

PEM GUIDE - HEAD TRAUMA

INTRODUCTION

The term “head trauma” is used to describe a spectrum of injuries, from minor mishaps to severe injury. The clinician must decide which patients are at risk of intracranial injury (i.e. hemorrhage, diffuse axonal injury, cerebral edema, and increased ICP) and therefore require a CT scan. While there are guidelines to assist in clinical decision-making, no guideline is perfect, and the topic remains controversial.

DIAGNOSIS

The diagnosis of head trauma is based on the mechanism of injury, patient symptoms and associated physical exam findings. In the patient at increased risk for intracranial injury, the use of neuroimaging is warranted. Diffuse axonal injury is the most common finding in pediatric head trauma. A multi-center study of pediatric head trauma by the Pediatric Emergency Care Applied Research Network (PECARN) was recently completed (see the article)

SIGNS AND SYMPTOMS SUGGESTIVE OF INTRACRANIAL INJURY	
C	Coagulopathy
F	Focal neurologic deficit
L	LOC > 1 minute
A	Altered mental status
P	Persistent vomiting
P	Persistent/worsening headache
S	Signs of skull fracture
S	Seizure (some contact seizures may be excluded)
S	Scalp hematoma in a child < 2 y.o.

SIGNS OF INCREASED ICP
Headache
Depressed consciousness
3 rd cranial nerve compression (fixed, dilated pupil)
Papilledema
Hemiparesis
Decorticate posturing
Cushing triad (bradycardia, hypertension, irregular respirations)

SIGNS OF BASILAR SKULL FRACTURE
Battle sign (bruising over the mastoid)
Raccoon eyes
Hemotympanum
Hearing loss
Facial paralysis
CSF otorrhea or rhinorrhea

AVPU CLASSIFICATION	
A	Alert
V	Responds to Voice Stimuli
P	Responds to Painful Stimuli
U	Unresponsive to all Stimuli

GLASCOW COMA SCALE		
Eye Opening	Spontaneous	4
	Verbal Stimuli	3
	Painful Stimuli	2
	No response	1
Motor Response	Obeys Commands	6
	Localizes Pain	5
	Withdraws to Pain	4
	Flexion -Decorticate	3
	Extension -Decerebrate	2
	No Response	1
Verbal Response	Oriented	5
	Confused / Disoriented	4
	Inappropriate words	3
	Incoherent	2
	No response	1
GCS = E + M + V (Range 3-15)		

INITIAL MANAGEMENT OF HEAD TRAUMA

Airway/Breathing	If C-spine injury is suspected, use the jaw-thrust technique to position the airway. Apply a semirigid cervical collar or use manual inline stabilization. Position patient supine on a backboard. Use log-roll maneuver when turning.
Circulation	The goal is to maintain cerebral perfusion pressure. If hypotension is present, treat with fluids. Pressors (vasoconstrictors) may be indicated in neurogenic shock
Disability	Assess mental status using AVPU or Glasgow Coma Scale. (see table above). Assess for signs of herniation (e.g. a dilated fixed pupil)
Exposure	Examine for signs of penetrating head trauma and signs of facial/back trauma that may be associated with intracranial injury. In addition assess for "raccoon eyes", "battle sign", hemotympanum and signs of CSF leakage from the ears or nose.

MILD HEAD TRAUMA

Mild head trauma is defined as head trauma in a patient with:

- A Glasgow Coma Score of 14-15
- A nonfocal neurologic exam
- No sign of a skull fracture

These children are at low risk for intracranial injury, and can generally be discharged home without a CT scan.

MILD HEAD TRAUMA + LOC (Loss of Consciousness)

As long as loss of consciousness is < 1 minute, these children can generally be observed for 6 hours and sent home without a CT scan. Observation can take place in the ER, the clinic, or even at home if the parents are reliable.