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Post Concussive Headache in Children and Adolescents: Evaluation and Treatment

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Disclosures

- No Financial
- Like a alot of child neurology, most medications discussed are used off-label
- I give evidence where I can, a lot is still consensus.

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Overview

- Epidemiology
- Defining the Problem and More Facts
- Treatment



Ouch



Epidemiology

- 1.6 million to 3.8 million sports-related TBIs occur each year, including those for which no medical care is sought.
- Among young people ages 15 to 24 years, sports-related injuries are now second only to motor vehicle collisions as a leading cause of traumatic brain injury.

Thurman DJ, Branche CM, Sniezek JE. The epidemiology of sports related traumatic brain injuries in the United States: recent developments. J Head Trauma Rehabil. 13(2):1-8, 1998

Langlois JA, et al. J Head Trauma Rehabil Vol. 21, No. 5, pp. 375-378, 2006



AAN Concussion

Symptoms of concussion

- Early (minutes and hours)
 - Headache
- Dizziness or vertigo
- Lack of awareness of surroundings
- Nausea or vomiting

AAN PRACTICE PARAMETER: THE MANAGEMENT OF CONCUSSION IN SPORTS

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AAN Concussion

Symptoms of concussion (Cont'd)

– Late (days to weeks):

- Persistent low grade headache
- Light-headedness
- Poor attention and concentration
- Memory dysfunction

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AAN Concussion

– Late (days to weeks):

- Easy fatigability
- Irritability and low frustration tolerance
- Intolerance of bright lights or difficulty focusing vision
- Intolerance of loud noises, sometimes ringing in the ears
- Anxiety and/or depressed mood
- Sleep disturbance

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Post-Traumatic Headache (PTH)

- International Classification of Headache Disorders, version 2 (ICHD-2) (4) Criteria
 - A secondary headache disorder
 - Must start within seven days of injury or
 - After regaining consciousness following TBI.
- An acute PTH becomes chronic if headaches persist beyond 3 months

The International Classification of Headache Disorders: Second edition. Cephalalgia 2004; 24(Suppl 1): 9–160.

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Table 2.—5.1.2. Acute PTH Headache Attributed to Mild Head Injury

(A) Headache, no typical characteristics known, fulfilling criteria C and D

(B) Head trauma with all the following:

1. Either no loss of consciousness or loss of consciousness of less than 30 minutes' duration
2. GCS score 13 or higher
3. Symptoms or signs diagnostic of concussion

(C) Headache develops within 7 days after head trauma

(D) One of the following:

1. Headache resolves within 3 months after head trauma
2. Headache persists, but 3 months has not yet passed since head trauma

The International Classification of Headache Disorders: Second edition. Cephalalgia 2004; 24(Suppl 1): 9–160.

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Pediatric Post-Traumatic Headache (PTH)

- Fifty-eight percent of pediatric patients still reported headaches 1 month after injury following mTBI (in a broader age group)
- 90% of high school athletes with a concussion reported headache initially
 - 83% had resolution of all symptoms within 1 week

Epidemiology of Postconcussion Syndrome in Pediatric Mild Traumatic Brain Injury Pediatrics Volume 126, Number 2, e374, 2010.

High School Concussions in the 2008–2009 Academic Year: Mechanism, Symptoms, and Management Am J Sports Med. 38(12): 2405–2409, 2010.

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Migraine

Diagnostic criteria:

A. At least 5 attacks fulfilling criteria B-D

B. Headache attacks lasting 2-72 hours (untreated or unsuccessfully treated)

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Migraine

C. Headache has at least two of the following characteristics:

1. unilateral location (bilateral in children)
2. pulsating quality
3. moderate or severe pain intensity
4. aggravation by or causing avoidance of routine physical activity (eg, walking or climbing stairs)

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Migraine

D. During headache at least one of the following:

1. nausea and/or vomiting
2. photophobia and phonophobia

E. Not attributed to another disorder

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Tension

- Headache lasting from 30 minutes to 7 days
- Headache has at least two of the following characteristics:

1. bilateral location
2. pressing/tightening (non-pulsating) quality
3. mild or moderate intensity
4. not aggravated by routine physical activity such as walking or climbing stairs

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Tension

D. Both of the following:

1. no nausea or vomiting (anorexia may occur)
2. no more than one of photophobia or phonophobia

E. Not attributed to another disorder

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Treatment

- Generally use of NSAID's discouraged for first 48 hours due to theoretical risk of bleeding

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Rest Protocol

- Bed or couch rest for 3-5 days
 - No TV, Phone, Texting, Email, Computer... Radio OK if tolerated
 - 1 hour of 24 hours is patient's to use as they see fit, but no exertional activities.
 - Sleep as much as possible
 - OK to get up to eat, shower, restroom.
 - No Homework
- Take it 24 hours at a time

Canadian Academy of Sport Medicine (CASM) Guidelines for Assessment and Management of Sport-Related Concussion. Clin J Sports Med 2000;10:209-211



Remember: Eat, Sleep, Bathe only





Total Rest should end at 5 days, if not sooner (Our group's opinion)

- Evidence is contradictory at times
- Fear is that too much change from patient's prior routine is detrimental
 - Sleep
 - Psychological
 - Conditioning (Physical and Cognitive)



If Rest Fails to Help

- Start symptomatic care
- If constant headache at visit (>1 week), consider admit to break headache

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Medication Overuse

- First, prevent and/or treat medication overuse headaches
 - Use acute treatments for headaches 3 or less days a week
 - If over-using, wash out offending drug for 1 week then reduce use to 2-3 days a week
 - **Think about an exception during first 1-2 weeks if treating musculoskeletal pain**

A consensus protocol for the management of medication-overuse headache: Evaluation in a multicentric, multinational study. [Cephalalgia](#), 2014 Feb 20. [Epub ahead of print]

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ER/Inpatient Treatment for Headache

In this order: Wait 30 minutes between treatments to assess effects

}	IVF	20 mg/kg/load (max 1 liter)
	Compazine	0.15 mg/kg/dose (Max 10 mg)
	Toradol	0.5 mg/kg/ dose (max 15 mg < age 16; max 30 mg over age 16 yr)
	Depakene	15-20 mg/kg/dose (max 1 gram)
	SoluMedrol	15 mg/kg/dose (max 1 gram)
	Keppra	10-20 mg/kg/dose
	Magnesium sulfate	25 mg/kg/dose (max 2 grams) over 4 hours

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Headache: Rx

- Healthy living
 - Eat 3 square meals (Don't skip meals)
 - Drink water until urine is clear/light yellow.
 - Get enough sleep
 - Exercise at least 30 min. three times a week **when advised**
 - Eat your Fruits and veggies
 - Avoid caffeine

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Headache: Rx

- Acute plan for headaches
 - 10-20 mg/kg/dose acetaminophen and/or ibuprofen once a day; no more than 3 doses a week.
 - Max is 1000 mg acetaminophen and 800 mg ibuprofen per dose
 - 20 oz water or sports drink
 - Add triptan if failing to abort migraine headache
 - Seek ED if headache persists past 2 hours (4 if triptan was used (this is after triptan was repeated once)

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Preventative Approach

- Using medications to prevent headaches is discouraged among expert opinion if patient is attempting to return to contact activities and its use is variable among practitioners.

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Prevention: Vitamins/supplements- More studies needed

- Check levels of vitamins below. If low, supplement. (25-OH Vitamin D <40 or CoQ10 less than 0.8 or index <midpoint of reference range)
- CoQ10 100 mg daily
- Vitamin D 50000 units weekly for 8 weeks then 1000 units bid

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**Prevention: Vitamins/supplements-
More studies needed**

- CoQ10 shows response usually in 4 weeks
- **Recheck levels 1 month after supplementing**

A randomized, double-blinded, placebo-controlled, crossover, add-on study of CoEnzyme Q10 in the prevention of pediatric and adolescent migraine. Cephalalgia 31(8) 897-905, 2011.

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Sleep

- **Preventative Treatment** (*What do I take every day to help sleep?*)
- Melatonin 3 mg one hour before bedtime. May increase by 3 mg every 3 days to a maximum of 9 mg before bedtime. **Only increase dose if needed.**
- Other _____ mg each night

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Sleep (cont'd)

HEALTHY HABITS:

- Exercise per treating provider
- Once cleared, then walk at least 3 times a week for 30 minutes. Follow return to play guidelines.
- No caffeine after lunch
- Snacks No heavy snacks after dinner (preferred) or within 3 hours of bedtime (if absolutely needed).

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Sleep (cont'd)

- No reading, TV, video games, or radio while in bed
- Lights off or low. Turn off TV. White noise/soothing sounds on radio OK to try.
- Stick to same schedule on school days, holidays and weekends.
 - Bedtime on weekends/ holidays should be within 1-2 hours of a school night.
 - Awaken within 1-2 hours of usual school day awakening time, even on weekends and holidays

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Sleep

- If simple treatments have not worked, I will try a one week course of a sleep aid (like zolpidem) to reset sleep clock.
- Continued problems get referred to sleep medicine

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Biofeedback and Cognitive Behavioral Therapy (CBT)

- CBT in meta-analyses shows promise in headache management
- Recent Study at CCHMC found combination of Amitriptyline and CBT decreased both headache days and headache disability

Psychological therapies for the management of chronic and recurrent pain in children and adolescents (Review) Copyright © 2013 The Cochrane Collaboration.

Cognitive Behavioral Therapy Plus Amitriptyline for Chronic Migraine in Children and Adolescents: A Randomized Clinical Trial JAMA. 2013;310(24):2622-2630.

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Preventative Approach

- Using medications to prevent headaches is discouraged among expert opinion if patient is attempting to return to contact activities and its use is variable among practitioners.

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Headache: Prevention

- Only increase medications if you don't see improvement.
- Patients have surprised me with how low of a dose has worked for them.

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Possible Quandaries

- How long do you let them try and recover before starting preventatives?
 - 4 weeks?
 - 1 week of the lifestyle changes without improvement?

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Possible Quandaries

- What do you do if they have a history of migraines/ headaches prior to injury?
 - Aim to get them back to their pre-injury headache frequency and severity with lack of other symptoms.
 - I don't count their pre-injury use of medications against them.
 - Exercise is your friend in this scenario

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Post Concussive Headache in Children and Adolescents: Evaluation and Treatment- Summary and Pearls

- PTH can be any type of headache
 - Migraine and Tension most common
- Behavioral management is primary treatment early in the course (first 1-2 weeks?) then always important
- Get moving within a week from injury

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Post Concussive Headache in Children and Adolescents: Evaluation and Treatment-Summary and Pearls

- Non-medication methods are showing promise
- Sleep and mood should not be ignored
- Sometimes cognitive effort drives the headache, so help the transition to be smoother




