

UAMS MEDICAL CENTER
ACS SERVICES MANUAL

SUBJECT: Cervical Spine Evaluation & Clearance Guidelines
UPDATED: 6/15/2023

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EFFECTIVE: 7/20/2023

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APPROVAL: 7/20/2023

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PURPOSE: To provide guidelines for the diagnostic evaluation and subsequent clearance of cervical spine injuries in the traumatically injured patient and to standardize these procedures across all services and phases of care.

DEVIATIONS: Deviations from these standards require attending involvement and preferably discussion.

INCLUSIONS: Trauma patients presenting to UAMS with spinal injuries *without known or suspected cord involvement*.

EXCLUSIONS: Suspicion or evidence of spinal cord injury (see separate SCI guideline).

CONSULTATION: The spine team should be notified immediately upon *confirmation* of cervical spine injury. Please refer to the SCI guideline for patients with high suspicion of spinal cord injury.

GENERAL CONSIDERATIONS:

1. Radiologic clearance of the cervical spine should occur after hemodynamic, respiratory, and surgical stabilization of the patient. During such stabilization, the cervical spine should be kept immobilized.
2. Penetrating trauma does not require a C-collar unless accompanied by significant blunt trauma or suspicion of penetrating injury to the spine.
3. Field c-spine collar to be replaced by an Aspen collar as soon as patient safety allows.
4. There should not be more than one attempt at c-collar clearance per day.

RISK STRATIFICATION:

1. **LOW-RISK:** A patient may be considered low risk if ALL the following are TRUE:
 - a. No posterior midline cervical pain/tenderness
 - b. Normal mental status (no confounding TBI, intoxication, shock)
 - c. No historical or physical exam evidence of a focal neurological deficit
 - d. No significant distracting injury (Note that if the patient can concentrate and comply with an exam, the injury is not “distracting.”)
 - e. A low-energy mechanism, such as a slow-speed MVC, bicycle collision, or fall from standing
2. **HIGH-RISK:** A patient may be considered high risk if ANY of the following are TRUE
 - a. Presence of posterior midline cervical tenderness
 - b. Abnormal mental status (regardless of cause).
 - c. Physical exam evidence of a new focal neurological deficit
 - d. Significant distracting injury (patient unable to cooperate/comply for examination)
 - e. Strongly consider high-energy mechanism to be high risk, which is defined as: fall from ≥ 3 ft (0.9 m) / 5 stairs, axial load injury, high speed MVC/rollover/ejection, bicycle collision, or motorized recreational vehicle
 - f. Strongly Consider Age ≥ 65 years

IMAGING:

1. No role for plain films in the initial assessment of cervical spine injuries
2. **LOW-RISK** patients may be cleared clinically (see below)
3. **HIGH-RISK** patients should receive a dedicated, non-contrasted CT cervical spine from occiput to T1 with sagittal and coronal reconstructions.

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- a. If the patient is to be admitted to the hospital, c-spine clearance can await final attending read.
- b. If the patient is to be otherwise discharged, a FINAL, ATTENDING READ should be requested by contacting the radiology resident on call.
4. MRI has no *routine* role in the management of c-spine clearance. Obtunded patients with a normal CT cervical spine (per final, attending read) AND without history or physical examination evidence of spinal cord injury may have their collar removed.
5. MRI may be required if the CT spine is negative, but the history and physical suggest a focal neurological deficit (see separate spinal cord injury guideline).

DISPOSITION:

1. Patients with un-cleared c-spines shall be dispositioned based on other injuries.
2. Those patients who cannot be clinically cleared for pain or limited range of motion should receive a cervical spine CT scan as described above.
3. In the absence of other indications for inpatient admission, a patient may be clinically cleared if they have a negative cervical spine CT as read by an attending radiologist AND their neurologic exam is at their baseline.
4. If there is a new neurologic deficit that localizes to the cervical spine, MRI cervical spine should be considered; please refer to the spinal cord injury policy for further recommendations.
5. In the rare event, there is clinical concern for ongoing spinal injury in a patient with a negative cervical spine CT and normal neurologic exam, a spine consult should be obtained for all admitted patients. For emergency department patients, the attending physician may opt to obtain MRI cervical spine OR consult spine for assistance. If the MRI is negative per final attending read, the cervical collar can be cleared without a spine consult.
6. If the spine team is consulted and recommends discharge in a rigid cervical collar, the patient should be placed in an Aspen collar and referred to spine clinic.

CERVICAL SPINE CLEARANCE PROCEDURE:

1. General Considerations:
 - a. The cervical spine clearance procedure should only be performed on alert patients who are either low risk and eligible for clearance without imaging or have had a negative cervical spine CT. Patients who are unconscious or intubated due to intracranial pathology may have their cervical collar removed as stated above.
 - b. If the Spine team is following for a concomitant thoracolumbar spinal cord injury, that team should perform the c-spine clearance exams.
 - c. If an emergency department patient is being discharged after a negative cervical spine CT, the emergency department team is responsible for cervical spine clearance.
 - d. Every attempt to clear the cervical spine collar should be documented in Epic (see “dot phrase” below).
 - e. No more than one attempt should be made in a day.
 - f. Clearance testing should be done as soon as safe and feasible.
2. Qualified Examiners: Physicians, APNs, or PAs who have:
 - a. Observed the clearance procedure at least once
 - b. Reviewed these guidelines
 - c. Been proctored by a qualified examiner for two examinations.
 - d. Have access to Epic for order writing and documentation purposes.
3. Clearance Examination
 - a. Assess the mental status and ability of the patient to comply with the exam.
 - b. Instruct the patient to notify you of any posterior or midline pain.

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- c. Instruct patient to not move head until told to do so.
- d. With a c-spine collar in place, palpate the posterior cervical midline for gross deformity.
- e. Instruct patient to go through the ranges of motion (flexion, extension, lateral rotation) and report any posterior midline pain/discomfort as well as any neurological symptoms.
- f. The cervical collar can be removed as long as none of the following are present:
 - cervical spine deformity
 - radicular symptoms
 - new neurologic findings
 - specific concern for ongoing cervical injury.
- g. Place c-collar clearance note in Epic (see suggested dot phrase in Appendix 1)
- h. Place “d/c c-collar order” in Epic
- i. No further imaging is necessary unless symptoms occur.

REFERENCES:

1. <https://www.facs.org/quality-programs/trauma/quality/best-practices-guidelines/>
 - a. ACS TQIP Best Practice Guidelines: Imaging
 - b. ACS TQIP Best Practice Guidelines: Spine Injury
2. Patel MB, Humble SS, Cullinane DC, et al. Cervical spine collar clearance in the obtunded adult blunt trauma patient: a systematic review and practice management guideline from the Eastern Association for the Surgery of Trauma. *The journal of trauma and acute care surgery*. 2015 Feb;78(2):430.
3. Hoffman JR, Wolfson AB, Todd K, Mower WR, NEXUS Group. Selective cervical spine radiography in blunt trauma: methodology of the National Emergency X-Radiography Utilization Study (NEXUS). *Annals of emergency medicine*. 1998 Oct 1;32(4):461-9.
4. Stiell IG, Wells GA, Vandemheen KL, Clement CM, Lesiuk H, De Maio VJ, Laupacis A, Schull M, McKnight RD, Verbeek R, Brison R. The Canadian C-spine rule for radiography in alert and stable trauma patients. *Jama*. 2001 Oct 17;286(15):1841-8.
5. Inaba K, Byerly S, Bush LD, Martin MJ, Martin DT, Peck KA, Barmparas G, Bradley MJ, Hazelton JP, Coimbra R, Choudhry AJ, Brown CV, Ball CG, Cherry-Bukowiec JR, Burlew CC, Joseph B, Dunn J, Minshall CT, Carrick MM, Berg GM, Demetriades D; WTA C-Spine Study Group. Cervical spinal clearance: A prospective Western Trauma Association Multi-institutional Trial. *J Trauma Acute Care Surg*. 2016 Dec;81(6):1122-1130. doi: 10.1097/TA.0000000000001194. PMID: 27438681; PMCID: PMC5121083.

APPENDIX I:

Proposed c-spine clearance Epic dot phrase (to only be used when c-spine cleared):

C-spine clearance note:

C-collar in place.

High-quality dedicated CT cervical spine shows no acute cervical fractures, evidence of injuries to the spinal cord, or injuries to spinal ligaments per final attending radiologist read.

The patient is awake and alert, able to understand and follow commands.

No step-offs or other gross deformities of the cervical spine are present. There is no new neurologic deficit. Full, active range of motion of the cervical spine (flexion, extension, lateral rotation) was completed without radicular pain or paresthesias. Passive range of motion was not performed.

Inclusion Criteria:

Trauma patients presenting to UAMS with spinal injuries *without known or suspected cord involvement.*

Exclusion Criteria:

Suspicion or evidence of spinal cord injury (see separate Spinal Cord Injury guideline).

Cervical Spine Evaluation Algorithm

Obtain history and complete physical exam, including cervical spine palpation and neurologic examination

Are any of the following true?

- a. Presence of posterior midline cervical tenderness
- b. Abnormal mental status (regardless of cause)
- c. Physical exam evidence of a new focal neurological deficit
- d. Significant distracting injury (patient unable to cooperate/comply for examination)
- e. Strongly consider: High-energy mechanism, defined as: fall from ≥ 3 ft (0.9 m) / 5 stairs, axial load injury, high speed MVC/rollover/ejection, bicycle collision, or motorized recreational vehicle
- f. Strongly consider: age ≥ 65 years

NO

YES

LOW RISK for cervical spine injury

HIGH RISK for cervical spine injury
Place in cervical collar

Attempt cervical spine clearance (see clearance examination)

Obtain cervical spine CT without contrast, including read by attending radiologist. Injuries identified?

Develops midline cervical spine pain or tenderness, focal deficit, has cervical deformity, radicular pain or paresthesias

YES

NO

YES

No injuries identified. Attempt cervical collar clearance (see clearance procedure)

Are any of the following true?
a. Focal deficit
b. Cervical deformity
c. Radicular pain or paresthesias

YES

Place in Aspen collar. See Spinal Cord Injury guideline

NO

NO

NO

YES

Remove cervical collar

Is there a specific concern for ongoing cervical spine injury despite negative CT and neurologic exam at baseline?

MRI negative OR Spine team recommends cervical spine clearance

Consult Spine team. For emergency department patients, may proceed directly with MRI cervical spine without contrast OR consult Spine team.

Cervical Spine MRI with traumatic findings OR Spine team recommends Aspen collar

Cervical Spine Clearance Examination

- a. Assess the mental status and ability of the patient to comply with the exam.
- b. Instruct the patient to notify you of any posterior or midline pain.
- c. Instruct patient to not move head until told to do so.
- d. With a c-spine collar in place, palpate the posterior cervical midline for gross deformity.
- e. Instruct patient to go through the ranges of motion (flexion, extension, lateral rotation) and report any posterior midline pain/discomfort as well as any neurological symptoms.
- f. The cervical collar can be removed as long as none of the following are present:
 - cervical spine deformity
 - radicular symptoms
 - new neurologic findings
 - specific concern for ongoing cervical injury
- g. Place c-collar clearance note in Epic
- h. Place "d/c c-collar order" in Epic
- i. No further imaging is necessary unless symptoms occur.