Rapid Drop in CBF Seen at Age 12

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NEW ORLEANS — A sudden decrease in cerebral blood flow at age 12 may reflect underlying neurophysiologic processes heralding the onset of behavioral and cognitive changes that define adolescence.

Whereas previous studies have documented gradual age-associated decreases in cerebral blood flow in normal subjects, by studying a large sample size investigators were able to pinpoint precisely a time of rapid change. The sample included 380 subjects retrospectively identified from a pool of more than 8,000 who had MRI exams with arterial spin labeling perfusion imaging, said Dr. Christopher T. Whitlow, a neuroradiologist at Wake Forest University, Winston-Salem, N.C., who presented his findings at the American Society of Neuroradiology meeting.

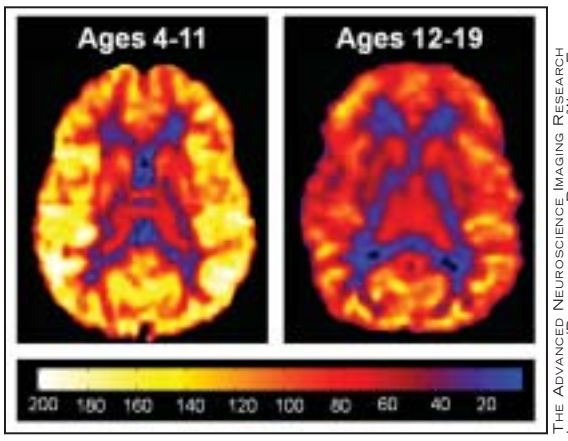
Three trends were found after analysis of mean rates of cerebral blood flow (CBF) per year, coinvestigator Dr. Joseph Maldjian, director of the advanced neuroscience imaging research Laboratory at Wake Forest University said in an interview. The first 3 years of life are characterized by a rapid increase in rates of cerebral perfusion.

Dr. Whitlow said the majority of preadolescent subjects (aged 4-11 years) demonstrated whole-brain gray matter perfusion rates greater than 90 mL/100 g per minute. At that pivotal point, things appear to suddenly and rapidly change, so that by age 12-13 whole-brain gray matter perfusion is less than 90 mL/100 g per minute.

Compared with those of children 4-11 years of age, mean rates of CBF were significantly reduced by 27% among adolescents 12-19 years of age and 31% among young adults 20-30 years of age. There were no statistically significant differences, however, in rates of CBF between the adolescent and young adult age subgroups.

"The relatively rapid changes in cerebral perfusion that correspond to the onset of adolescence may help to explain the sudden nonlinear nature of marked shifts in emotional, motivational, and cognitive processes associated with this period of development," said Dr. Whitlow.

He plans to explore age-related regional changes in CBF and to correlate CBF changes with hormone status. ■



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Mean CBF rates were 27% lower among teens than children 4-11 years of age.

The ADC Is Key

DTI *from page 1*

medial lemniscus resolved, and the pattern of infiltration in the corticospinal tracts and transverse pontine fibers was improved in all patients, he said at the American Society of Neuroradiology meeting.

In two patients with tumoral necrosis at baseline, the corticospinal tracts and posterior transverse pontine fibers appeared disrupted at presentation, and the medial lemnisci were displaced posteriorly. In one patient who presented with mild neurologic symptoms of slurred speech and drooling, initial fiber tract visualization showed infiltrated corticospinal tracts, but the tracts resolved progressively after radiation and remained unchanged with stable disease. The other patient with baseline tumoral necrosis presented with left-sided weakness and ataxia, and the DTI showed infiltration of the right corticospinal tract at presentation. After radiation, the right corticospinal tract showed progressively improved resolution but then was disrupted completely with tumor progression, coinciding with worsening neurologic deficits. In both patients, corticospinal tracts were best resolved when the tumor volume was at a minimum.

Though the series was small, Dr. Vajapeyam says that it demonstrates the value of sequential DTI imaging over time and the ability to correlate DTI findings with neurologic deficits. A larger study may determine if the findings correlate with tumor time to progression or outcome. He envisions DTI providing presurgical guidance in brainstem gliomas.

Dr. Vajapeyam said that he had nothing to disclose. ■