Trauma Service Guidelines
Title: Cervical Spine Guidelines
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See Also: TRM 08.04 Management Patient with Spinal Precautions
TRM04.03 Thoracolumbar Spine Guideline

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Overview

This guideline provides an evidence-based approach to assessment of the cervical spine in the blunt trauma patient. The purpose is to have a consistent approach to the investigation and early referral and management of suspected cervical spine injuries.
For the purpose of this guideline, patients whose spines has been assessed using the nexus criteria and undergone clinical and or radiological examination and deemed injury free or not requiring further management of simple fractures or soft tissue injuries will be recorded as having there cervical spine "cleared."

Background

Failure to diagnose unstable fractures or ligamentous injuries in the cervical spine can result in irreversible devastating neurologic consequences. Acute cervical spine injuries (bone, cord, ligaments) in blunt trauma occur in approximately 3% of the population, this rate increases to 8% of the unconscious/ obtunded (GCS< 3-8) population. Missed injuries are 5-23% with up to 30% of these injuries resulting to permanent neurologic deficit. [1-5]

The incident of cervical spine injuries at RMH in blunt major trauma patients is14% of those 92% are fractures and/or cord injury and 14% are ligamentous and or soft tissue injuries. [6]

Early cervical spine "clearance", not only improves patient outcomes, but also decreases potential immobilisation complications such as skin breakdown and pressures ulcers, compromised airway, raised intracranial pressures, results in fewer ventilation and ICU days, decreases the incidence of pneumonia, delirium,

failed enteral feeding and venous thromboembolism. The immobilised patient also increases nursing workload and nursing the immobilised patient associated workplace injuries. [2, 4, 7]

CT scan is now the gold standard for the assessment of cervical spine injuries, and is 100% accurate in diagnosing bony injury [1] however limited in soft tissue assessment. [3, 8]

MRI is more sensitive in identifying soft tissue injuries, however timing is important. The accuracy decreases over time as the swelling and oedema from the initial injury decreases. Best results in diagnosing soft tissue injury are when the MRI is undertaken within 72 hours of the injury. [1, 7]

Guidelines

In the awake and orientated blunt trauma patient, assessment of the cervical spine is relatively straight forward with the application of the validated NEXUS criteria [9], which includes; assessment using 5 predetermined criteria and a clinical assessment of the patients cervical spine. The results of this assessment will determine if the patient's cervical spine can be deemed injury free ("cleared") or if they require further assessments including CT scanning and/or MRI.

The Nexus Criteria [8, 10]

All blunt trauma patients presenting to RMH with a potential cervical spine injury who **DO NOT** meet any of the 5 NEXUS criteria will require a clinical assessment of the cervical spine to confirm that they have full range of motion before they can be cleared. These patients do not require any radiological imaging and cervical collars can be removed.[7] If patients have any of the following 5 criteria present they will require a CT scan and ongoing assessment as outline below.

1. ***Altered neurologic function/ level of consciousness***

   Altered neurologic function is present if any of the following is present:

   a) Glasgow Coma Score 14 or less;

   b) disorientation to person, place, time, or events;

   c) inability to remember 3 objects at 5 minutes;

   d) delayed or inappropriate response to external stimuli;

   e) any focal deficit on motor or sensory examination.

   Patients with none of these individual findings should be classified as having normal neurologic function

2. ***Intoxication***

   Patients should be considered intoxicated if they have either of the following:

   a) a recent history (can be provided from an observer) of intoxication or intoxicating ingestion

   b) evidence of intoxication on physical examination such as slurred speech, ataxia, alterted thought patterns, or other cerebellar findings or any behaviours consistent with intoxication.

   Patients may also be considered to be intoxicated if test of bodily secretions are positive for drugs that affect level of alertness, including a blood alcohol level greater than .08mg/dl.

3. ***Posterior midline tenderness***

   Midline posterior bony cervical spine tenderness is present if the patient complains of pain on palpation of the midline neck from the nuchal ridge to the prominence of the first thoracic vertebra, or if the patient evinces pain with direct palpation of any cervical spinal process.

4. ***Focal neurological deficit***

   A focal neurological deficit is any focal neurologic finding on motor or sensory examination

5. ***Painful Distracting injuries***

No precise definition of painful distracting injury is possible. Therefore this category includes any condition thought by clinicians to be producing pain sufficient enough to distract the patient from a second (neck) injury.

Such injuries might include but are not limited to:

- *a long bone fracture*
- *a visceral injury requiring surgical consultation*
- *a large laceration, degloving injury, or crush injury; large burns*
- *any other injury producing acute functional impairment.*

Physicians may also classify any injury as distracting if it is thought to have the potential to impair the patient's ability to appreciate other injuries.

The Canadian C-Spine Rule [11, 12]

The Canadian C-Spine Rules are designed for alert and stable trauma patients; it is a validated tool that is said to be 100% sensitive in identifying clinically important injuries.

It includes assessment for all GCS 15 patients age> 65 with a dangerous mechanism or parenthesis in the extremities requires some radiology. The remainder of the indications include low risk criteria and a physical examination to assess 45 degree rotation of the neck.

Components of the Canadian C-spine rules have been incorporated into the flow diagram

The Royal Melbourne Hospital experience

The Royal Melbourne Hospital Trauma Service undertook a review of the cervical spine guideline application in 2010. The current guideline is based on the use of the NEXUS criteria for assessment and clearance. During a 4 year period (2005-2009) there were 3006 blunt trauma patients admitted to RMH. The study found that 43.4% of trauma patients underwent cervical spine imaging, with a 13.9% of the patients diagnosed with a cervical spine injury. Application of the current RMH cervical spine guideline resulted in a 99.52% sensitivity and a specificity of 99.96%.

The NEXUS criteria applied by RMH staff demonstrated a sensitivity of 99.76% and a specificity of 66.95% and the imaging techniques used to diagnose cervical spine injury had a sensitivity of 99.35% and a specificity of 99.88%. This demonstrates that the cervical spine management guideline had a high efficacy in diagnosing cervical spine injuries at RMH.

Who is at high risk for a ligamentous injury?

The elderly (> 65 years) due to the aging process, dementia, osteoporosis, degenerative changes to the spine, injury patterns are more commonly seen in the upper cervical spine.[13]

High risk mechanism include: Fall from ≥3metres or 5 stairs, axial loading (diving, car rollovers), high speed MVA > 100kms, ejection, motorised recreation vehicles (quad bikes) bicycle struck by other vehicles. [3, 7, 14]

If there is a clinical concern about a patient suffering a ligamentous injury without radiological changes present, specialist opinion from the orthopaedic service should be obtained.

If the ED or trauma team is concerned about the patient's cervical spine and/ or their neurological status, then the orthopaedic team should be notified immediately. If further imaging is deemed to be appropriate, then this should also trigger an immediate referral to orthopaedics.

Does the patient require a CT scan of the cervical spine?

If one of the 5 NEXUS criteria are present when the patient is assessed they will require a cervical spine CT from occiputl to T1 with sagittal and coronial reformats. [1-3, 5, 7] This CT has been demonstrated to be 100% sensitive in identifying cervical spine bony injuries and is the gold standard cervical spine clearance. [1-5, 7, 15]

Who can clear a cervical spine?

The cervical spine can be cleared using the NEXUS criteria & Canadian C/Spine rule and/ or radiologically. If the patient is unable to be assessed using NEXUS/ CCSR then they will require radiological assessment.

Who can clinically clear a cervical spine using NEXUS criteria?

A qualified clinician can deem a cervical spine injury free after assessing the patient using the NEXUS criteria.

A qualified clinician is anyone of the following:

- Trauma consultant
- ED consultant
- Neurosurgery consultant
- Orthopaedic consultant

Or those deemed "accredited" by their respective consultant teams above.

Who can radiologically clear a cervical spine?

A Radiologist or an accredited registrar deem the cervical spine radiologically injury free. Documentation of clearance will be by the reporting radiologist completing the report in synapse.

Documentation of spinal management/clearance

When a spinal management plan or "spinal clearance" is ascertained there should be clear documentation by the treating team on either symphony (in the emergency department), in the patients progress notes, or on the spinal management chart. The team can transcribe the radiologist who cleared the spine name from synapse.

Position restrictions

The consensus opinion of the ACT committee and amongst the orthopaedic spinal surgeons is that trauma patients awaiting a spinal management plan are to be nursed with spinal precautions i.e. immobilised on a flat surface in a neutral position. If they need to have head elevation this should be achieved by tilting the bed. There is to be no hip flexion unless specified by the managing unit and documented on the spinal management chart and/or in the patients' medical record.

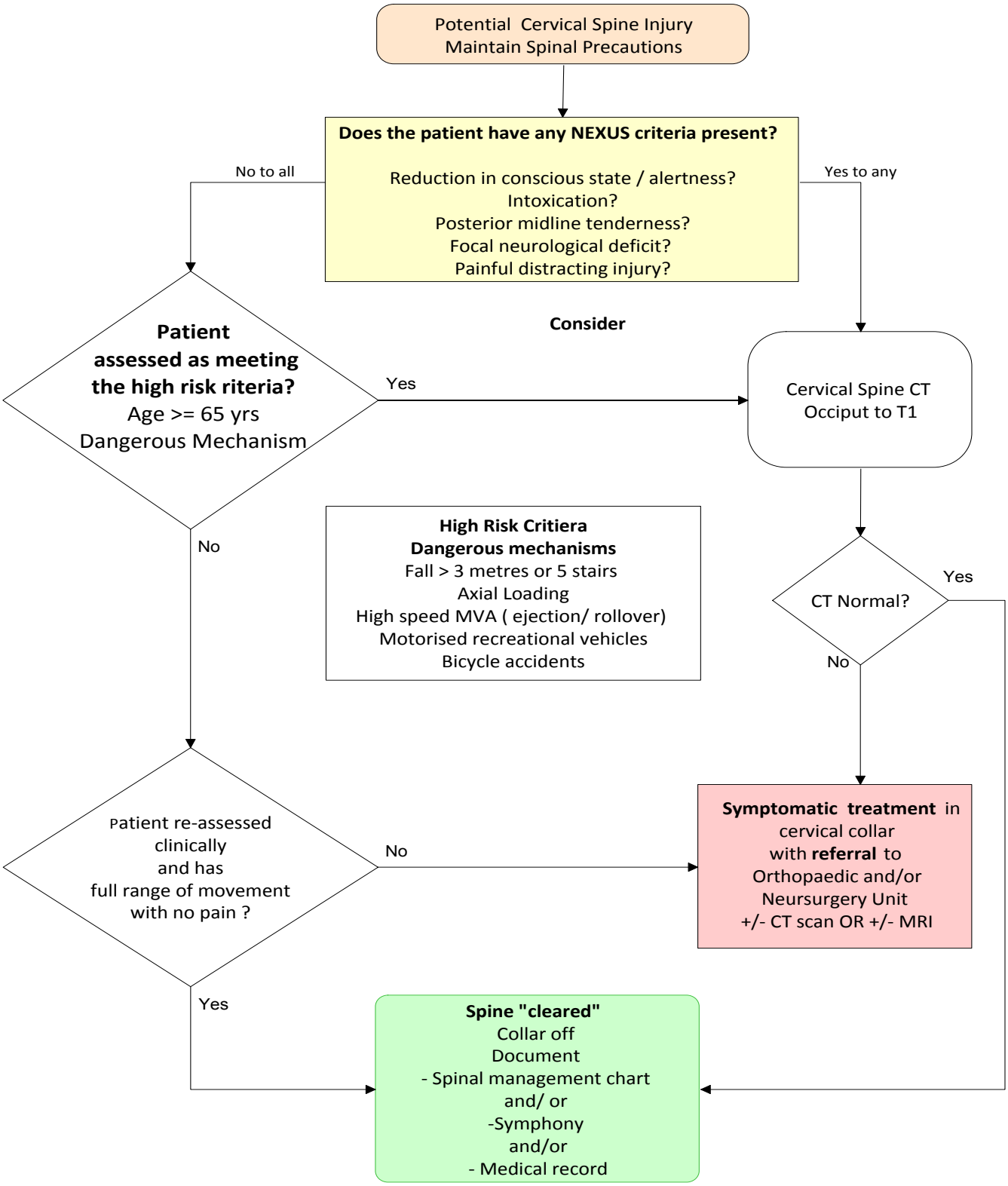
Hyperlink to the management of the patient with spinal precautions doc

Management of cervical spine injuries

If a cervical spine injury is confirmed or of there is a high degree of suspicion, then referral to the trauma or orthopaedic service should be made. Cord injured patients with other traumatic injuries and most neurologically intact patients will be managed within RMH. Cord injured patients without other injuries will be transferred to the Austin in accordance with State Trauma Guidelines. Advice can always be sought from the trauma or orthopaedic service.

If further imagining is required, such as MRI, then this should be requested in consultation with the orthopaedic team.

Cervical Clearance Spine Guideline



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