CLINICAL GUIDELINE

CERVICAL SPINE CLEARANCE
(< 25 YEARS)

Children's MINNESOTA
Level I Pediatric Trauma Center

Aim: To standardize the initial management and clearance of patients with suspected cervical spine injury.

A cervical injury is presumed in blunt trauma patients in patients presenting with a high index of suspicion of cervical spine injury based on mechanism of injury and/or clinical presentation. Spinal immobilization should be maintained until the clearing of the cervical spine is complete. See Note 1 on page 2.

GCS 14-15

History*
- Child or parents reports persistent neck pain, abnormal head posture, or difficulty with neck movement
- History of focal sensory abnormality or motor deficit

Physical Exam
- Torticollis/abnormal head position
- Posterior midline neck tenderness
- Limited cervical range of motion
- Not able to maintain focus due to other injuries
- Visible known substantial injury to chest, abdomen, or pelvis**

See Note 2, page 2 for further details.

Answer "No" to all of the above → Clear c-spine

Answer "Yes" to any of the above → Plain radiograph# (lateral view minimum)

- Normal → Options:
  1. Clear c-spine if physical exam findings resolve
  2. Maintain collar and re-evaluate in 2 weeks
  3. Neurosurgery consult
- Abnormal → Neurosurgery consult

GCS 9-13

Mental status expected to improve to GCS 14–15 within 12 hours?

- No → CT# → Neurosurgery consult
- Yes → Plain radiograph# (lateral view minimum)
  - Abnormal → Neurosurgery consult
  - Normal → Repeat clinical exam within 12 hours
    - Abnormal → Neurosurgery consult
    - Normal++ → Clear c-spine

GCS ≤ 8

CT# → Neurosurgery consult

Further imaging warranted for diagnostic or monitoring?

- No → Anticipate the patient will improve to GCS 14-15 in 24-72 hrs.
- Yes → Static MRI#
  - No → Anticipate the patient will improve to GCS 14-15 in 24-72 hrs.
  - Yes

Anticipate the patient will improve to GCS 14-15 in 24-72 hrs. → Yes

Options once GCS 14–15:
1. Clear c-spine
2. Maintain collar or repeat imaging per neurosurgery recommendations

*Stronger consideration for imaging should be given towards patients with the following mechanisms of injury (MOI): diving, axial load, clothes-lining, and high-risk MVC (HR-MVC), however the literature findings are controversial. HR-MVC is defined as a head-on collision, rollover, ejected from the vehicle, death in the same crash, or speed > 55mph.

**Substantial injury is defined as an observable injury that is life-threatening, warrants surgical intervention, or warrants inpatient observation.

#All imaging should be read by an attending physician.

++Patient has achieved GCS 14–15 and no longer presents with abnormal head posture, persistent neck pain, or difficulty in neck movement.

EXCLUSIONS:
None; patients with multiple critical injuries may have delays in spine clearance based on clinical stability to undergo imaging

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NOTE 1: GENERAL GUIDELINES

1. If a patient arrives with an extrication collar in place, or without cervical spine immobilization despite concerning mechanism of injury or clinical presentation, the patient should be placed in an Aspen collar as soon as possible.
2. For patients who do not fit the Aspen collars, alternative methods of cervical spine immobilization such as sandbags or manual stabilization should be used. An orthotics consult can also be placed for alternative collars.
3. Cervical spine clearance should be performed only by Emergency Department physicians, trauma surgeons, Trauma Advanced Practice Providers (TAPPs), neurosurgeons, and/or neurosurgery advanced practice providers (APPs).
4. Clinical clearance of the cervical spine of a child with a significant developmental disability or preexisting musculoskeletal conditions that have the potential to affect the cervical spine is possible, but information about the type of disability, the child's baseline intellectual function, and preinjury behaviors should be considered in the clearance process.
5. Documentation of the cleared cervical spine by the physician or APP should be placed in the patient's medical record, including clearance methodology, date, and time.
6. If a patient remains in a cervical collar for extended periods of time, regular assessments of the skin should be done per nursing practice standards to prevent skin breakdown. Replacement collars and pads are available through MESA.
7. A child who presents with suspected abusive head trauma should undergo MRI of the cervical spine when clinically appropriate to evaluate for ligamentous or other soft tissue injury.

NOTE 2: CONSIDERATIONS FOR PATIENTS WITH GCS 14-15

1. If the child can maintain focus during a physical examination for clinical clearance, despite the presence of other significant injuries, clinical clearance can be performed. Clinical clearance after blunt trauma that could potentially involve the neck CANNOT be performed if the child exhibits a visible or known substantial injury to the chest, the abdomen, or the pelvis.
2. When clinical clearance is not possible, the primary imaging modality for children who are <3 years old is radiographs. A one-view (lateral) radiograph is sufficient initially. Other views (anteroposterior, odontoid, oblique, flexion-extension) are unnecessary for initial conventional radiographic evaluation.
3. Clinical clearance can be performed in a child with neck tenderness that is NOT in the posterior midline.
4. Clinical clearance CANNOT be performed if the child or parent reports persistent neck pain, abnormal head posture, or difficulty in neck movement.
5. For a child with a GCS score of 15 who has an abnormal neurologic examination or persistent neck findings with normal neurologic examination and normal lateral radiograph, the next step is a neurosurgery consultation before additional imaging.

REFERENCE:

Herman, et al. (2019) Pediatric cervical spine clearance: A consensus statement and algorithm from the Pediatric Cervical Spine Clearance Working Group. *Journal of Bone and Joint Surgery,* 101:e1 (1-9), http://dx.doi.org/10.2106/JBJS.18.00217.