## Initial Management of Adult Closed Head Injury

### Initial Assessment and Stabilisation of ABCDEs

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

### 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 anticoagulants
- Consider ICP monitoring
- ICU admission
- Brain injury rehabilitation consult

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

- PaO₂ >60
- SaO₂ >90
- PaCO₂ 35-40
- Systolic BP >90
- Head up 30°

### 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

### 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 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 (AWPTAS <18/18)*
- Persistent abnormal alertness / behaviour / cognition*
- Persistent severe headache*
- Large scalp haematoma or laceration.**
- Multi-system trauma**
- Known neurosurgery / neurological deficit.**
- Delayed presentation or representation**

* particularly if persist 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 pupils(s)
- Focal neurological deficit
- Seizure
- Cushing’s response – bradycardia and hypotension

**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 intubation to PaCO₂ 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
  - Clinical deterioration
  - Abnormal CT scan
  - Normal CT scan but not clinically improving
  - CT scan unavailable.

**Clinical approach**
- When in doubt consult you network neurological 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 neurological 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.

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### Contact Information

**AMRS (adult)**
- 1800 650 004

**NETS (children)**
- 1300 362 500

**Network neurosurgical service**
- [Network neurosurgical service](#)

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**Notes:**
- Prevent secondary brain injury: NB. Minimum supportive care aims to

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**Important Points:**
- **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 anticoagulants
  - Consider ICP monitoring
  - ICU admission
  - Brain injury rehabilitation consult

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**Initial Assessment and Stabilisation of ABCDEs**

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

**GCS 3-8**
- Head up 30°
- Systolic BP >90
- PaO₂ >60
- PaCO₂ 35-40
- SaO₂ >90

**GCS 9-13**
- Head up 30°
- Systolic BP >90
- PaO₂ >60
- PaCO₂ 35-40
- SaO₂ >90

**GCS 14-15**
- Head up 30°
- Systolic BP >90
- PaO₂ >60
- PaCO₂ 30-35
- SaO₂ >90

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**Initial Management of Adult Closed Head Injury**

**Algorithm.**

**Initial Assessment and Stabilisation of ABCDEs**

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- PaCO₂ 35-40
- SaO₂ >90

**GCS 14-15**
- Head up 30°
- Systolic BP >90
- PaO₂ >60
- PaCO₂ 30-35
- SaO₂ >90

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**Network neurosurgical service**

[Network neurosurgical service](#)

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**Important Points:**
- Prevent secondary brain injury: NB. Minimum supportive care aims to

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**Additional Points:**
- **Late signs of deterioration**
  - Decrease in GCS by two or more points
  - Dilated pupils(s)
  - Focal neurological deficit
  - Seizure
  - Cushing’s response – bradycardia and hypotension

**Clinical approach**
- Resuscitate ABCDEs and exclude non head injury cause
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