Imaging decisions in the setting of closed head injury

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Clinical question
Which head-injured patients need CT imaging?

How could this change my practice?
Appropriately selecting patients for imaging after head trauma should enhance patient safety by detecting intracranial trauma that requires hospital observation or neurosurgical intervention.

Why did we choose this topic?
Patients with closed head injury frequently present in primary care and urgent care settings. Demographically, we are experiencing a growth in elderly patients and the number of individuals treated with antiplatelet agents, warfarin, and direct oral anticoagulants. Both factors are associated with increased risk of intracranial hemorrhage.

Recommendations
Which patients with closed head injury need imaging regardless—no need to apply a decision rule?

- Adults over age 65 with objective signs of trauma above the clavicles
- Adults on warfarin, antithrombin oral anticoagulants, or dual antiplatelet therapy (aspirin plus another medication)
- Intoxicated individuals with history or evidence of trauma above the clavicles
- Individuals with a Glasgow Coma Scale score less than 15
- Individuals who experienced seizure after injury

Which head-injured patients can be safely observed without imaging?

High-quality, evidence-based evaluation tools are available for assessing which patients can be safely observed and not imaged. These are generally algorithm-based calculators with exclusions based on the Glasgow Coma Scale, mechanism of injury, anticoagulation status, age, and other factors; these tools allow a provider to decide on an evidence basis whether imaging can be safely excluded or should be included in the patient's evaluation. Additional patient factors to consider include reliability, insight, judgment, and access to prompt follow-up.

As with all decision rules, these have tradeoffs between sensitivity and specificity. It is important to recognize that their sensitivity for injury requiring neurosurgical intervention is very high and has been validated through multiple studies. As a result, their positive predictive value is low, and a high number of negative studies will be performed using these rules. However, if these rules are used in conjunction with clinical judgement and shared decision-making, they will lead to better patient care.
Resources

The following tools are available from MDCalc:

- The Canadian CT Head Injury/Trauma Rule is validated and widely used for individuals over age 15.
- In the pediatric setting, use the PECARN Pediatric Head Injury/Trauma Algorithm.
- Glasgow Coma Scale: Patients aged 2 years and older | Patients under age 2 years

References


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