

Vascular Endothelial Dysfunction, Cognition and Stroke in Early Life Study (VECSELS)

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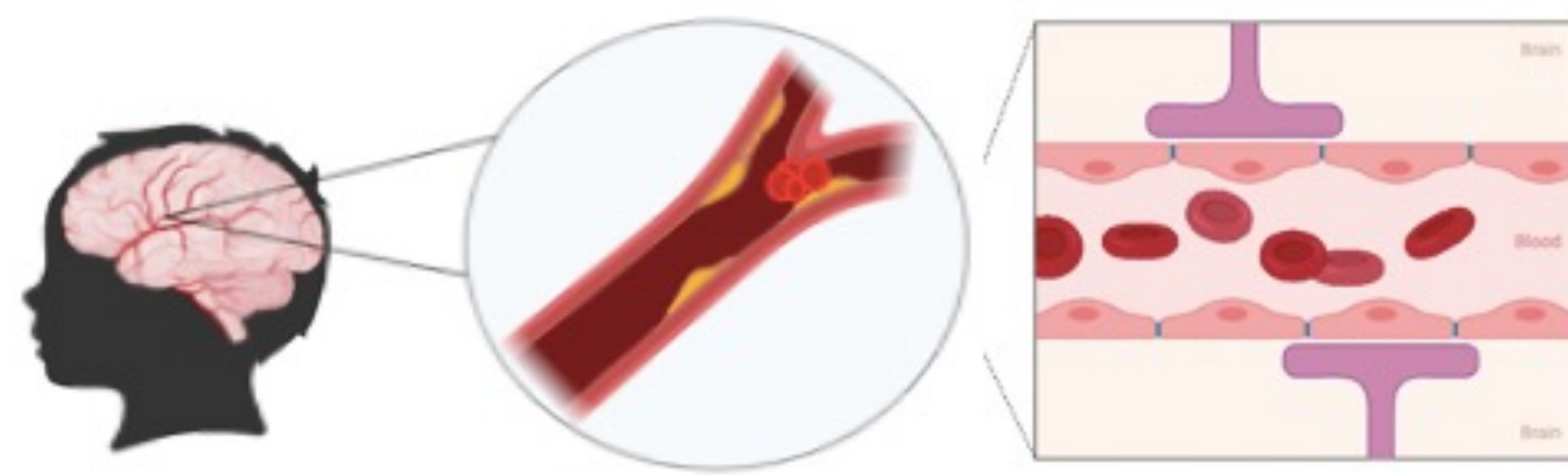
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Background

- Cardiac diseases such as congenital heart disease (CHD) account for up to 30% of all childhood strokes.
- 50-70% of stroke patients have adverse neurological outcomes, including cognitive impairments.
- Cognitive impairments are also prevalent in children with CHD in the absence of stroke.



Objectives

- To demonstrate that children with CHD+AIS have abnormal perfusion in the contralesional hemisphere, and these observations are associated with specific cognitive impairments.
- To demonstrate a spectrum of vascular endothelial dysfunction (VED) associated with cognitive function among children with CHD with and without a history of AIS.

Hypothesis

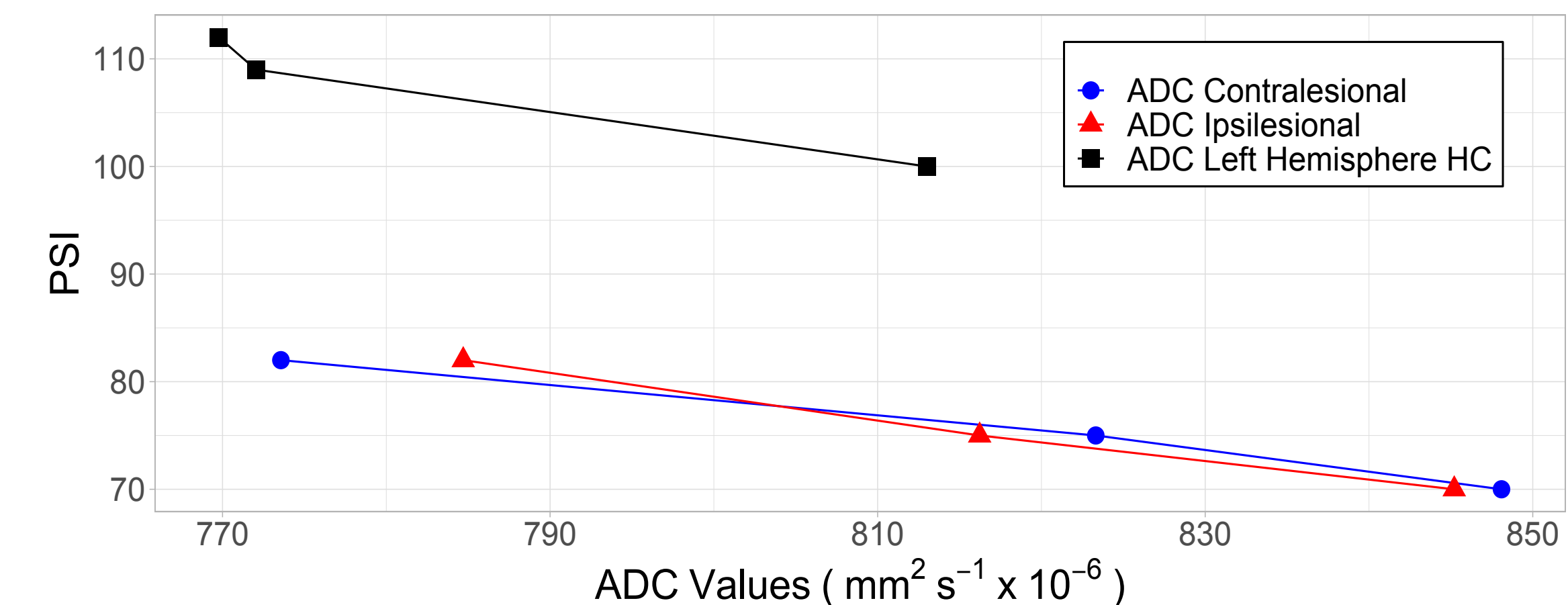
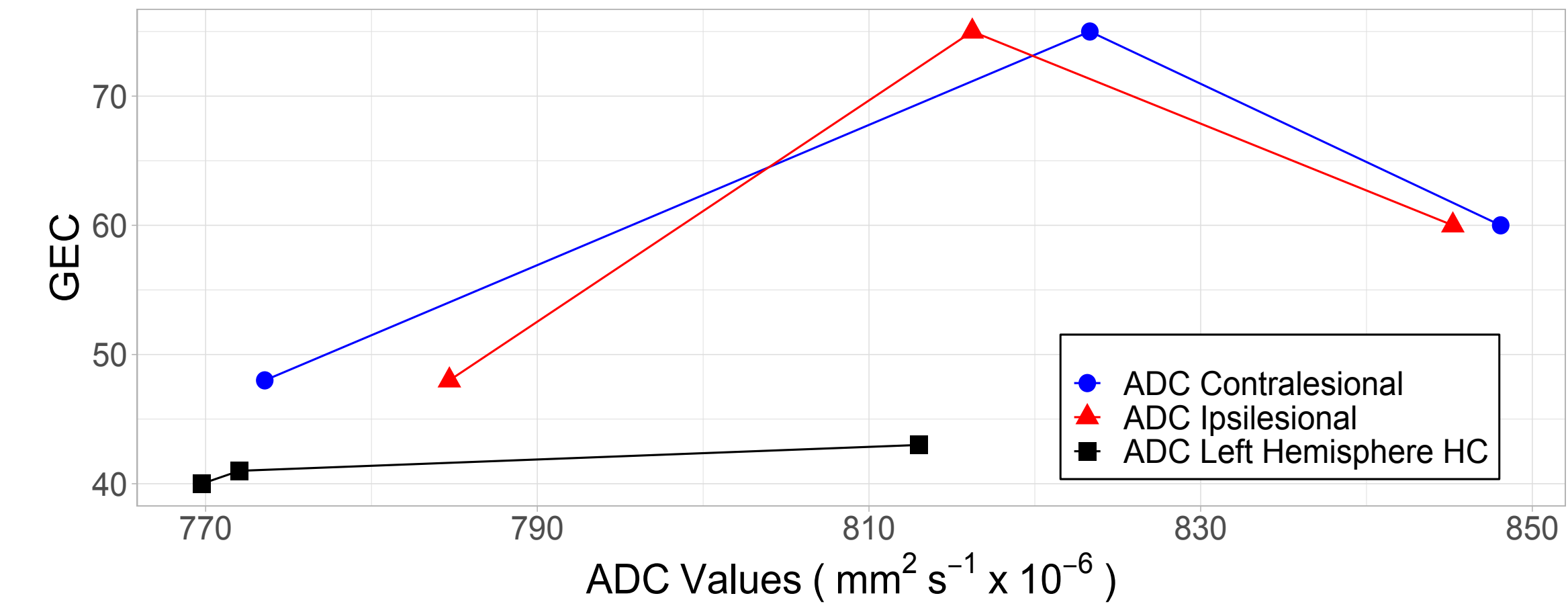
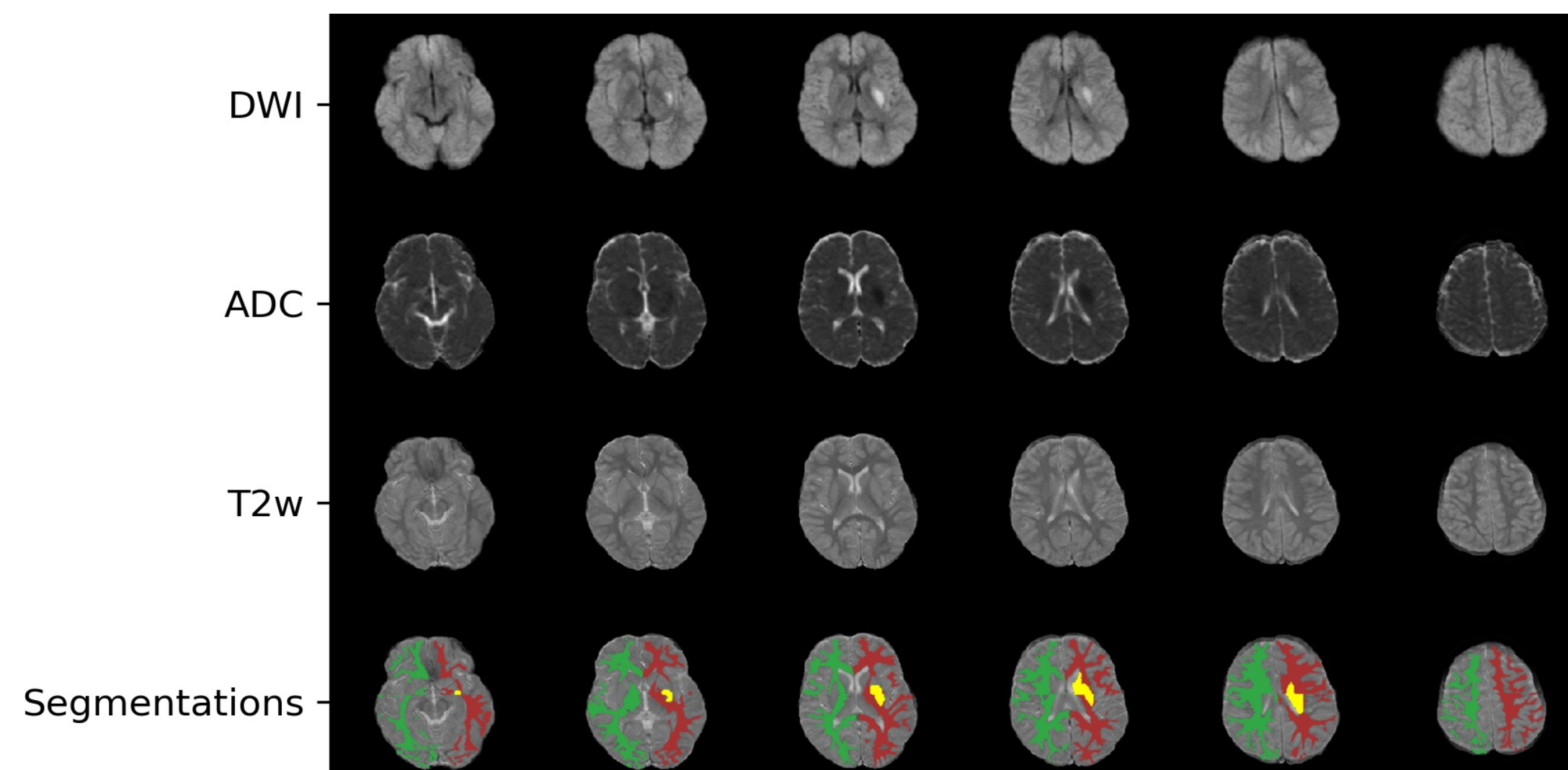
- There is a global mechanism of injury that affects the microvasculature of children with CHD with and without stroke, and this is correlated to cognitive function.

Methods

- Retrospective arm:
 - ADC values collected from analysis of acute MRI brain scans using : DWI, T2 images, and ADC maps.
 - ADC values compared with test scores from the BRIEF Parent Report to measure executive function and the WISC sub-tests to measure intelligence.
- Prospective arm:
 - Cerebral VED assessed using a hypercapnic challenge BOLD-MRI scan in 3 cohorts: 1) CHD+AIS, 2) CHD only, and 3) healthy controls.
 - Results assessed with cognitive testing scores looking at executive function and intelligence.

Results

- The average ADC values ($\text{mm}^2/\text{s} \times 10^{-6}$) in both the ipsilesional ($M=815.38$, $SD=30.26$) and contralesional ($M=814.99$, $SD=37.96$) hemisphere of patients were elevated compared to controls ($M=784.94$, $SD=24.33$).



- Processing speed ($M=75.7$, $SD=6.0$) and global executive composite ($M=61$, $SD=13.5$) scores display a spectrum of impairment that correspond to a spectrum of ADCs.

Conclusions

- This preliminary data suggests that specific cognitive outcomes may be moderated by global hypoperfusion in the brains of childhood stroke patients.
- Next Steps:** To investigate specific mechanisms of injury that cause global hypoperfusion (i.e., vascular endothelial dysfunction).

Contact

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