SEX MODIFIES THE EFFECT OF COVID-19 AND PASC STATUS ON HAVING WORSE ARTERIAL ELASTICITY

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BACKGROUND Sex differences in immunological responses to COVID-19 infection and mechanisms that may contribute towards persistent symptoms consistent with post-acute sequelae of SARS-CoV-2 (PASC) have been reported. Independent of age, male sex have higher severity and mortality from COVID-19 infection compared to female sex while female sex is associated with higher risk of PASC. Evidence on the effects of COVID infection on vascular dysfunction and PASC are limited.

METHODS Study Participants ≥18 years of age were prospectively enrolled in this adult cohort if they were:

- SARS-CoV-2 antibody reactive and had no prior history of COVID-19 infection (COVID-19), or
- COVID+ participants who were previously recovered but have no persistent or new acute symptoms of SARS (COVID+ no PASC), or
- Prior documented COVID infection with presence of persistent symptoms attributable to PASC at least four weeks following infection (PASC).

Non-invasive, FDA approved EndoPAT (Endo-PAT2000) was used for endothelial assessment by post-occlusive reactive hyperemia arterial tonometry (RH-PAT).

Arterial elasticity was measured by Augmentation Index (Higher AI = worse arterial stiffness) and standardized to 75 heart beats per minute (AI@75).

The effects of COVID and PASC status on arterial elasticity depends on sex. Female sex is associated with increased arterial stiffness (worse arterial elasticity) in the post-acute phase of COVID-19.

RESULTS

- COVID+ [38.01% (n=187)]
  - 57.22% (n=107) were female
  - 31.72% (n=59) were non-white race,
  - Average age was 46.64±13.79 years,
  - 109 (22.15%) experienced PASC (COVID+ PASC+).

- COVID [81.99% (n=305)]
  - 38.03% female sex,
  - Lower BMI [27.76±5.89 kg/m² vs. COVID+ (30.79±8.95 kg/m²); p<0.0001],
  - Higher proportion of smokers [58.22% vs. COVID+ (17.78%); p<0.0001].

- Augmentation Index @ 75 bpm
  - COVID+ PASC+ (10.5±14.72),
  - COVID+ No PASC (3.6±16.24),
  - COVID- (3.1±19.97); p<0.0001.
  - Male sex had lower AI@75 (6.08±14.9) compared to female sex (10.75±15.3; <0.0001).
  - COVID+ PASC+, female sex (adjusted) had:
    - 8.14 ± 2.95 higher AI@75 compared to COVID+ PASC+, male sex (p<0.0001).
    - 16.58 ± 2.93 higher AI@75 compared to COVID+ No PASC, male sex (p<0.0001).
    - 13.81 ± 2.11 higher AI@75 compared to COVID+, male sex (p<0.0001); and
    - 4.97 ± 2.28 higher AI@75 compared to COVID+, female sex (p=0.03).

CONCLUSIONS The effects of COVID & PASC on arterial elasticity is modified by sex. Convalescent COVID+ PASC+ female sex have worse arterial elasticity and are higher risk of cardiovascular events.

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Figure 1: Characteristics of Study Participants

Figure 2: Distribution of AI@75 by COVID & PASC Status, and SEX

Figure 3: Modification of the effect of COVID and PASC status on AI@75 by Sex