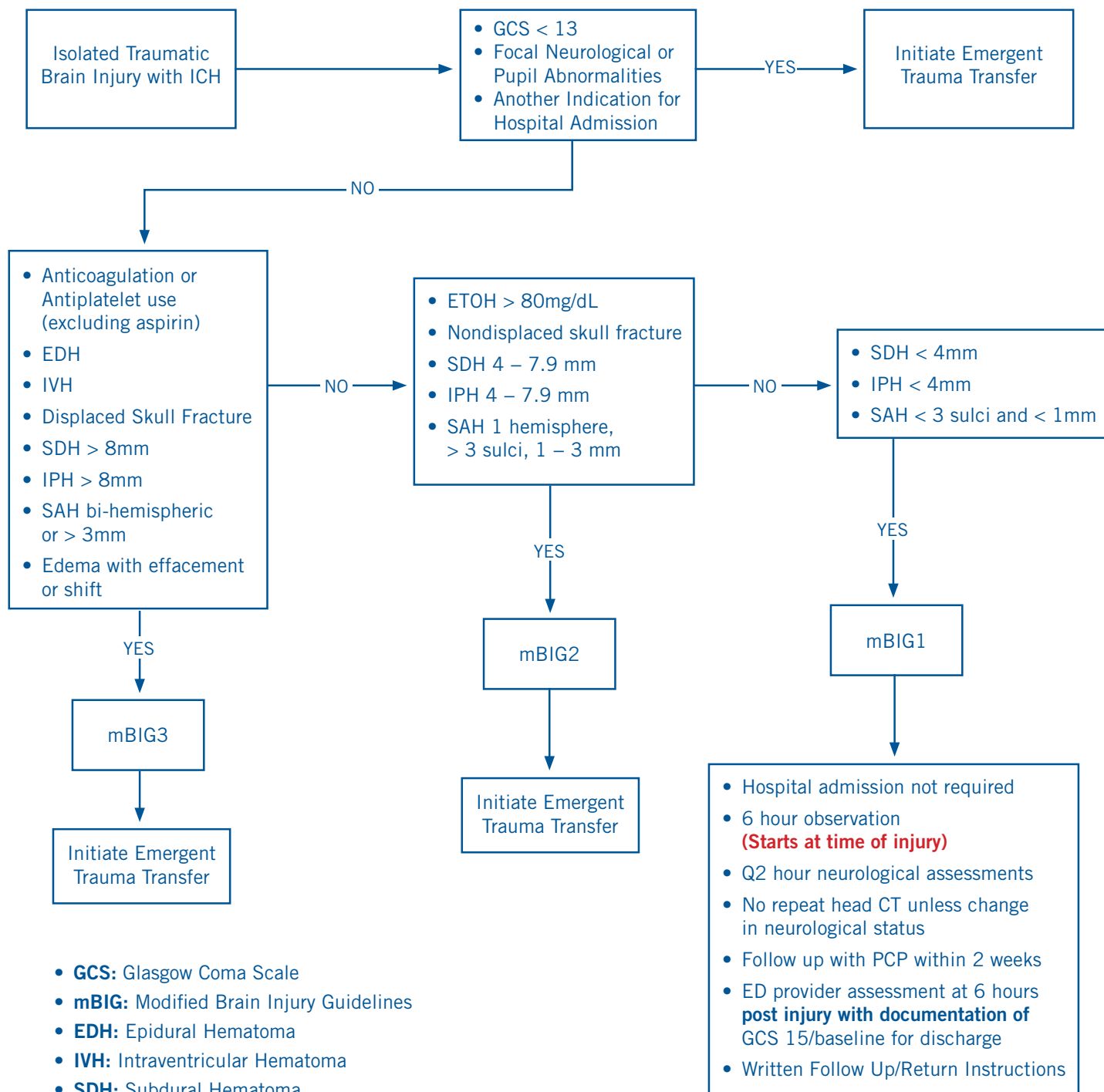


RECOMMENDED TREATMENT PATHWAY



- **GCS:** Glasgow Coma Scale
- **mBIG:** Modified Brain Injury Guidelines
- **EDH:** Epidural Hematoma
- **IVH:** Intraventricular Hematoma
- **SDH:** Subdural Hematoma
- **SAH:** Subarachnoid Hemorrhage
- **IPH:** Intraparenchymal Hemorrhage

These guidelines were designed to serve as a clinical reference based upon the evidence and clinical expertise available at the time of development. They intend to serve as a general guide regarding clinical patient care practices. They are in no way intended to replace clinical judgement or dictate the care of the individualized patient.

INCLUSION CRITERIA:

- Isolated head trauma

EXCLUSION CRITERIA:

- Poly-system trauma
- Penetrating trauma
- Patient < 18 years old
- Non-traumatic ICH
- TBI without ICH

KEY DEFINITIONS:

Early Signs of Herniation

- Altered mental status
- Ptosis
- Slowed pupillary light reflex

Late Signs of Herniation

- Fixed pupil
- Contralateral paralysis

RSI with Severe Brain Injury

- Sedation
 - Use caution with Propofol and Benzodiazepines due to hypotension
 - Ketamine has not been proven to cause increased ICP and may be optimal choice in low BP
- Paralytics
 - Succinylcholine is ideal given short duration of action and ability to repeat exam frequently
 - Succinylcholine should not be used in crush injuries or burn injuries > 24 hours

Anticoagulation Reversal

- Tranexamic acid (TXA) should be considered for patients with mild to moderate head injury with intracranial bleeding within 3 hours of presenting injury
- 4-factor prothrombin complex concentrate or FFP for patients on anticoagulants.
- Platelets for patients with thrombocytopenia (Platelets < 100), evidence of platelet dysfunction, or concerns of platelet dysfunction without ability to test
- Desmopressin for patients with Von Willebrand deficiency and patients with hemophilia A.

INITIAL EVALUATION AND TREATMENT

History:

- Time of trauma
- Mechanism of trauma
- Concerns for potential medical etiology of trauma (stroke, seizure, arrhythmia, ect.)
- Initial symptoms and subsequent progression
- Neurological symptoms
- Known or suspected substance use
- Anticoagulation use, antiplatelet use, or bleeding disorders
- Relative past medical history

Exam:

- Patients with suspicion for traumatic brain injury should receive a complete head-to-toe examination to evaluate for other injuries
- Examine full scalp noting size and location of:
 - Hematomas, lacerations, bleeding
- Evaluate for signs of basilar skull fractures:
 - Raccoon eyes, Hemotympanum, Cerebrospinal fluid (CSF) leakage
- Examine the pupils, specifically evaluating for asymmetry and reactivity
- GCS: Both the initial score and serial examinations are important.

Labs: CBC, CMP, PT/INR, PTT, Ethanol level, TEG (if available)

Imaging:

- Obtain computed tomography (CT) of the head without contrast as rapidly as possible
- Sedation should be considered in patients who are agitated because of head injury or concomitant drug or alcohol intoxication (eg, benzodiazepine, droperidol, haloperidol, ketamine)

STANDARD TREATMENT

Airway:

- If intubation is not immediately required, optimize hemodynamics first
- If intubation is immediately required, consider using RSI drugs that minimize hemodynamic changes, use push dose vasopressors, and transfusion to avoid significant drops in BP

Breathing:

- Hypoxia, Hypercapnia, and Hypocapnia are significant risk factors for increased mortality following traumatic brain injury
- Goal SpO₂ ≥ 95% and Goal PaCO₂ 35-45mmHg

Circulation:

- Hypotension is a risk factor for increased mortality following traumatic brain injury
- Treat hemorrhagic shock with transfusion, limit crystalloid use
- Reverse anticoagulation
- Transfuse platelets if available if Platelets < 100

Disability:

- Elevate the head of the bed ≥ 30°, maintaining cervical spine precautions as indicated
- In cases with signs of transtentorial herniation or progressive neurological deterioration, mannitol 1g/kg as an intravenous bolus is the recommended option
- Keppra Load for suspicion or evidence of seizure, otherwise consult with neurosurgery for seizure prophylaxis

Exposure:

- Keep the patient warm (blankets, fluids, or blood products)

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APPROVALS

- Medical Director, Transfer Center
- Medical Director, Emergency Medicine
- Medical Director, Trauma

DATE APPROVED

August 19, 2026