Algorithm 1: Selection of adults for CT head scan

Adults presenting to the emergency department who have sustained a head injury.

Are any of the following risk factors present?
- GCS < 13 on initial assessment
- GCS < 15 at 2 hours after injury on assessment in the emergency department
- Suspected open or depressed skull fracture
- Any sign of basal skull fracture
- Post-traumatic seizure
- Focal neurological deficit
- More than one episode of vomiting since the head injury

Yes

No

Perform CT head scan within 1 hour of risk factor being identified.

A provisional written radiology report should be made available within 1 hour of the CT taking place.

Current anticoag treatment?
- Yes
- No

Is there loss of consciousness or amnesia since the head injury?
- Yes
- No

No imaging required/ further imaging required.

Are any of the following risk factors present?
- Age ≥ 65 years
- A history of bleeding or clotting disorder
- Dangerous mechanism of injury (a pedestrian or cyclist struck by a motor vehicle, an occupant ejected from a motor vehicle or a fall from height of > than 1 metre or 5 stairs)
- More than 30 minutes’ retrograde amnesia of events immediately before the head injury

Yes

No
Algorithm 2: Selection of children for CT head scan

Children presenting to the emergency department who have sustained a head injury.

Are any of the following risk factors present?

- Suspicion of non-accidental injury
- Post-traumatic seizure, but no history of epilepsy
- On initial assessment GCS <14, or for children under 1 year GCS (paediatric) <15
- At 2 hours after the injury GCS < 15
- Suspected open or depressed skull injury or tense fontanelle.
- Any sign of basal skull fracture (haemotympanum 'panda' eyes, cerebrospinal fluid leakage from the ear or nose, Battle’s sign).
- Focal neurological deficit
- For children under 1 year, presence of bruise, swelling or laceration of more than 5 cm on the head

Yes

- Witnessed loss of consciousness > 5 minutes
- Abnormal drowsiness
- 3 or more discrete episodes of vomiting
- Dangerous mechanism of injury (high-speed road traffic accident either as a pedestrian, cyclist or vehicle occupant, fall from height of >3 metres, high speed injury from an object
- Amnesia (antegrade or retrograde) lasting > 5 minutes (assessment not possible in pre-verbal children and unlikely in any child < 5 years).

Yes

Perform CT head scan within 1 hour of risk factor being identified. A provisional written radiology report should be made available within 1 hour of the CT head scan taking place.

Observe for a minimum of 4 hours post head injury.

Are any of the following risk factors present during observation?
- GCS < 15,
- further vomiting
- further episodes of abnormal drowsiness

Yes

Perform CT head scan within 8 hours of the injury. A provisional written radiologist’s report should be made available within 1 hour of the CT head scan taking place.

No

Current anticoag treatment?

Yes

No imaging required. Use clinical judgement to determine when further observation is required.

No

No

Yes

No

No
Algorithm 3: Selection of adults for imaging of the cervical spine

Adults presenting to the emergency department who have sustained a head injury.

Are any of the following risk factors present?

- GCS < 13 on initial assessment
- Intubation
- A definitive diagnosis of cervical spine injury is required urgently (e.g. before surgery)
- Other body areas are being scanned for head injury or multi-region trauma
- The patient is alert and stable, there is a suspicion of cervical spine injury and any of the following are present: age > 65; dangerous mechanism of injury (fall from > 1 metre or 5 stairs, axial load to head [e.g. diving], high speed motor vehicle collision, rollover motor accident, ejection from a motor vehicle, accident involving motorized recreational vehicles, bicycle collision); focal peripheral neurological deficit or paraesthesia in the upper or lower limbs.

Yes

Perform CT cervical spine within 1 hour of risk factor being identified.

A provisional written radiology report should be made available within 1 hour of the CT taking place.

No

Is there suspicion of cervical spine injury (neck pain or tenderness) with any of the following low risk factors present, which indicate it is safe to assess the range of movement of the neck?

- Involved in a simple rear–end motor vehicle collision
- Is comfortable in a sitting position in the emergency department
- Has been ambulatory at any time since injury
- Absence of midline cervical tenderness
- Presents with delayed onset of neck pain

Yes

On assessment can the patient actively rotate the neck to 45 degrees to the left and right?

Yes

No imaging/further imaging required

No

Perform three-view cervical spine X-rays within 1 hour of risk factor being identified.

Are the three-view cervical spine X-rays technically inadequate, suspicious or definitely abnormal?

Yes

No

No
Algorithm 4: Selection of children for imaging of the cervical spine

Children presenting to the emergency department who have sustained a head injury.

Are any of the following risk factors present?

- GCS < 13 on initial assessment
- Intubation
- A definitive diagnosis of cervical spine injury is required urgently (e.g. before surgery)
- Other body areas are being scanned for head injury or multi-region trauma
- Focal peripheral neurological signs
- Paraesthesia in the upper or lower limbs

Yes

Perform CT cervical spine within 1 hour of risk factor being identified.

A provisional written radiology report should be made available within 1 hour of the CT taking place.

Is there neck pain or tenderness?

Yes

Perform three-view cervical spine X-rays within 1 hour of risk factor being identified.

Are any of the following low risk factors present?

- Involved in a simple rear–end motor vehicle collision
- Is comfortable in a sitting position in the emergency department
- Has been ambulatory at any time since injury
- No midline cervical tenderness
- Presents with delayed onset of neck pain

No

Was there a dangerous mechanism of injury (fall from > 1 metre or 5 stairs; axial load to the head [e.g. Diving]; high-speed motor vehicle collision; rollover motor accident; ejection from a motor vehicle, bicycle collision)?

Yes

No

Is there neck pain or tenderness?

Yes

No

On assessment can the patient actively rotate the neck to 45 degrees to the left and right?

Yes

No

No imaging/ further imaging required