H05: Spinal Cord and Neck Trauma

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Introduction

Spinal cord injuries (SCI), while relatively rare, contribute significantly to morbidity and disability among those affected. Spinal motion restriction (SMR) must be undertaken on any patient who is at risk for SCI. Traditional SMR devices, such as cervical collars and rigid immobilization boards, carry risks of their own and should not be applied without a clinical indication to do so.

Contemporary care for potential SCI patients does not need to be an "all or nothing" approach, but instead should be patient centric. At all times the risks of applying SMR should be weighed against its benefits for each individual patient.

Cervical spine injuries are often the sole source of focus; attention must be paid to thoracic and lumbar injuries as well.

Essentials

- The mechanism of injury alone is not an accurate predictor of spinal column/cord injury.
- The NEXUS c-spine clearance tool may be used for adult patients.
- NEXUS only applies to cervical spine injuries. Thoraco-lumbar injuries must be assessed separately.
- Factors such as intoxication, altered levels of consciousness, language barriers, and major distracting injuries can all confound the assessment of spinal injuries.
- Only multi-trauma patients or those with new onset neurological impairment require transport on a clamshell stretcher.

Additional Treatment Information

- Known risks associated with SMR include: airway compromise, respiratory restriction, pressure ulcers, decreased cardiac output, vomiting/aspiration, increased intracranial pressure, pain, increased scene time and more complicated ER management.
- Elderly patients (age > 65) are at greater risk for spinal fractures from lower force injuries. Careful attention must be paid to thorough assessment with any trauma above the clavicles.
- Penetrating trauma requires rapid transport. SMR has been shown to increase mortality in these patients.
- Early and frequent focused neurological assessments (motor, sensation) may help monitor an evolving injury.
- Spinal cord injuries often require higher perfusion pressures to overcome swelling. Target a systolic BP of 120 mm/hg or greater in patients with clear signs of neurological deficit.

General Information

- NEXUS Criteria:
  1. Does the patient have midline tenderness of the cervical spine?
  2. Is the patient's level of consciousness altered? (Must be alert and oriented to time, person, place, and events.)
  3. Are there new focal neurological deficits?
  4. Is the patient intoxicated? (Judgement and pain sensation must be intact.)
  5. Is there a major distracting injury significant enough to interfere with their ability to assess pain response when palpating spine?
- If the answer to all five NEXUS questions is "no," SMR is not warranted.
- Thoracolumbar injuries: If the patient does not require SMR based on the NEXUS criteria but has any of the following findings do not sit the patient up or raise the head of the stretcher on the assumption that thoracic or lumbar injuries may be present:

- Fall from height > 3m
- Axial loading to head or base of spine
- High speed MVI >100 kph
- Rollover MVI
- New back deformity, bruising or bony midline tenderness

Interventions

First Responder

- Apply spinal motion restriction as clinically indicated
- Supplemental oxygen as required
  - → A07: Oxygen and Medication Administration

Primary Care Paramedic – All FR and EMR interventions, plus:

- Treat nausea/vomiting:
  - DimenhyDRINATE
- Correct hypo-perfusion/hypotension:
  - → D03: Vascular Access and Fluid Administration
  - For suspected or confirmed spinal cord injury target systolic BP of 120 mmhg or greater

Advanced Care Paramedic – All FR, EMR, and PCP interventions, plus:

- Secure airway if required.
  - → PR18: Anesthesia Induction

Critical Care Paramedic – All FR, EMR, PCP, and ACP interventions, plus:

- Manage hemodynamic instability:
  - MAP > 80-85 mmHg for isolated spinal cord injury.
  - In cases of distributive shock, early vasopressors may be required to maintain a higher than normal MAP to ensure spinal cord perfusion.
  - Crystalloid and/or vasopressor administration may be required.
    - PhenyLEPHRine.
    - DOPamine.
    - NORepinephrine.
- If mechanical ventilation is required, refer to mechanical ventilation procedure guideline.
- Maintain appropriate blood glucose levels.
- Arterial or venous blood gas analysis:
  - Adjust mechanical ventilation to ensure adequate oxygenation, appropriate ventilation, and safe ground ventilating parameters.

Evidence Based Practice

Spinal Injuries

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