**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

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**Early transport**
Limit scene time to 10 minutes

- 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
- Control hemorrhaging

- Establish IV/IO
- Cardiac monitor
- EtCO₂ monitoring

- If SBP < 90 in adults
  - Normal Saline bolus 500ml IV/IO
  - Reassess patient for criteria above
  - *May repeat to a Maximum 1L as long as criteria above exists*

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

  **For Adults, Consider**
  - Ondansetron 4mg IV/IO/IM/ODT
  - May repeat every 10 minutes to a *Maximum 12mg* for adults.

  **For peds patients ≥ 4 years, Consider**
  - Ondansetron IV/IO/IM/ODT
  - Use PEDIATAPE and refer to dosing guide
  - *May repeat x1 for peds > 40kg.*

- Exit to Airway TG *if indicated*

- Notify receiving facility.
- Contact Base Hospital for medical direction
Pearls

- ALS procedures in the field do not significantly improve patient outcome in critical trauma patients.
- Basic airway management is preferred unless unable to effectively manage with BLS maneuvers. Utilize jaw thrust technique to open the airway.
- Intubation of head injury patients is best addressed at the hospital. Advanced Airways should not be used in traumatic arrest.
- In cases of clear-cut traumatic arrest, epinephrine is not indicated in PEA or asystole. Epinephrine will not correct arrest caused by a tension pneumothorax, cardiac tamponade, or hemorrhagic shock. If there is any doubt as to the cause of arrest, treat as a non-traumatic arrest.
- Hypotension is age dependent. This is not always reliable and should be interpreted in context with the patient’s typical BP, if known. Shock may be present with a seemingly normal blood pressure initially.
  - 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
- Avoid hyperventilation. Maintain an EtCO\(_2\) of 35 or greater, which may be unreliable if the patient was subject to multisystem trauma or poor perfusion.
- In patients with a dilated pupil on one side or posturing, which indicates brainstem herniation, modest hyperventilation is appropriate. Keep EtCO\(_2\) of 30 or greater.
- Scalp hemorrhage can be life threatening. Treat with direct pressure and pressure dressing.
- Increased intracranial pressure may cause hypertension and bradycardia.
- Hypotension usually indicates injury or shock unrelated to the head injury and should be treated aggressively.
- An important item to monitor and document is a change in the level of consciousness by repeat examination.
- Limit IV fluids unless the patient is hypotensive.
- Concussions are traumatic brain injuries involving any number of symptoms including confusion, LOC, vomiting, or headache. Any prolonged confusion or mental status abnormality which does not return to the patient’s baseline within 15 minutes of injury or any documented LOC should be evaluated by a physician immediately.
- Do not overlook the possibility of associated domestic violence or abuse.

Increased Intracranial Pressure

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

*Infants*

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

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