## SPINAL CLEARANCE MANAGEMENT - INTENSIVE CARE UNIT (ICU) – ST GEORGE HOSPITAL

### Cross references (including NSW Health/ SESIAHS policy directives)

|-------------------|

### 1. What it is

A description of the process for the management of a patient presenting to the Intensive Care Unit (ICU and ICU2) with spinal immobilisation due to suspected spinal injury.

### 2. Employees it applies to

Nursing and medical staff employed at The St George Hospital Intensive Care Unit.

### 3. When to use it

For patients admitted to ICU from the Emergency Department or transferred from another hospital who are suspected of having sustained a spinal injury. The process of the rule to be implemented as outlined begins from the moment of admission of the patient to the ICU.

### 4. Why the rule is necessary

The aim of this rule is:

1. To achieve spinal clearance as soon as clinically feasible – the goal is **within 24 hours of hospitalisation** – either to:
   a. Expedite early diagnosis of spinal injury and institute appropriate provisional treatment, or
   b. Exclude spinal injury and remove activity restrictions, in order to minimize the complications due to prolonged sedation and intubation for immobilization, and minimize the complications associated with hard cervical collars* (APPENDIX A).
2. To exclude significant ligamentous injury in the cervical spine prior to discharge from the ICU.

### 5. Who is responsible

Directors, Intensive Care Unit, Neurosurgery and Trauma Service
Nurse Manager, Intensive Care Unit
Medical Staff, Intensive Care Unit

### 6. The Process

The fundamental basis for a spinal clearance protocol is to provide a consistent approach to spinal management of the obtunded trauma patient in the intensive care unit (ICU). This protocol was developed in accordance with best practice models and evidence-based guidelines, and is the result of the collaboration of the Departments of Neurosurgery, Trauma and Intensive Care at The St. George Hospital.

1. Evaluation for spinal injury shall be initiated in the Emergency Department for every trauma patient with clinical evidence or mechanism of injury consistent with spinal trauma* (APPENDIX A).

2. Diagnosis or exclusion of spinal injury is determined by the Neurosurgical service or the admitting Trauma service in consultation with the Neurosurgical service. The Neurosurgical service is to be consulted for all spinal injuries identified or for other special considerations.
3. Spinal clearance is established by clinical examination and radiological investigation when it is determined that no injury exists, at which point immobilisation procedures can be ceased.

4. For the patient with major blunt trauma, the entire spine is immobilized during the primary examination.

5. Secondary and tertiary examinations include examination of the spine for tenderness and alignment as well as testing motor function, sensation and reflexes. Tertiary examinations are performed only on alert and unimpaired patients without distracting injuries.

6. Patients who do not meet the NEXUS low-risk criteria for cervical spine injury* (APPENDIX A) or who are obtunded (neurologically impaired, unconscious or intubated) should be entered into the spinal clearance algorithm.

7. A cross-table lateral x-ray of the cervical spine may be attempted in the Emergency Department resuscitation room if any delay in obtaining a CT scan is anticipated or when this is clinically indicated (e.g. in the unstable patient with unexplained shock).

8. A multi-slice, helical CT scan of the cervical spine from base of skull to T1 with three-dimensional (axial, sagittal and coronal) reconstructions must be performed on all obtunded patients with major trauma where a cervical spine injury is suspected. If any spine fractures are identified, the entire spine must be radiographed.

9. For obtunded patients in the ICU:
   a. Stiff Neck collars should be removed within 6 hours and replaced with Philadelphia or Aspen collars when indicated (see algorithm APPENDIX B).
   b. Philadelphia or Aspen collars should be removed and replaced with definitive treatment collars (e.g. Miami J) within 72 hours.
   c. If Philadelphia or Aspen/Miami J collars are removed for pressure care, sandbags may be used to maintain neutral head position but only if the patient is adequately sedated.

10. Patients should remain on full or partial spinal precautions until the spine is cleared clinically AND radiologically in accordance with the spinal clearance algorithm (APPENDIX B).

11. Where patients are deemed to be of high risk of cervical spine injury* (APPENDIX A) and there is no evidence of fracture or dislocation on initial imaging by CT scan, there remains an imperative for the patient to be further evaluated to exclude a ligamentous injury:
   a. If bedside neurological examination is unreliable then clearance must be deferred pending further radiological evaluation with flexion/extension radiography i.e. dynamic fluoroscopy (DF); alternatively, MR imaging (MRI) may be indicated.
   b. Until such time, or when a complete tertiary examination is possible, partial spinal precautions should be maintained according to the patient’s individual treatment immobilization prescription.

12. It is the responsibility of the primary treating service (Neurosurgical or Trauma team) to accurately document the findings in relation to the spinal evaluation (see Documentation of spinal clearance or injury below).
7. Documentation of Cervical Spine Clearance or Injury:

1. Required on the ICU Spine Management Chart found under the tab ‘Medical Docs’ > ‘Spine Management’ in the ICU Clinical Information System (CIS) and documented by the primary treating service (Neurosurgical team or Trauma team in consultation with the Neurosurgical team), after clinical assessment of the patient and after review of all appropriate imaging studies that have been reported by a Consultant Radiologist.

2. It is important to document appropriate measures of immobilization, which conforms to the individual patient’s injury:
   a. **NOT CLEARED**: Full spine precautions until review of initial CT.
   b. **NOT CLEARED – PENDING**: Partial spine precautions after negative initial CT but pending further imaging or clinical spinal clearance.
   c. **NOT CLEARED – INJURY**: Rigid orthotic immobilization for spinal injury identified on imaging.
   d. **CLEARED – NO INJURY**: Cervical collar removal without additional imaging.

3. Standardized orders for spine precautions:
   a. **Full spine precautions**:
      i. Bed surface must remain flat at all times (no pillow under patient’s head).
      ii. Reverse Trendelenberg with bed tilt 30° head-up should be the default positioning.
      iii. *Hard cervical collar at all times* (pressure area observation as per neurosurgical documentation).
      iv. Log roll with manual cervical stabilization (full log roll).
      v. *Do not place on therapeutic air mattress.*
   b. **Partial spine precautions**:
      i. Supine +/- lateral positioning in anatomical alignment, unless otherwise specified (may be sat upright for x-rays).
      ii. Sandbags to maintain head in neutral position if adequately sedated and/or paralysed.
      iii. *Hard cervical collar when >45º head-up and during extubation.*
      iv. Log roll until thoracolumbar spine is cleared. Log rolling not necessary when cervical collar in place and thoracolumbar spine is cleared (modified log roll).
   c. Documentation should also include:
      i. Type of collar (Philadelphia, Aspen, Miami J, Soft).
      ii. If hip flexion and/or side-tilt +/- wedge is allowable.
      iii. If a pressure relieving or ‘eggshell’ mattress can be used.

4. Whenever the spine precautions are changed, the primary treating service must update the spine clearance orders and write a progress note in the patient’s medical record, reflecting the relevant evaluation and change in activity restriction status.
APPENDIX A:

*Risks of prolonged immobilization and use of cervical collar:
1. Cutaneous pressure ulceration
2. Difficult airway
3. Elevated intracranial pressure due to jugular venous obstruction
4. Restricted central vascular access
5. Difficult oral hygiene
6. Gastrostasis, reflux and intolerance to enteral nutrition
7. Pulmonary aspiration
8. Venous thromboembolism
9. Increased risk of nosocomial infection
10. Delayed weaning from mechanical ventilation

*High risk criteria for cervical spine injury:
1. Fall from height > 1 metre (3 feet)
2. Axial load on head (egg diving) or impact on head by falling object
3. High speed motor vehicle injury (> 100 km/hr combined speed of impact)
4. Rollover or ejection from vehicle
5. Pedestrian struck by motor vehicle
6. Cyclist, motorcyclist or rider on motorized recreational vehicle in collision
7. Coincident traumatic brain injury
8. Coincident fractures of the thoracic or lumbar spine
9. Coincident fractures of the face (Le Fort or mandibular)
10. Presence of spinal degenerative changes

^NEXUS Low risk criteria:
1. Normal level of alertness
2. No evidence of intoxication
3. No posterior midline cervical spine tenderness
4. No focal neurological deficit
5. No painful distracting injuries

Cervical spine radiography is indicated for patients with trauma unless they meet ALL of the above criteria. In addition, the patient should have no neurological symptoms.
9. Compliance

A. What are the two main purposes of the spinal clearance policy for
evaluation the trauma patient with a suspected spinal injury?
To achieve spinal clearance as soon as clinically feasible – the goal is within 24 hours of hospitalisation – and to exclude significant ligamentous injury in the cervical spine prior to discharge from the ICU.

B. What are the main complications of spinal immobilisation?
- Cutaneous pressure ulceration
- Difficult airway
- Elevated intracranial pressure due to jugular venous obstruction
- Restricted central vascular access
- Difficult oral hygiene
- Gastrostasis, reflux and intolerance to enteral nutrition
- Pulmonary aspiration
- Venous thromboembolism
- Increased risk of nosocomial infection
- Delayed weaning from mechanical ventilation

C. Who is responsible for documenting the spinal management and where should the management be documented?
Cervical spine clearance is required on the ICU spinal clearance and management chart (under ‘Medical Docs’ in CIS) and documented by the Neurosurgical or Trauma Consultant/Registrar after review of the appropriate cervical imaging, which has been reported by the Consultant Radiologist.

10. External references


20. Padayachee L, Cooper DJ, Irons S, *et al.* Cervical spine clearance in...


I, Dawn Fowler, Clinical Group Manager Medicine and Critical Care of St George Hospital, attest that this business rule is not in contravention of any legislation, industrial award or policy directive.
<table>
<thead>
<tr>
<th>Date</th>
<th>Revision number</th>
<th>Contact Officer (Position)</th>
<th>Date for revision</th>
</tr>
</thead>
</table>