Clearing Cervical Spine Injury in the Awake Adult Patient

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Introduction

“Clearing” the cervical spine involves the confident exclusion of injuries to both the bones and the supporting soft tissues of the neck (notably the ligaments). In many patients this may be possible following careful clinical examination. However in many other cases imaging is also required. It is now widely accepted that if imaging is necessary a normal appearing lateral cervical spine (“C Spine”) view, although encouraging, is not enough to confidently exclude all injuries. In many patients, clearance involves both clinical and radiological evaluation.

What guidance exists?

A number of good sources provide guidance. These include:

• The Canadian C-spine rule (1)

• The NEXUS (National Emergency X-Radiography Utilization Study) criteria (2)

• National Institute of Clinical Excellence (NICE) (3)

• Eastern Association for the Surgery of Trauma (EAST) (4)

• The College of Emergency Medicine (5)
• ATLS (Advanced Trauma and Life Support) Cervical Spine guidelines

Other guidelines also exist.

**How do these guidelines differ?**

There is some difference in the criteria used to determine whether a patient needs radiological imaging. They also differ in the recommend choice of imaging.

**SCOPE OF GUIDANCE**

This summary guidance applies to patients who:

i) Have a Glasgow Coma Scale (GCS) of 15

ii) Are 16 years or older

This summary guidance does not apply to patients who:

i) Have sustained a penetrating neck injury

**SUMMARY OF GUIDANCE**

1. Patients who present following blunt trauma to the neck and who need to have their cervical spine cleared should have their neck immobilised by a collar.

2. If there are “high-risk factors”, radiographic imaging is mandatory. Keep the patient immobilised and obtain imaging (proceed directly to point 6) (1).

“High-risk factors” include:

i) Age of patient >65 years old

ii) Symptoms of paresthesia in the extremities

iii) The mechanism of injury was “dangerous” (see Box 1)
3. For those who do not have any “high-risk factors”, determine if the patient is at “low-risk” of cervical spine injury. This can be done by either the Canadian C-Spine Rule (a) or using the NEXUS criteria (b) (Box 2).

4. If a patient is determined to be at “low-risk” of cervical spine injury using either of the above criteria then the neck should be examined for range of motion. **Proceed directly to point 6 if the patient has not been determined to be at “low-risk” of cervical spine injury.**

5. Range of motion is demonstrated by active rotation of the neck left and right, a minimum of 45 degrees regardless of pain. If range of motion is demonstrated, the patient does not require radiological imaging (1).

6. If “high-risk factors” are present (see point 2) or patients placed in the “low risk” category for cervical spine injury are unable to demonstrate range of motion (see points 3-5), then a CT scan should be performed in adults (3,4)

7. CT scanning is superior to plain films in sensitivity and time-efficiency (7-9) and therefore plain films should not be used (4)

8. MRI is indicated if
There is a neurological abnormality which could be attributable to spinal cord injury \(^{(3,4)}\) or

The patient is neurologically intact, awake and alert complaining of neck pain with a negative CT \(^{(4)}\)

9. Remember also the possibility of a thoracic or lumbosacral injury \(^{(11)}\).

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**Box 2**

**Determining “low risk” of cervical spine injury**

(a) (“Canadian C-Spine Rule”) If ANY of the following criteria are met, then the patient is at a very low risk of injury and can be safely assessed for range of motion \(^{(1)}\)

- Simple rear-end motor vehicle collision
- Found to be in sitting position in ED
- Ambulatory status at any time after injury
- Delayed onset of neck pain
- Absence of midline C-spine tenderness

(b) (“NEXUS Criteria”) If the following 5 criteria are **all** met then the patient is at low risk of cervical spine injury and radiographic imaging of the cervical spine is unnecessary (see Video 2) \(^{(2)}\)

- Absence of tenderness at the posterior midline of the cervical spine
- Absence of focal neurological deficit
- Normal level of alertness
- No evidence of intoxication
- Absence of clinically apparent pain that might distract patient from the pain of a cervical spinal injury
Indications for CT

1 The patient demonstrates “high-risk factors” which include:
   i) Age of patient >65 years old
   ii) There is paresthesia in the extremities
   iii) The mechanism of injury was “dangerous”:
       • Fall from $\geq 1$ metre height / 5 stairs
       • Axial load to head e.g. diving
       • Motor vehicle collision at high speed ($>100$km/h)
       • Rollover motor vehicle accident
       • Ejection from a motor vehicle
       • Motorised recreational vehicles
       • Bicycle collision

2 The patient cannot be placed into the “low-risk” category using either the Canadian C-Spine or NEXUS criteria

Indications for MRI

There is a neurological abnormality which could be attributable to spinal cord injury or

The patient is neurologically intact, awake and alert complaining of neck pain with a negative CT
Figure 1 – A summary of guidance on clearing the cervical spine in the awake patient based on previous guidance (1-4)
Video 1 – The Canadian C-Spine Rule (courtesy of EM Ottawa) https://www.youtube.com/watch?v=k0cqlYypvIo

Video 2 – The NEXUS Criteria (courtesy of MEDZCOOL) https://www.youtube.com/watch?v=wjUDJAGzGPQ
References


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Learning points

1 Clearing the cervical spine following blunt trauma does not always require imaging

2 Current guidelines still differ in their recommendations whether imaging is required. If unsure, always follow your agreed local protocol.

3 Clinical assessment and mechanism of action of injury are important in determining whether imaging is required

4 If imaging is required, CT scanning should be performed and is superior to plain film radiography.

5 Plain films alone are now rarely indicated

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