Table 1: Types of Hemorrhages
Subarachnoid hemorrhage, subdural hematoma, epidural hematoma, intraparenchymal hemorrhage, cerebral contusion

Examples of Head CT findings suitable for Observation Protocol:
1. Convexity Subarachnoid Hemorrhage
2. Punctate Contusions (no more than 5)
3. Rim Subdural along Convexity

Table 2: Inclusions and Exclusions from Protocol

Inclusion Criteria:

- Adult patients who sustain an isolated head injury with a GCS 14 or 15 may be included in the ED mild TBI observation protocol. Patients may have a normal or abnormal head CT.

Patients will be excluded from protocol if found to have any of the following features:

1. Any patient with INR >3.0 is excluded. Patients with an INR ≥1.5 may only have a hemorrhage listed in Table 4. Please see Table 4 for eligibility of patients on Coumadin.
2. Patient is on a factor Xa inhibitor or a direct thrombin inhibitor.
3. Objective new neurologic exam deficits (e.g. aphasia, hemiparesis, weakness, etc.)
4. Intoxicated patients with negative head CT who need only to achieve sobriety prior to discharge
5. Patients who require intensive nursing attention, direct line of sight and/or are restrained
6. Hemorrhages that require neurosurgical intervention or bleeds determined to be unsuitable for observation (please see Table 1)
7. Patients who are greater than 24 hours after their injury with new neurologic symptoms
8. Multiple traumatic injuries or any other severe traumatic injury
9. Patients with actively declining mental status
10. Vital sign abnormalities: BP>190/110 or <85/50; HR>120 or <45; O2<91% on RA
11. Other active acute comorbid conditions (e.g. DKA, CHF, etc.)
12. Patients who require additional inpatient syncope workup as the cause of their fall
13. Greater than one seizure, or any seizure greater than 30 minutes after initial injury
14. INR greater than or equal to 1.5; unless patient has hemorrhage listed in Table 4.
15. Thrombocytopenia (Platelet count <100,000)
16. Patient is on Heparin or Low Molecular Weight Heparin

Table 3: Observation Protocol Discharge Goals

1. Education regarding concussions and mild TBI
2. Medication reconciliation, specifically, regarding use of Aspirin and Plavix
3. Return to sports requirements if necessary
4. Follow up established with a PCP
5. Patient is in care of family or friends
6. Patient is sober
7. Serial head CT’s demonstrate no significant progression of ICH
8. Patient has been seen by the attending neurosurgeon
9. Neurotrauma nurse has been notified of patient in the emergency department, or the patient has been given the neurotrauma nurse hotline to call if needed. Phone # is 584-2804
10. Consider Internal Medicine Consultation for Medication Reconciliation / impact of mild TBI on medical co-morbidities (i.e., in relationship to continuation of home medications such as anti-platelet or anti-coagulation)
11. Evaluate for Return to Sports Requirement if indicated: [Link]

Table 4: Low Risk Hemorrhages in Patients Therapeutic (1.6-3.0) on Coumadin
1. Punctate Contusions
2. Convexity Subarachnoid Hemorrhage

Table 5: Low Risk Hemorrhage in Patients on Anti Platelet Therapy (Aspirin or Plavix):
1. Punctate Contusions
2. Convexity Subarachnoid Hemorrhage
3. Rim Subdural Hematoma along Convexity
ED Protocol for patients with mild TBI and a normal Head CT

Patient has head trauma and GCS of 14 or 15
Noncontrast Head CT is negative

Admit to hospital

Patient requires additional workup for syncope?

No

No need to consult Neurosurgery, or obtain TEG or Verify Now

Consider Observation Protocol for Negative Head CT Mild TBI – entails education and Neurotrauma follow up as needed.

Discharge if no other significant injuries

Patient’s Mental Status normal or at baseline?

Yes

No
ED Protocol for patients with mild TBI, but not on Anti-Platelet Medications or any Anti-coagulation (including Heparin or LMWH)

Patient presents with head trauma and GCS of 14 or 15.

Noncontrast Head CT if indicated

Head CT positive for blood (See Table 1)

Neurosurgery Consult
Obtain CBC, PT/PTT and TEG and Verify Now

Admit to Neurosurgery

Neurosurgery Recommends Admission?

Yes

No

Hospital admission to Medicine or Trauma

Does patient have other injuries or require syncope workup?*

Yes

No

Consider Observation Protocol (Protocol page 2)
Based on comorbid and social situation, and give patient Neurotrauma Hotline Number

Discharge with concussion education

Head CT negative for ICH

Mental status normal or at baseline?

Yes

No

Does patient have other injuries or require syncope workup?

Yes

Hospital admission to medicine or trauma

No

Consider Observation Protocol (Protocol page 2)
Based on comorbid and social situation, and give patient Neurotrauma Hotline Number

If patient meets Inclusion Criteria and has no Exclusion Criteria, consider Observation Protocol

See Tables 2 and 3 for Observation Exclusions and Discharge Goals

*Please see other Observation Inclusion/Exclusion Criteria

Table 1: Types of Hemorrhages
- Subarachnoid hemorrhage, subdural hematoma, epidural hematoma, intra-parenchymal hemorrhage, cerebral contusion

Examples of Head CT findings suitable for Observation Protocol:
1. Convexity Subarachnoid Hemorrhage
2. Punctate Contusions (no more than 5) (Punctate hemorrhage is defined as a 1mm focus of hyperdensity)
3. Rim Subdural along Convexity (A rim subdural is defined as ≤2mm with no mass effect.)
ED Protocol for patients with mild TBI, and on Coumadin

Patient has head trauma and GCS of 14 or 15

Noncontrast Head CT and INR

Head CT positive for blood (See Table 1)

Neurosurgery Consult
Obtain CBC, PT/PTT, TEG and Verify Now, and Type and Screen

INR > 3.0? Yes

INR 1.6 – 3.0? Yes

INR ≤ 1.5
Place in Observation Protocol with delayed 2nd head CT, as long as other Inclusion and Exclusion Criteria met (Table 2)*

Yes

No

Consider Observation (Protocol page 2) based on comorbid and social situation. If high degree of concern for delayed head bleed obtain 2nd head CT just prior to discharge.

Low risk bleed? (See Table 4)

Discharge with concussion education. If patient not observed inform them there is a very small chance of delayed bleed.**

Does patient have other injuries or require syncope workup?

Yes

Hospital admission to medicine or trauma

No

Mental status normal or at baseline?

Yes

No

Admission to Neurosurgery required

INR 1.6 – 3.0? Yes

Low risk bleed? (See Table 4)

Admission to Neurosurgery required

INR ≤ 1.5
Place in Observation Protocol with repeat head CT between 12-20 hours after first.

If neurologic condition unchanged, consider delaying serial CT until closer to discharge time. 6 hour CT not a requirement.*

No

Patient may be placed in Observation Protocol with repeat head CT between 12-20 hours after first.

If neurologic condition unchanged, consider delaying serial CT until closer to discharge time. 6 hour CT not a requirement.*

*ED/CDU Team should attempt to coordinate the second head CT as close to definite neurosurgery attending evaluation as possible.

**Despite negative head CT, ED provider may exercise clinical judgment to determine need for ongoing observation.

Table 4: Low Risk Hemorrhages in Patients Therapeutic (1.6-3.0) on Coumadin

1. Punctate Contusions (Punctate contusion is defined as a 1mm focus of hyperdensity)
2. Convexity Subarachnoid Hemorrhage

Consider primary SAH leading to injury in this case.
ED Protocol for patients with mild TBI, and on Aspirin, Plavix, Aggrenox, or Prasugrel

Patient has mild head trauma and GCS of 14 or 15

Noncontrast Head CT

Head CT positive for blood

Neurosurgery Consult
Obtain CBC, PT/PTT, TEG and Verify Now

Low Risk Bleed? (Table 5)

Admission

No

Yes

Place in Observation Protocol as long as other Inclusion and Exclusion Criteria are met. (Table 2)

If neurologic condition unchanged consider delaying serial CT until closer to discharge time. 6 hour CT not a requirement*

*ED/CDU Team should attempt to coordinate the second head CT as close to definite neurosurgery attending evaluation as possible.

Head CT negative for ICH

Mental status normal or at baseline?

Yes

No

Discharge with concussion education. If patient not observed inform them there is a very small chance of delayed bleed.**

**Despite negative head CT, ED provider may exercise clinical judgment to determine need for ongoing observation.

Does patient have other injuries or require syncope workup?

Yes

Consider Observation (Protocol Page 2) based on comorbid and social situation.

If high degree of suspicion for delayed bleed, obtain delayed 2nd head CT

No

Hospital admission to medicine or trauma

Table 5: Low Risk Hemorrhages in Patients on Anti Platelet Therapy (Aspirin or Plavix):

1. Punctate Contusions (Defined as a 1mm focus of hyperdensity)
2. Convexity Subarachnoid hemorrhage Consider primary SAH leading to injury in this case
3. Rim Subdural Hematoma along Convexity (Defined as ≤2mm with no mass effect)
References


