of research on this topic with a focus on pro-inflammatory cytokines and c-reactive protein. The symposium topics covered lie at the heart of the INS mission to study brain-behavior relationships using a multidisciplinary lens, with an emphasis on sharing and applying scientific knowledge. The symposium seeks to inform professionals working with youth with stroke about cutting-edge research, clinically applicable and novel insights, and ideas for future research directions. In this way, our symposium contributes to evidence-based care and the advancement of research.

Keyword 1: pediatric neuropsychology
Keyword 2: stroke
Keyword 3: cognitive functioning

1 Predictors of Neurocognitive Outcome in Pediatric Ischemic and Hemorrhagic Stroke

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Objective: Neurocognitive deficits commonly occur following pediatric stroke and can impact many neuropsychological domains. Despite awareness of these deleterious effects, neurocognitive outcome after pediatric stroke, especially hemorrhagic stroke, is understudied. This clinical study aimed to elucidate the impact of eight factors identified in the scientific literature as possible predictors of neurocognitive outcome following pediatric stroke: age at stroke, stroke type (i.e., ischemic vs. hemorrhagic), lesion size, lesion location (i.e., brain region, structures impacted, and laterality), time since stroke, neurologic severity, seizures post-stroke, and socioeconomic status.
Participants and Methods: Ninety-two patients, ages six to 25 and with a history of pediatric stroke, chose to participate in the study and were administered standardized neuropsychological tests assessing verbal reasoning, abstract reasoning, working memory, processing speed, attention, learning ability, long-term memory, and visuomotor integration. A standardized parent questionnaire provided an estimate of executive functioning.
Statistical analyses included spline regressions to examine the impact of age at stroke and lesion size, further divided by stroke type; a series of one-way analysis of variance to examine differences in variables with three levels; Welch's t-tests to examine dichotomous variables; and simple linear regressions for continuous variables.
Results: Lesion size, stroke type, age at stroke, and socioeconomic status were identified as predictors of neurocognitive outcome in our sample. Large lesions were associated with worse neurocognitive outcomes compared to small to medium lesions across neurocognitive domains. Exploratory spline regressions suggested that ischemic stroke was associated with worse neurocognitive outcomes than hemorrhagic stroke. Based on patterns shown in graphs, age at stroke appeared to have an impact on outcome depending on the neurocognitive domain and stroke type, with U-shaped trends suggesting worse outcome across most domains when stroke occurred at approximately 5 to 10 years of age. Socioeconomic status positively predicted outcomes across most neurocognitive domains. Participants with seizures had more severe executive functioning impairments than youth without seizures. Youth with combined cortical-subcortical lesions scored lower on abstract reasoning than youth with cortical and youth with subcortical lesions, and lower on attention than youth with cortical lesions. Neurologic severity predicted scores on abstract reasoning, attention, processing speed, and visuomotor integration, depending on stroke type. There was no evidence of differences on outcome measures based on time since stroke, lesion laterality, or lesion region defined as supra- versus infratentorial.
Conclusions: The current study contributed to the scientific literature by identifying lesion size, stroke type, age at stroke, and socioeconomic status as predictors of neurocognitive outcome following pediatric stroke. Future research should examine other possible predictors of neurocognitive outcome that remain unexplored. Multisite collaborations would provide larger sample sizes and allow teams to build models with better statistical power and more predictors. Enhancing understanding of neurocognitive outcomes following pediatric stroke is a first step towards improving appraisals of prognosis.

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Findings are clinically applicable as they provide professionals with information that can help assess individual expected patterns of recovery and thus refer patients to appropriate support services.

Categories: Acquired Brain Injury (TBI/Cerebrovascular Injury & Disease - Child)
Keyword 1: cerebrovascular injury
Keyword 2: child brain injury
Keyword 3: cognitive functioning
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2 Associations Between Motor Functioning and Intellectual Abilities in Pediatric Arterial Ischemic Stroke

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Objective: Motor impairments are one of the most common adverse outcomes after pediatric arterial ischemic stroke (AIS), affecting approximately half of survivors. The development of motor and cognitive skills is closely interrelated, and they share common neural substrates. The objective of this study was to examine whether motor functioning after the acute phase of stroke is associated with school-age intellectual abilities. We also examined associations between concurrent motor functioning and intellectual abilities. Finally, we explored clinical features associated with motor impairments.
Participants and Methods: Participants were 64 children, 34 childhood AIS (Meanage= 11.90[2.38]); 30 perinatal AIS (Meanage= 8.75[2.22]), from the Children's Stroke Program at SickKids Hospital. Motor functioning was assessed with the Pediatric Stroke Outcome Measure sensorimotor subscale at two timepoints, Time 1 or early recovery (childhood group between 30 days post-stroke to 1 year; perinatal group between 2-5 years of age) and Time 2, closest to neuropsychological testing. Intellectual abilities were measured using the Wechsler Intelligence Scale for Children 4th or 5th edition. Associations between motor and intellectual functioning were examined separately in childhood and perinatal AIS groups. Clinical features associated with motor impairment were examined across the full sample.
Results: Motor functioning during early recovery was significantly associated with processing speed (r= -.391, *p*= .036) in the perinatal group and with overall intellectual functioning (r= -.414, *p*= .018) verbal intellectual abilities (r= -.444, *p*= .011), working memory (r= .393, *p*= .026), and processing speed (r= -.351, *p*= .042) in the childhood group. There were no associations between concurrent motor and intellectual functioning in the perinatal group, and only with processing speed (r= -.525, *p*= .002) in the childhood group. When motor functioning was dichotomized as no/mild motor deficit and moderate/severe motor deficit at Time 1, children in the perinatal group with moderate/severe motor deficit had significantly lower perceptual reasoning scores (*t*[28]= 2.15, *p*= .040) and participants in the childhood group with moderate/severe motor deficit had significantly lower perceptual reasoning (*t*[32]= 2.35, *p*= .025) and processing speed (*t*[32]= 2.14, *p*= 0.41) scores. There were no differences between no/mild and moderate/severe motor deficit groups for either perinatal or childhood AIS at Time 2. Clinical features associated with moderate/severe motor deficit at Time 1 were cortical+subcortical infarcts, large lesions, presenting with hemiparesis and seizures at time of neuropsychological assessment, and accessing occupational therapy and physical therapy.
Conclusions: Results suggest that motor functioning during early stroke recovery is associated with intellectual outcome, whereas motor functioning at time closest to neuropsychological assessment is not. This may be related neuroplastic changes post-injury, likely in frontal-subcortical connections, that result in observable motor deficits after stroke and affect subsequent hierarchal brain maturational processes thereby impacting later cognitive outcome. Different patterns of associations between motor functioning and specific intellectual abilities in perinatal and childhood groups suggest possible age-mediated effects on this relationship.

Categories: Acquired Brain Injury (TBI/Cerebrovascular Injury & Disease - Child)
Keyword 1: pediatric neuropsychology
Keyword 2: intellectual functioning

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