PAEDIATRIC ACUTE CARE GUIDELINE	
Head Injury	
Scope (Staff):	All Emergency Department Clinicians
Scope (Area):	Emergency Department

This document should be read in conjunction with this DISCLAIMER
http://kidshealthwa.com/about/disclaimer/

Head Injury

Background

- In **all** head injuries consider the possibility of cervical spine injury

General

- Head injury is the leading cause of death in children > 1 year of age
- Head injury is the 3rd most common cause of death in children
- Ratio of head injury, boys to girls is 2:1
- Ratio of fatal head injury, boys to girls is 4:1

Risk factors

High Energy Mechanism:

- Fall from > 1 metre
- Motor vehicle accident (MVA)
- Assault
- Projectile (e.g. golf, cricket ball)
- Lack of history

Increased Risk of Bleeding:

- Thrombocytopenia or other haematological disorders
- Medication (e.g. quinine, penicillin, digoxin, anti-epileptics, salicylates, heparin,

warfarin)

Signs of Raised Intracranial Pressure (ICP) Include:

- Cushing's reflex (hypertension with bradycardia)
    - Note: relative bradycardia alone can herald raised ICP before patient becomes hypertensive
- Unilateral or bilateral pupillary dilatation
- Deteriorating GCS (changing by more than 2 points)
- Developing focal neurological signs
- Extensor posturing

Assessment

Mild Head Injury	Moderate Head Injury	Severe Head Injury
• 95% of head injuries are mild • GCS 14-15 • AVPU = A • No LOC • Normal neurological examination	• GCS 9-13 • AVPU = V • 3 or more vomits • Brief seizure after head injury • Amnesia of event • LOC < 5 mins • Large scalp laceration, bruise or abrasion (> 5cm in < 1 year old) • Drowsy • Features of basal skull fracture ◦ Blood behind tympanic membrane ◦ CSF leak from ear/nose ◦ Raccoon eyes ◦ Battles sign • Open or depressed skull fracture • High energy mechanisms	• GCS < 9 • AVPU = P or U • Seizures • Focal neurological deficit • Raised ICP • Penetrating head injury

Examination

Head:

- Penetrating injury
- Depressed skull fracture
- Large bruising or swelling
- Panda eyes
- Battles sign (bruising behind the ear)
- CSF from nose or ear
- Fundi
    - Papilloedema not seen acutely
    - Retinal haemorrhage in NAI
- Pupillary reaction – equal, reactive, size

CNS:

- Full neurological examination

Investigations

Indications For a Skull X-Ray:

- Focal impact to head
- Boggy swelling to head (potential depressed skull fracture)

Indications For Head CT:

- Focal neurological deficit
- Depressed skull fracture
- Deterioration in GCS of more than 2 points
- Penetrating skull injury
- Possible basal skull fracture
- Post traumatic seizure with no history of epilepsy
- Suspicion of open or depressed skull injury or tense fontanelle
- Clinical suspicion of non accidental injury
- Age < 1 year: presence of bruising, swelling or laceration > 5 cm on the head

Two or more of the following:

- LOC > 5 minutes
- Abnormal drowsiness
- More than 3 vomits (discrete episodes)
- Amnesia (antegrade or retrograde) lasting > 5 minutes
- Dangerous mechanism of injury:
    - High speed MVA – either as pedestrian, cyclist or vehicle occupant
    - Fall from > 3 metres
    - High speed injury from a projectile or an object
- Bleeding tendency

Indications For C-spine CT:

- GCS < 13 on initial examination
- Intubated
- Focal neurological signs
- Paresthesis on upper limb or lower limb
- Strong clinical suspicion despite normal X-Rays
- Plain X-Ray difficult to take or inadequate
- Plain X-Rays abnormal
- Definitive diagnosis of cervical spine injury needed (e.g. before surgery)

Other X-Rays and CT As Clinically Indicated:

Bloods:

- FBC
- Coagulation profile
- U&E
- BGL
- Venous blood gas
- LFT + Lipase (if abdominal trauma)
- Group and hold or cross match

Initial management

Mild Head Injury

- Observe for 2-4 hours in ED if there is clinical concern
- Most can be discharged home with the Head Injury and Return To Sport Fact Sheet

Moderate Head Injury

- CT if indicated (see above)
- Admit to ED Observation Ward (4E)
- Neurological observations half hourly until GCS = 15, then hourly thereafter
- Consider Head CT if:
    - Persistent headache
    - Persistent vomiting
    - Drowsy
    - New neurological signs
    - Deteriorating GCS
- If the child remains well discharge home with the Head Injury and Return To Sport Fact Sheet

Severe Head Injury:

The aim is to prevent further secondary injury to the brain after the initial serious primary head injury.
Treatment for:

- **Hypoxia:**
    - Intubate (continue C-spine precautions)
    - Keep $ETCO_2$ 35-40
    - SpO_2 100%
    - Keep head in midline at 30^{o}
    - Insert nasogastric tube (orogastric tube if concerned about a base of skull fracture)

- Consider cooling

- **Hypotension:**
  - 0.9% saline bolus of 20mL/kg (as required)
  - Consider inotrope infusion

- **Raised Intracranial Pressure:**
  - Hypertonic 3% saline: 3mL/kg as a slow IV push
  - Mannitol 20% solution: 0.5 – 1g/kg (2.5 – 5 mL/kg) IV over 20 minutes
  - Hyperventilation to decrease $ETCO_2$: 35-40

- **Seizures:**
  - Load with Phenytoin 20mg/kg over 30 minutes

Admission criteria

Children Who Will Need Admission:

- Severe head injuries
- Moderate head injuries with:
  - Abnormal CT – admit under Neurosurgical Team
  - Children who have not had a CT and need a period of observation – admit to the ED Observation Ward
    - Utilise PMH Observation Ward: Medical Documentation – Head Injury Clinical Pathway (> 2 years old) – print to PRPMEMER08 (PMH only)

This document can be made available in alternative formats on request for a person with a disability.

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Standards Applicable:	NSQHS Standards:
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