

Head Injuries in Sport

Jeff Anthony, D.O., F.A.A.F.P., F.A.O.A.S.M
San Diego Sports and Family Medicine Center
Team Physician San Diego State University,
San Diego Sockers

Today's talk

- Cases
- Pathophysiology concussions
- Second Impact Syndrome
- Post Concussion Syndrome
- Evaluation of head injuries
- Grading of concussions
- Return to play
- Future directions / Wrap up

Case 1

- L.M. is a 34 y/o cyclist who fell while negotiating the railroad tracks. His helmet broke; he did not remember any LOC.
- 3d later his wife brings him to you because of persistent mild HA and still acting a 'little funny'.
- P.E.-Neuro intact. except 1/3 short term memory
- Plan ?

Case 2

- RM is a 21 y/o running back who sustains a 'dinger' in the game. The cloudiness lasts 10 min., then fully clears. Neuro intact.
- Can he play?
- 20 Min?
- PTA x 15min.?
- Previous bell rung 1 wk ago?
- Workup?

Head Trauma

"Silent Epidemic"

- High Prevalence, little recognition

National Football Head/Neck registry

- 250,000 inj. Per year in sport

- Average: 8 fatalities, 7 quadriplegics per yr.
- Severe injuries are devastating
- Minor injuries very common
- Accumulated effects?

Head Trauma

- Concerns:
 - 1. Intracranial Bleed
 - 2. Cervical Fractures
 - 3. Concussion

Cases

- 17 y/o male HS football players
 - DR...

Concussion

- Immediate and transient post-traumatic impairment of neural function.
- Incidence- 1/5 of high school football players per year.

Physiologic Changes

- Transient / lasting EEG changes
- Slowing of cerebral circulation
- Release of acetylcholine and K⁺ into CSF
- Changes in BBB permeability
- Altered metabolism of glucose, pyruvate, ADT.

SECOND IMPACT SYNDROME

- Minor head impact following unresolved concussion may lead to catastrophic brain swelling, coma and death.

- Predisposed by neural disruption and edema following first concussion
- Effects of head trauma are cumulative
- Chance of second impact is 4x greater.

POST CONCUSSION SYNDROME

- Symptoms: Headache, dizziness, fatigue, irritability, impaired memory and concentration.
- Severity and duration is related to the persistence of P.T.A.
- Reflects altered neurotransmitter function.

Evaluation of Head Injuries

Evaluation- Neuro, Screening

- Unconscious
 - Assume sever head injury
 - Assume cervical fracture
 - A.B.C's
 - Spine board
 - Activate systems to transport to medical facility.

Evaluation- Neuro, Screening

- Conscious
 - Assume neck injury
 - Alertness, orientation
 - Pain?
 - PERLA, EOMI
 - Active ROM of extremities
 - Sensation
 - DTR's

Evaluation- Neuro, Definitive

- Focal deficits? –neuro, ears...
- AO x 3
- Ocular nystagmus
- Amnesia-PTA
- Indications of increased ICP

Signs/Symptoms of Increased ICP

- Increasing HA

- N/V
- Unequal pupils
- Disorientation
- Increased BP, Decreased HR

Evaluation- Continued

- Coordination: finger-nose, rhombergs, etc.
- Behavior / Emotional
- Cognitive
- Detailed exam: Vitals, Battle sign, Racoon eyes, etc.
- Serial Exams!

EVALUATION

- Neuropsychologic Testing
- SAC (Standardized Assessement of Conc.)
 - Mentation
 - Calculation
 - Memory

Concussion

- Grading
- Treatment
- Return to Play?

Concussion

Purpose of grading:

To identify the severity to allow optimal treatment, return to play, and prognostication.

Moderate Injury:

LOC: 30s, PTA: 30m

Concussion Grading
Torg 4/6

Nelson 3/4
Cantu 2/3
Hugenholtz 1/3
Colorado 3/3

Concussion: Cantu

- **G1.** No LOC, PTA <30 min.
 - RTP on selected circumstance
- **G2.** LOC < 5min. or PTA 1/2 – 24hrs
 - No RTP, evaluate ED
- **G3.** LOC > 5min. or PTA > 24hrs
 - Transport ED

Return to play: A.A.N. 1997

- | <u>Grade</u> | <u>First</u> | <u>Second</u> |
|--------------------------------------|---------------|---------------|
| • 1 | Asx 15min | 1wk |
| (confusion < 15min change in mental) | | |
| • 2 | Asx 1wk | |
| (confusion > 15 min.) | | |
| • 3 | Asx-1wk-2wks. | 1 month |
| (LOC) | | |

Return to play, SDSU

- **G1a:** may potentially return to game
- **G1b:** (Sx > 15 min, or PTA) No play that day. Rest 24hrs. Daily eval. Progressive exertion. May return in 4 days.

- **G2**: 'Eventual' RTP protocol. No contact 1wk
- **G3**: Consider transport to ED. No contact for 2 weeks. Then eval for RTP

'Eventual' RTP (usually G2)

- No play that day
- Home with supervision, head sheet
- Evaluate q 24 hrs
- Rest first 2d
- If now Asx and nl exam, may gradually increase activity
- No contact activity for 1 week

Concussion

Asymptomatic (Asx):

No HA, dizziness, or impaired orientation, concentration, or memory, during rest or exertion.

Return to play protocol

- If focal neurological signs / sx's » workup
 - If Asx / nl PE: gradual testing / progression
 - Sit ups, stationary cycle, running etc.
 - Observe for sx's
- (+): revert (-): progress

Post concussion

- Rapid processing and recall of new information is the most impaired function.
- Watch for subtle signs: irritability, emotional changes...

Concussion: issues

- Pick a good protocol for you to use
- LOC not required for concussion
 - PTA also prognosticating
- Most RTP criteria based on 'season'

- Time frame?
- Long term effects of repeated concussions?

Second Concussion

Return to Play

Grade 1 - >2 weeks (Asx x 1 week)

Grade 2 - >1 month (Asx x 1 week)

Grade 3 - terminate session

CONCUSSIONS

Future directions

- Standardized protocols
- Objective measurement
 - Neuropsych Testing
 - Functional MRI
- Educated lay public
- Research: effects of accumulated trauma

CASE

- 23 y/o male college fullback during 2-a-days
 - Head trauma, no LOC
 - Continued to play
 - Neuro intact
 - HA persists, varied 1-7 intensity over next week

THANK YOU

San Diego Sports Medicine Family Health Center

Concussion: SDSMC

PTA or LOC Return if O s/sx and Asx

- | | | |
|-----------|------|------------------|
| 1. <5min | 0 | 15 min |
| 2. <24hrs | <30s | >3d, then Asx 3d |
| 3. >24hrs | >30s | >2w, then Asx 2w |

Case 2

- RM is a 21 y/o running back who sustains a 'dinger' in the game. The cloudiness lasts 10 min., then fully clears. Neuro intact.
- Can he play?
- 20 Min?
- PTA x 15min.?
- Previous bell rung 1 wk ago?
- Workup?