Concussion Evaluation and Management in the Primary Care Setting

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Disclosure

- I have no relevant financial relationships with the manufacturers(s) of any commercial products(s) and/or provider of commercial services discussed in this CME activity
- I do not intend to discuss an unapproved/investigative use of a commercial product/device in my presentation.

Outline

- Review Concussion Evaluation and Diagnosis
- Review Management of Concussion
- Discuss barriers in evaluation, diagnosis and management in the primary care setting
- Review tools utilized within one general pediatrics primary care practice
  - Workflow Algorithm
  - Education handout
  - Return to school/Academic Accommodations
  - Return to play guidelines

Concussion Diagnosis

- Definition
  - Complex pathophysiological process affecting the brain, induced by biomechanical forces
- Cause
  - Direct impact to head, neck, face or another part of body with force transmitted to the head
  - Functional rather then structure changes
- Result
  - Short-lived impairment of neurologic function, usually spontaneously resolving over time

Committee on Sports-Related Concussions in Youth, 2017

Concussion Diagnosis

- Diagnosed clinically
  - No one diagnostic test exists to diagnosis concussion
  - Relies on excellent history and physical exam skills
  - Diagnosis can be variable based on clinician evaluating patient and time at which patient is evaluated

Concussion Diagnosis

- Previous criteria graded on scale 1, 2, 3 for mild, moderate and severe; HOWEVER, latest guidelines from 2012 **NO** longer use this grading scale because evidence now suggests that a brief loss of consciousness in association with concussion does **NOT** predict clinical course or long-term cognitive impairment
- Similarly, the absence of loss of consciousness in a young athlete who has sustained a concussion should **NOT** be used to justify more rapid return to play.

Giza CC., et al.

Concussion Diagnosis

- Centers for Disease Control and Prevention estimate that as many as 3.8 million sport-related traumatic brain injuries occur annually

MMWR Mob Mortal Wkly Rep. 2007 Jul 27

Concussion Diagnosis

- Standardized tools do exist to assist in diagnosing but are not required to formally diagnose
  - Acute Concussion Evaluation tool (ACE)
  - Child Sport Concussion Assessment Tool 3 (Child SCAT 3)
  - Sport Concussion Assessment Tool 3 (SCAT 3)
  - Balance Error Scoring System (BESS)

Concussion Symptoms by Category

Somatic	Cognitive	Emotional	Sleep
•Headache •Fuzzy or blurry vision •Dizziness •Fatigue •Drowsiness •Sensitivity to light •Sensitivity to noise •Balance problems •Nausea or vomiting (early on)	•Difficulty thinking clearly •Feeling slowed down •Difficulty concentrating •Difficulty remembering new information	•Irritability •Sadness •Feeling more emotional •Nervousness or anxiety	•Sleeping more than usual •Sleeping less than usual •Trouble falling asleep

Committee on Sports-Related Concussions in Youth, 2014

Concussion Diagnosis

- Patients that are high risk (well appearing but have any of the following) warrant imaging for structural intracranial injury:
  - Focal neurologic findings
  - Skull fracture, especially findings of basilar skull fracture
  - Seizure
  - Persistent alteration in mental status
  - Prolonged loss of consciousness

Concussion Management

- Cognitive and Physical rest are primary interventions for concussion
- In addition to AVOIDANCE of subsequent injury

Graham R, et al. *The National Academies Press.* 2017

Concussion Management

- Most patients will be asymptomatic by seven days after injury
- Concussion symptoms usually have a high burden on functioning during the 2 weeks of symptom activity
- Irritability, sleep disturbance, frustration, and poor concentration can take more than 14-16 days to resolve
- Most athletes can return gradual return to play by 10–14 days post concussive injury

Eisenberg et al, *Pediatrics*, 2014.

Concussion Complications

- Strenuous cognitive and physical exertion during the earlier parts of recovery may prolong or exacerbate the symptoms of concussion
- Second impact syndrome
  - Death or devastating neurological injury attributed to massive swelling in patients who sustain subsequent brain injury prior to fully recovering from a concussion
- Chronic traumatic encephalopathy
  - **PERMANENT** changes in mood, behavior, cognition, somatic symptoms, and, in severe cases, dementia or Parkinsonian symptoms occurring in patients with multiple concussions

Brown NJ, et al. *Pediatrics*, 2014.

Kansas Law for Student Athletes

- Kansas Legislature enacted the School Sports Head Injury Prevention Act (the "Kansas Act") that went into effect July 1, 2011
- Kansas was the 19th state to sign this legislation
  - now all 50 states have concussion legislation
- Parents and students ARE REQUIRED to complete a Concussion & Head Injury Information Release Form each academic year
- Return to Play or Practice Clearance Requirements:
  - The clearance must be in writing and signed by a health care provider (healthcare provider per the law is an MD or DO)
  - The National Federation and the KSHSAA recommend the clearance should not be issued on the same day the athlete was removed from play
  - Gradual return to play FOLLOWING concussion clearance

Question

- 13 year old girl presents to you one week after a head injury for her initial medical evaluation. She was playing soccer and collided heads with another player. She had no loss of consciousness, no amnesia, and no immediate headache. She did not receive acute medical care, and after sitting out the rest of the game, she returned to school and sports the next day without difficulties. One day prior to presentation, she developed a bi-frontal headache that has been refractory to over-the-counter analgesics. She presents to you for evaluation of the headache. How likely would you be to diagnose the patient with a concussion?
  - A. Very likely
  - B. Likely
  - C. Neither likely nor unlikely
  - D. Unlikely
  - E. Very Unlikely

Question

* An 11-year-old boy presents to you five days after a head injury for his initial medical evaluation. He fell over the handlebars of his bicycle and struck his head. He was not wearing a helmet. He had no loss of consciousness and no amnesia, and had an initial mild headache that resolved with acetaminophen. He did not receive acute medical care, and returned to school the next day. His mother has noticed that, since his fall, he has been more irritable than normal and has been taking longer to complete his homework. How likely would you be to diagnose the patient with a concussion?
  * A. Very Likely
  * B. Likely
  * C. Neither Likely nor Unlikely
  * D. Unlikely
  * E. Very Unlikely

Question

* A 17-year-old boy presents to you one day after a head injury for his initial medical evaluation. He had a direct helmet to helmet with another player while playing football. Witnesses say he was briefly stunned and seemed confused for about 10 minutes after the hit. He sat out the rest of the game and did not seek acute medical care. He has amnesia to the event and intermittent headaches for the following day, which prompts his mother to bring him to you for evaluation. How likely are you to diagnose this patient with a concussion?
  * A. Very Likely
  * B. Likely
  * C. Neither likely nor unlikely
  * D. Unlikely
  * E. Very Unlikely

What barriers impact concussion diagnosis?


PEDIATRICS
OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

Pediatric Providers' Self-Reported Knowledge, Practices, and Attitudes About Concussion

Mark R. Zonfrillo, Christina L. Master, Matthew F. Grady, Flaura K. Winston, James M. Callahan and Kristy B. Arbogast

Pediatrics 2012;130;1120; originally published online November 12, 2012; DOI: 10.1542/peds.2012-1431

The online version of this article, along with updated information and services, is located on the World Wide Web at:

/content/130/6/1120.full.html

Barriers identified

- Study looked at cross-sectional survey to pediatric primary care and emergency medicine providers in a single, large pediatric care network
- 91% of respondents had at least 1 concussion patient in prior three months to the survey
- 92% of clinicians had referred at least 1 concussion patient in the previous 3 months after the initial visit, PCP more likely to refer then emergency medicine clinicians

Zonfrillo, et al. *Pediatrics*, 2012

Barriers to diagnosis and managing concussion

- ER physicians felt not their place to manage concussion patients
- PCPs were more uncomfortable or didn't have time to manage
- Authors found:
  - 16% inadequate training to educate
  - 15% inadequate time to educate
  - 96% of providers without provider decision support tool specific to concussion and 100% without discharge instructions believed these would be helpful

Zonfrillo, et al. *Pediatrics*, 2012

Is this applicable to practices around Kansas?

- Well, we surveyed general pediatrics faculty (including physicians, nurse practioners and physician assistants) and pediatric residents at University of Kansas Health System in Kansas City
- And guess what, we weren't so hot at managing these, and not everyone in department was aware of resources available to manage concussions

Survey at University of Kansas Health Systems Pediatrics Department

- 75% of respondents had cared for a patient with an acute (within 24 hours) or non-acute (> 24 hours) since symptom onset of concussion
- 50% of respondents reported referring some patients with symptoms consistent with concussion
- 38% of respondents reported referring ALL patients with symptoms consistent with concussion

Survey at University of Kansas Health Systems Pediatrics Department cont.

- What reasons for referring concussion patients?
  - 43% respondents reported not always feeling comfortable with management
  - 46% respondents reported not always having time for management
  - 60% respondents reported not always having adequate resources for management

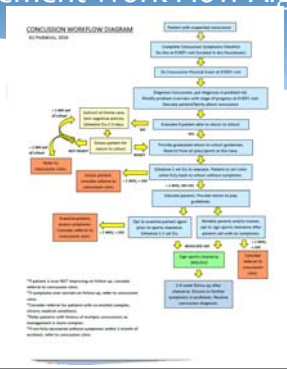
Questions (cont.)

- Think back to our three patients earlier.
  - How likely would you be to recommend concussion specific interventions for:
    - 13 year old girl who collided while playing soccer?
    - 11 year old boy who fell over his handlebars?
    - 17 year old boy with helmet to helmet contact while playing football?
  - How likely would you be to refer any of the above patients?

Implementations to Improve Concussion Management

- Survey results reviewed with department with education regarding concussion diagnosis and management
- Resources for patient education, academic accommodations and step wise return to play reviewed with faculty and made available in clinic locations
- Workflow Algorithm created and implemented department wide for appropriate management and referral pathway

Management Work Flow Algorithm



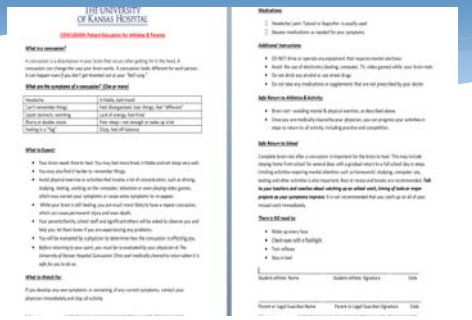
Evaluating Symptoms at Each Encounter

- Concussion Symptom Checklist provided to every patient with concussion concerns or head injury upon check in
- Results entered into electronic medical record

Concussion Symptom Checklist in EMR

Symptoms	0900
Headache	
Nausea	
Vomiting	
Balance Problem	
Dizziness	
Fatigue	
Trouble Falling Asleep	
Sleeping more than usual	
Sleeping less than usual	
Drowsiness	
Sensitivity To Light	
Sensitivity To Noise	
Irritability	
Sadness	
Nervousness	
More Emotional	
Numbness or tingling and/or neck pain	
Feeling Slowed Down	
Feeling Mentally Foggy	
Difficulty Concentrating	
Difficult Remembering	
Visual Problems	
Neck Pain	
Total Number Of Symptoms	
Total Symptoms Score	

Patient Education Hand-out



THE UNIVERSITY OF KANSAS HOSPITAL

http://www.kumed.com/medicalservices/concussionmanagement/resources

Academic Accommodations Handout

http://www.kumed.com/medicalservices/concussionmanagement/resources

Step Wise Return to Play Hand-Out

http://www.kumed.com/medicalservices/concussionmanagement/resources

Concussion Resources

- Concussion Legacy Foundation
  - http://concussionfoundation.org/learning-center/concussion-clinics
- Heads Up
  - https://www.cdc.gov/headsup/index.html
- University of Kansas Health Systems
  - http://www.kumed.com/medical-services/concussion-management
- Healthy Children
  - https://www.healthychildren.org/English/health-issues/injuries-emergencies/sports-injuries/Pages/Concussions.aspx
- Kansas State High School Activities Association
  - http://www.kshsaa.org/Public/General/ConcussionGuidelines.cfm
- Kansas Sports Concussion Partnership
  - http://www.kansasconcussion.org/

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