Maine Medical Center Trauma Clinical Practice Guideline (MMCT-CPG)

Mild Traumatic Brain Injury Clinical Practice Guideline (MMCT-CPG ID: 2019-08)

This guideline provides recommendations for management and disposition of mild traumatic brain injury.

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First Publication Date: JULY2019	Publication Date: JULY2019	Supersedes CPG dated:

Guidelines translate best evidence into best practice. A well-crafted guideline promotes quality by reducing healthcare variations, improving diagnostic accuracy, promoting effective therapy, and discouraging ineffective – or potentially harmful – interventions.

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PURPOSE

These guidelines are not intended to supplant physician/APP judgement. Rather, these guidelines are intended to provide a basic framework for the assessment and management of mild traumatic brain injury.

BACKGROUND

The incidence of traumatic brain injury (TBI) has steadily increased. With improvements in imaging with CT and MRI, the sensitivity for finding TBI has also increased. TBI, including intracranial hemorrhage, diffuse axonal injury, and skull fractures have traditionally been taken care of by or with recommendations from neurosurgery. However, the increase in sensitivity of imaging has yielded in negligible or miniscule findings. Several papers have investigated the significance of such findings (1-3) and have found that less severe injuries do not require neurosurgical involvement. After defining and implementing a criteria for management due to CT and clinical findings, Joseph et al, further characterized that patients with mild traumatic injury rarely have progression of their injuries and did not require any surgical intervention (3). These criteria for minor TBI were classified as GCS >13, normal neurologic exam, SDH <= 4mm, EDH <=4, IPH <=4mm in one location, trace SAH, and on no anticoagulation or antiplatelets. Using similar accepted criteria and definitions, this guideline was created to help manage minor TBI to reduce hospital utilization, need for unnecessary repeat CTs and to decrease the need for specialty consultation services.

INITIAL MANAGEMENT

Please see Figure 1 for detailed algorithm. This guideline is for minor TBI, and patients for more severe disease should follow the guidelines for severe TBI. Patients that present with GCS 14 or 15, no focal neurologic deficits and minimal CT findings as defined below can be managed primarily by the Trauma Service without Neurosurgical consultation.

Minor CT findings:

- Non-displaced skull fracture
- IPH <= 4mm
- SDH <= 4mm
- Punctate SAH

Exclusion criteria

- GCS <= 13
- IVH
- Displaced skull fracture
- EDH

IPH > 4mm

SDH > 4mm

Scattered or aneurysmal SAH

Any shift

Convexity SDH

Those patients without anticoagulation and antiplatelets can be observed for 8 hours, and if there is a stable exam, be safely discharged. Patients that require syncopal workup and/or have anticipated PT/OT needs may require admission.

Patients that are on antiplatelet medications can be at risk for progression of their injury and mortality (4). Admission and repeat CT in 6-12 hours is warranted. The reversal of antiplatelets, however, is controversial. Patients on P2Y12 inhibitors such as clopidogrel or ticagrelor have worse outcomes and more neurosurgical interventions, but the outcomes are not known in minor TBI (5-6). Patients on anticoagulation require neurosurgical consult and anticoagulation reversal as defined by the institutional guidelines.

Patients on anticoagulation are at risk for progression of intracranial hemorrhage. The increase use of direct oral anticoagulants (DOACs) that act on factor Xa or thrombin, has created new challenges in managing life-threatening bleeding. Advantages of DOACS over warfarin are that they are quick acting, short half-life, and do not require monitoring. The disadvantage of DOACs, until recently, was there were no true reversal agents other than for dabigatran (Pradaxa). Reversal for these agents have relied on prothrombin complex concentrates (PCCs), which can also increase the risk of thrombotic complications.

In a multi-institutional retrospective study evaluating the progression of intracranial hemorrhage in DOACs vs coumadin or antiplatelet agents, there was a high progression for all patients that were anticoagulated at 17%, with no statistically significant difference between DOACs vs Coumadin. Furthermore, the risk of progression was seemingly less, although not statistically significant in DOACs vs Coumadin (24% vs 27%). Aspirin and Plavix use also had high rates of progression (35% and 33%, respectively), although there confounding factors contributing to this higher rate of progression. When evaluating reversal of anticoagulation, the study was underpowered but there were fewer patients on DOACs that were reversed compared to Coumadin (19% vs 47%) (7). Other studies have also evaluated similar risks of progression for both antiplatelets and anticoagulation with either Coumadin or DOACs (8).

For the initial management of our guideline, patients with anticoagulation require a neurosurgery consult, reversal of anticoagulation according to institutional guidelines, and require follow-up CT head.

PERFORMANCE IMPROVEMENT MONITORING

INTENT (EXPECTED OUTCOMES)

1. All patients with mild TBI will follow the guideline for management and disposition.
2. All patients with clinical and radiologic findings outside of the inclusion criteria will follow the guideline for severe TBI.

PERFORMANCE/ADHERENCE MEASURES

1. Patients that meet inclusion criteria will follow the guideline as outlined.
2. Progression of injury, neurologic decline, and need for neurosurgical intervention will be monitored and captured by the PIPS process and trauma registry.
3. Patterns of unexpected outcomes will undergo thorough review and adjustments in the guidelines as necessary.

DATA SOURCE

- Patient Record

SYSTEM REPORTING & FREQUENCY

The above constitutes the minimum criteria for PI monitoring of the MMCT-CPG. System reporting will be performed annually; additional PI monitoring and system reporting may be performed as needed.

The system review and data analysis will be performed by the MMC Trauma Service under the direction and responsibility of the MMC Trauma Medical Director and MMC Trauma Medical Program Manager.

RESPONSIBILITIES

It is the Trauma Medical Director's responsibility to ensure familiarity, appropriate compliance and PI monitoring with this MMCT-CPG.

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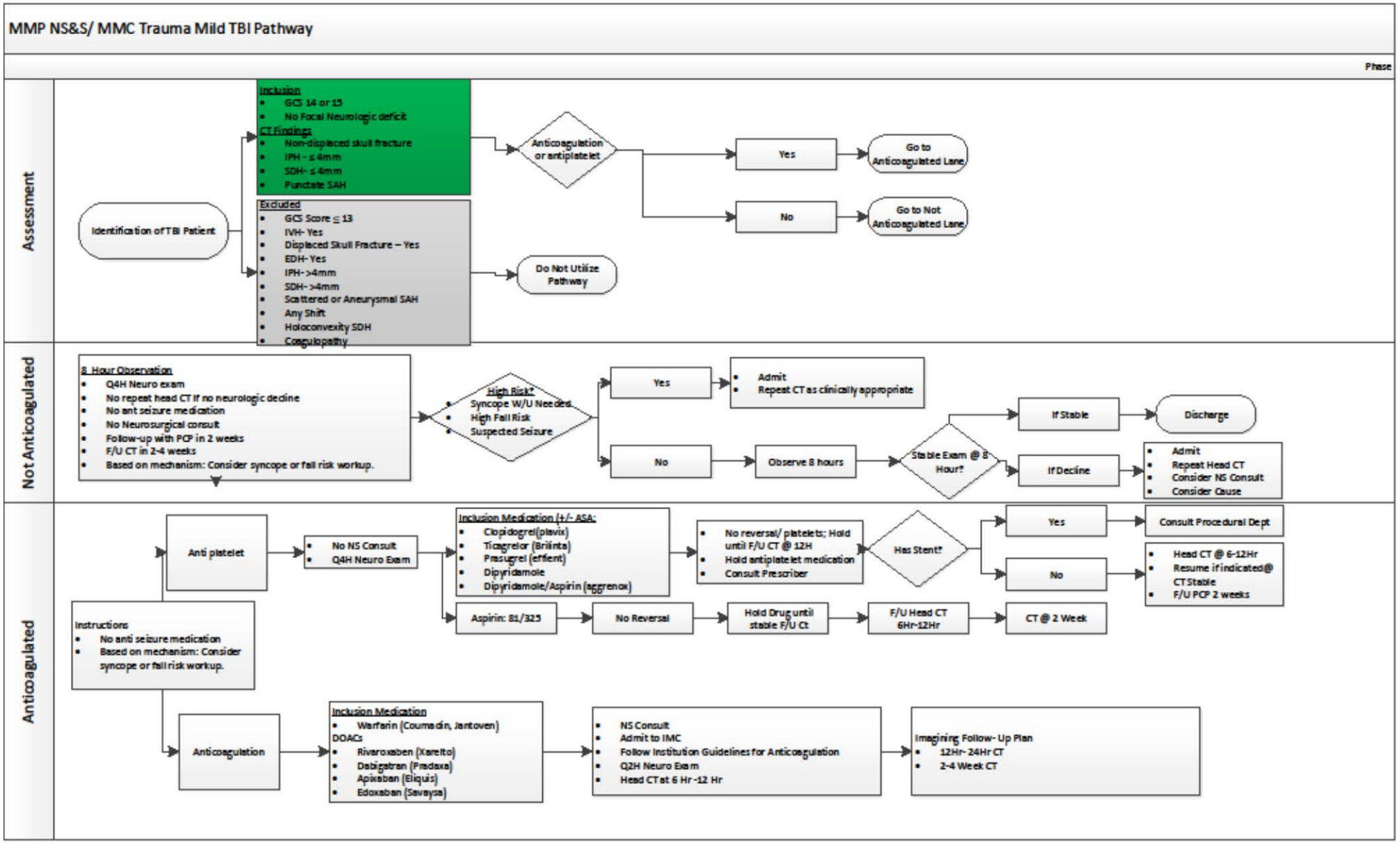
MMP NS&S/ MMC Trauma Mild TBI Pathway
Phase
Assessment
Identification of TBI Patient
Inclusion
GCS 14 or 15
No Focal Neurologic deficit
CT Findings:
Non-displaced skull fracture
IPH - ≤ 4mm
SDH- ≤ 4mm
Punctate SAH
Excluded
GCS Score ≤ 13
IVH- Yes
Displaced Skull Fracture – Yes
EDH- Yes
IPH- >4mm
SDH- >4mm
Scattered or Aneurysmal SAH
Any Shift
Holoconvexity SDH
Coagulopathy
Anticoagulation or antiplatelet
Yes
Go to Anticoagulated Lane
No
Go to Not Anticoagulated Lane
Do Not Utilize Pathway
Not Anticoagulated
8 Hour Observation
Q4H Neuro exam
No repeat head CT if no neurologic decline
No ant seizure medication
No Neurosurgical consult
Follow-up with PCP in 2 weeks
F/U CT in 2-4 weeks
Based on mechanism: Consider syncope or fall risk workup.
High Risk?
Syncope W/U Needed
High Fall Risk
Suspected Seizure
Yes
Admit
Repeat CT as clinically appropriate
No
Observe 8 hours
Stable Exam @ 8 Hour?
If Stable
Discharge
If Decline
Admit
Repeat Head CT
Consider NS Consult
Consider Cause
Anticoagulated
Instructions
No anti seizure medication
Based on mechanism: Consider syncope or fall risk workup.
Anti platelet
No NS Consult
Q4H Neuro Exam
Inclusion Medication (+/- ASA:
Clopidogrel(plavix)
Ticagrelor (Brilinta)
Prasugrel (effient)
Dipyridamole
Dipyridamole/Aspirin (aggrenox)
No reversal/ platelets; Hold until F/U CT @ 12H
Hold antiplatelet medication
Consult Prescriber
Has Stent?
Yes
Consult Procedural Dept
No
Head CT @ 6-12Hr
Resume if indicated@ CT Stable
F/U PCP 2 weeks
Aspirin: 81/325
No Reversal
Hold Drug until stable F/U Ct
F/U Head CT 6Hr-12Hr
CT @ 2 Week
Anticoagulation
Inclusion Medication
Warfarin (Coumadin, Jantoven)
DOACs
Rivaroxaban (Xarelto)
Dabigatran (Pradaxa)
Apixaban (Eliquis)
Edoxaban (Savaysa)
NS Consult
Admit to IMC
Follow Institution Guidelines for Anticoagulation
Q2H Neuro Exam
Head CT at 6 Hr -12 Hr
Imagining Follow- Up Plan
12Hr- 24Hr CT
2-4 Week CT