IMMEDIATE CRITICAL CARE REVIEW

≤8 ← GCS → >8

GCS < 15 – triage immediately
GCS 15 – triage within 15 minutes

Airway + C-spine

Indications for Immediate intubation:
- GCS ≤8
- Absent laryngeal reflexes
- Shock
- Abnormal respiratory pattern/ventilatory insufficiency: PaO2 <13kPa on O2, PaCO2 >6kPa
- Signs of impending brain stem herniation

NB: Intubate for transfer if
- Unstable facial fracture/bleeding into mouth
- Seizures
- Deteriorating GCS

Refer to STRS neurosurgical emergency guideline for ongoing management/neuroprotection: http://www.strs.nhs.uk/resources/pdf/guidelines/neurosurgtransfer.pdf

Indications for **Neurosurgical referral** (regardless of imaging)
- GCS falling (esp .motor)/fluctuating/≤8 after resuscitation
- Persisting unexplained confusion > 4 hours
- Progressive neurological deficit
- Seizures – recurrent/prolonged/lack of full recovery
- Definite/suspected penetrating injury
- CSF leak
- Basal skull fracture

Please **contact neurosurgical SpR directly** to refer, not retrieval service (though retrieval service can help with advice on management and finding a bed). **Local anaesthetic team must transfer patient as TIME CRITICAL TRANSFER**

LOCAL HOSPITAL ADMISSION if:
- Abnormality on CT not warranting transfer to neurosurgical unit
- GCS <15 after CT
- CT delayed – only transfer to Ash if clinically SAFE to do so
- Persisting symptoms after CT
- CSF leak
- NAI or intoxication suspected
- Any deterioration

Neuro-observations*
- Every 15 mins for 1st 2 hours
- Every 30 mins for next 4 hours, then stop if well
- Return to every 15 mins if deteriorates & urgent doctor review

Box 1
Head CT scan *within 1 hour* if any 1 of:
- ? NAI
- Post-traumatic seizure, no history of epilepsy
- In ED, initial GCS <14, or if under 1 yr GCS <15
- GCS <15 2 hours after injury
- Suspicion of open or depressed skull fracture or tense fontanelle
- Suspicion of basal skull fracture
- Focal neurology
- If under 1yr: bruise, swelling or laceration >5cm on head
- On Warfarin or known clotting disorder – perform CT **within 8 hours of injury**

Provisional CT report should be available within 1 hour of CT

No

Box 2
Head CT scan *within 1 hour* if more than 1 of:
- LOC (witnessed) > 5 mins
- Abnormal drowsiness
- ≥3 discrete vomits
- Dangerous mechanism of injury: high speed RTA (pedestrian, cyclist, vehicle occupant), fall from height > 3m, high-speed injury from a projectile or other object
- Amnesia (antegrade/retrograde) > 5mins

Provisional CT report should be available within 1 hour of CT

No

If only 1 risk factor from box 2, observe in the ED for minimum of 4 hours after the injury . Thereafter review suitability for discharge with Head-Injury advice if well .
CT within 1 hour if:
- GCS <15
- Further vomiting
- Further abnormal drowsiness

HOME WITH HEAD-INJURY ADVICE LEAFLET (Providing does not meet criteria in **Hospital Admission Box**)

CT head normal

*based on advice from local neurosurgical referral centre, St George's Hospital, London, UK

Criteria for performing a CT of cervical spine in children after head injury

The threshold for CT C-spine is higher in children compared to adults because of the increased risk to the thyroid gland from ionising radiation and the generally lower risk of significant spinal injury.

Perform a CT cervical spine within **1 hour** if any **one** of the following apply:

- GCS <13 on initial assessment
- Intubated and ventilated
- Focal peripheral neurology
- Parasthesia in the upper or lower limbs
- Definitive diagnosis of C-spine injury is needed urgently (eg: before surgery)
- Patient is having other body areas scanned for head injury or multi-region trauma
- Strong suspicion of injury despite normal X-rays
- Plain X-rays are technically difficult or inadequate
- Plain X-rays identify a significant bony injury

Provisional radiology report should be ready within 1 hour of the scan being performed.

If clinical concerns of C-spine injury (eg: persisting peripheral neurology) despite normal X-rays and CT C-spine, MRI should be considered to look for soft tissue injury ie: SCIWORA – spinal cord injury without radiological abnormality.

Peter Lillitos Jan 2016

References:

- **Head injury: assessment and early management NICE guidelines [CG176] Published date: January 2014**
- Expert opinion of local neurosurgical referral centre, St George's Hospital, London, UK
- APLS UK 6th Edition