Medical Xpress

Children with ADHD more likely to be moderately disabled after mild traumatic brain injury

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Researchers at Children's Hospital of Pittsburgh, the University of Pittsburgh, and the University of Chicago have found that children with attention deficit hyperactivity disorder (ADHD) are more likely to demonstrate a moderate disability after sustaining a mild traumatic brain injury than children without ADHD. Detailed findings of this phenomenon are reported and discussed in "The impact of attention deficit hyperactivity disorder on recovery from mild traumatic brain injury. Clinical article," by Christopher M. Bonfield, M.D., Sandi Lam, M.D., M.B.A., Yimo Lin, B.A., and Stephanie Greene, M.D., published today online, ahead of print, in the *Journal of Neurosurgery: Pediatrics*.

The researchers set out to find whether ADHD has an effect on outcome following mild traumatic brain injury (TBI). They examined the charts of all patients with ADHD who received a diagnosis of mild closed-head injury (an injury in which no neurosurgical treatment is required) at Children's Hospital of Pittsburgh between January 2003 and December 2010. A mild closed-head injury results in what is termed a mild TBI, which is categorized by an initial Glasgow Coma Scale score of 13 to 15. From their review of patient charts, Dr. Bonfield and colleagues identified 48 children with ADHD who had sustained a mild TBI. They paired this group of patients with a randomly selected age-matched control group of 45 patients without ADHD who also had sustained a mild TBI. The researchers compared outcomes in the two groups of patients by using the King's Outcome Scale for Childhood Head Injury

(KOSCHI). Based on the Glasgow Outcome Scale, which is used commonly to assess long-term disability following TBI in adults, the KOSCHI offers greater differentiation of deficits across the milder range of disabilities. In addition to outcomes, the researchers compared patient demographics and injury-related factors.

Dr. Bonfield and colleagues found that 25% of the patients with ADHD had a moderate disability (KOSCHI Category 4b) and 56% were completely recovered (KOSCHI Category 5b) at the end of the follow-up period (mean 24.9 weeks). These results compared unfavorably to findings in the group of patients without ADHD, in which 2% of patients had a moderate disability (KOSCHI Category 4b) and 84% were completely recovered (KOSCHI Category 5b) at the end of a much shorter follow-up period (mean 7.2 weeks). Statistical analysis in this study showed that "patients with ADHD were statistically significantly more disabled after mild TBI than were control patients without ADHD, even when controlling for age, sex, initial GCS [Glasgow Coma Scale] score, hospital length of stay, length of follow-up, mechanism of injury, and presence of other (extracranial) injury." It came as no surprise that a multivariate analysis demonstrated an association between the length of follow-up and KOSCHI category, with children having greater disabilities requiring a longer follow-up period.

In the Discussion section of their paper, the researchers evaluate several possible explanations for the significant differences between patient groups, some of which include the possibility that ADHD is associated with a greater vulnerability to brain injury, impairs the healing process, or renders rehabilitation programs less effective.

Dr. Bonfield and colleagues list recommendations based on the findings of this study:

1. Prevention of TBI in children with ADHD is important because

outcomes can be more severe in these children than in children without ADHD. The authors suggest that perhaps children with ADHD should be steered away from engaging in sports or hobbies that carry increased risks of sustaining a TBI.
2. Clinical management of closed head injury may have to be adjusted when treating children with ADHD, perhaps by introducing better monitoring and initiating more intensive treatment and rehabilitation.
3. Physicians must counsel families of children with ADHD about expected outcomes following mild TBI.

Dr. Bonfield and colleagues also point out the need for additional studies on the effect of ADHD on more severe TBIs as well as on the mechanisms underlying the relationship between ADHD and TBI.

When asked to comment on the study, Dr. Bonfield replied, "Our study provides evidence that for children with ADHD who sustain a TBI, different treatment and patient and family education may be necessary to achieve optimal outcomes."

More information: *Journal of Neurosurgery: Pediatrics* thejns.org/doi/full/10.3171/2013.5.PEDS12424

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