CLINICAL PRACTICE GUIDELINE FOR THE MANAGEMENT OF MILD HEAD INJURY (MHI) IN ADULTS

Acknowledgement

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- **Dr. Radwa Muhammad Ashour,** *Lecturer of Emergency medicine and critical care, Suez University:* Provided overall supervision and coordination of the guideline development process; led PICO questions formulation; formatted Recommendations 1–9 and ensured consistency across sections; managed and verified references; and conducted comprehensive revision of the Introduction and all recommendations.
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Abbreviations

CCHR	Canadian CT Head Rule
CT	Computed Tomography
DOAC	Direct Oral Anticoagulants
GCS	Glasgow Coma Scale
GRADE	Grading of Recommendations, Assessment, Development and Evaluation
MHI	Mild Head Injury
PICO	Population, Intervention, Comparison, Outcome

Executive Summary

These recommendations promote selective CT imaging and safe disposition in adult mild head injury, and standardizing care with clear admission/discharge criteria.

No.	Recommendations	Strength of recommendation
1.	We recommend the Canadian CT Head Rule (CCHR) to guide CT use in adults with mild head injury not on anticoagulants or antiplatelets, to minimize unnecessary imaging. If CT imaging is not available, refer to an appropriate facility. CT is indicated if any of the following are present: • Failure to reach a GCS score of 15 within 2 hours of injury. • Suspected open skull fracture. • Signs of basal skull fracture. • Vomiting more than once. • Age > 64 years. The Canadian CT Head Rule (CCHR) is not applicable to patients younger than 16 years, those receiving anticoagulant therapy (blood thinners), or patients who experience a post-traumatic seizure.	**Strong**
2.	We recommend performing a non-contrast head CT in patients over 60 years old who are present with loss of consciousness or post traumatic amnesia. If CT imaging is not available, refer to an appropriate facility.	**Strong**

No.	Recommendations	Strength of recommendation
3.	We recommend performing a non-contrast head CT in intoxicated patients with mild head trauma who present with loss of consciousness or posttraumatic amnesia. If CT imaging is not available, refer to an appropriate facility.	**Strong**
4.	We recommend performing a non-contrast head CT in anticoagulated patients with mild head injury, rather than relying solely on clinical decision tools to exclude imaging. If CT imaging is not available, refer to an appropriate facility.	**Strong**
5.	We advise against routine repeating a non-contrast head CT in adults with mild head injury on anticoagulants or antiplatelets who remain at baseline neurologic assessment, if the initial CT is negative for hemorrhage.	**Conditional**
6.	We recommend admitting patients with mild head injury to hospital if clinical assessment identifies any risk factors or concerning features that warrant close observation or further management. Admission is advised when one or more of the established admission criteria for mild head injury are present: • New, clinically important abnormalities on imaging (An isolated simple linear non-displaced skull fracture is unlikely to be clinically important unless the patient is taking anticoagulant or antiplatelet medication.) • GCS score did not return to 15 (or pre-injury baseline) after imaging, regardless of the imaging results. • Indications for CT scanning are present, but scanning cannot be performed within the appropriate time period, either because CT is unavailable or because the person is not sufficiently cooperative to allow scanning. • Continuing worrying symptoms of concern to the clinician, such as persistent vomiting, severe headaches, or seizures. • Other sources of clinician concern, including but not limited to drug or alcohol intoxication, other injuries, shock, suspected non-accidental injury, meningism, cerebrospinal fluid leak, or suspicion of ongoing post-traumatic amnesia.	**Good Practice Statement**
7.	We recommend discharging patients with mild head injury when clinical assessment and investigations identify no evidence of clinically important brain or cervical spine injury, provided that: • CT scan of the head and/or cervical spine is not indicated or has shown normal findings, and the Glasgow Coma Scale (GCS) has returned to 15 or the pre-injury baseline. • There are no other factors that would warrant hospital admission. (refer to recommendation number 6) • There is appropriate supervision at home or a suitable environment for continued observation in the community.	**Good Practice Statement**

No.	Recommendations	Strength of recommendation
8.	We advise against routine hospital admission in anticoagulated or antiplatelet-treated patients with mild head injury who have a normal neurological exam, a normal initial CT, and lack criteria warranting extended monitoring. The criteria warranting extended monitoring and hospital admission are the same as those for patients who are not taking anticoagulant or antiplatelet therapy.	**Conditional**
9.	We recommend providing written discharge instructions outlining red-flag symptoms and follow-up guidance to adults with mild head injury to improve early recognition of complications. A. Discharge instructions should include advice to: • Avoid activities that may increase the risk of recurrent head injury. • Maintain social contact and communicate with family or friends about recovery symptoms. • Use only medications approved by the treating physician for symptom control. • Limit screen time and exposure to loud noise before sleep, keep a consistent sleep schedule, and rest in a quiet, dark environment. B. Inform a trusted person about the injury and the warning signs to monitor for, as they may recognize symptoms before the patient does. C. Arrange a follow-up visit within 48 hours of discharge. On discharge you should inform the patient and his/her companion about red-flag symptoms: • A headache that gets worse and does not go away. • Significant nausea or repeated vomiting. • Unusual behavior, increased confusion, restlessness, or agitation. • Drowsiness or inability to wake up • Slurred speech, weakness, numbness, or decreased coordination. • Convulsions or seizures (shaking or twitching). • Loss of consciousness (passing out)	**Good Practice Statement**

Introduction

Trauma is considered a leading cause of death in the world and brain injury contributes a significant proportion of that mortality, hence it is a public health emergency. [1] In Egypt, road traffic accidents continue to represent the primary cause of head injuries, reflecting global trends identified by the World Health Organization (2023). Integrating national data underscores the public health significance of establishing standardized approaches for head injury management. [2]

Mild head injury (MHI) is defined as blunt head injury with Glasgow Coma Scale (GCS) score of 13-15 within 30 minutes of injury or at presentation or as a blunt injury to the head which is accompanied with temporary loss of consciousness, amnesia or disorientation/confusion with a Glasgow Coma Score of 13-15.[3,4]

Some recommend classifying patients with a GCS score of 13 as moderate head injury (defined as GCS score of 9-12) because they seem more similar with regard to prognosis and incidence of intracranial abnormalities. [5,6]

MHI constitute about 80-90% of all MHI, and may have intracranial pathologies requiring neurosurgical intervention in about 10% of cases, 1% of which could be life-threatening. [7]

For an industrialized country, estimates of the relative causes of head injury are as follows: motor vehicle accidents (20 to 45 %), falls (30 to 38 %), occupational accidents (10 %), recreational accidents (10 %) and assaults (5 to 17 %). [8,9] In older adults, falls are more likely the cause, and motor vehicle accidents are more common in the young.

MHI results from direct external contact forces or from the brain being slapped against intracranial surfaces with acceleration/deceleration trauma. Concussion may result in neuropathologic changes, but the acute clinical symptoms are believed to reflect a disturbance of function rather than structural injury. [10]

The acute evaluation of a patient with MHI includes a neurologic assessment and mental status testing. Prolonged unconsciousness (greater than one minute), persistent mental status alterations, or abnormalities on neurologic examination require urgent imaging and neurosurgical consultation.

It is important to note that MHI and concussion may be unrecognized by both the injured and non-medical trained observers, particularly if there is no loss of consciousness.[11] Some surveys have found that more than 80 percent of individuals with a past concussion did not recognize it as such. [12,13]

Imaging usually computed tomography (CT) without contrast is recommended for a subset of patients with MHI. While imaging is normal in patients with a concussion or MHI, studies suggest that there is a sufficient incidence of abnormalities to make imaging worthwhile in a subset of at-risk patients. One systematic review of the literature estimated the prevalence of CT abnormalities of 5% among patients presenting to a hospital with GCS of 15 and 30% for those presenting with a GCS of 13. The incidence of abnormalities leading to neurosurgical intervention was approximately 1%. 5, 14–17

Scope and Purpose

This guidelines provides evidence-based recommendations for the assessment and early management of adults with mild head injury (GCS 13–15) presenting to emergency and acute care settings, covering key decisions on neuroimaging (CT) use, referral when CT is unavailable, observation/admission criteria, safe discharge, and discharge advice.

The guideline is intended to reduce unwarranted variation in clinical practice and standardize the quality of service delivered to patients nationwide, improving safety, consistency, and efficient use of resources through clear, actionable recommendations aligned with internationally accepted guideline principles.

Target Audience

This guideline targets healthcare professionals and health-system stakeholders involved in the assessment and early management of adults with mild head injury (GCS 13–15) across prehospital and hospital settings.

It is primarily designed for Prehospital clinicians: EMS/ambulance clinicians and paramedics involved in triage and transfer, Emergency/acute care teams: emergency physicians, trauma/surgical teams, and ED nurses, and Consulting and diagnostic services: radiology and neurosurgery teams.

Methodology

A comprehensive search for guidelines was undertaken to identify the most relevant guidelines to consider for adaptation.

Inclusion/ exclusion criteria were followed in the search and retrieval of guidelines to be adapted:

- Selecting only evidence-based guidelines (guidelines must include a report on systematic literature searches and explicit links between individual recommendations and their supporting evidence)
- Selecting only national and/or international guidelines
- Selecting peer-reviewed publications only
- Selecting guidelines written in the English language
- Excluding guidelines written by a single author, not on behalf of an organization, to be valid and comprehensive, a guideline ideally requires multidisciplinary input
- Excluding guidelines published without references, as the panel needs to know whether a thorough literature review was conducted and whether current evidence was used in the preparation of the recommendations

The following characteristics of the retrieved guidelines were summarized in:

- Developing organization/authors
- Date of publication, posting, and release
- Country/language of publication
- Date of posting and/or release
- Dates of the search used by the source guideline developers

All retrieved Guidelines were screened and appraised using AGREE II instrument (www.agreetrust.org) by at least three members. The panel decided on a cut-off point or ranked the guidelines (any guideline scoring above 50% on the rigor dimension was retained). The GDG decided to adopt Clinical Policy: Critical Issues in the Management of Adult Patients Presenting to the Emergency Department With Mild Traumatic Brain Injury - ACR Appropriateness Criteria Head Trauma: 2021 Update. [18,19]

Evidence assessment

According to WHO Handbook for Guidelines, we used the GRADE (Grading of

Recommendations, Assessment, Development and Evaluation) approach to assess the quality of a body of evidence, develop and report recommendations. GRADE methods are used by WHO because they represent internationally agreed standards for making transparent recommendations. Detailed GRADE information is available on the following sites:

- GRADE working group: https://www.gradeworkinggroup.org/
- GRADE online training modules: http://cebgrade.mcmaster.ca/

Table 1 Quality and Significance of the four levels of evidence in GRADE:

Quality	Definition	Implications
High	The guideline development group is very confident that the true effect lies close to that of the estimate of the effect	Further research is very unlikely to change confidence in the estimate of effect
Moderate	The guideline development group is moderately confident in the effect estimate: the true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different	Further research is likely to have an important impact on confidence in the estimate of effect and may change the estimate
Low	Confidence in the effect estimate is limited: the true effect may be substantially different from the estimate of the true effect	Further research is very likely to have an important impact on confidence in the estimate of effect and is unlikely to change the estimate
Very low	The group has very little confidence in the effect estimate: the true effect is likely to be substantially different from the estimate of the effect	Any estimate of effect is very uncertain

Table 2 Factors that determine How to upgrade or downgrade the quality of evidence

Downgrade in presence of	Upgrade in presence of
Study limitations -1 Serious limitations -2 Very serious limitations	Dose-response gradient +1 Evidence of a dose-response gradient
Consistency -1 Important inconsistency	Direction of plausible bias +1 All plausible confounders would have reduced the effect
Directness -1 Some uncertainty -2 Major uncertainty	Magnitude of the effect +1 Strong, no plausible confounders, consistent and direct evidence
Precision -1 Imprecise data	+2 Very strong, no major threats to validity and direct evidence
Reporting bias -1 High probability of reporting bias	

The strength of the recommendation

The strength of a recommendation communicates the importance of adherence to the recommendation.

Strong recommendations

With strong recommendations, the guideline communicates the message that the desirable effects of adherence to the recommendation outweigh the undesirable effects. This means that in most situations the recommendation can be adopted as policy.

Conditional recommendations

These are made when there is greater uncertainty about the four factors above or if local adaptation should account for a greater variety in values and preferences, or when resource use makes the intervention suitable for some, but not for other locations. This means that there is a need for substantial debate and involvement of stakeholders before this recommendation can be adopted as policy.

When not to make recommendations

When there is lack of evidence on the effectiveness of an intervention, it may be appropriate not to make a recommendation.

Recommendations:

(1) In adults with mild head trauma, normal neurological exam, and not on anticoagulant or antiplatelet therapy, does applying the Canadian CT Head Rule compared to routine CT reduce unnecessary imaging without missing significant injuries?

We recommend the Canadian CT Head Rule (CCHR) to guide CT use in adults with mild head injury not on anticoagulants or antiplatelets, to minimize unnecessary imaging. If CT imaging is not available, refer to an appropriate facility.

CT is indicated if any of the following are present:

- Failure to reach a GCS score of 15 within 2 hours of injury.
- Suspected open skull fracture.
- Signs of basal skull fracture.
- Vomiting more than once.
- Age > 64 years.

The Canadian CT Head Rule (CCHR) is not applicable to patients younger than 16 years, those receiving blood thinners, or patients who experience a post-traumatic seizure.

(Strong recommendation, High certainty of evidence) [4,18,20–22]

Criterion	Judgment
Certainty of the evidence	High
Values and preferences	No important uncertainty or variability
Desirable effects	Large
Undesirable effects	Small
Balance of effects	Favors the intervention
Resources required	Large savings
Certainty of evidence for resources	No included studies
Cost-effectiveness	Favors the intervention
Problem priority	Yes
Equity	increased
Acceptability	Yes
Feasibility	Yes

(2) In adults over 60 years old with head trauma who present with loss of consciousness or post-traumatic amnesia, do immediate CT brain imaging, compared to no CT or delayed imaging, improve the detection of clinically significant intracranial injury and guide appropriate management?

We recommend performing a non-contrast head CT in patients over 60 years old who are present with loss of consciousness or post traumatic amnesia. If CT imaging is not available, refer to an appropriate facility.

(Strong recommendation, High certainty of evidence) [19,23]

Criterion	Judgment

Criterion	Judgment
Certainty of Evidence	High
Values and Preferences	No important uncertainty or variability
Desirable Effects	Large
Undesirable Effects	Small
Balance of Effects	Probably favors the intervention
Resources Required	Moderate costs
Certainty of Resource Evidence	No included studies
Cost-Effectiveness	Probably favors the intervention
Problem Priority	Yes
Equity	Probably increased
Acceptability	Yes
Feasibility	Yes

(3) In intoxicated patients with mild head trauma , does CT scanning compared to observation improve detection of clinically significant brain injury?

We recommend performing a non-contrast head CT in intoxicated patients with mild head trauma who present with loss of consciousness or posttraumatic amnesia. If CT imaging is not available, refer to an appropriate facility.

(Strong recommendation, Moderate certainty of evidence) [19,23]

Criterion	Judgment
Certainty of the evidence	High
Values and preferences	Probably no important uncertainty or variability
Desirable effects of intervention (CT)	Moderate
Undesirable effects of intervention (CT)	Small
Balance of effects	Favors the intervention (CT)
Resources required	Moderate costs
Certainty of evidence for resources	No included studies
Cost-effectiveness	Favors the intervention (CT)
Priority of the problem	Yes
Equity	increased
Acceptability	Yes

Criterion	Judgment
Feasibility	Yes

(4) In adults with mild head injury (MHI) who are neurologically intact and are receiving anticoagulant or antiplatelet therapy , do routine head computed tomography (CT) imaging compared to no CT imaging improve the detection of intracranial hemorrhage?

We recommend performing a non-contrast head CT in anticoagulated patients with mild head injury, rather than relying solely on clinical decision tools to exclude imaging. If CT imaging is not available, refer to an appropriate facility.

(Strong recommendation, Low certainty of evidence) [18,24–29]

Criterion	Judgment
Certainty of the evidence	Low
Values and preferences	No important uncertainty or variability
Desirable effects	Large
Undesirable effects	Small
Balance of effects	Favors the intervention
Resources required	Moderate costs
Certainty of resource evidence	No included studies
Cost-effectiveness	Favors the intervention
Priority of the problem	Yes
Equity	Probably increased
Acceptability	Yes
Feasibility	Yes

(5) In the same group of patients , does repeating a CT scan after an initial negative CT compared to no repeat CT improve detection of delayed intracranial hemorrhage?

We advise against routine repeating a non-contrast head CT in adults with mild head injury on anticoagulants or antiplatelets who remain at baseline neurologic assessment, if the initial CT is negative for hemorrhage.

(Conditional recommendation, Moderate certainty of evidence) [18,25–29]

Criterion	Your Judgment
Certainty of evidence	Moderate
Values and preferences	Probably no important uncertainty or variability
Desirable effects	Small
Undesirable effects	Moderate
Balance of effects	Favors the comparison (no repeat CT)

Criterion	Your Judgment
Resources required	Moderate costs
Certainty of resource evidence	No included studies
Cost-effectiveness	Favors the comparison
Priority of the problem	Probably No
Equity	Probably no impact
Acceptability	Probably No
Feasibility	Yes

(6) In patients with mild head injury , does hospital admission compared with discharge with observation at home improve early detection and management of complications?

We recommend admitting patients with mild head injury to hospital if clinical assessment identifies any risk factors or concerning features that warrant close observation or further management.

Admission is advised when one or more of the established admission criteria for mild head injury are present:

- New, clinically important abnormalities on imaging (An isolated simple linear non-displaced skull fracture is unlikely to be clinically important unless the patient is taking anticoagulant or antiplatelet medication.)
- GCS score did not return to 15 (or pre-injury baseline) after imaging, regardless of the imaging results.
- Indications for CT scanning are present, but scanning cannot be performed within the appropriate time period, either because CT is unavailable or because the person is not sufficiently cooperative to allow scanning.
- Continuing worrying symptoms of concern to the clinician, such as persistent vomiting, severe headaches, or seizures.
- Other sources of clinician concern, including but not limited to drug or alcohol intoxication, other injuries, shock, suspected non-accidental injury, meningism, cerebrospinal fluid leak, or suspicion of ongoing post-traumatic amnesia.

(Good practice statement)

(7) In patients presenting with mild head injury , does discharging them from hospital based on normal clinical assessment and imaging results compared to continued observation or hospital admission lead to safe outcomes without missed clinically significant brain or cervical spine injuries?

We recommend discharging patients with mild head injury when clinical assessment and investigations identify no evidence of clinically important brain or cervical spine injury, provided that:

- CT scan of the head and/or cervical spine is not indicated or has shown normal findings, and the Glasgow Coma Scale (GCS) has returned to 15 or the pre-injury baseline.
- There are no other factors that would warrant hospital admission. (refer to recommendation number 6)
- There is appropriate supervision at home or a suitable environment for continued observation in the community.

(Good practice statement)

(8) In adults with mild head trauma, normal neurological exam, and on anticoagulants/antiplatelets , is inpatient admission, or prolonged ED observation compared to safe discharge from the ED equally safe without missed complications?

We advise against routine hospital admission in anticoagulated or antiplatelet-treated patients with mild head injury who have a normal neurological exam, a normal initial CT, and lack criteria warranting extended monitoring.

The criteria warranting extended monitoring and hospital admission are the same as those for patients who are not taking anticoagulant or antiplatelet therapy.

(Conditional recommendation, Low certainty of evidence) [18,25–30]

Criterion	Judgment
Certainty of the evidence	Moderate
Values and preferences	Possibly important uncertainty or variability
Desirable effects of intervention (admission)	Small
Undesirable effects of intervention (admission)	Moderate
Balance of effects	Favors the comparison (discharge)
Resources required	Large costs
Certainty of evidence for resources	High
Cost-effectiveness	Favors the comparison (discharge)
Priority of the problem	Yes
Equity	Reduced (with intervention)
Acceptability	No (for intervention)
Feasibility	No (for intervention)

(9) In adults with mild head trauma , does providing discharge advice including red-flag symptoms and when to seek re-evaluation compared to no structured advice improve early recognition of complications and timely return for care?

We recommend providing written discharge instructions outlining red-flag symptoms and follow-up guidance to adults with mild head injury to improve early recognition of complications.

A. Discharge instructions should include advice to:

- Avoid activities that may increase the risk of recurrent head injury.
- Maintain social contact and communicate with family or friends about recovery symptoms.
- Use only medications approved by the treating physician for symptom control.
- Limit screen time and exposure to loud noise before sleep, keep a consistent sleep schedule, and rest in a quiet, dark environment.

B. Inform a trusted person about the injury and the warning signs to monitor for, as they may recognize symptoms before the patient does.

C. Arrange a follow-up visit within 48 hours of discharge.

On discharge you should inform the patient and his/her companion about red-flag symptoms:

- A headache that gets worse and does not go away.
- Significant nausea or repeated vomiting.
- Unusual behavior, increased confusion, restlessness, or agitation.
- Drowsiness or inability to wake up
- Slurred speech, weakness, numbness, or decreased coordination.
- Convulsions or seizures (shaking or twitching).
- Loss of consciousness (passing out)

(Good practice statement)

Clinical Indicators for Monitoring

(1) Use and documentation of CCHR in eligible adults
(2) Avoidance of CT when no indication exists
(3) Referral to another facility when CT is unavailable
(4) Timely availability of radiology reports
(5) Admission when predefined clinical risk factors are present
(6) Provision of written discharge instructions with red-flag symptoms
(7) Arrangement of follow-up within 48 hours

Research Gaps

During the review of evidence and development of recommendations, several research gaps were identified:

(1) Anticoagulated/antiplatelet patients: Clear risk stratification for CT, observation, admission, and repeat CT (especially DOACs vs warfarin).

(2) Delayed intracranial hemorrhage: Optimal duration of observation after a normal initial CT remains uncertain.

(3) Older adults: Need tailored pathways for elderly/frail patients, including those with baseline cognitive impairment or recurrent falls.

(4) Intoxicated patients: Insufficient data on safe imaging and discharge decisions when clinical assessment is unreliable.

(5) Low-resource settings: Lack of evidence on effective CT-unavailable pathways, referral thresholds, and cost-effectiveness.

(6) Patient-centered outcomes: Limited data on long-term outcomes (missed injuries, post-concussion symptoms, re-attendance, satisfaction).

Update of the Guideline:

This guideline will be updated whenever there is new evidence

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