## Initial Management of Adult Mild Closed Head Injury

**Initial GCS 14-15 on arrival following blunt head trauma**
Stabilise ABCDEs and assess clinical risk factors. Commence minimum of hourly clinical observations of vital signs, GCS, pupils, PTA and clinical symptoms.

### Low risk mild head injury

**No indication for CT scan if all of...**
- GCS 15 at 2 hours post injury.
- No focal neurological deficit.
- No clinical suspicion of skull fracture.
- No vomiting.
- No known coagulopathy or bleeding disorder.
- Age <65 years.
- No seizure.
- Brief loss of consciousness (<5 mins).
- Brief post traumatic amnesia (<30 mins).
- No severe headache.
- No large scalp haematoma or laceration.
- Isolated head injury.
- No dangerous mechanism.
- No known neurosurgery / neurological impairment.
- No delayed presentation or representation.

**Clinical symptoms IMPROVING or remain normal during period of observation.**

**Clinically safe for discharge for home observation if:**
- GCS 15/15.
- No persistent post traumatic amnesia (nb A-WPTAS 18/18).
- Alertness / behaviour / cognition returning to normal.
- Clinically improving after observation.
- Normal CT scan or no indication for CT scan.
- Clinical judgment required regarding discharge and follow up of elderly patients or patients with known coagulopathy or bleeding disorder due to increased risk of delayed subdural haematoma.

**Clinically deteriorates or clinical symptoms not improving during observation period**

**Clinical symptoms IMPROVING at 4-6 hours post time of injury.**

**Normal CT scan**

**Indication for CT scan. Continue clinical observations.**

**临床 symptoms NOT IMPROVING at 4-6 hours post time of injury.**

**Abnormal CT scan**

**Consider transfer for CT scanning particularly if:**
- Persistent GCS <15.
- Deterioration in GCS.
- Focal neurological deficit.
- Clinical suspicion of skull fracture.
- Known coagulopathy (esp if INR>4).
- Persistent abnormal alertness, behaviour, cognition, PTA, vomiting or severe headache at 4 hours post injury.

**CT scan unavailable**

**Consult senior clinician and network neurosurgical service regarding further management and disposition. Continue clinical observations in hospital.**

### High risk mild head injury

**Strong indication for CT scan if...**
- GCS <15 at 2 hours post injury.
- Deterioration in GCS.
- Focal neurological deficit.
- Clinical suspicion of skull fracture.
- Vomiting (especially if recurrent).
- Known coagulopathy or bleeding disorder.
- Age >65 years.
- Seizure.
- Prolonged loss of consciousness (>5 mins).
- Persistent post traumatic amnesia (A-WPTAS <18/18 at 4hrs post injury).
- Persistent abnormal alertness / behaviour / cognition.
- Persistent severe headache.

**Relative indication for CT scan if...**
- Large scalp haematoma or laceration.
- Multi-system trauma.
- Dangerous mechanism.
-Known neurosurgery / neurological impairment.
- Delayed presentation or representation.

**Note**

The presence of multiple risk factors is more concerning than a single isolated risk factor. In most uncomplicated mild head injury patients clinical symptoms start to improve by 2 hours post injury and are returning to normal by 4 hours post injury. Clinical symptoms that are deteriorating or not Improving by 4 hours post injury on serial observation such as abnormal alertness / behaviour / cognition, PTA, vomiting or severe headache are very concerning.

**Abnormal CT scan**

**Consider transfer for CT scanning particularly if:**
- Persistent GCS <15.
- Deterioration in GCS.
- Focal neurological deficit.
- Clinical suspicion of skull fracture.
- Known coagulopathy (esp if INR>4).
- Persistent abnormal alertness, behaviour, cognition, PTA, vomiting or severe headache at 4 hours post injury.

**CT scan unavailable**

**Consult senior clinician and network neurosurgical service regarding further management and disposition. Continue clinical observations in hospital.**

### Explanatory notes for risk factors

1. Using GCS<15 at 2 hours post injury allows clinical judgement for patients who present soon after injury or who have drug or alcohol intoxication. Drug or alcohol intoxication has not been shown to be an independent risk factor for intracranial injury but persistent GCS<15 is a major risk factor and mandates CT.
2. Clinical suspicion of skull fracture includes history of focal blunt assault or injury; palpable skull fracture; large scalp haematoma or laceration; signs of base of skull fracture – haemotympanum / CSF leak / raccoon eyes / Battle’s sign.
3. Recurrent vomiting more concerning than isolated vomiting but both are indications.
4. Known coagulopathy is both a strong indication for early CT scan and to check the INR. Early reversal of anticoagulation if abnormal CT scan and consider reversal if initially normal CT scan with high-INR (>4) depending on clinical situation.
5. Elderly patients have increasing risk of intracranial injury with increasing age, routine CT scanning indicated unless totally asymptomatic patient with no other risk factors.
6. Brief generalised seizures immediately following head injury are not significant risk factors. Prolonged, focal or delayed seizures are risk factors for intracranial injury.
7. Post traumatic amnesia may manifest as repetitive questioning or short term memory deficits and can be objectively tested using the A-WPTAS. PTA > 30 mins is a minor risk factor and PTA > 4 hours a major risk factor for intracranial injury.
8. Abnormal alertness/behaviour/cognition detects subtle brain injury better than GCS and should be part of the bedside assessment. Family may help establish what is normal.
9. Multi-system trauma – beware patient with unstable vital signs or distracting injuries or who receive analgesia or anaesthesia, as significant head injury is easily missed.
10. Clinical judgement required as to what is a large scalp haematoma or laceration.
11. Dangerous – MVA ejection / rollover; pedestrians / cyclists hit by vehicle; falls >own height or five stairs; falls from horses / pikes etc; focal blunt trauma, eg bat / ball / fist.
12. Known neurosurgery/neurological impairment – conditions such as hydrocephalus with shunt or AVM, tumour or cognitive impairment such as dementia make clinical assessment less reliable and may increase risk of intracranial injury.
13. Delayed presentation should be considered as failure to clinically improve during observation. For representation consider both intracranial injury and post concussion symptoms and have a low threshold for CT scanning if not done initially.