVID-19 patients (nPC, n=27) based on the presence or absence of symptomatology at month 6, respectively. Plasma cytokines (IL-1β, IL-3, IL-6, IL-8, IL-18, IP-10, MIG, TNF-α, IFN-γ, MIP-1α and MIP-1β) and total peroxide (TPX) levels were quantified at baseline and at months 1 and 6 after the onset of the infection. Baseline values were the highest for both TPX and cytokines that progressively decreased thereafter the acute infection. IL-1β, MIP-1α, and TNF-α at month 1 were the only cytokines that show a significant difference between nPC and PC. These findings suggest that a persistent inflammatory state one month after the onset of SARS-CoV-2 infection related to specific cytokines (IL-1β, MIP-1α, and TNF-α) might guide to predict post COVID-19 symptomatology.

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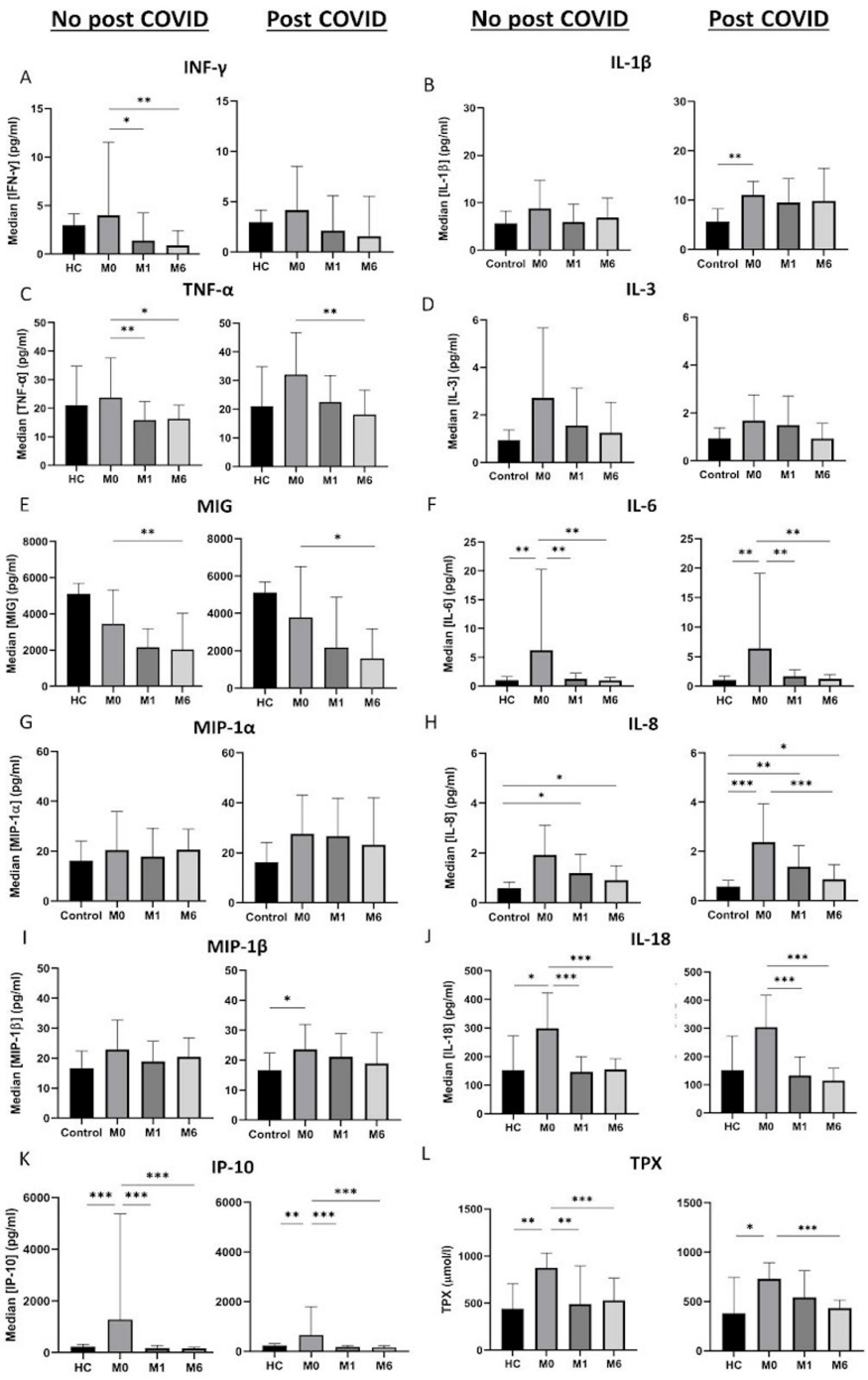

Figure 1. Cytokine and TPX dynamics in nPC and PC during the study period. IFN-γ (A), IL-1β (B), TNF-α (C), IL-3 (D), MIG (E), IL-6 (F), MIP-1α (G), IL-8 (H), MIP-1β (I), IL-18 (J) and IP-10 (K) and TPX (L) levels are expressed as median ± IQR in the three tested time points. Changes between different time points of each group were analyzed by the Friedman test, and differences between groups at each time point were assessed using the Kruskal-Wallis test. * = p value <0,05; ** = p value <0.01; *** = p value <0.001.

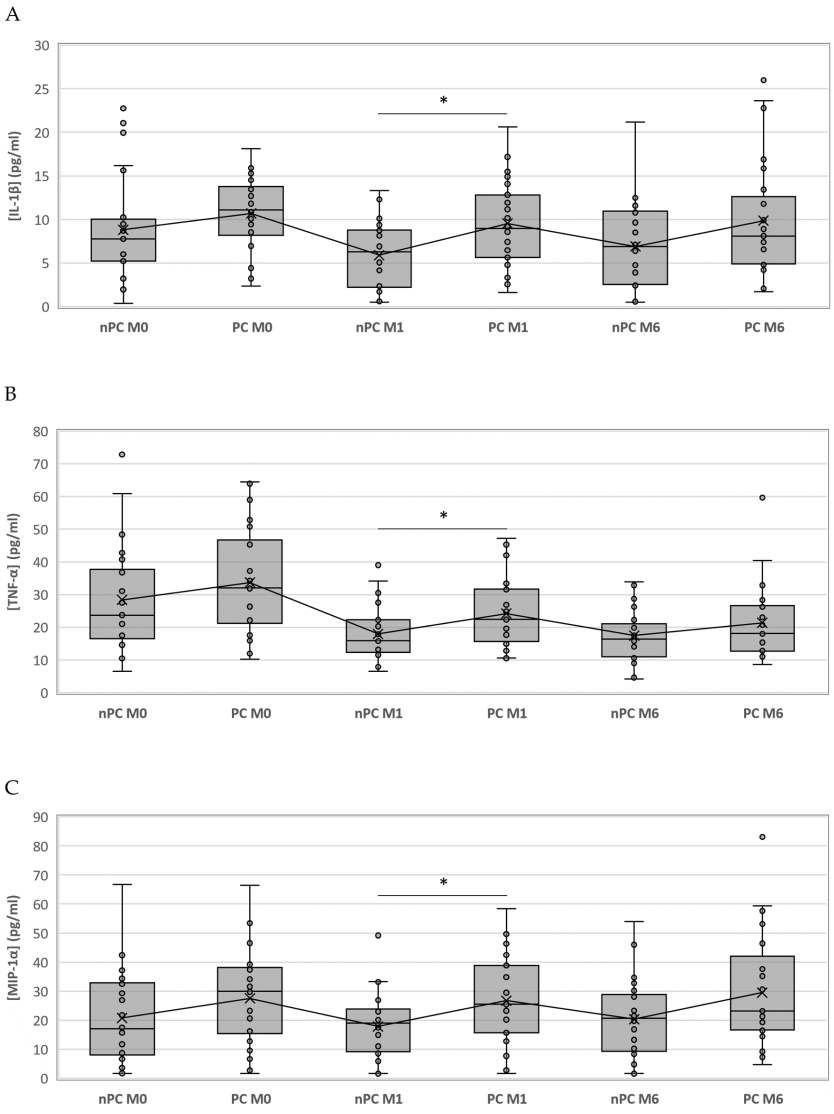

Figure 2. **Boxplot representing the differences of IL-1β, TNF-*α*, and MIP-1*α* between nPC and PC**. IL-1β (A), TNF-α (B) and MIP-1α (C) concentrations in PC and nPC. Differences between groups were assessed using the Kruskal-Wallis test and the Mann-Whitney U test when appropriate. * = p value <0,05; ** = p value <0.01; *** = p value <0.001.

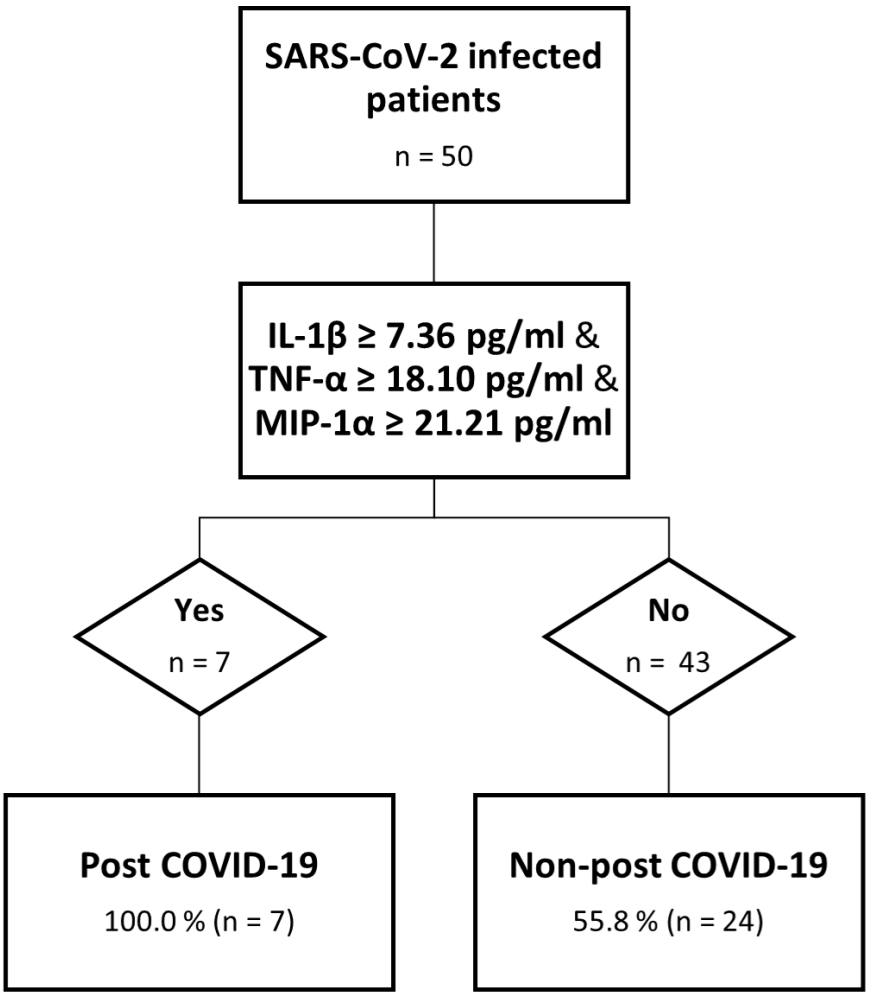

Figure 3. Decision tree analysis. Predictive model of post COVID-19.

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