

# Head Trauma



## History

- \* Time of injury
- \* Mechanism (blunt vs. penetrating)
- \* Loss of consciousness
- \* Bleeding
- \* Past medical history
- \* Medications
- \* Evidence for multi-trauma

## Signs and Symptoms

- \* Pain, swelling, bleeding
- \* Altered mental status
- \* Unconscious
- \* Respiratory distress / failure
- \* Vomiting
- \* Major traumatic mechanism of injury
- \* Seizure

## Differential

- \* Skull fracture
- \* Brain injury (Concussion, Contusion, Hemorrhage or Laceration)
- \* Epidural hematoma
- \* Subdural hematoma
- \* Subarachnoid hemorrhage
- \* Spinal injury
- \* Abuse

	Age Appropriate Airway Protocol(s) AR 1, 2, 3, 5, 6 <b>if indicated</b>
	<b>Obtain and Record GCS</b>
	Supplemental oxygen Airway adjuncts as needed Preferably $\geq 92 - 98\%$
	Prevent Oxygen desaturation events $< 90\%$
	Blood Glucose Analysis Procedure ASP 4
	IV / IO Access Protocol UP 6 <b>if indicated</b>
	Cardiac Monitor
	Altered Mental Status Protocol UP 4 <b>if indicated</b>
	Multiple Trauma Protocol TB 6 <b>if indicated</b>
	Age Appropriate Hypotension / Shock Protocol AM 5 / PM 3 <b>if indicated</b>
	Seizure Protocol UP 13 <b>if indicated</b>
	Spinal Motion Restriction Protocol TB 8 Procedure WTP 2 <b>if indicated</b>
	Pain Control Protocol UP 11 <b>if indicated</b>
	Monitor and Reassess

**Rapid Transport** to appropriate destination  
using  
**Trauma and Burn:**  
**EMS Triage and Destination Plan**

**Notify Destination or  
Contact Medical Control**

## Age Specific Blood Pressure indicating possible shock

Age 0 – 28 days: SBP  $< 60$   
Ages  $\geq 1$  month: SBP  $< 70$   
Age 1 – 9: SBP  $< 70 + (2 \times \text{Age})$

Ages 10 – 64: SBP  $< 90$   
Ages  $\geq 65$ : SBP  $< 110$

All ages Shock Index:  
HR  $>$  SBP

## Hyperventilation:

Hyperventilation is **NOT**  
recommended in patients who  
require BVM, BIAD, or ETT.

Maintain ventilation rate to target  
EtCO<sub>2</sub> of 35 – 45 mmHg  
*See Pearls*

Maintain oxygenation to target SpO<sub>2</sub>  
of 92 – 98%  
(Near 100% if possible)

# Head Trauma



## Pearls

- \* **Recommended Exam: Mental Status, HEENT, Heart, Lungs, Abdomen, Extremities, Back, Neuro**

- \* **Hypoxia:**

Single episode of hypoxia can worsen head injury and double mortality.  
Maintain SpO<sub>2</sub> preferable between 92 – 98%, but 100% if possible.

- \* **Hyperventilation in head injury requiring advanced airway:**

Hyperventilation lowers CO<sub>2</sub> and causes vasoconstriction leading to increased intracranial pressure (ICP).  
Hyperventilation is not recommended and can worsen the brain injury.

In patients requiring BVM, BIAD, or endotracheal tube, titrate ventilation rate to EtCO<sub>2</sub> between 35 - 45 mmHg.

**Recommended ventilation rates with advanced airways:**

Infant/ Toddler: 25 breaths / minute

Children: 20 Breaths / minute

Adolescents/ Adults: 10 – 12 Breaths / minute

- \* **Hypotension:**

Episodes of hypotension can worsen head injury and increase mortality:

In adults, target SBP is at least 90 - 100 mmHg.

In pediatrics, target SBP is at least > 70 + (2 x the age in years).

Usually indicates shock unrelated to the head injury and should be aggressively treated, otherwise limit fluid administration.

- \* **GCS**

Key performance measure used in the EMS Acute Trauma Care Toolkit.

Serial assessments of GCS with ongoing assessments should be performed.

- \* **Do not place in Trendelenburg position as this may increase ICP and worsen blood pressure.**

- \* **Poorly fitted cervical collars may also increase ICP when applied too tightly.**

- \* **In areas with short transport times, Drug Assisted Airway protocol is not recommended for patients who are spontaneously breathing and who have oxygen saturations of ≥ 90% with supplemental oxygen including BIAD/ BVM.**

- \* **Increased intracranial pressure (ICP) may cause hypertension and bradycardia (Cushing's Response).**

- \* **Consider Restraints if necessary for patient's and/ or personnel's protection per the Restraints: Physical Procedure USP 5.**

- \* **Concussions:**

Traumatic brain injuries involving any of a number of symptoms including confusion, loss of consciousness, vomiting, or headache.

Any prolonged confusion or mental status abnormality which does not return to normal within 15 minutes or any documented loss of consciousness should be evaluated by a physician ASAP.

**EMS Providers should not make return-to-play decisions when evaluating an athlete with suspected concussion.**

**This is outside the scope of practice.**

Eye Opening Response	Verbal Response	Motor Response
4 = Spontaneous	5 = Oriented	6 = Obeys commands
3 = To verbal stimuli	4 = Confused	5 = Localizes pain
2 = To pain	3 = Inappropriate words	4 = Withdraws from pain
1 = None	2 = Incoherent	3 = Flexion to pain or decorticate
	1 = None	2 = Extension to pain or decerebrate
		1 = None