

Cervical Spine Evaluation and Management

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Purpose: Although cervical spine injuries are relatively uncommon among all trauma patients presenting to emergency departments (approximately 1-3%), cervical spine fractures and associated spinal cord or blunt cerebrovascular injuries can be potentially devastating to an individual. These guidelines serve to provide our trauma patients with an efficient and thorough evaluation of the cervical spine with either clearance of c-spine precautions or appropriate intervention and treatment of injuries when identified.

C-spine Precautions:

- I. Who needs C-spine precautions?
 - a. All blunt trauma patients should be placed in c-spine precautions until the cervical spine can be appropriately evaluated and cleared.
 - b. Penetrating trauma patients do not need to be placed in c-spine precautions unless there is other associated blunt trauma or they are unevaluable and blunt force trauma cannot be excluded.
- II. “C-spine precautions” includes:
 - a. Bedrest (until remainder of spine can be cleared/evaluated)
 - b. Head flat (in a neutral position)
 - c. C-spine immobilization in a rigid cervical collar (Philadelphia collar or Miami-J) at all times
 - d. Transport flat or in reverse Trendelenburg on a gurney
- III. In low risk patients, after T&L spines have been cleared, the Trauma Attending or Fellow may use his/her judgement and write the c-spine precautions order to include “HOB may

be 30 degrees up.”

C-Spine Evaluation and Clearance of Cervical Collar:

- I. Routine c-spine clearance includes imaging of the cervical spine COMBINED WITH a clinical exam of the cervical spine.
 - a. **A CT c-spine is the preferred imaging modality** for evaluation of the cervical spine if the patient is scheduled to undergo another type of CT examination.
 - b. If cervical spine x-rays are obtained, they must be considered adequate films which allow complete visualization of all cervical vertebra (from the skull base down to T1).
 - c. NEXUS CRITERIA--In patients that are a GCS 15, examinable and no further CT scans are planned, the c-collar can be cleared clinically using the National Emergency X-Radiography Utilization Study (NEXUS) criteria without additional c-spine imaging.
 - i. NEXUS low-risk criteria include:
 1. No posterior midline cervical-spine tenderness
 2. No evidence of intoxication
 3. A normal level of alertness
 4. No focal neurologic deficit
 5. No painful distracting injuries

If ALL of these criteria are met, no additional imaging is required and the c-collar may be cleared with clinical exam alone. If any of these criteria are not met, one should proceed with CT c-spine to further evaluate for cervical spine injury.

- d. Special populations:
 - i. Pediatric patients (15 and younger)
 1. If the child is awake/alert and examinable, the cervical spine should be attempted to be cleared with NEXUS Criteria.
 2. If the child is obtaining CT scans for work-up of other injuries, obtain a CT c-spine.
 - ii. Elderly patients (age 65 yrs and older)
 1. Elderly patients are more likely to have cervical spine injury without associated mid-line tenderness. In patients 65 years or older, have a

lower threshold to obtain CT c-spine depending on the mechanism of injury.

II. **Patients with any spinal fracture should have a radiologic exam of the entire spine.**

III. C-spine clearance after negative imaging tests

a. Clinically clearing the c-spine involves performing a physical examination to rule out midline pain or tenderness with palpation and range of motion (ROM).

i. First, palpate the cervical spine down the midline. If the patient denies midline pain and tenderness with palpation, the anterior half of the collar may then be removed.

ii. Next, the patient should then be given clear instructions to slowly move his/her head from side to side (without assistance) and then back to front and to stop at any time if he/she experiences any pain/discomfort. If no midline cervical spine pain is appreciated with ROM, then the c-collar may be removed.

b. **Both an order and a progress note** (documenting that the patient's C-spine has been both radiographically and clinically cleared) must be written in order to clarify that the patient no longer requires c-spine precautions.

IV. Any patient with:

- a. Midline cervical pain or tenderness
- b. A distracting injury or competing pain
- c. Intoxication (any intoxicating substance)
- d. Any head injury or impaired level of consciousness
- e. Focal neurologic deficit

SHOULD NOT undergo attempted clinical exam/clearance until sensorium is cleared.

V. Patients who are obtunded due to injury, intubated for a prolonged period of time or are unable/incapable of having his/her c-spine cleared clinically:

a. C-collar maybe cleared based on negative imaging (CT C-spine) alone at the discretion of the trauma attending

b. consider MRI of the c-spine within the first 72 hours of admission (if clinically stable to do so) to rule out ligamentous injury in patients sustaining poly trauma or injury

secondary to high energy mechanisms. If the MRI does not demonstrate signs of ligamentous injury, the C-collar may be removed.

C-spine Injury Present or Unable to Clear C-collar:

I. Any patient with complaints of midline pain or tenderness of the c-spine should be kept in a cervical collar regardless of their radiographic exam results.

II. **Negative CT c-spine but persistent pain** on clinical exam.

a. A second attempt to clear the cervical collar with exam should be made 12-24 hours following the initial attempt.

b. If still unable to clear a patient's c-spine:

i. The patient should be instructed to wear the collar for 2 weeks and follow-up in Spine clinic for repeat evaluation and clearance of precautions. This has been approved by Drs. Wilson (Neurosurgery) and Vincent (Ortho Spine).

ii. Consider MRI c-spine in special populations such as elderly where the presence of a c-collar may result in significant dysphagia or impair balance or mobility. This should be discussed with the trauma attending prior to obtaining.

III. Any patient with a **c-spine injury noted on imaging or has neurologic deficits present** on exam should be maintained in c-spine precautions and receive a formal spine surgery consult (either neurosurgery or orthopedic spine service).

a. If other spine injuries are present, the consulting spine team will be responsible for clearance of the cervical spine.

b. Patients with any cervical or > 3 thoracic/lumbar isolated transverse process or spinous process fractures should receive spine consultation.

IV. Some cervical spine fractures are associated with increased risk of blunt cerebrovascular injury (BCVI) and should be investigated with a CTA neck. Risk factors for BCVI are high energy transfer mechanisms associated with:

a. Displaced mid-face fracture (LeForte II or III)

b. Basilar skull fracture involving carotid canal

c. Closed head injury consistent with diffuse axonal injury and GCS <6

d. Cervical body fracture or transverse foramen fracture, subluxation or ligamentous injury at any level

- e. Cervical fractures, at any level
 - f. Near hanging with cerebral anoxia
 - g. Clothesline type injury or seatbelt abrasion (sign) with significant swelling, pain or altered mental status.
- V. Patients who require a c-collar for extended periods of time are at risk for skin breakdown and pressure wounds.
- a. Mechanisms to prevent this include:
 - i. exchange the Philadelphia collar to a Miami-J collar
 - ii. ensure collar fits properly and has pads in appropriate locations
 - iii. consider consulting Hanger or Burton for custom fit cervical collars
 - iv. nursing is performing appropriate c-collar cares daily
 - 1. cervical collar care performed q shift to assess skin for red/opened areas
 - 2. pads should be changed daily and as needed if soiled
 - 3. if patient is on flat bedrest, consider using ICU occipital back panel with Vista collar to reduce skin breakdown

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