

VASCULAR DISORDERS**Differentiation of Posterior and Anterior Ischemic Stroke**Laura M. DiDomenico, MD, MS¹ and J. Michael Taylor, MD^{1,2,*}¹Division of Neurology, Cincinnati Children's Hospital Medical Center, Cincinnati, Ohio²University of Cincinnati, College of Medicine, Cincinnati, Ohio*Correspondence: Dr. J. Michael Taylor, E-mail: jm.taylor@cchmc.org**Related Article:** Goeggel Simonetti B, Rafay MF, Chung M, Lo WD, Beslow LA, Billingham LL, et al.; IPSS Study Group. Comparative study of posterior and anterior circulation stroke in childhood: Results from the International Pediatric Stroke Study. *Neurology*. 2020 Jan;94(4):e337–44.**Keywords:** Pediatric Stroke; Posterior Circulation Stroke; Pediatric Stroke Risk Factors

Investigators from the International Pediatric Stroke Study Group (IPSS) reviewed data from a multicenter observational cohort of neonates and children with stroke, comparing clinical features and outcomes differentiating posterior circulation arterial ischemic stroke (PCAIS) and anterior circulation arterial ischemic stroke (ACAIS). The authors hypothesize PCAIS will have non-specific symptoms, distinct risk factors, and different recurrence rates and outcomes compared to ACAIS.

Stroke was identified in 2,438 subjects enrolled in IPSS between 0-19 years at disease onset, with PCAIS in 508 (18%) and ACAIS in 1,931 (70%). Cases with both anterior and posterior strokes were excluded (12%).

Comparing children (age 29 days-<19 years) in the database, PCAIS subjects were older (7.8 vs 5.1 years, $p<0.001$) and more commonly males (64% vs 56%, $p=0.002$) than subjects with ACAIS. Patients with PCAIS showed a significant increase in non-specific symptoms of ataxia, nausea/vomiting, vertigo, and headache. Speech disturbance and seizure were more common in ACAIS. A majority of subjects in each group showed weakness, with hemiparesis more common in ACAIS (86% vs. 65%, $p<0.001$) and quadriparesis more common in PCAIS (5.4% vs. 2%, $p=0.001$). Alteration of consciousness did not differ by arterial territory. The overall symptom burden at presentation, as measured by the pediatric NIH stroke scale, was less severe in PCAIS (4 vs 8, $p=0.001$).

Risk factors showed a significant preference for stroke location. Cardioembolic conditions and acute systemic illness were more commonly seen in ACAIS, while PCAIS was more commonly a complication of acute head and neck and chronic head and neck conditions. While the most common risk factor for stroke overall, vasculopathy did not show a localization preference. Specific vasculopathy subtypes did differentiate vessel preference with a higher frequency of cervicocephalic arterial dissection in PCAIS (20% vs 8.5%, $p<0.001$), with moyamoya and transient cerebral arteriopathy more frequent in ACAIS.

In multivariate analysis, PCAIS and arterial dissection were significant predictors of stroke recurrence. Case fatality was identical between arterial territories (2.9%). Patients with PCAIS were more likely to have a normal neurological examination at discharge (29% vs 21%,

$p=0.002$) and lower quantified disability at the last follow-up visit.

Analysis of neonatal stroke cases (0-28 days at onset) did not differ upon a comparison of their clinical presentations, outcomes, or recurrence rates. The authors' hypothesis was accepted as applied to children but not neonates. [1]

COMMENTARY. The study examines posterior and anterior circulation strokes in neonates and children. Challenges in diagnosing PCAIS are highlighted, with attention to non-specific and poorly localized clinical features. Neonates do not show variable features concerning arterial territory, while older children have statistically distinct symptoms, risk factors, recurrence rates, and outcomes by arterial distribution. Addressing knowledge gaps in the index of suspicion for pediatric stroke is a priority of the AHA/ASA Scientific Statement on pediatric stroke [2]. The authors address this gap by highlighting the phenotypic expressions of stroke throughout childhood.

The strength of this paper derives from the large sample size and standard data collection methodology, reducing sampling bias represented in smaller case series. Database-derived studies are limited by the selection bias of contributing sites and missing data which can limit generalizability. This study impacts clinical practice by elucidating the unique presentation of posterior circulation arterial ischemic stroke in children.

Disclosures

The authors have declared that no competing interests exist.

References

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