



## Conference Abstract

# P.18 Carotid Stiffness Parameters and Cerebral Blood Flow Pulsatility in Young Healthy Individuals across Races

Jie Liu<sup>1\*</sup>, Michelle E. Favre<sup>1</sup>, Stephanie G. Iring<sup>1</sup>, Allan Knox<sup>2</sup>, Jorge M. Serrador<sup>1</sup>

<sup>1</sup>Department of Pharmacology, Physiology and Neuroscience, Rutgers New Jersey Medical School, Newark, NJ

<sup>2</sup>California Lutheran University, Thousand Oaks, CA

### Keywords

Carotid compliance  
transcranial  
ultrasound

### ABSTRACT

**Background:** Higher cerebral blood flow (CBF) pulsatility was found to be associated with severer brain white matter lesions in the elderly [1]. It was hypothesized that the central/elastic arterial stiffness/compliance may directly affect CBF pulsatility. However, it is still unclear which carotid stiffness parameters may better reflect this impact, and whether race and sex differences are present.

**Methods:** To study the correlations among those parameters with comparisons between different races and sexes, we enrolled 35 young healthy subjects (19 females), aged  $29 \pm 5$  (18~40) years, with three races of comparable age and sex ratio, i.e. White ( $n = 16$ ), Black ( $n = 7$ ), and Asian ( $n = 12$ ). All subjects were in resting seated position, with continuous transcranial Doppler recording of CBF velocity at middle cerebral artery (MCA), simultaneous 1-min ultrasound echo-tracking on bilateral common carotid arteries, and multiple measurements of brachial blood pressure (BP).

**Results:** All derived parameters [2], including MCA pulsatility index (PI), showed no significant racial differences but with significantly ( $p < 0.05$ ) higher carotid stiffness index ( $\beta$ ), Peterson's pressure modulus (Ep), BP pulsatility index (mostly driven by higher systolic BP but similar diastolic BP), and lower arterial compliance (AC,  $p = 0.07$ ) in males than in females. Only AC (but not  $\beta$  and Ep) showed a significant correlation with PI ( $r = 0.49$ ,  $p = 0.004$ ) even after controlling for BP pulsatility index, which negatively correlated with AC ( $\rho = -0.35$ ,  $p = 0.038$ ).

**Conclusions:** Higher carotid AC (i.e. decreased stiffness) seems to enhance CBF pulsatility in young healthy populations, which might differ from the elderly.

### REFERENCES

- [1] Tarumi T, Ayaz Khan M, Liu J, Tseng BY, Parker R, Riley J, et al. Cerebral hemodynamics in normal aging: central artery stiffness, wave reflection, and pressure pulsatility. *J Cereb Blood Flow Metab* 2014;34:971–8.
- [2] Liu J, Cao TS, Duan YY, Yang YL, Yuan LJ. Effects of cold pressor-induced sympathetic stimulation on the mechanical properties of common carotid and femoral arteries in healthy males. *Heart Vessels* 2011;26:214–21.

© 2020 Association for Research into Arterial Structure and Physiology. Publishing services by Atlantis Press International B.V. This is an open access article distributed under the CC BY-NC 4.0 license (<http://creativecommons.org/licenses/by-nc/4.0/>).

\*Corresponding author. Email: [jieliu.dr@rutgers.edu](mailto:jieliu.dr@rutgers.edu)