In Women COVID-19 Accelerates Vascular Aging

A study published revealed that coronavirus disease 2019 (COVID-19) can increase arterial stiffness and accelerate vascular aging, especially in women.

Study

The study recruited 2390 individuals from 38 centers in 18 countries. Analyses were performed on ~2,094 participants with vascular measurements available. Based on their COVID-19 status, the participants were categorized into four groups.

The first group included participants with SARS-CoV-2-negative results (control group); the second group included non-hospitalized participants with confirmed SARS-CoV-2 infection; the third group included hospitalized participants with confirmed infection; and the fourth group included participants with confirmed infection who required intensive care unit (ICU) admission. All COVID-19 patients were assessed 6 ± 3 months after SARS-CoV-2 infection.

All participants were evaluated for carotid-femoral pulse wave velocity, an established biomarker for large artery stiffness and vascular aging.

Results

The study reported that all participants with confirmed SARS-CoV-2 infection have a significantly higher large artery stiffness than SARS-CoV-2-negative participants. The gender-specific analysis revealed that women with confirmed infection have significantly higher large artery stiffness than those without infection, irrespective of COVID-19 severity. However, no significant difference was observed between men with and without confirmed infection.

Among infected women, the increase in arterial stiffness compared with controls was ≈ +0.55-0.60 m/s in non-hospitalized and hospitalized cases, and ≈ +1.09 m/s in those admitted to the ICU. Furthermore, women with persistent COVID-19 symptoms had significantly higher arterial stiffness than fully recovered women, regardless of disease severity and cardiovascular confounders.

The study included another round of vascular measurements taken from the participants at the second follow-up visit, approximately 12 months from the first follow-up visit. These measurements indicated a stable or improved large artery stiffness over time in participants with confirmed infection. In contrast, non-infected participants exhibited increased large artery stiffness, which may be due to chronological aging.

Conclusion

The study reveals that COVID-19 can significantly accelerate vascular aging regardless of disease severity, particularly in women. Among various cardiovascular risk factors, the study finds that the association between COVID-19 and vascular aging is only partly mediated by elevated blood pressure. The 12-month follow-up findings indicate that the increased arterial stiffness partially attenuates in the long term.

The study identifies factors positively or negatively associated with accelerated vascular aging in women with COVID-19. These factors are vaccination, which was associated with lower arterial stiffness in women at six months and remained associated with lower stiffness at ~ 12 months, especially in hospitalized groups, and persistent COVID-19 symptoms, which increase the risk of arterial stiffness. However, causality cannot be inferred.

Evidence regarding COVID-19-related vascular damage suggests that SARS-CoV-2 can alter the functionality of vascular endothelial cells, that viral RNA can persist in these cells, and subsequently induce chronic inflammatory responses, leading to vascular damage.

An increased vascular inflammation has been observed in the early post-infection phase in patients with severe COVID-19, which may trigger fibrotic changes and initiate the long-lasting process of arterial stiffening.

Some small-scale studies have previously reported endothelial dysfunction and arterial stiffness up to six months after an acute COVID-19 infection. However, the current study is the first large-scale study to accurately demonstrate COVID-19-induced vascular ageing and its relationship with disease severity, independent of cardiovascular risk factor burden.

The increased susceptibility to vascular aging observed in women could be due to the differences in immune system function between females and males. Females exhibit more rapid and robust innate and adaptive immune responses than males, which might accelerate their recovery from initial infection and protect them against severe disease. However, the same difference can increase their susceptibility to prolonged autoimmune-related diseases.

The study reports that Asians and Latin Americans have lower arterial stiffness than Caucasians in the COVID-19 negative group, but not in the COVID-19 positive group. This finding suggests that the ethnic benefits of cardiovascular fitness can be offset by SARS-CoV-2 infection.

The study links COVID-19 with mid-term and long-term accelerated vascular aging, especially in women. Further studies are needed to determine whether these preclinical changes are associated with clinical cardiovascular events, and whether newer SARS-CoV-2 variants or SARS-CoV-2 reinfections are associated with accelerated vascular ageing to the same extent.

Source:

https://www.news-medical.net/news/20250820/COVID-19-accelerates-vascular-aging-in-women.aspx