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VASCULAR DISORDERS

STROKE HOSPITALIZATIONS AND RISK FACTORS

Researchers at the Centers for Disease Control and Prevention, Atlanta, GA determined rates of acute stroke hospitalization and the prevalence of stroke risk factors among children and young adults hospitalized for acute stroke, 1995-2008. Seven consecutive 2-year time intervals were selected, and data for three age groups were compared: 5 to 14 years, 15 to 34 years, and 35 to 44 years. The prevalence of hospitalizations of acute ischemic stroke increased among all age and gender groups, except females aged 5 to 14 years; 31.3% increase from 3.2 to 4.2/10,000 ($p=0.005$). The largest increases in ischemic stroke occurred in males of all age groups. Overall, males had higher rates of subarachnoid hemorrhage, intracerebral hemorrhage, and ischemic stroke hospitalizations than females among those aged 15 to 34 and 35 to 44 years ($p<0.001$). Females aged 15 to 34 years and males and females aged 35 to 44 years showed a decrease in hospitalizations for subarachnoid hemorrhage, whereas females aged 5 to 14 years showed an increase for subarachnoid hemorrhage. The rate of ischemic stroke with sickle cell disease (SCD) in children aged 5 to 14 years decreased by more than half from years 1995-1996 to 2007-2008 (from 27.8 to 12.6%, $p<0.001$), whereas the rate of alcohol abuse in this age group increased significantly from 2.5% in 1995-1996 to 6.2% in 2007-2008 ($p<0.001$).

Coexisting conditions with stroke included hypertension, diabetes, obesity, lipid disorders, congenital heart disease, migraine, coagulation defects, tobacco use, and patent foramen ovale. The prevalence of these risk factors among adolescents and young adults (aged 15-44 years) hospitalized with acute ischemic stroke increased significantly ($p<0.01$) from 1995 to 2008. (George MG, Tong X, Kuklina EV, Labarthe DR. Trends in stroke hospitalizations and associated risk factors among children and young adults, 1995-2008. **Ann Neurol** Nov 2011;70(11):713-721). (Respond: Dr. George. E-mail: MGeorge@cdc.gov).

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COMMENT. The American Heart Association, in a most definitive statement and review of stroke in infants and children (Roach ES, et al. **Stroke** 2008;39:2644-2691), finds 55% of strokes in children are ischemic and the remainder is hemorrhagic, whereas among adults, 85% are ischemic. About one-half of children presenting with an acute focal neurological deficit due to stroke have a previously identified risk factor, and the remainder has >1 additional risk factor. (Ganesan V, et al. **Ann Neurol** 2003;53:167-173). The most common underlying conditions are SCD and congenital or acquired heart disease. Head trauma, often minor and sports related, is a trigger for arterial stroke (Kieslich M, et al. **J Neurol Neurosurg Psychiatry** 2002;73:13-16) and dehydration for venous stroke (deVeber G, et al. **N Engl J Med** 2001;345:417-423). Infections, including varicella, meningitis, tonsillitis, and otitis media are risk factors for both. Pediatric endocarditis was a risk factor for stroke in 7 patients reported from Children's Memorial Hospital, Chicago, 3 patients having mycotic aneurysms. (Venkatesan C, Wainwright MS. **Pediatr Neurol** 2008;38(4):243-247).

The peak age for ischemic stroke and intracerebral hemorrhage in children is in the first year of life, and one third of childhood stroke cases present in this age group. Subarachnoid hemorrhage is more common among teenagers. (Fullerton HJ, et al. **Neurology** 2003;61:189-194). An excess of strokes in boys and in those of African American ethnicity is independent of SCD.

NEONATAL ARTERIAL ISCHEMIC STROKE STUDY

The International Pediatric Stroke Study, a global research initiative of 149 co-investigators (30 centers in 10 countries), examined predictors of infarct characteristics and outcome in patients with clinical and neuroimaging confirmation of symptomatic arterial ischemic stroke (AIS). Of 248 neonates enrolled 2003-2007, 57% were male and 10% premature. Seizure was the presenting feature in 72% and nonfocal neurologic signs in 63%. Vascular imaging infarcts on MRI, involving the anterior circulation and left hemisphere preferentially, were multifocal in 30%. Maternal health and pregnancies were usually normal. Neonates required resuscitation in 30% and systemic illnesses were associated in 23%. Cardiac and prothrombotic abnormalities were found in <20%, and antithrombotic treatment was used in only 21%. Short-term outcome at discharge was poor, with deficits in 49%. Long-term outcomes are pending. (Kirton A, Armstrong-Wells J, Chang T et al. Symptomatic neonatal arterial ischemic stroke: The International Pediatric Stroke Study. **Pediatrics** Dec 2011;128(6):e1402-e1410). (Respond: Adam Kirton MD, Alberta Children's Hospital, 2888 Shaganappi Trail NW, Calgary, Alberta, Canada T3B 6A8. E-mail: adam.kirton@albertahealthservices.ca).

COMMENT. Neonates with arterial ischemic stroke (AIS) are often systemically ill, whereas their mothers are usually well. Risk factors for perinatal stroke include cardiac disorders, coagulation disorders, infection, trauma, drugs, maternal and placental disorders, and perinatal asphyxia. (Nelson KB, et al. **Lancet Neurol** 2004;3:150-158). The risk of perinatal arterial ischemic stroke increases dramatically with multiple risk factors. Long-term disabilities are frequent, and include cerebral palsy and cognitive impairments. Estimates of the incidence of cerebral palsy after AIS vary widely from 9% to 88%. Although many neonates with AIS present with seizures, most do not develop