<table>
<thead>
<tr>
<th>NAME OF DOCUMENT</th>
<th>Acute Spinal Cord Injury of the Adult – Management and Referral Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE OF DOCUMENT</td>
<td>Procedure</td>
</tr>
<tr>
<td>DOCUMENT NUMBER</td>
<td>SESLHDPR/291</td>
</tr>
<tr>
<td>DATE OF PUBLICATION</td>
<td>June 2016</td>
</tr>
<tr>
<td>RISK RATING</td>
<td>High</td>
</tr>
<tr>
<td>LEVEL OF EVIDENCE</td>
<td>NSQHS Standard 1 - Governance for Safety and Quality in Health Service Organisations</td>
</tr>
<tr>
<td>REVIEW DATE</td>
<td>June 2018</td>
</tr>
<tr>
<td>FORMER REFERENCE(S)</td>
<td>PD 162 Acute Spinal Cord Injury of the Adult – Management of</td>
</tr>
</tbody>
</table>
| EXECUTIVE SPONSOR or EXECUTIVE CLINICAL SPONSOR | Dr James Mackie  
SESLHD Medical Executive Director |
| AUTHOR           | Dr Ralph Stanford  
Staff Specialist / Orthopaedic Surgeon  
Prince of Wales Hospital |
| POSITION RESPONSIBLE FOR THE DOCUMENT | Liz Walter  
District Trauma Coordinator, SESLHD  
Elizabeth.walter@health.nsw.gov.au |
| KEY TERMS        | Acute Spinal Cord Injury, Spinal Cord Injury Service                      |
| SUMMARY          | Procedure for the transfer of Adults with acute spinal cord injury to the Major Trauma Service and/or to the Spinal Cord Injury Service (SCIS) for the South Eastern Sydney Local Health District (SESLHD) and its referral network. |
1. **POLICY STATEMENT**

Early referral and transfer of patients with spinal cord injury (SCI) to a specialised Spinal Cord Injury Service (SCIS) improves outcomes and reduces major complications. This is in line with the [NSW Policy Directive PD2010_021: Critical Care Tertiary Referral Networks and Transfer of Care (Adults)] and [Selected Specialty and Statewide Service Plans, NSW Trauma Services Number Six, December 2009]. The purpose of this procedure is to ensure patients with SCI are able to access speciality SCIS when needed. Admission should be timely and equitable. Timely admission means as soon as is practically possible, with an ideal being a direct admission less than 24 hours following injury.

2. **BACKGROUND**

The NSW State Spinal Cord Injury Service for **adults (age 16 years or greater)** is co-located at the Prince of Wales Hospital (POWH) and the Royal North Shore Hospital (RNSH). This is a tertiary level service that delivers multidisciplinary care in an appropriate physical environment as required by the NSW Health Model of Care for SCI. This combination of expertise is not available at or transferable to other sites and so transport of patients to one of the SCIS hospitals is required.

**Acute spinal cord injury**

The rapid deterioration in neurological function due to injury of the spinal cord or cauda equina (covering neurological segments C1 to S5) from non-progressive disease, including trauma, intervertebral disc herniation, transverse myelitis, bacterial infection, ischaemia or haematoma. Progressive neurological disorders and metastatic neoplastic disease are specifically excluded. Unilateral injury to single nerve roots (sciatica or brachialgia) is not included in the definition of spinal cord injury.

**The SCIS at POWH**

The POWH SCIS is the default service to provide immediate and continuing care for acute spinal cord injured patients from within SESLHD and its referral network within Southern NSW. Referring Local Health Districts are the following:

- South Eastern Sydney
- Illawarra Shoalhaven
- Murrumbidgee
- Southern NSW
- South Western Sydney
- Sydney
- Australian Capital Territory (ACT)
- St Vincent’s Health Network

**Non-refusal policy at POWH**

The SCIS at POWH is bound to accept any appropriate referral of acute spinal cord injury that is notified within 24 hours of the injury occurring. Referrals to POWH later than 24 hours after the onset of SCI will be accommodated at the earliest possible opportunity based on availability of appropriate resources within the hospital.
It is not expected that POWH will be mandated to accept all referrals of SCI, in some circumstances transfer of the patient may not be appropriate. In cases where a bed is not available at POWH SCIS, the Spinal Surgeon on call will liaise with RNSH for admission of the patient.


**Appropriate Referral Type**

The SCIS at POWH will accept patients with the following clinical characteristics:
- Age 16 years or older
- Sudden onset of neurological deficit affecting spinal segments from C1 to S5 (but not unilateral, single nerve root compromise).
- Presentation following trauma or presumed non-progressive pathology
- Has a reasonable expectation of surviving the acute injury and/or medical co-morbidities
- Spinal cord and spinal column imaging are not required prior to referral or transfer

**Patients with the following characteristics will not be accepted**
- Age younger than 16 years (refer to Sydney Children’s Hospital Network at Randwick or Westmead)
- Moribund patients or patients with such severe injury as to put their immediate survival in jeopardy
- Patients with documented or presumed progressive pathology affecting the spinal cord or cauda equina (demyelinating and degenerative conditions of the spinal cord, metastatic tumours or congenital disorders)

**Network SCIS and Major Trauma Service SESLHD**

The SCIS at POWH is networked with the Major Trauma Service at St George Hospital in SESLHD. The SCIS at POWH will be the primary referral centre for SCI patients referred to the Trauma Service at St George Hospital and will provide a non-refusal service to such patients. Referral of multisystem injured patients with SCI to St George Hospital is appropriate for triage directly to the most appropriate service (the Trauma Service or SCIS).

St George Trauma Hotline Use and Referral Procedure

**NSW Aeromedical and Medical Retrieval Service (AMRS)**

The need for physician-assisted transfer is determined by AMRS in consultation with the receiving SCIS and ICU. Transfer will generally require medically supervised transport which may be via AMRS. AMRS should be contacted on 1800 650 004 by the referring hospital to facilitate the medical retrieval of adults with an acute spinal cord injury.

3. RESPONSIBILITIES

3.1 Referring clinicians will:
- Refer cases of acute spinal cord injury at the time of diagnosis without delay
• Seek advice from the SCIS at POWH if uncertain of the appropriateness of referral
• Ensure adequate spinal precautions are implemented
• Ensure adequate breathing and airway in cases of cervical spinal cord injury
• Complete the Spinal Cord Injury Referral and Transfer form to accompany the patient
• Ensure that any imaging studies performed are sent with the patient
• Contact AMRS to arrange patient transfer

3.2 On-duty Senior Trauma Officer at St George Hospital Trauma Service will:
• Assess referred cases for physiological stability
• May refer cases of multisystem trauma with SCI that require major intervention for non-spinal injuries to RNSH (evidence of motor and/or sensory deficit is required, paraesthesia alone is not sufficient evidence of spinal cord injury)
• May accept cases of multisystem trauma with life-threatening injuries for immediate trauma care at St George Hospital trauma service
• Refer patients with isolated SCI or SCI with associated minor injuries or who have been stabilised following multi-system injury to POWH SCIS

3.3 On-duty Spinal Surgeon at POWH Spinal Cord Injury Service will:
• Assess referred cases for suitability for transfer to the SCIS
• Discuss referral with the consultant on-duty in POWH ICU and the on-call POWH spinal rehabilitation specialist
• Use the POWH SCIS ‘Non-Refusal’ policy to accept urgent appropriate referrals
• Otherwise determine an appropriate time of patient transfer
• Establish suitable plan of management if delays in transfer are expected
• Liaise with the SCIS at Royal North Shore Hospital in the event that POWH does not have sufficient resources to accept the patient at the time of referral

3.4 Receiving Spinal Surgical Team at POWH will:
• Notify POWH Emergency Department (ED) of the expected arrival of the patient
• Arrange for a ‘trauma call’ on all cases of post-traumatic SCI
• Arrange for an appropriate in-patient bed for the patient
• Review the patient in the ED within 30 minutes of arrival at POWH
• Notify the Spinal Rehabilitation team of the arrival of the patient

3.5 Receiving Spinal Rehabilitation Team at POWH will:
• Review the patient within 12 hours of arrival at POWH

4. PROCEDURE
See flow chart in Appendix 1.
5. DOCUMENTATION

Acute Spinal Cord Injury Referral and Transfer Form and Neurological Assessment Form (see Appendix 2).

6. MANAGEMENT

- Remove from spinal board
- Replace rigid collar with semi-rigid collar (Miami-J or Philadelphia type)
- Keep nil by mouth
- Insert urinary catheter
- Maintain mean arterial blood pressure above 80mmHg if possible
- Controlled turn every 2 hours for pressure care
- Monitor ventilation if there is cervical level of spinal cord injury
  - Look for respiratory distress
  - Check oxygen saturation and/or serial arterial blood gasses
  - Measure vital capacity
  - Consider intubation and ventilation if oxygen saturation falls, CO₂ levels rise or vital capacity is falling

7. AUDIT

Annual analysis of the Spinal Cord Injury Database held jointly between POWH and Royal North Shore Hospital. This database will capture all cases of spinal cord injury in NSW and allows analysis of referral times.

8. REFERENCES

1. NSW Ministry of Health ‘Selected Specialty and Statewide Service Plans: NSW Trauma Services’ (Number 6) December 2009.

2. NSW Ministry of Health ‘Critical Care Tertiary Referral Networks & Transfer of Care (Adults)’ Policy Directive PD2010_021


9. **REVISION AND APPROVAL HISTORY**

<table>
<thead>
<tr>
<th>Date</th>
<th>Revision No.</th>
<th>Author and Approval</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 2013</td>
<td>1</td>
<td>Revised by Leanne Horvat, Clinical Stream Nurse Manager, Medicine, Critical Care &amp; Emergency</td>
</tr>
<tr>
<td>Sept 2013</td>
<td>2</td>
<td>Converted to procedure and re-formatted by Scarlette Acevedo, District Policy Officer</td>
</tr>
<tr>
<td>Sept 2013</td>
<td>2</td>
<td>Revised by Dr Ralph Stanford, Staff Specialist/Orthopaedic Surgeon, Prince of Wales Hospital and Leanne Horvat, Clinical Stream Nurse Manager, Medicine, Critical Care &amp; Emergency</td>
</tr>
<tr>
<td>Nov 2013</td>
<td>3</td>
<td>Clinical &amp; Quality Council provided requested further amendments to be made. Further amendments made by Leanne Horvat, Clinical Stream Nurse Manager, Medicine, Critical &amp; Emergency Clinical Stream and Dr Ralph Stanford, Staff Specialist/Orthopaedic Surgeon POW.</td>
</tr>
<tr>
<td>Dec 2013</td>
<td>3</td>
<td>Finalised and re-formatted by Scarlette Acevedo, District Policy Officer.</td>
</tr>
<tr>
<td>Nov 2015</td>
<td>4</td>
<td>Revised by Liz Walter, District Trauma CNC, SESLHD</td>
</tr>
<tr>
<td>Dec 2015</td>
<td>4</td>
<td>Endorsed by: The Network Trauma Committee</td>
</tr>
<tr>
<td>January 2016</td>
<td>4</td>
<td>Endorsed by: Dr Tony Joseph, Director of Trauma, RNSH</td>
</tr>
<tr>
<td>February 2016</td>
<td>4</td>
<td>Endorsed by Executive Sponsor</td>
</tr>
<tr>
<td>June 2016</td>
<td>4</td>
<td>Approved by SESLHD CQC</td>
</tr>
</tbody>
</table>
Appendix 1

Referring Hospital
Acute Spinal Cord Injury (SCI) – Adult (aged 16 years or greater)

Multi-System Trauma and SCI

Refer to St George Hospital Trauma Hotline
9113 4500

St George trauma service will make appropriate referral:
- St George Hospital
- RNSH
- POWH

Isolated SCI or SCI with minor associated injuries

Refer to SCIS at POWH
9382 2222

Please state:
"I have an adult patient with an acute spinal cord injury, please connect me to the consultant spine surgeon on-call"

Switch-board will direct call to Spinal Surgeon On-Call who will establish appropriate transfer

Referring Hospital
Calls AMRS to arrange patient transfer 1800 650 004
ACUTE SPINAL CORD INJURY REFERRAL AND TRANSFER FORM (v March 2016)

This form is to be completed prior to transfer of the person with a SCI to a spinal or trauma unit and given to the Retrieval or NSW Ambulance Service teams as part of the medical record and/or faxed to the receiving hospital.

<table>
<thead>
<tr>
<th>CONTACT DETAILS</th>
<th>Patient name:</th>
<th>Age:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Referring Hospital:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Referring Doctor:</td>
<td></td>
<td>Weight (kg):</td>
</tr>
<tr>
<td>Referring Doctor’s contact number:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Referral date <strong><strong>/</strong></strong>/____</td>
<td>Referral time _____:____AM/PM</td>
<td></td>
</tr>
<tr>
<td>Hospital accepting referral:</td>
<td></td>
<td>Doctor accepting referral:</td>
</tr>
<tr>
<td></td>
<td>Destination ward:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Accepting Doctor’s contact number:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SPINAL CORD INJURY</th>
<th>Date of injury _____/<em><strong><strong><strong>/</strong></strong></strong></em></th>
<th>Time of injury _____:_____AM/PM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanism of Injury:</td>
<td></td>
<td>For guidance on sensory and motor level refer to attached neurological chart.</td>
</tr>
<tr>
<td>Approximate sensory level:</td>
<td>Approximate motor level:</td>
<td></td>
</tr>
<tr>
<td>Is peri-anal sensation present:</td>
<td>Is anal contraction present?</td>
<td></td>
</tr>
<tr>
<td>YES</td>
<td>YES</td>
<td></td>
</tr>
<tr>
<td>NO</td>
<td>NO</td>
<td></td>
</tr>
</tbody>
</table>

Results of Spinal X-Rays, CT or MRI Scan

<table>
<thead>
<tr>
<th>SPINAL PRECAUTIONS &amp; STABILISATION</th>
<th>Cervical collar ☐ YES ☐ NO</th>
<th>Surgery ☐ YES ☐ NO</th>
<th>Date of surgery _____/<em><strong><strong><strong>/</strong></strong></strong></em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of collar ______________________</td>
<td>Type of surgery ______________________</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Time of application of collar ____AM/PM</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**AIRWAY**

- ETT in situ
- Correct ETT position
- ETT secure
- NGT/OGT if intubated or vomiting
- Mechanical vent.

**BREATHING**

- Resp rate
- SpO2
- FiO2
- ETT in situ
- Correct ETT position
- ETT secure
- NGT/OGT if intubated or vomiting
- Mechanical vent.
- FiO2
- ETT in situ
- Correct ETT position
- ETT secure
- NGT/OGT if intubated or vomiting
- Mechanical vent.

**VITALS**

- Resp rate
- SpO2
- FiO2
- ETT in situ
- Correct ETT position
- ETT secure
- NGT/OGT if intubated or vomiting
- Mechanical vent.

**CIRCULATION**

- Pulse
- Urine Output
- Blood Pressure
- Arrhythmias
- Core Temp
- IDC
- SPC

**LEVEL OF CONSCIOUSNESS**

- GCS
- Seizures: NO YES
- Current level of consciousness: GCS
- Seizures: NO YES

**ASSOCIATED INJURIES**

**MEDICAL CONDITIONS**

**SKIN PROTECTION**

- Has the patient been log rolled and skin checked 2nd hourly?
- YES NO
- Time of last log roll
- Time skin under cervical collar checked

**DOCUMENTATION FOR TRANSFER**

- AMRS / NETS Transfer form
- Relevant records:
- Medical & Nursing
- X-rays/CT/MRI scans - spinal column
- X-rays/CT/MRI scans-head/chest/abdo/pelvis/limbs

**NEXT OF KIN (NOK)**

- Notified YES NO
- NOK Name
- Ph
INTERNATIONAL STANDARDS FOR NEUROLOGICAL CLASSIFICATION OF SPINAL CORD INJURY

MOTOR

<table>
<thead>
<tr>
<th>R</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>C5</td>
<td>Elbow flexors</td>
</tr>
<tr>
<td>C6</td>
<td>Wrist extensors</td>
</tr>
<tr>
<td>C7</td>
<td>Elbow extensors</td>
</tr>
<tr>
<td>C8</td>
<td>Finger flexors (dorsal phalanx of middle finger, Finger abductors (little finger)</td>
</tr>
<tr>
<td>T1</td>
<td></td>
</tr>
</tbody>
</table>

KEY MUSCLES (scoring on reverse side)

LIGHT TOUCH

<table>
<thead>
<tr>
<th>R</th>
<th>L</th>
</tr>
</thead>
</table>

SENSORY

KEY SENSORY POINTS

Comments:

L2 | Hip flexors
|---|---|
| L3 | Knee extensors
| L4 | Ankle dorsiflexors
| L5 | Long toe extensors
| S1 | Ankle plantar flexors

(VAC) Voluntary anal contraction

(Yes/No)