E-Poster

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The Relationship Between Cerebrovascular Reactivity and Mobility Function in Older Adults

Topic: Physiology

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BACKGROUND

Mobility impairments affect one-third of older adults. While mobility outcomes provide a behavioral link to underpinning musculoskeletal and cardiovascular health, recent work has demonstrated relations to overall brain health, with cortical atrophy, cerebral small vessel disease, and amyloid-β concentrations all demonstrating a relation to poorer mobility. In expansion of this work, the current study examines the relationship between functional mobility, as measured with overground gait analysis, and fMRI-BOLD assessed cerebrovascular reactivity (CVR), a surrogate measure of cerebrovascular health, in a sample of older adults.

METHODS

Twenty-one cognitively intact, older adults aged 65-80 years completed an fMRI-BOLD CVR scan in which individuals alternated between breathing normal room air and a hypercapnic gas mixture (5% CO2, 21% O2, balanced N2). BOLD data was registered to a segmented T1-MPRAGE image to attain whole-brain CVR values. Participants also walked on an instrumented gait mat, where we quantified mobility according to gait velocity and cycle dynamics (% if time in stance, swing, double support phase).

RESULTS

Utilizing multivariate linear regression analysis, we observed a trend between lower CVR and higher and gait velocity ($p = .10$). Gait cycle dynamics were a strong predictor of cerebrovascular function, as participants exhibiting a higher percentage of time in the single support phase, lower percentage of time in double support, and lower percentage of time in the stance phase of overground gait (all indicative of greater mobility) demonstrated lower whole-brain CVR (all $p < .01$).

CONCLUSION

Lower BOLD-CVR was associated with better mobility outcomes runs counter to the assumption that higher CVR is associated with better functional outcomes (fitness and cognitive). These assumptions, stemming from studies using Doppler ultrasound, suggest the need for multi-modal assessment of CVR to relate mobility outcomes across differing vasculature.

Statement of Disclosures

None

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