WORSE ARTERIAL STIFFNESS, AND NOT ENDOTHELIAL DYSFUNCTION, IS ASSOCIATED WITH POST-ACUTE SEQUALAE OF COVID-19

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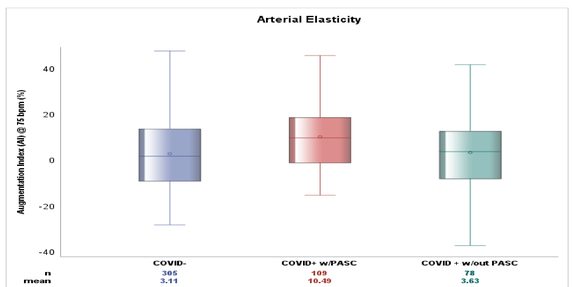
BACKGROUND

COVID-19 survivors can experience lingering symptoms known as **PASC** that appear in different **phenotypes.** The etiology remains elusive, and **endothelial dysfunction** has been postulated as a **main driver of PASC**.

METHODS

- Prospective cohort including COVID- and COVID+ **with** (COVID+PASC+) **or without** (COVID+PASC-) **PASC.**
- We measured **endothelial function using Endopat**, an FDA approved test, with **derived reactive hyperemic index RHI** (endothelial dysfunction≤1.67) and **arterial elasticity** (augmentation index standardized at 75 bpm or AI@75; (lower =better).
- PASC symptoms were **categorized into three non-exclusive phenotypes**: **Cardiopulmonary CP** (post-exertional malaise, shortness of breath, cough, palpitations), **Neurocognitive N** (change in smell/taste, neuropathy, 'brain fog', headache), and **General G** (fatigue, gastrointestinal or bladder problems).



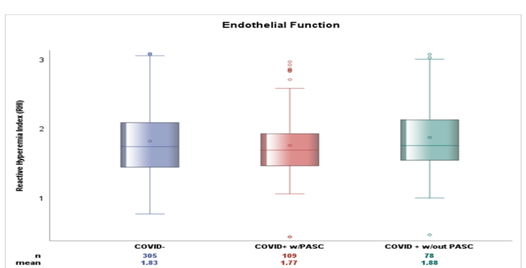


Fig 1. AI and RHI among the three groups COVID-, COVID+PASC+, and COVID+PASC-

- Post-Acute Sequelae of COVID-19 is associated with arterial stiffness
- The cardiopulmonary phenotype of symptoms is associated with the worst arterial elasticity

RESULTS

- We included **491 participants** with **109** of the **186 with confirmed COVID+ experiencing PASC**.
- Median number of days between **COVID diagnosis and study visit was 249 days** (IQR: 144, 510).
- **Among COVID+PASC+,** the median **number of symptoms was 7.0** (IQR: 3.0,13.0)
- **97 experienced symptoms categorized as G, 90 as N, and 87 as CP.**
- **COVID+ PASC+ had the lowest RHI** (1.77±0.47) and the largest proportion [46.79% (n=51)] with RHI≤1.67 (Figure).
- **AI@75 was the lowest in COVID-** (3.11±15.97) followed by **COVID+PASC-** (3.57 ± 16.34).
- **Within COVID+PASC+,** the mean AI@75 among G was 10.11±14.85, 11.36±14.67 with N, **and highest (12.01 ± 14.48) with CP**.
- **Symptoms' number** was **positively associated with AI@75** (p=0.01).
- The estimated **mean difference in AI@75** between COVID+ PASC+ with CP and COVID+ PASC- was 8.44±2.46 (p=0.001), between COVID+ PASC+ with CP phenotype and COVID- was 8.9±1.91 (p<.0001), **and between COVID+ PASC+ with CP phenotype and COVID+ PASC without CP phenotype was 7.51±3.75** (p=0.04)

CONCLUSIONS

- **PASC** was associated with **worse arterial elasticity.**
- **Within PASC**, the **cardiopulmonary phenotype** had the **highest arterial stiffness.**

ADDITIONAL KEY INFORMATION

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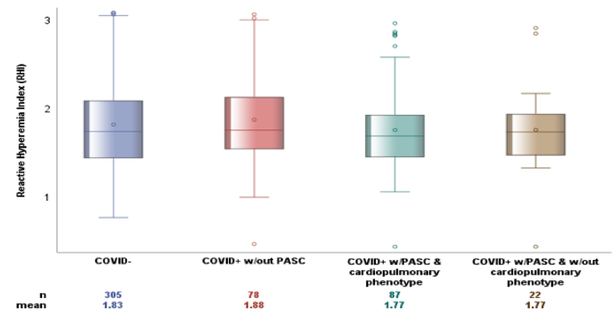

Fig 2. Reactive Hyperemia Index by COVID-19 & PASC Status with and without Cardiopulmonary Phenotype

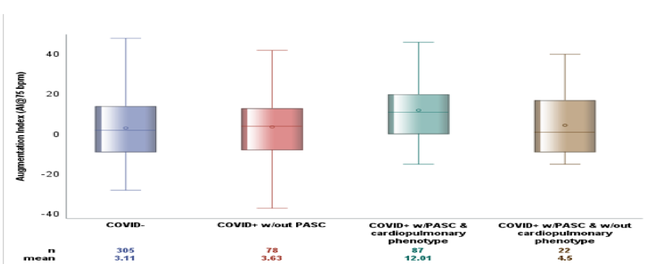

Fig 3. Arterial Elasticity by COVID-19 & PASC Status with and without Cardiopulmonary Phenotype