Contra Costa County Emergency Medical Services

Head Trauma

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

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

Differential
- Skull fracture
- Spinal injury
- Abuse

E
- *If indicated, spinal motion restriction (SMR)*
- 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 (FP28)

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

If indicated, exit to appropriate TG
- Exit to Adult Airway TG
- Exit to Pediatric Airway TG

Limit scene time
Transport early

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

Yes

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 100 or rapidly dropping in adults
- **Normal Saline bolus 1000ml IV/IO**
- May give additional **500ml** boluses **IV/IO** as long as criteria above exists
- If poor perfusion or shock in Pediatrics (Refer to age dependent chart)
- **Normal Saline bolus IV/IO**
- Use PEDIATAPE and refer to dosing guide
- May repeat to age dependent goal SBP, to a Maximum 1L

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*

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

Age Dependent SBP for 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

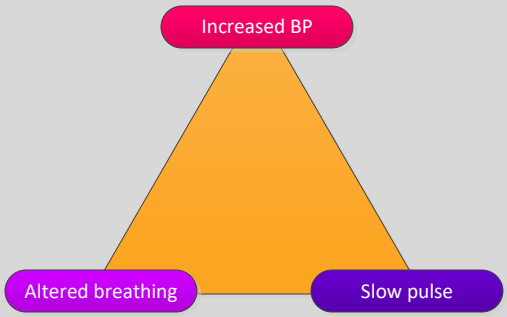
Adult and Pediatric Trauma/Environmental Treatment Guidelines

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

	Hypotension
Neonate	< 60 mmHg or weak pulses
Infant	< 70 mmHg or weak pulses
1-10 years	< 70 mmHg + (age in years x2)
Over 10 years	< 90 mmHg
Over 65 years	< 110 mmHg

- 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.
- 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.
- Target ETCO2 of 40 (range 35-45). ETCO2 may be unreliable if the patient was subject to multisystem trauma or poor perfusion.
- Assessment of baseline GCS is critical for patient care. Aggressively monitor and assess 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).

Pearls

- 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 child/elder abuse.