THE CHILDREN'S MEDICAL CENTER OF DAYTON

Pediatric Clips NURSING

A heads up on pediatric concussion —

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Pediatric Nursing Clips *from Pediatric Advanced Practice Nurses at Dayton Children's are quick reviews of common pediatric conditions.*

The Children's Medical Center is the region's pediatric referral center for a 20-county area. As the only facility in the region with a full-time commitment to pediatrics, Children's offers a wide range of services in general pediatrics as well as in 35 subspecialty areas for infants, children and teens. We welcome your inquiries about services available – call 937-641-3666 or e-mail marketing @childrensdayton.org.

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CASE STUDY

Joshua, a 14-year-old male, was skateboarding at a local skate park without a helmet when he fell and struck his head. He did not lose consciousness. Bystanders reported that he appeared stunned, temporarily confused and lost his balance several times. Upon picking him up, Joshua's mother noticed that he was fatigued and complaining of headache, nausea and dizziness. He presented to his pediatrician with a normal neurologic exam. A noncontrast head CT scan was performed and read as normal, leading the pediatrician to diagnose concussion and recommend rest, acetaminophen for headache and a follow-up appointment in one week. His symptoms persisted at follow-up, requiring referral to pediatric neurosurgery.

CASE DISCUSSION

Concussion is defined as a mechanical force or impact transmitted to the head, which results in a short-lived alteration in neurologic function (ie, confusion, amnesia or loss of consciousness), that resolves spontaneously. Clinical findings are grossly normal with a nonfocal exam and normal neuroimaging. Following resolution of initial neurologic dysfunction, a varying constellation of clinical and cognitive symptoms may occur and persist for days to weeks.

Presenting signs and symptoms of concussion include:

- Cognitive factors — confusion, amnesia, loss of consciousness (LOC)
- Symptoms — headache, off-balance (dizzy), nausea, feeling "stunned", visual change (seeing stars), ringing in the ears, irritable, emotional, fatigued
- Signs — poor coordination/balance, seizure, unsteady gait, mentally slow, emotional, vomiting, vacant stare, slurred speech

DIAGNOSING CONCUSSION

Joshua presents for evaluation in the neurosurgery clinic. History reveals a similar fall two weeks prior, where he struck his head and experienced three days of mild headache and dizziness. He recovered fully; therefore he did not seek medical attention. However, multiple concussions within a short period of time can be cumulative, leading to greater severity of functional, neurologic injury.

Joshua's symptoms of headache, nausea, and poor concentration persisted and seem to worsen with physical and cognitive exertion. He vomited once this morning. Joshua has retrograde amnesia (events preceding fall) and anterograde amnesia (events after fall). He has a normal, nonfocal neurologic exam. Due to the severity and duration of his symptoms, a repeat head CT scan is obtained and is normal. Joshua is diagnosed with a complex, grade 2 concussion.

Neuroimaging is usually normal in concussion, as the injury is considered functional rather than structural. General indications for neuroimaging are prolonged unconsciousness (> 60 seconds), post-traumatic seizure, worsening severity/prolonged symptoms, or any focal neurologic injury with suspicion of a structural intra-cerebral lesion.

RECOMMENDED TREATMENT

Recommended treatment for concussion is rest, both physical and cognitive, with slow, gradual return to normal activity. Recurrence of symptoms with exertion is indicative of continued brain injury. Over-the-counter acetaminophen, or rarely prescription pain medication, are employed to treat headache. The duration of symptoms is unpredictable and not related to the grade or severity of injury.

GRADING & RECOMMENDATIONS

Joshua sustained two concussions (highest level of severity = grade 2); therefore, according to the American Academy of Neurology Concussion Grading Scale (1), it is recommended that he refrain from physical activity for at least two weeks and until completely symptom free. Consensus is unanimous regarding abstinence from sports participation or other high-risk activities until the child is completely symptom free. The latest recommendations also assert that no child should be allowed to return to play, on the day of the concussion, regardless of being symptom-free (2).

SUMMARY

Evaluation by a physician is recommended for all children who experience loss of consciousness, amnesia or symptoms lasting longer than 24 hours. Most will experience uncomplicated concussions, expecting resolution of symptoms within

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seven to 10 days. No further intervention is required for this group. Approximately 15 percent suffer complex concussion, characterized by symptoms that persist for weeks with additional emotional, behavioral and cognitive findings. Presence of prolonged symptoms after concussion is also known as post-concussive syndrome. Children with post-concussive syndrome benefit from formal neuropsychological testing, ongoing neurologic follow-up with a neurosurgeon or sports medicine physician and often require an Individualized Education Plan (IEP), to assist with school performance. Rarely psychiatric counseling or treatment for depression is warranted.

Health care professionals have a duty to educate children and their families regarding the use of protective headgear. A good guideline for parents is that the child should begin wearing the helmet early in life, and it should be worn for any activity where the child is in motion, on an object with wheels. Children also learn by example, necessitating that parents also wear helmets. Proper protective gear must also be worn with participation in organized sports.

REFERENCES:

1. Practice Parameter: The management of concussion in sports (summary statement). Report of the Quality Standards Subcommittee. Neurology. 1997 48:581-5.
2. McCrory P, et al (2005). Summary and agreement statement of the 2nd annual international conference on concussion in sport, Prague 2004. Clin J Sport Med 15(2).

FEATURED NURSE SPECIALISTS

Angela R. Enix, MS, RN, CPNP-AC, received her bachelor and master's degrees from Wright State University. She holds dual certification as a pediatric nurse practitioner (PNP) in primary and acute care. Angela practices as a PNP in the department of neurosurgery at Dayton Children's and she was recipient of the Cameo of Caring award in 2004. She is an active member in the American Association of Neuroscience Nurses (AANN) and the Ohio Association of Advanced Practice Nurses (OAAPN) and serves as a board member of the Ohio Chapter of the National Association of Pediatric Nurse Practitioners (NAPNAP). She is a new adjunct faculty member in the Acute Care PNP tract at Wright State University School of Nursing.

Sherry Kahn, MS, RN, CPNP, received her master's degree from Wright State University. She holds certification as a pediatric nurse practitioner (PNP) and practices in Dayton Children's department of neurosurgery. She is an active member in AANN, OAAPN and the Ohio Chapter of NAPNAP. Sherry is past adjunct faculty member at Wright State University School of Nursing and Kettering College of Medical Arts.

NEUROSURGERY AT DAYTON CHILDREN'S

The department of neurosurgery provides elective and emergent care to children with disorders of the brain, spinal cord and peripheral nerves. Services are available 24 hours a day for emergencies and are also provided through the neurosurgical, neuro-oncology and myelomeningocele clinics at Dayton Children's.

IMPACT PROGRAM AT DAYTON CHILDREN'S

The department of neurosurgery, under direction of Todd Maugans, MD, has been instrumental in facilitating the use of ImPACT (Immediate Post-concussive Assessment & Cognitive Testing) software in a local school system. ImPACT is a PC-based software program that examines athletes for alterations in memory, impulsivity, reaction time and concentration. Athletes complete baseline testing before participation; testing is repeated at regular intervals and when there is suspicion of concussion, to assist in determining readiness to return-to-play. Further information on ImPACT, as well as a pocket card on grading and management of concussion, is available by calling 937-641-3461.

For further information about
The Children's Medical Center of Dayton or its
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