Assessment and management of Paediatric C-spine injuries

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See also: **Paediatric major trauma guidelines – imaging in children with trauma**
Paediatric major trauma guidelines – spinal injury

Background

- Cervical spine injuries in children are rare.
- Use the Canadian C-spine rule to assess risk
- MRI scans are not available out of hours at BSUH. Please discuss on an individual patient basis with Consultant Radiologist.

SCIWORA - spinal cord injury without radiographic abnormality

- Spinal cord injury without an obvious vertebral column injury.
- Injury will not be seen on plain x-rays or CT.
- Most frequently seen in younger children (especially < 8 years of age), and in the cervical spine. Incidence ranges from 1% to 10% of all spinal cord injuries in children.

Assessment and management

See pathway on page 3.

Spinal Immobilisation

Spinal immobilisation carries a potential airway risk, particularly if the child should vomit. All immobilised patients must be triage category ORANGE and should be nursed with close supervision. They must not be admitted to the SSU.

Use manual immobilisation (MILS = manual in-line stabilisation) or apply head blocks and tape.

Hard collars are only to be used in children who have:

- Abnormal neurology
- ABC compromise including serious brain injury / intubated and ventilated / unconscious

The child must be co-operative. Any struggling that the child does may increase leverage on the neck and cause instability.

Imaging

Plain x-rays of the C-spine are the imaging modality of choice in children in whom you do not have a strong suspicion of cord or column injury (see next paragraph on p2).

Perform immediate **MRI** of the C-spine if strong suspicion of C-spine cord or column injury as indicated by **dangerous mechanism of injury** (see box 1 on p3.) or **complaining of paraesthesia in upper or lower limbs, and** by **clinical assessment** e.g. abnormal neurological signs and symptoms.

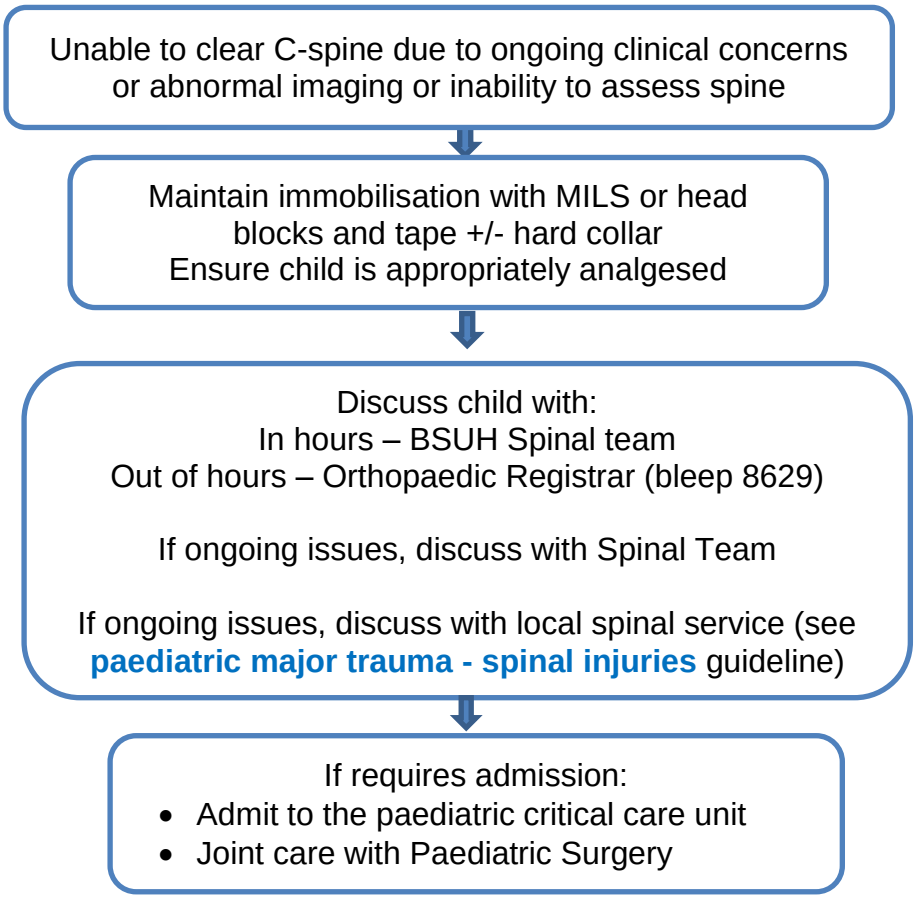
OR, if the child **has sustained a head injury** and has any of the following features – perform immediate **CT** of the C-spine:

- GCS < 13 on initial assessment
- Patient intubated
- Focal peripheral neurological signs
- Paraesthesia in the upper or lower limbs
- Definitive diagnosis of cervical spine injury is needed urgently
- Patient being scanned for multi-region trauma
- Plain X-rays technically difficult or inadequate
- Strong clinical suspicion despite normal x-rays
- X-rays show a significant injury

Clearing the C-spine

Use the pathway on page 3 to clear the C-spine.
Ensure documentation when C-spine clearance occurs.

What to do if you are unable to clear the C-spine after plain x-rays or CT scan



Paediatric Cervical Spine Injury pathway

(See also **additional guidance for C-spine CT in children with head injuries NICE 176)

History of trauma and:
- **GCS < 15**
- **Unable to assess / uncooperative**
- **Major distracting injury**
- **Major trauma**
- **Intoxicated / drug affected**
- **Focal peripheral neurology**
- **Paraesthesia in the upper or lower limbs**

No → Complaining of neck pain

No → Assess range of ACTIVE neck movements

Yes → give oral and / or intranasal analgesia

Yes to any

Dangerous mechanism of injury (see box 1.)
OR
Unable to safely assess range of movement in neck (see box 2.)

Yes → **C-spine immobilise** + Spinal precautions

Proceed to imaging**

Indication for MRI after Consultant to Consultant discussion:

Dangerous mechanism of injury (see box 1.) **or** paraesthesia in limbs **and** abnormalities on clinical assessment suggesting spinal cord or column injury

Not applicable or not available

Box 1. Dangerous mechanism of injury:
- Fall from height > 1 metre or 5 stairs
- Axial load to head
- High speed MVC, rollover
- Ejection from a motor vehicle
- Accident involving motorised recreational vehicles
- Bicycle collision or pedestrian being struck

Box 2. Safe to assess range of movement in neck – Any 1 of:
- No focal posterior mid-line C-spine tenderness
- Involved in simple rear-end MVC
- Comfortable in sitting position in ED
- Has been ambulatory at any time since injury
- Presents with delayed onset of neck pain

Can actively rotate neck 45 degrees to left and right?

No → **C-spine immobilise** + Spinal precautions

3-view C-spine x-rays Lateral / AP / PEG view if can obey commands and open mouth

Normal → C/o neck pain OR C-spine tenderness OR Neurological deficit OR Unable to assess

Yes → **Clear C-spine**
- document in notes

No → Can actively rotate neck 45 degrees to left and right?

Abnormal

Yes →
- Discuss with CED Consultant or Ortho or Spinal Registrar
- Discuss with Paediatric Radiologist to consider CT scan
- Maintain immobilisation and spinal precautions

No →