Head Trauma

History
- Time of injury
- Mechanism (blunt vs. penetrating)
- Loss of consciousness
- Bleeding
- Past medical history
- Medications (anticoagulants)

Signs and Symptoms
- Evidence of trauma
- Pain, swelling, or bleeding
- AMS
- Unconscious
- Respiratory distress or failure
- Vomiting
- Seizure

Differential
- Skull fracture
- Spinal injury
- Abuse

E
- Spinal Motion Restriction ***if indicated***
- Secure airway and support respiratory rate
- Elevate head 30 degrees unless contraindicated. Position patient on left side if needed for vomiting
- Hemorrhage Control
  - Direct Pressure
  - Pressure Bandage
  - Consider Hemostatic Gauze

→ Exit to Airway TG ***if indicated***

P
- Establish IV/IO
- Cardiac monitor
- $EtCO_2$ monitoring

POTENTIAL SEVERE HEAD INJURY?
Any one of these:
- LOC at any point
- GCS ≤ 14
- Any post-traumatic seizure
- Multisystem trauma requiring intubation?

YES →

Limit scene time – Transport early

E
High flow O_2 via NRB
Maintain SPO_2 as close to 100% as possible
If unable to maintain SPO_2 with NRB & BLS maneuvers – Proceed with BVM
AVOID HYPERVENTILATION

P
If SBP approaching 90 or rapidly dropping in adults
Normal Saline bolus 1000ml IV/IO
Reassess patient for criteria above
May give additional **500ml IV/IO**
as long as criteria above exists

If poor perfusion or shock in peds
Normal Saline bolus IV/IO
Use PEDIATAPE and refer to PEARLS
Repeat to age dependent goal SBP
*May repeat to a **Maximum 1L***
as long as criteria above exists

NO →

E
Manage ABCs

P
For Nausea/Vomiting Consider
Adults - **Ondansetron 4mg IV/IO/IM/ODT**
*(May repeat every 10 minutes to a **Maximum 12mg**)*

Pediatric ≥ 4 years - **Ondansetron IV/IO/IM/ODT**
Use PEDIATAPE and refer to dosing guide
(May repeat x1 for peds > 40kg)

Age Dependent Signs of Shock
- Neonate: < 60mmHg or weak pulses
- Infant: < 70mmHg or weak pulses
- 1-10 years: < 70mmHg + (age in years x2)
- Over 10 years: <90mmHg
- Over 65 years: <110mmHg

Notify receiving facility. Contact Base Hospital for medical direction, as needed.

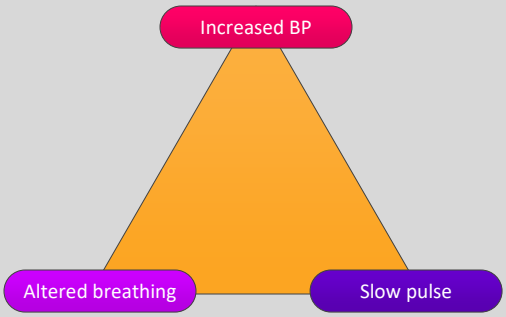
Adult and Pediatric Trauma/Environmental Treatment Guidelines

Head Trauma

Increased Intracranial Pressure

Changes in LOC
Papilledema
Impaired eye movement
↓ sensory/motor function

Infants
Bulging fontanels
Cranial suture separation
↑ head circumference
High-pitched cry



Cushing's Triad

Headache
Pupillary changes
Vomiting
Changes in vital signs
↑ Blood pressure
↓ Pulse
Changes in respiratory pattern

Pearls

- Aggressively prevent and treat the "**Three H-Bombs**" of TBI:
  - Hypoxemia — Early signs include confusion and restlessness.
  - Hypotension — Usually indicates injury or shock unrelated to head Injury and should be treated aggressively.
  - Hyperventilation — Causes vasoconstriction which can lead to decreased blood supply.
- All potential TBI patients should receive continuous oxygen via NRM. Threshold ≥ 90% O2 saturation with optimal 92-98% readings.
- Basic airway management is preferred unless unable to effectively manage with BLS maneuvers. Utilize jaw thrust technique to open the airway. Do not delay scene time to intubate.
- If patient shows any sign of inadequate oxygenation, ventilate using BVM. Use of two-finger bag valve technique is critical. Ventilation rates: Adults 15+ 10 BPM; Peds 2-14 20 BPM; Infants 25 BPM
- IV Crystalloids if SBP approaching 90 or dropping rapidly in average adult.
- Hypotension is age dependent. This is not always reliable and should be interpreted in context with patients normal BP, if known. Shock may be present with a seemingly normal blood pressure:
  - Neonate: < 60mmHg or weak pulses
  - Infant: < 70 mmHg or weak pulses
  - 1-10 years: < 70 + (age in years x 2)
  - Over 10 years: < 90 mmHg
  - Over 65 years: < 110 mmHg
- Target ETCO2 of 40 (range 35-45). ETCO2 may be unreliable if the patient was subject to multisystem trauma or poor perfusion.
- Initial documentation of GCS is a vital step in the assessment process. Aggressively monitor and document for changes by repeat examination.
- Perform modest hyperventilation to maintain an EtCO2 of 30-35 for significant signs of increased intercranial pressure or signs of brainstem herniation (dilated pupil on one side or posturing).
- In cases of traumatic arrest, the use of Epi is not indicated.
- Scalp hemorrhage can be life threatening. Treat with direct pressure and pressure dressing. If bleeding is not controlled apply hemostatic agent topically.
- Consider possibility of domestic violence or abuse.