Office Based Evaluation and Management of Concussion

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I have no disclosures
TBI common

- In US 1.7 million new TBI cases per year.
- 1.4 million ER visits per year.
- 275,000 admitted to hospital
- 52,000 die per year
- TBI accounts for almost 1/3 of all injury related deaths

Mild TBI and concussion

- Mild TBI and acute concussion account for approximately 75% of all TBI cases.
- The actual number is unknown as many do not seek care
- One estimate suggest that as many as 8 million head injuries occur in the US per year.
Risk Factors

- Greater among males
- The very young (age 1-4)
  - 500,000 of all TBI ER visits
- Adolescents (age 15-19)
- Older adults (older than 65)

Etiology

- In the very young falls and accidental trauma
- In adolescents sports concussion and MVA
- In older adults falling is main cause
TBI in military population

- In the military population blast related TBI is being recognized. More than 60% of combat casualties in Iraq and Afghanistan are caused by explosive blasts.
- 169,738 experienced some degree of TBI. 77% experienced mTBI

Mechanism of Injury

- First phase is the tissue injury that is direct consequence of the trauma. Results in stress induced strain deformation of CNS tissue
- Second phase is multiple related neuropathologic processes that are responses to the trauma that can last days to weeks.
Mechanism of Injury

- First phase occurs immediately and the damage is often completed by the time care can be initiated.
- Second phase begins quickly. Injury can involve both neurons and glia. Neuronal suicide includes hypoxia, free radicals, excitatory amino acids, ions, ischemia and inflammation. Research is aimed at this phase.

Mild TBI vs concussion

- Mild TBI and concussion clinically are essentially synonymous.
- Concussion refers to altered function while mild TBI describes a pathologic state of brain after the concussive event.
- Concussion may be preferred if you want to reassure an expectation of a full and complete recovery.
- Mild TBI may be used to underscore the need to take the injury seriously.
Sports Concussion

- A concussion may be due to an obvious, extraordinary blow to the head, or a result of several, routine hits.
- Neuroimaging is negative
- A loss of consciousness is not required for diagnosis.
- Most commonly there is a rapid onset of symptoms or cognitive impairment that is self-limited and resolves spontaneously.

Sports Concussion

- Diagnosis can be challenging.
- A football player after a full contact practice may develop headache. It may be the result of concussion, an exertional migraine, or the effect of a poorly fitting helmet.
- Athletes might possess motivation to hide or minimize symptoms in order to return to play sooner, where in the general population a concussion history may be more obvious.
Clinical Presentation of Concussion

- Symptoms are typically maximal at onset or worsen over minutes to hours after the injury.
- In sports symptoms may be delayed for hours when the athlete continues physical exertion after the impact or if a second impact occurs.

Signs and Symptoms of Concussion

**Signs**
- Amnesia prior to or after injury
- Behavior or personality change
- Confabulation
- Delayed verbal and motor responses
- Disequilibrium
- Disorientation
- Emotional lability
- Loss of consciousness
- Slurred/incoherent speech
- Vacant stare

**Symptoms**
- Blurry vision/double vision
- Confusion
- Dizziness
- Excessive drowsiness, sleep difficulty
- Feeling hazy, foggy, or groggy
- Headache
- Inability to focus, concentrate
- Nausea and/or vomiting
- Not feeling right
- Photophobia/phonophobia
Repeated Injury

- Chronic traumatic encephalopathy (CTE) is thought to be a consequence of repeated injury. First identified as dementia pugilistica in boxers.
- Recent autopsies of professional football players demonstrate significant structural brain damage.

Second Impact Syndrome

- May be serious complication of mTBI.
- Children at higher risk.
- Consequence of sustaining another TBI before completely recovering from the first one.
- A rare disorder in which there is rapid development of cerebral edema.
- Severe neurological deficits, coma, death in (50%)
Initial Assessment and Management

- If concussion suspected, ABCs and the possibility of C spine injury should be followed to assess for the need for emergency services.
- If concussion suspected the athlete must be removed from the game until a health care professional knowledgeable in concussion evaluates them.
- Document time and mechanism of injury.

- The athlete shouldn't be left alone for 3-4 hours. A significant change in mental status, especially consciousness, may indicate intracranial hematoma and emergent head CT is required.
- CT imaging should not be used to diagnose sport-related concussion but might be obtained to rule out more serious TBI such as an intracranial hemorrhage in athletes with a suspected concussion who have loss of consciousness, posttraumatic amnesia, persistently altered mental status (Glasgow Coma Scale <15), focal neurologic deficit, evidence of skull fracture on examination, or signs of clinical deterioration.
Name: ____________________ Date of Evaluation: ________________ Date of Injury: ____________

## Concussion Evaluation

<table>
<thead>
<tr>
<th>Symptoms</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache</td>
<td>Pressure in head</td>
</tr>
<tr>
<td>Nausea</td>
<td>Vomiting</td>
</tr>
<tr>
<td>Blurred Vision</td>
<td>Balance problems</td>
</tr>
<tr>
<td>Noise sensitivity</td>
<td>Feeling slowed down</td>
</tr>
<tr>
<td>Difficulty concentrating</td>
<td>Difficulty remembering</td>
</tr>
<tr>
<td>Confusion</td>
<td>Drowsiness</td>
</tr>
<tr>
<td>More emotional</td>
<td>Don’t feel right</td>
</tr>
<tr>
<td>Sadness</td>
<td>Nervous / anxious</td>
</tr>
</tbody>
</table>

Do symptoms get worse with physical activity:  Yes / No
Do symptoms get worse with mental activity:   Yes / No

### Standardized Assessment of Concussion (SAC)

What month is it?  (1) What is the date?  (1)
Day of the week?  (1) Year?  (1)
Time (within 1 hour)?  (1)

**IMMEDIATE MEMORY**: Repeat 3 words: tree, apple, table, monkey, elbow
Trial #1___________(5) Trial #2__________(5) Trial #3__________(5)

**CONCENTRATION**: reverse digits

<table>
<thead>
<tr>
<th>Option 1</th>
<th>Option 2</th>
<th>Option 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-9-3</td>
<td>6-2-9</td>
<td>5-2-6</td>
</tr>
<tr>
<td>3-8-1-4</td>
<td>3-2-7-9</td>
<td>1-7-9-5</td>
</tr>
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<td>6-2-9-7-1</td>
<td>1-5-2-8-6</td>
<td>3-8-5-2-7</td>
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<tr>
<td>7-1-8-4-6-2</td>
<td>5-3-9-1-4-8</td>
<td>8-3-1-6-4</td>
</tr>
</tbody>
</table>

Months in reverse order:
Dec-Nov-Oct-Sept-Aug-July-June-May-April-March-Feb-Jan  (1)
BALANCE TEST: (score 1 point for each error – maximum 10)
1. Both feet, side by side, 20 seconds, eyes closed (10)
2. Single leg stance, non-dominant foot, eyes closed (10)
3. Tandem stance, 20 seconds, eyes closed (10)

COORDINATION:
1. Finger to nose (5)

DELAYED RECALL: tree, apple, table, monkey, elbow _______________ (5)

SYMPTOM SCORE: _____/25  SAC SCORE: _____/30
COORDINATION SCORE: _____/40

2013 AAN guideline update

• Evaluation and Management of Concussion in Sports
• Return to play
Return to play – risk of recurrent concussion

In order to diminish the risk of recurrent injury, individuals supervising athletes should prohibit an athlete with concussion from returning to play/practice (contact-risk activity) until an LHCP has judged that the concussion has resolved (Level B).

In order to diminish the risk of recurrent injury, individuals supervising athletes should prohibit an athlete with concussion from returning to play/practice (contact-risk activity) until the athlete is asymptomatic off medication (Level B).

Return to play – age effects

Individuals supervising athletes of high school age or younger with diagnosed concussion should manage them more conservatively regarding return to play (RTP) than they manage older athletes (Level B).

Individuals using concussion assessment tools for the evaluation of athletes of preteen age or younger should ensure that these tools demonstrate appropriate psychometric properties of reliability and validity (Level B).
Return to play –
concussion resolution and graded physical activity

Clinical LHCPs might use supplemental information, such as neurocognitive testing or other tools, to assist in determining concussion resolution. This may include but is not limited to resolution of symptoms as determined by standardized checklists and return to age-matched normative values or an individual’s preinjury baseline performance on validated neurocognitive testing (Level C).

LHCPs might develop individualized graded plans for return to physical and cognitive activity, guided by a carefully monitored, clinically based approach to minimize exacerbation of early postconcussive impairments (Level C).

Return to play
cognitive restructuring

LHCPs might provide cognitive restructuring counseling to all athletes with concussion to shorten the duration of subjective symptoms and diminish the likelihood of development of chronic postconcussion syndrome (Level C).
LHCPs should counsel athletes with a history of multiple concussions and subjective persistent neurobehavioral impairment about the risk factors for developing permanent or lasting neurobehavioral or cognitive impairments (Level B).

LHCPs caring for professional contact sport athletes who show objective evidence for chronic/persistent neurologic/cognitive deficits (such as seen on formal neuropsychological testing) should recommend retirement from the contact sport to minimize risk for and severity of chronic neurobehavioral impairments (Level B).
Post Traumatic Headache

- Acute posttraumatic headache
  - Headache develops within 7 days of head trauma
  - Resolves within 3 months after trauma

- Chronic posttraumatic headache
  - Headache persists for > 3 months after trauma

PTHA resembling tension type HA

Typically bilateral and of mild to moderate severity.

Pressure or tightness in quality and not aggravated by activity.

Abortive agents: Naproxen, ibuprofen

Prophylactic agents: (if >10 HA's per month): amitriptyline or nortriptyline

If not improved consider biofeedback, acupuncture, mirtazapine, tizanidine
PTHA's resembling migraine

Most common form of PTHA
Characteristics include:
- moderate to severe pain
- unilateral or asymmetric
- throbbing or pulsatile in quality
- aggravated by physical activity
- N/V
- photophobia and phonophobia.
  Aura may be a transient focal neurological symptom

PTHA's resembling migraine

Abortive treatment: triptans, ibuprofen, naproxen, indomethacin. Avoid tylenol, butalbital, opioids

Adjunctive agents for nausea: metaclopramide, promethazine, prochlorperazine

Prophylactic agents (>2 HA's per week or >3 per month not relieved by abortive therapy): topamax, amitriptyline, nortriptyline, propranolol, valproate, gabapentin

If not improved may consider: botox, quetiapine, memantine, biofeedback/behavioral therapy
Occipital Neuralgia

- Most common neuralgiform disorder following head or neck injury. Others include neuralgias involving the branches of the trigeminal nerve such as supraorbital or infraorbital nerves.
- Occ Neuralgia characterized by persistent, moderate head pain with brief, severe lancinating pain to the side of the head.
- Can trigger migrainous headaches in certain cases.

Occipital Neuralgia

- First line treatment is occipital nerve block
- NSAIDs
- Gabapentin
- Carbamazepine
- Botox
Medication Overuse Headache

- Using analgesics 15 or more days per month for > 3 months.
- Narcotics, butalbital, acetaminophen, triptans, ASA
- Primary treatment is cessation of overused analgesic
- Bridge therapy with medrol dose pack or short course of prednisone
- Long acting NSAID, antiemetics
- Initiate prophylaxis according to headache type

Cervicogenic Headache

- Pain is generated or referred from a source in the Cspine. Discs, facets, or myofascial structures.
- Headaches present associated with persistent or intermittent neck discomfort.
- Neck or occipital tenderness or trigger points may be present
- HA's may be triggered by certain neck movement or positions
- Head pain may be posterior, anterior, bilateral or unilateral
Cervicogenic Headache

- Imaging of Cspine to evaluate for structural problems that may require specific intervention
- PT and OMT primary initial therapy
- Adjunctive medications:
  - Naproxen
  - Gabapentin
  - Amitriptyline/nortriptyline
  - MM relaxers
  - Add'l consideration: Botox, occ N block, trigger point injs, ESI's

Ways to improve memory after mTBI

- Use checklists
- Prioritize
- Keep a cheat sheet of information with you
- Get 7-8 hours of sleep
- Avoid alcohol, tobacco, excessive caffeine, and energy drinks
- Use a pill organizer to organize your medicines
- Stay physically active
- Maintain a healthy diet
- Avoid further brain injury
- Focus on one thing at a time
- Get a routine
- Keep mentally active
- Decrease your stress level
- Write it down

  - www.dvbic.org/images/pdfs/ClinicalTools/10_Ways_to_Improve_Your_Memory.aspx
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