

Journal Club Synopsis

Can an adult patient be safely discharged with mild or minor head trauma without a head CT?

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Clinical Decision Instruments for minor head trauma in the ED

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Discussion Article

Comparison of Clinical Performance of Cranial Computed Tomography Rules in Patients With Minor Head Injury: A Multicenter Prospective Study from ACADEMIC EMERGENCY MEDICINE 2011; 18:597–604 2011 by the Society for Academic Emergency Medicine.

Nationwide, at least 1.7 million traumatic brain injuries occur each year and according to the U.S. Centers for Disease Control and Prevention, about 75% of these are concussions or other mild forms of traumatic brain injury. Different definitions have been proposed for mild head injury and minor head injury. Minor head injury has been proposed as a GCS of 15 and mild with a GCS of 13-14. Most patients with minor head trauma do not need any intervention and can be discharged home safely. Complications from mild and minor traumatic brain injury is uncommon. Can we safely discharge adult patients without a head CT? CT scans are expensive, they expose patients to radiation, and may cause a backlog in the ED. During residency, I have not seen Clinical Decision Instruments used for mild or minor head injury to assist with disposition. This could be for several reasons: Uncertainty about the clinical performance or just being unaware that such clinical decision instruments exist.

The main goal of a Clinical Decision Instrument is to limit unnecessary computed tomographic scans in patients with mild or minor traumatic brain injury. Several clinical decision instruments have been proposed and externally validated. The ideal clinical decision instrument would exclude patients with minor/mild head trauma who have essentially no risk of significant intracranial injury, therefore, making scanning unnecessary.

The discussion article was a prospective, multicenter, observational cohort study of patients with blunt head trauma from June 2008 to May 2009. The study objective was to compare the Canadian CT Head Rule, the New Orleans Criteria, and the National Emergency X-Ray Utilization Study. The primary outcome was clinically important traumatic brain injury, and the secondary outcome was neurosurgical intervention. 7,131 patients were prospectively enrolled. Patients eligible for The Canadian CT Head Rule 696, New Orleans Criteria 677, and The National Emergency X-Ray Utilization Study 2,951. In this population the sensitivities for clinically important traumatic brain injury were less than the original studies but the sensitivities for neurosurgical intervention were comparable to the original studies. The National Emergency X-Ray Utilization Study rule showed the highest reduction rate for CT scans, however, it did not identify all needing neurosurgical intervention.

Looking at the three different instruments, the New Orleans Criteria is the most restrictive instrument and The National Emergency X-ray Utilization study is the least restrictive. This is shown in those enrolled in the study. The National Emergency X-Ray Utilization Study could be applied the most 2,951 of the 7,131 enrolled. The Canadian CT Head Rule could be applied to 696 of the 7,131 enrolled, and the New Orleans Criteria could only be applied to 677 of the 7,131 enrolled. It makes sense that the least restrictive instrument could be used on more patients but might miss a few clinically significant brain injuries or those needing neurosurgical intervention.

During the Journal club we broke up into groups and looked at three different clinical vignettes. The groups chose what they would do without using a clinical decision instrument, then they applied the Canadian, New Orleans or Nexus II.

The general consensus was they would be most comfortable sending someone home without a CT scan using the New Orleans Criteria and the least comfortable using the Nexus II. Overall the group felt the clinical situation and a physicians' gestalt were just as important as the clinical decision instruments.

Clinical Vignette and Decision Instruments

Clinical Vignette # 1:

30 yo male playing in a community adult baseball league was struck in the head by a baseball bat. A wayward bat struck him when he turned his head while in the on deck circle. Witnesses report he fell to the ground and lost consciousness. He began to have abnormal movements and was unresponsive for about 1 minute. He was taken out of the game and friends dropped him off at home. When he told his wife the story she promptly made him go to the ER. Patient reports it has been about 2 hours since the incident. He is amnesic to the event. He reports HA and nausea. He had one episode of vomiting at home. VS are stable. GCS is 15 and he reports no other pain. On exam you appreciate an abrasion midline just inferior to the vertex of the scalp. No underlying defect. No hemotympanum, raccoon eyes, nasal discharge, battles sign. He has no laceration and no obvious underlying defect.

Clinical Vignette # 2:

45 yo male sitting on a porch fell backward 3 ft striking his head on the ground. He reports losing consciousness for approximately 1 minute. His head hurts where he struck the ground. He has mild nausea, but has not vomited. GCS 15, small abrasion and hematoma where he struck his head. No hemotympanum, battle's sign, raccoon eyes, no discharge coming from eyes or ears.

Clinical Vignette # 3:

35 yo Female was hit in the face by her boyfriend with a closed fist. She reports losing consciousness for approximately 1 minute. She is amnesic to event. She denies any pain except a mild HA and her forehead hurts where she was struck. She has mild nausea and vomited 1 x. On exam she appears disheveled and tearful. Vital signs are BP 152/84, HR 93, O₂ sat 98% on RA, afebrile, GCS 15, no abrasion, ecchymosis or hematoma visible where she was hit. No hemotympanum, battle's sign, raccoon eyes, no discharge coming from nose or ears.

Canadian

Head CT not required if **NONE** of the following are present

- Age \geq 65 years
 - Vomiting > 2 times
 - Suspected open or depressed Skull Fracture
 - Signs suggesting basal skull fracture:
 - Hemotympanum
 - Raccoon eyes
 - CSF otorrhea or rhinorrhea
 - Battle's sign (bruising around mastoid process)
- GCS < 15 at 2 hours post injury

Retrograde Amnesia > 30min

Dangerous mechanism

- Pedestrian struck by vehicle
- Ejection from motor vehicle
- Fall from elevation >3 feet or 5 stairs

New Orleans

Head CT not required if **NONE** of the following are present

- Headache
- Vomiting
- Age > 60yr
- Drug or Alcohol Intoxication
- Persistent anterograde amnesia (deficits in short-term memory)
- Visible trauma above the clavicles
- Seizure

Nexus II

Head CT not required if **NONE** of the following are present

- Age \geq 65yr
- Evidence of significant skull fracture
- Scalp hematoma
- Neurologic deficit
- Altered Level of alertness
- Abnormal behavior
- Coagulopathy
- Recurrent or forceful vomiting