Computed tomography indications for mild traumatic brain injury

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https://www.cdc.gov/traumaticbraininjury/pdf/tbi_clinicians_factsheet-a.pdf

There is considerable uncertainty about the indications for Head computed tomography in patients with mild traumatic brain injury.

A head computed tomography (CT) with positive results for acute intracranial hemorrhage is the gold-standard diagnostic biomarker for acute traumatic brain injury (TBI). In mild TBI (mTBI; GCS scores 13-15), the distribution and co-occurrence of pathological CT features and their prognostic importance are not well understood. In a longitudinal, observational Transforming Research and Clinical Knowledge in Traumatic Brain Injury (TRACK-TBI), pathological CT features carried different prognostic implications after mTBI to 1-year postinjury. Some patterns of injury were associated with worse outcomes than others. These results support that patients with mTBI and these CT features need TBI-specific education and systematic follow-up. [1)]

In 2011 Sharif-Alhoseini et al.surveyed the post-traumatic symptoms, signs, or past historical matters that can be used for the indication of brain CT scan.

All patients with MHI who were older than 2 years, had a Glasgow Coma Scale (GCS) score ≥13, were referred to the ED, and underwent a brain CT scan. Data on age, headache, vomiting, loss of consciousness (LOC) or amnesia, post-traumatic seizure, physical evidence of trauma above the clavicles, alcohol intoxication, and anticoagulant usage were collected. The main outcome measure was the presence of lesions related to the trauma in the brain CT scan. For categorical variables, the Chi-square test was used.

Six hundred and forty-two patients were examined by brain CT scan after MHI, and 388 patients (60.4%) did not have any risk indicator. Twenty patients (3.1%) had abnormal brain CT scans. The logistic regression model showed that headache (P=0.006), LOC or amnesia (P=0.024), and alcohol (P=0.036) were associated with abnormal brain CT.

They SUGGESTED THAT ABNORMAL BRAIN CT SCAN RELATED TO THE TRAUMA AFTER MHI CAN BE PREDICTED BY THE PRESENCE OF ONE OR MORE OF THE FOLLOWING RISK INDICATORS: Headache, vomiting, loss of consciousness or amnesia, and alcohol intoxication. Thus, if any patient has these indicators following MHI, he must be considered a high-risk MHI [2)].

In 2006 Stein et al. performed a structured literature review of mild traumatic brain injury and constructed a cost-effectiveness model. The model estimated the impact of missed intracranial lesions on longevity, quality of life, and costs. Using a 20-year-old patient for primary analysis, we compared the following strategies to screen for the need to perform a CT scan: observation in the emergency department or hospital floor, skull radiography, Selective CT based on the presence of additional risk factors, and scanning all.

Outcome measures for each strategy included average years of life, quality of life, and costs. Selective CT and the CT All policy performed significantly better than the alternatives with respect to outcome. They were also less expensive in terms of total direct health care costs, although the differences did not reach statistical significance. The model yielded similar, but smaller, differences between the selective imaging and other strategies when run for older patients.

Although the incidence of intracranial lesions, especially those that require surgery, is low in mild traumatic brain injury, the consequences of delayed diagnosis are forbidding. The adverse outcome of an intracranial hematoma is so costly that it more than balances the expense of CT scans. In this cost-effectiveness model, the liberal use of CT scanning in mild TBI appears justified [3)].

Computed tomography indications for mild traumatic brain injury in the anticoagulated patient

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Glucose

Patients with mild TBI who had signs of brain injury in the CT scan had significantly higher blood glucose levels than patients with normal CT scan findings. Although indications for performing a brain CT scan are usually based on clinical criteria, blood glucose levels can be helpful in determining the requirement for a brain CT scan in patients with mild TBI [4)].

1)
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