# Longitudinal Changes in Arterial Stiffness and Inflammation from Pre- to Post-COVID-19 infection

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## BACKGROUND

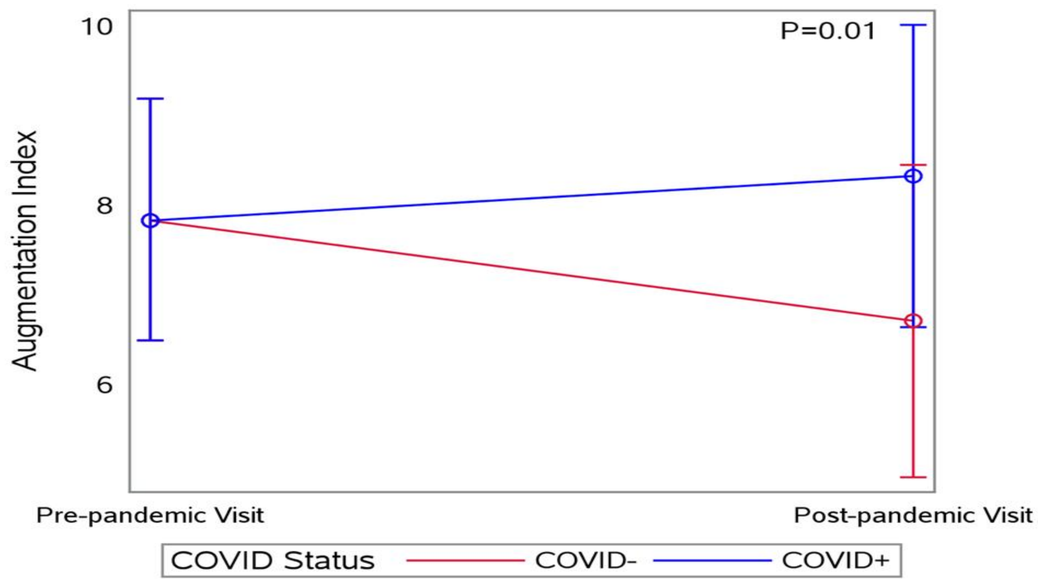
- We have previously shown in cross-sectional studies that COVID-19 infection was associated with arterial stiffness and elevated oxidized LDL (oxLDL).
- Data is limited on assessing the effect of COVID infection on endothelial function pre- and post-pandemic.
- **Direct infection** of endothelial cells by SARS-CoV-2 and the subsequent **cytokine storm** produced as a result of infection may influence endothelial cell function
- **Oxidized Low-Density Lipoprotein (oxLDL)** is a biomarker increased in the post-acute phase of COVID-19 that correlates with persistent symptoms of long COVID
- **The objective of this study** was to assess changes in pre-pandemic cardiovascular and inflammatory parameters after COVID-19.

## METHODS

- This **prospective cohort** study used FDA-approved **EndoPAT2000** to measure Augmentation Index (AI; arterial elasticity) and Reactive Hyperemic Index (RHI; endothelial function).
- Markers of **endothelial function**, **inflammation** and **gut integrity** were collected n a standardized manner in a group of participants pre- and post-pandemic visits.
- Participants who never had COVID were **1:1 propensity** score matched to the participants who had COVID between the 2 timepoints; matching was on pre-pandemic covariates, and **AI≥5.0** was defined as having worse AI.

COVID infection is more than four times more likely to yield to serious arterial elasticity compared to uninfected controls

Female sex is four times more likely to have worse AI compared to male sex




## RESULTS

- Among **156 participants**, 50% had documented COVID-19 during the study, and 50% did not. Groups were balanced (P>0.05) on pre-pandemic characteristics except for smoking status, TNF-RI, TNF-RII, and I-CAM (P<0.05).

Between pre-pandemic and post-pandemic timepoints:

- Increases in oxLDL (P=0.03) were observed in the COVID-positive group, and increases in inflammatory markers (VCAM, TNF-RI, TNF-RII, sCD14) and gut integrity (I-FABP, BDG) were seen in the COVID survivors when compared to the never-COVID group (P<0.05).
- No changes were seen in the proportion of participants with AI≥5.0 in the never infected group however in the COVID+ group, we observed a 16.7% (P=0.02) increase in the proportion of COVID-positive participants with AI≥5.0 was observed.
- **COVID infection, female sex, and higher IL-6 and sCD163** were associated (P<0.05) with an increase in having worse AI.

## CONCLUSIONS

- The results of our study shed light on the importance of long term follow-up after COVID-19 infection for better prevention and early diagnosis of **cardiovascular risk**
- SARS-CoV-2 infection is **independently** associated with arterial stiffness.
- For COVID-19 survivors, **female sex** and higher markers of **inflammation** were associated with arterial stiffness.
- **Long-term cardiovascular effects** of arterial stiffness are concerning in this population and should be investigated.

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