When to go to the ER after a head injury & what to expect

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In the US, 200,000 teenagers are treated annually in emergency departments for sport-related head injuries.
Symptoms of a Concussion

- Headache, vomiting, dizziness, poor balance, sensitivity to noise or light, ringing in the ears, blurred vision, poor concentration, memory problems or amnesia

- Only 9% result in a loss of consciousness
When to go to the ED

- Loss of consciousness
- Amnesia
- Any abnormal behavior
- Loss of coordination or balance
- Confusion, lethargy, slurred speech, visual changes
- Worsening headache
- Vomiting
- Numbness or tingling or weakness in any extremity
- Neck pain
- Blood or clear fluid from nose or ears
Post-traumatic Amnesia (Retrograde & Anterograde)
Don’t forget about the spine

Spine injuries and head injuries often occur together.
Cervical Spine Injury

- Incidence of spine injury increases with increasing severity of head injury.
What are we looking for?

• Does the patient need a CT Scan of the head?
• Does the patient need to be seen by a Neurosurgeon?
• Is it safe for the patient to go home?
• Does the patient need to be admitted for observation?
• Does the patient have any other injuries or medical conditions?
Tests generally not performed in Emergency Departments
What size are your pupils?
Glasgow Coma Scale
total score of 15 is normal
Glasgow Coma Scale

• Eye opening
  - Spontaneous: 4
  - To speech: 3
  - To pain: 2
  - None: 1
Glasgow Coma Scale

- Motor response:
  - Obey commands: 6
  - Purposeful response to pain: 5
  - Withdrawal to pain: 4
  - Flexion response to pain: 3
  - Extension response to pain: 2
  - None: 1
Glasgow Coma Scale

- Verbal response
  - Oriented: 5
  - Confused: 4
  - Inappropriate: 3
  - Incomprehensible: 2
  - None: 1
Radiographic Studies

• CT scan of Head and/or spine
  - focal—epidural, subdural hematoma, contusions
  - diffuse—diffuse axonal injury
• Plain films
  - Waste of time
• MRI scan
To scan or not to scan?
What are the dangers of a CT scan?

• CT emits a significant dose of ionizing radiation
• A CT of the head = 100 Chest X-rays!
• 24% increased cancer risk in young children
• For every 1,000 children who have an abdominal CT scan, 1 will develop cancer as a result of scan
• FDA - 15,000 people estimated to die each year in US of cancer due to radiation from CTs
Emergency CT scans of the brain are not needed or recommended in the vast majority of concussions.
New Orleans Head CT Rule

• Headache
• Vomiting
• Drug or alcohol intoxication
• Persistent anterograde amnesia
• Visible trauma above the clavicle
• Seizure
Everyone has a headache
How bad does it hurt?
It’s an 11 !!
Canadian Head CT Rule

- GCS < 15 in ED (2 hours post-injury)
- Suspect Skull Fracture
- Two or more episodes of Vomiting
- Retrograde amnesia to event > 30 minutes
- Dangerous mechanism (fall from 3 or more feet, hit by car or ejected from vehicle)
Signs of a Basilar Skull Fracture
Neuroimaging for Concussion

- New Orleans Criteria
  - Very high sensitivity
  - Estimated to reduce CT imaging by 23%
- Canadian Head CT Rule
  - Very high sensitivity
  - Estimated to reduce CT scanning by 46%

Both decision rules have subsequently been validated.

When in doubt, observe or MRI
Discharge Instructions

• When to return
  – Worse headache
  – Vomiting
  – Any altered level of consciousness or behavior

• No need to wake up every 2 hours

• Follow-up with primary care provider or Neurologist and school trainer/coach