

# Initial Management of Adult Closed Head Injury

## Initial Assessment and Stabilisation of ABCDEs

Trauma Team activation if initial GCS 3-13 or otherwise indicated

Commence minimum of hourly clinical observations of vital signs, GCS, pupils, PTA (if applicable) and clinical symptoms

### GCS 3-8

#### Severe Head Injury (10%)

- Early intubation
- Supportive care of ABCDEs
- Prevent secondary brain injury by avoiding hypoxaemia and hypotension
- Early CT scan
- Early neurosurgical consult
- Early retrieval consult if transfer required
- Consider use of anticonvulsants
- Consider ICP monitoring
- ICU admission
- Brain injury rehabilitation consult

**NB. Minimum supportive care aims to prevent secondary brain injury:**

- PaO<sub>2</sub> >60
- SaO<sub>2</sub> >90
- PaCO<sub>2</sub> 35-40
- Systolic BP >90
- Head up 30°

### GCS 9-13

#### Moderate Head Injury (10%)

- Supportive care of ABCDEs
- Prevent secondary brain injury by avoiding hypoxaemia and hypotension
- Early CT scan
- Period of clinical observation
- Consider intubation in the event of clinical deterioration or to facilitate management
- Early neurosurgical consult if not clinically improving and/or abnormal CT scan
- Early retrieval consult if transfer required
- Admit to hospital for prolonged observation unless rapid clinical improvement to GCS 15, normal CT scan and absence of other risk factors (as per mild head injury)
- Routine post traumatic amnesia testing and consider referral to brain injury rehabilitation service due to significant risk of cognitive behavioural social sequelae

### GCS 14-15

#### Mild Head Injury (80%)

- Initial assessment followed by period of clinical observation to detect risk factors for significant intracranial injury.
- CT scan not routinely indicated unless one or more risk factors listed below are present.
- Discharge for home observation with head injury advice sheet at 4 hours post injury if clinically improving with either no risk factors indicating the need for CT scan or normal CT scan if performed.
- Consider hospital admission and consult network neurosurgical service if abnormal CT scan.
- Consider hospital admission for observation if clinically not improving at 4 hours post injury irrespective of CT scan result.
- Consider hospital admission for observation if elderly, known coagulopathy or socially isolated.
- Advise patients to see their local doctor if they do not return to normal within 48 hours so they can be reassessed and monitored for post concussion symptoms.

**NB. Also see separate Mild Head Injury Algorithm.**

### Risk factors indicating potentially significant mild head injury

- GCS <15 at 2 hours post injury
- Deterioration in GCS
- Focal neurological deficit
- Clinical suspicion of skull fracture
- Vomiting (especially if recurrent)
- Known coagulopathy / bleeding disorder
- Age >65 years
- Post traumatic seizure
- Prolonged loss of consciousness (>5 min).
- Persistent post traumatic amnesia (AVPTAS <18/18)\*
- Persistent abnormal alertness / behaviour / cognition\*
- Persistent severe headache\*
- Large scalp haematoma or laceration.\*\*
- Multi-system trauma\*\*
- Dangerous mechanism\*\*
- Known neurosurgery / neurological deficit.\*\*
- Delayed presentation or representation\*\*

\* particularly if persists at 4 hours post time of injury  
\*\*clinical judgement required

### What should be done when patients with closed head injury acutely deteriorate?

#### Early signs of deterioration

- Confusion
- Agitation
- Drowsiness
- Vomiting
- Severe headache

#### Late signs of deterioration

- Decrease in GCS by two or more points
- Dilated pupil(s)
- Focal neurological deficit
- Seizure
- Cushing's response – bradycardia and hypertension

#### Clinical approach

- Resuscitate ABCDEs and exclude non head injury cause
- Supportive care of ABCDEs
- Early intubation if indicated
- Immediate CT scan
- If clinical or CT evidence of raised ICP/mass effect consult with network neurosurgical and retrieval services re;
  - short term hyperventilation to PaCO<sub>2</sub> 30-35
  - bolus of mannitol (1g/kg)
  - local burr holes/craniectomy when more than 2 hours from neurosurgical care
  - prophylactic anti-convulsants

### When should patients with closed head injury be transferred to hospitals with neurosurgical facilities?

#### Potential indications

Patient with severe head injury

Patient with moderate head injury if:

- clinical deterioration
- abnormal CT scan
- normal CT scan but not clinically improving
- CT scan unavailable.

Patient with mild head injury if:

- clinical deterioration
- abnormal CT scan
- normal CT scan but not clinically improving within 4-6 hours post injury
- mild head injury with CT scan unavailable, particularly if:
  - Persistent GCS<15
  - Deterioration in GCS
  - Focal neurological deficit
  - Clinical suspicion of skull fracture
  - Persistent abnormal mental status
  - Persistent vomiting
  - Persistent severe headache
  - Known coagulopathy (particularly if age >65 or INR >4)

#### Clinical approach

- When in doubt consult you network neurosurgical service.
- Patients with closed head injuries should be observed in facilities that can manage any complications that are likely to arise. Clinical judgment regarding risk of deterioration is required and neurosurgical consultation may be appropriate.
- Patients with closed head injuries should be transferred to the nearest appropriate hospital with neurosurgical facilities if there is significant risk of intracranial injury. The transfer of patients to hospitals with CT scan facilities but without neurosurgical services should be avoided.

### AMRS (adult)

'formerly the MRU'

1800 650 004

### NETS (children)

1300 362 500

Network neurosurgical service