

Management of People with Spinal Cord Injury

NHS Clinical Advisory Groups Report

26th August 2011

Spinal Cord Injury

Spinal cord injury (SCI) is a rare and complex impairment. Compromise to the spinal cord may result from traumatic insult, vascular disruption or a disease process and may be immediate or insidious in onset. The consequence of such an injury is loss or reduction in voluntary motor function, sensory deprivation and disruption of autonomic function related to the level and severity of the cord damage¹.

Incidence of SCI in the UK have been difficult to obtain due to a number of factors – accurate diagnosis & classification of injury and management of SCI patients in other specialist or non-specialist services². However, the available data from the UK specialist spinal cord injury centres estimate an incidence of 12 – 16 per million of the population, a wide range in age from infants to the elderly and a majority of injuries caused by trauma (70 – 75%), the most common cause being road traffic accidents and falls.

Scope

Specialised spinal cord injuries encompass any traumatic insult to the spinal column at cervical (neck), thoracic (chest), thoracolumbar, lumbar, lumbo-sacral (lower back) or multiple levels which causes complete or partial interruption of spinal cord function.

National Specialised Services Definition Set No 6 (all ages) (3rd Edition) Part I ³

<http://www.specialisedservices.nhs.uk/doc/specialised-spinal-services-all-ages>

This paper applies to people with a spinal cord injury resulting in full or partial para- or tetraplegia.

It applies to people with spinal cord injury with polytrauma, and people with isolated spinal cord injury.

It does **not** apply to the larger group of people with a vertebral (spinal column) injury only ie. with no spinal cord impairment.

NHS Spinal Cord Injury Centres in England:

Specialised health care services for the management of spinal cord injury are provided in 8 specialist centres in England, offering support for patients sustaining spinal cord injury through the initial period of treatment and rehabilitation and on-going lifelong support.

Duke of Cornwall Spinal Treatment Centre, Salisbury District Hospital, Odstock, Salisbury

Tel: 01722 336262

Golden Jubilee Regional Spinal Cord Injuries Centre, James Cook University Hospital, Middlesbrough

Tel: 01642 850850

London Spinal Cord Injuries Centre, Royal National Orthopaedic Hospital NHS Trust, Stanmore

Tel: 020 8954 2300

Midlands Centre for Spinal Injuries, Robert Jones & Agnes Hunt Orthopaedic Hospital, Oswestry

Tel: 01691 404655

National Spinal Injuries Centre, Stoke Mandeville Hospital, Aylesbury

Tel: 01296 315000

Princess Royal Spinal Injuries Centre, Northern General Hospital, Sheffield

Tel: 0114 2715644

North-West Regional Spinal Injuries Centre, Southport & Formby Hospital, Southport

Tel: 01704 547471

Yorkshire Regional Spinal Injuries Centre, Pinderfields General Hospital, Wakefield

Tel: 0844 8118110

Background

A recent study of patients admitted to 9 specialised SCI Centres in England and Wales reported that 71% of patient admitted to Spinal Cord Injury Centres with new spinal cord injury have sustained the injury through trauma ². 24% sustained associated injuries at the time of the cord injury and 44% had pre-existing medical conditions. Patterns of referral to specialised SCI Centres were inconsistent (7% referred within 1 day of injury) with resultant delays in admission, such that 41% of the total were not admitted within 1 month of injury. Delayed admission to a specialised SCI Centre was shown to have a strong correlation with the incidence of complications on admission to the SCI Centre and patients admitted to an SCI Centre with complications spent significantly longer in hospital.

Initial management of new spinal cord injuries must focus on swift, accurate diagnosis and multi-system physiological stabilisation of the individual in order to minimise impairment and prevent further disability^{4,5,6,7,8}. The importance of appropriate management from the time of diagnosis of the cord injury has been shown to have significant effect on the long-term outcome for the individuals with spinal cord injury and reduce short and long-term complications^{8,9,10,11,12,13,14,15,16,17,18,19,20}.

National Spinal Cord Injury Strategy Board

The National Spinal Cord Injury Strategy Board was established in 2010 under the aegis of the National Specialised Commissioning Group

The purpose of the NSCISB is:

- To agree a co-ordinated and common approach across England to the delivery and commissioning of services for people with a spinal cord injury (SCI).
- To ensure improved health outcomes for people with spinal cord injury in England by effective commissioning of appropriate high quality and cost effective services.

The NSCISB membership includes representation from:

- All eight NHS Spinal Cord Injury Centres in England
- All ten Specialised Commissioning Groups
- The British Association of Spinal Cord Injury Specialists
- The Multi-Disciplinary Association of Spinal Cord Injury Professionals
- The Spinal Injuries Association
- The National Clinical Director for Trauma Care Clinical Policy and Strategies

In the preparation of this document the NSCISB additionally sought the advice of colleagues from other specialties including, Pre-Hospital Care, Emergency Medicine, Neurosurgery, Paediatric Neurosurgery and Paediatric Medicine.

Introduction

This document contains advice offered by the National Spinal Cord Injury Strategy Board to their colleagues in NHS England. It is intended to support the recommendations from the NHS Clinical Advisory Groups Report on Regional Networks for Major Trauma (September 2010) with specific reference to people with spinal cord injury, and should be read in conjunction with this.

The recommendations and advice do not necessarily represent the views of the Department of Health.

Please see Acknowledgements towards the end of this report for the members and colleagues who contributed to this report.

Definition of Terms and Abbreviations

SCI - Spinal Cord Injury

SCIC - Spinal Cord Injury Centre. A specialised centre optimised for the care of people with spinal cord injury, including acute care following injury, rehabilitation and reintegration, life long follow-up and secondary admission. See Page 3.

NSCISB - National Spinal Cord Injury Strategy Board

Inclusive Trauma System - An Inclusive Trauma System (ITS) describes a model in which commissioners; providers, public health representatives and other stakeholders of trauma care in a geographical region collaborate to plan, provide and manage the treatment of people injured as a result of Major Trauma.

The ITS is responsible for all aspects of trauma care, from the point of injury to rehabilitation, as well as for injury prevention. Each ITS comprises of one or more 'Trauma Networks' (see definition below). The ITS also features:

- a population-based approach to the assessment of need and the provision of treatment.
- a role for every hospital and provider of care.
- provision for the speedy transfer of patients between facilities, particularly where the severely injured have been under-triaged away from the Trauma Centre.
- a quality assurance structure that penetrates across the region and to each stage of care, which underpins providers' clinical governance processes, identifies inadequate performance in order to support its correction and ultimately can apply sanctions where this does not occur. It also informs commissioners about the quality of care being delivered.

The Royal College of Surgeons advises that the ITS should have in place a plan which sets out the detail of the 'Trauma Care Pathway' (TCP) for the region.

Trauma Care Pathway - This is the process through which care is provided for patients who have suffered Major Trauma; specifically, it describes the 'the location and capability of each trust/hospital within the ITS and outlines ambulance bypass protocols and thresholds for transferring patients to more specialist units'.

Trauma Network - A Trauma Network (TN) is the name given to the collaboration between the providers commissioned to deliver trauma care services in a geographical area. At its heart is the 'Major Trauma Centre'. A TN should include all providers of trauma care, particularly: pre-hospital services, other hospitals receiving acute trauma admissions (Trauma Units), and rehabilitation services. The TN has appropriate links to the social care and the voluntary/community sector.

While individual units retain responsibility for their clinical governance, members of the Network collaborate in a Quality Improvement programme.

Major Trauma Centre - A Major Trauma Centre (MTC) is a multi-specialty hospital, on a single site, optimised for the provision of trauma care. It is the focus of the Trauma Network and manages all types of injuries, providing consultant-level care.

- It is optimised for the definitive care of injured patients. In particular it has an active, effective trauma Quality Improvement programme. It also provides a managed transition to rehabilitation and the community.
- It takes responsibility for the care of all patients with Major Trauma in the area covered by the Network. It also supports the Quality Improvement programmes of other hospitals in its Network.
- It provides all the major specialist services relevant to the care of major trauma, i.e. general, emergency medicine, vascular, orthopaedic, plastic, spinal, maxillofacial, cardiothoracic and neurological surgery and interventional radiology, along with appropriate supporting services, such as critical care.

The Royal College of Surgeons cite research advising that such centres should admit a minimum of 250 critically injured patients per year

Trauma Unit - A Trauma Unit (TU) is a hospital in a Trauma Network that provides care for most injured patients and:

- is optimised for the definitive care of injured patients. In particular, it has an active, effective trauma Quality Improvement programme. It also provides a managed transition to rehabilitation and the community.
- has systems in place to rapidly move the most severely injured to hospitals that can manage their injuries.
- may provide some specialist services for patients who do not have multiple injuries (e.g. open tibial fractures). The Trauma Unit then takes responsibility for making these services available to patients in the Network who need them. Other Trauma Units may have only limited facilities, being able to stabilise and transfer serious cases but only to admit and manage less severe injuries.

Local Emergency Hospital (not designated as TU) - The Local Emergency Hospital (LEH) is a hospital in a Trauma Network that does not routinely receive acute trauma patients (excepting minor injuries that may be seen in an MIU). It has processes in place to ensure that should this occur patients are appropriately transferred to an MTC or TU. It may have a role in the rehabilitation of trauma patients and the care of those with minor injuries.

Specialised Spinal Surgery Centre - A centre designated for the provision of Specialised Spinal Surgery as defined in the Specialised Services National Definition Set No. 6, Part II.

<http://www.specialisedservices.nhs.uk/doc/specialised-spinal-services-all-ages>

This may be a specialised orthopaedic spinal surgery centre or a specialised neurosurgical spinal surgery centre.

TARN - Trauma Audit and Research Network.

1. Overriding essential considerations in the management of spinal cord injury

The Service for people with spinal cord injury must be delivered in line with:

Pilot Care Pathways for the Management of Spinal Cord Injury Patients, published by the National Spinal Cord Injury Strategy Board in July 2011,

<http://www.secscg.nhs.uk/home/national-spinal-cord-injury-strategy-board>

which advocate early identification of impairment and intervention to minimise and prevent further disability, in order to achieve lifelong health and well-being.

Spinal **Cord** Injury requires a distinct pathway from **vertebral** injury.

All acute spinal cord injured persons have a complex evolving multisystem pathophysiology¹. Patients with SCI resulting in any degree of neurological deficit are prone to serious complications unless managed from the outset by teams skilled in the special needs of this group^{4,9,21,22,23,24,25,26}.

Optimum spinal care of a new traumatic spinal cord injury involves not only an understanding of spinal biomechanics but also of the multifaceted physiological and related problems of the spinal cord injured person related to the level and severity of neurological compromise^{5,8,14,16,23}.

Networks

Each **Trauma Network** will have a linked SCIC. Agreed protocols and standards for management of newly injured patients will be in place to support patient management and movement within the network during the first 4 hours post injury¹⁵. Protocols will address key management considerations including agreement on stabilisation, registration on the national SCI database, specific investigations required, nursing requirements, provision of SCI Centre outreach and agreed timetables for transfer¹⁵.

The treating consultant in the Major Trauma Centre or Trauma Unit will contact the on call consultant in the linked SCIC within 4 hours of injury.¹⁵ They will determine between them the optimum management plan for the patient.

The SCIC will be responsible for providing ongoing advice, guidance and appropriate support to the linked MTC through its outreach system until such time as the SCI person is transferred to a SCIC¹⁵.

Both operative and non-operative (or 'conservative') approaches have a place in the treatment of new injuries^{4,9,26,28}.

For isolated SCI, in some Networks the appropriate location for stabilisation surgery of patients may be the SCIC¹⁵.

In other Networks, the stabilisation surgery will be undertaken in a designated specialised spinal surgery centre (either neurosurgical or orthopaedic), working in partnership with the linked SCIC. Protocols will be in place to address key management considerations including agreement on resuscitation, anaesthesia, stabilisation, nursing and therapy requirements, provision of SCI acute outreach, and agreed timetables for transfer to the SCIC. Facilities required include 24 hour access to CT and MRI scanning¹⁵

The Major Trauma Centre and linked SCIC will develop a close working partnership. This will include the development of acute management protocols, including management plans for skin care, joint protection, bladder and bowel, neuroprotection etc

Early transfer to a SCIC is recommended as this has been shown to reduce complications^{2,10,12}.

Commissioners and the NSCISB must assess the level of need for specialised Spinal Cord Injury Services and plan adequate capacity to meet the needs of newly injured patients.

PCTs, GP Consortia, Social Services Departments and Housing Departments must plan to meet the needs of newly injured SCI people returning to the community in a timely manner, so that beds in specialised SCI Centres are not blocked by people who are waiting for resources to be in place in the community.

2. Pre-hospital care and inter-hospital transfer

National Spinal Cord Injury Strategy Board report summary

It is important that patients with unstable spines and/or cord injury are identified accurately and rapidly so that the patient can be handled correctly^{4,8,21,22,23}.

The prevention of complications arising from spinal instability or neurological compromise must begin immediately^{5,8}.

Triage protocols must be in place to assist emergency services to manage and transfer the patient appropriately⁸.

Patients with injuries suggestive of unstable **spine and/or cord injury** who are within 45 minutes travelling time from the Major Trauma Centre should be taken to the Major Trauma Centre directly, bypassing other units.

Patients with unstable spines and/or spinal cord injury **and other major trauma** who are taken to a local Trauma Unit must be transferred promptly to the Major Trauma Centre after initial assessment and optimisation in the Trauma Unit¹⁵.

However, in some Networks it may be appropriate that patients who have **spinal cord injury where the mechanism of injury rules out the possibility of other major trauma**, may transfer directly to the SCIC, either from the scene of injury or from a Trauma Unit, subject to the development and implementation of appropriate protocols¹⁵. In Networks where it is agreed that direct transfer from Trauma Unit to SCIC is appropriate, the consultant in the Trauma Unit will be responsible for communication with the SCIC, as described in more detail in Section 3. The **default position** where no mutually agreed protocol is in place is that contact must occur within 4 hours of injury.

The appropriate location for optimum medical management and the immediate management plan for SCI must be agreed, taking into account other injuries and pre-existing medical conditions¹⁵.

Recommendations

Please read in conjunction with section 2.3 of the NHS Clinical Advisory Groups Report on Regional Networks for Major Trauma (September 2010)

Assessment of patients and handling in critical care must be carried out according to Joint Royal Colleges Ambulance Liaison Committee (JRCALC) guidelines²¹, the BOA⁸ and BASCIS Guidelines¹⁸ and the NSCISB Pilot Pathways¹⁵.

All patients who are unconscious must be assumed to have a potential unstable spine and/or cord injury.

The onward journey and reception must be safe, efficient and planned. Any secondary transfer must be overseen jointly by a consultant in the receiving unit and the trauma lead consultant from the MTC or SCIC¹⁵. It is the Network's responsibility to ensure that all those involved in these transfers must work to guidelines and be specifically trained and equipped for their task.

Networks must audit the number of 'missed' and late-onset spinal cord injuries resulting from trauma¹⁵. Such an event must be discussed individually as part of the Quality Assurance process in the Trauma Network.

Implementation considerations

Education of ambulance and paramedic staff relating to SCI specific needs and agreed pathways.

3. Acute care and surgery

National Spinal Cord Injury Strategy Board report summary

There must be a network protocol in place for clearing the whole spine in all patients with major injuries.

The prevention of complications arising from spinal instability or neurological compromise must begin immediately and involves all members of the multi-disciplinary team^{5,15}.

Specialised assessment of people with new spinal cord injury must take place immediately after injury^{4,5,8,15}. Network protocols must be in place to determine key assessments and appropriate resuscitation and provision of SCI Centre outreach as necessary. Within both the MTC and the specialist neurosurgical/spinal surgical Centres, appropriate spinal imaging and assessment must be completed and reviewed by a consultant in radiology, neurosurgery or orthopaedics within 24 hours of initial hospital admission.^{8,18}

If there is significant spinal cord injury, the receiving consultant in the Major Trauma Centre must ensure early contact is made with the SCIC consultant by telephone to discuss the management of the patient, in accordance with locally agreed protocols. The **default position**, where no mutually agreed protocol is in place, is that contact must occur within 4 hours of injury. The appropriate location for optimum medical management and the immediate management plan for SCI must be agreed, taking into account other injuries and pre-existing medical conditions.¹⁵

Once a full range of Protocols have been developed, agreed and implemented in a whole Network, the requirements for contact within 4 hours about each individual patient may no longer be considered necessary, as all clinicians in the care pathway will be completely familiar with what they should do. This latter would be a long-term goal, and is likely to be more quickly achieved in some Networks than others. 4 hour contact with the SCIC is recommended to be the initial default action.

Early contact is also essential for operational reasons, as it assists the SCIC to plan acute outreach and to plan for the transfer to the SCIC.^{5,15}

Early transfer to a specialised spinal cord injury centre is recommended and has been shown to reduce complications.¹⁶³ In some Networks it may be appropriate that patients who have **spinal cord injury** where the mechanism of injury rules out the possibility of other **major trauma** may transfer directly to the SCIC, subject to the development and implementation of appropriate protocols.¹⁵

Urgent primary spinal surgery to stabilise the spine and/or decompress threatened neural structures may be required.^{8,26} **Surgery is covered in more detail later in this section.**

Pathway – SCI in Polytrauma^{15,19}

Patients with injuries suggestive of unstable spine and/or cord injury who are within 45 minutes travelling time from the Major Trauma Centre should be taken to the Major Trauma Centre directly, bypassing other units.

Patients with unstable spines and/or spinal cord injury **and other major trauma** who are taken to a local Trauma Unit must be transferred promptly to a Major Trauma Centre after initial assessment and optimisation in the Trauma Unit¹⁵.

After initial assessment of spinal cord injury, the receiving consultant in the Major Trauma Centre must ensure early contact is made with the SCIC consultant by telephone to discuss the management of the patient, in accordance with locally agreed protocols. The **default position**, where no mutually agreed protocol is in place, is that contact must occur within 4 hours of injury. The appropriate location for optimum medical management and the immediate management plan for SCI must be agreed, taking into account other injuries and pre-existing medical conditions¹⁵.

Once a full range of protocols have been developed, agreed and implemented in a whole Network, the requirements for contact within 4 hours about each individual patient may no longer be considered necessary, as all clinicians in the care pathway will be completely familiar with what they should do. This latter would be a long-term goal, and is likely to be more quickly achieved in some Networks than others. 4 hour contact with the SCIC is recommended to be the initial default action.

Early contact is also essential for operational reasons, as it assists the SCIC to plan acute outreach and to plan for the transfer to the SCIC.

Pathway - Isolated SCI¹⁵

Network protocols will ensure identification of patients with isolated SCI, guided by the mechanism of injury.

In some Networks it may be appropriate that patients who have **spinal cord injury where the mechanism of injury rules out the possibility of other major trauma** may transfer directly to the SCIC from the Trauma Unit, subject to the development and implementation of appropriate protocols.

In Networks where direct transfer of Isolated SCI patients has been agreed, the Consultant in the Trauma Unit must ensure immediate contact is made with the SCIC consultant by telephone to discuss the management of the patient. This contact must occur within 4 hours of injury. The appropriate location for optimum medical

management and the immediate management plan for SCI must be agreed, taking into account pre-existing medical conditions. If the SCIC is able to accept the transfer of a person with isolated spinal cord injury immediately, there is no requirement for transfer to the Major Trauma Centre.

If it is agreed by the Trauma Unit consultant and the Spinal Cord Injury Centre consultant that the patient's best interests will be served at the Major Trauma Centre, the transfer will be arranged immediately.

In designing the optimum pathway for patients with isolated SCI in the Network, the following must be taken into account:

- The earliest involvement of the linked SCIC in the acute management of the patient.
- The inclusion of the Trauma Units in agreed Network protocols for management of SCI.
- The preferred location for spinal stabilisation of SCI patients in the Network
- The avoidance of unnecessary multiple transfers.

24 hour availability of image transfer will be required to allow appropriate decision making.

The patient's onward journey to the Major Trauma Centre or the Spinal Cord Injury Centre and reception must be safe, efficient and planned. All those involved in these transfers must work to protocols and be specifically trained and equipped for their task.

Pathway – All Patients with SCI¹⁵

Patients with SCI should normally be transferred from the MTC or Specialised Spinal Surgery Centre to the SCIC, unless it has been agreed by the SCIC that the interests of the individual patient would be best served by planning a different model of care.

The movement of a patient with SCI from a MTC, Specialised Spinal Surgery Centre or Trauma Unit to another location whilst awaiting admission to a SCIC is poor care, and should be a focus of the Network's Quality Assurance Programme.

Surgery and Non-Operative Management

Spinal cord injured patients represent the most vulnerable patients. Competency in their management involves not only the requisite technical skills but also a full understanding of the pathophysiology of the spinal cord injured person and the functional consequences of any treatment.

Both operative and non-operative (or 'conservative') approaches have a place in the treatment of new injuries. Treatment must be carried out competently and with the right techniques.^{26,27,28}

The role of spinal surgery in the management of the spinal cord injury itself has yet to be fully determined. There is emerging evidence that patients with some types of injury (e.g. some Rugby Football injuries) may under some circumstances make a full recovery if treated within the critical window of 4 hours.⁹ However, evidence of the impact of surgery on the rate or completeness of neurological recovery is inconclusive, although research continues²⁶.

Centres undertaking surgery on people with SCI must work in partnership with SCICs to ensure appropriate techniques, and have adequate staffing and facilities to prevent complications and optimise medium and long-term outcomes.

Patients in the acute phase of spinal cord injury are autonomically damaged and surgery does carry a risk of neurological deterioration if oxygenation and blood pressure are not precisely controlled. This is of particular importance in the cervical spine where the difference between a C5 lesion and a C6 lesion is very substantial in terms of independent living.

Spinal stabilisation techniques employed need to result in the optimum short-term and long-term outcomes and independence for SCI patients. These may differ from those employed in vertebral column fracture without spinal cord injury.

Spinal surgery patients require an experienced team and the highest quality anaesthetic technique, together with appropriate holistic management in conjunction with the partner SCI centre. Only an experienced orthopaedic or neurosurgical spinal surgeon, anaesthetist and team, who have been appropriately trained in spinal cord injury interventions, must undertake stabilisation surgery on patients with SCI.

Management of people with SCI in the acute setting must be by a team competent in managing the multiple system involvement and preventing complications. This will include nurses, physiotherapists and occupational therapists.

Early stabilisation may facilitate the management of other injuries, but surgical stabilisation is not appropriate for all patients with SCI^{4,26,27,28}. Conservative reduction and management may be appropriate in some cases but only SCI centres are likely to have the expertise to undertake this²⁸.

In some Networks, where the linked SCIC service includes specialised spinal surgery for people with Spinal Cord Injury, the appropriate location for stabilisation surgery may be the SCIC.

In other Networks, the stabilisation surgery will be undertaken in a designated specialised spinal surgery centre (either neurosurgical or orthopaedic), working in partnership with the linked SCIC.

The spinal surgeon must ensure immediate contact is made with the SCIC consultant by telephone to discuss the management of the patient, in accordance with locally agreed protocols.¹⁵ The **default position** where no mutually agreed protocol is in place is that contact must occur within 4 hours of injury. The appropriate location for optimum medical management and the immediate management plan for SCI must be agreed, taking into account other injuries and pre-existing medical conditions¹⁵.

Once a full range of Protocols have been developed, agreed and implemented in a whole Network, the requirements for contact within 4 hours about each individual patient may no longer be considered necessary, as all clinicians in the care pathway will be completely familiar with what they should do. This latter would be a long-term goal, and is likely to be more quickly achieved in some Networks than others. 4 hour contact with the SCIC is recommended to be the initial default action.

Early contact is also essential for operational reasons, as it assists the SCIC to plan acute outreach and to plan for the transfer to the SCIC.

Registration of newly injured patients with SCI

All newly injured SCI patients must be registered as quickly as practicable on the National Spinal Cord Injury Database¹⁵.

(Note: The National Database is under development at the publication date of this report. In the interim the South of England Web-Based Referral and Registration <https://nww.spinalreferrals.nhs.uk> continues in use for referrals to the SCICs at Salisbury, Stoke Mandeville and RNOH Stanmore.)

This will enable Providers and Commissioners to pro-actively monitor numbers of patients awaiting transfer and lengths of wait, to plan for adequate capacity in future, and to audit outreach and outcomes. All patients with cord injury should be registered, even if it decided that they are not suitable for transfer to a SCIC.

The National SCI Database must work with TARN to ensure the retrospective data collected by the TARN database and the live data collected by the SCI Database are compatible and complementary.

The network protocol must also consider existing and future research initiatives, to ensure that the necessary data collection is completed for the National SCI database and where appropriate new technologies and techniques for prevention of neurological damage and improved long-term outcomes are employed. Neuro-protective therapies are being evaluated which may require to be delivered within tight timescales, perhaps one hour.

Recommendations

Please read in conjunction with section 3.3 of the NHS Clinical Advisory Groups Report on Regional Networks for Major Trauma (September 2010)

There must be a network protocol in place for clearing the whole spine in all patients with major injuries.

Every Trauma Network must have a defined link with a specified partner SCI Centre, allowing the joint development of written protocols for management of acute spinal cord injury to be agreed^{15,30}. These protocols must encompass the Trauma Units and any centres providing surgical and non-surgical stabilisation of the spine.

The receiving consultant in the Major Trauma Centre must ensure early contact is made with the SCIC consultant by telephone to discuss the management of the patient, in accordance with locally agreed protocols. The **default position** where no mutually agreed protocol is in place is that contact must occur within 4 hours of injury¹⁵.

The SCIC will be responsible for providing ongoing advice, guidance and appropriate support to the linked MTC through its outreach system until such time as the SCI person is transferred to a SCIC¹⁵.

Surgery

The Major Trauma Centre and the Specialist Spinal Surgery Centre (neurosurgical or orthopaedic), must:

- Confer with the SCIC and jointly agree the plan of management.
- Demonstrate adequate trained staff and facilities, which, with advice from acute outreach staff from the SCI Centre, will allow a SCI patient to be managed safely until it is possible to transfer the patient to the SCI Centre.
- Agree joint audit and governance arrangements to achieve and monitor long-term outcomes.

Implementation considerations

Availability of spinal surgery in under 4 hours in some injuries.

24/7 availability of consultant staff in MTC, TU & SCI Centres

Link SCI Centres for all trauma networks

All new spinal injury patients must be registered on the National Spinal Cord Injury database. Incidence of complications must also be recorded.

All hospitals in the Care Pathway must submit audit data to TARN.

The NSCISB and Commissioners must re-assess access to specialised Spinal Cord Injury Services and plan adequate community integration service capacity to meet the urgent needs of newly injured patients.

4. Ongoing care and reconstruction

National Spinal Cord Injury Strategy Board report summary

Where immediate transfer of the SCI patient to a SCIC is not possible, whether because of the patient's medical condition or operational constraints, the services of the SCIC must be brought to the patient¹⁵ in the form of:

- Direct outreach to the patient and family
- Direct outreach to the multi-disciplinary team caring for the patient
- Telephone advice and support to team and patient

The prevention of complications arising from spinal instability or neurological compromise must begin immediately and involves all members of the multi-disciplinary team¹⁵. Nursing staff, allied health professionals and other staff groups must be trained in the management of the spinal cord injured patient. Particularly important are skin integrity and bladder and bowel care^{5,6,31,32,33,34,35,36}. Specialist equipment, such as turning beds and hoists, may be needed and there must be access to appropriate equipment and orthotics.

Psychological support will be required for patients and family as they face up to the long term implications of spinal cord injury¹⁵. Clarity about immediate plans and responsibilities will provide a degree of reassurance¹⁵.

Recommendations

Please read in conjunction with section 4.3 of the NHS Clinical Advisory Groups Report on Regional Networks for Major Trauma (September 2010)

- The SCIC must provide outreach support, both face to face and by telephone, to the patient, family and treating team.
- Trauma Networks must ensure there are sufficient staff who are trained in the current care of the SCI patient.
- Trauma Networks must ensure that the necessary equipment and resources are in place to optimise the care of the SCI patient.
- The early advice of the SCIC must be obtained and followed, particularly in respect of prevention of pressure sores, SCI bowel and bladder management, and psychological support.
- If the patient is ventilated, the SCIC must assess the patient and add advice about the possibility of weaning, and the weaning programme to be followed.

Implementation considerations

Education of trauma network staff in care of SCI patient

24/7 availability of advice from SCI Centres

Link SCI Centres for all trauma networks

5. Rehabilitation

National Spinal Cord Injury Strategy Board report summary

The rehabilitation needs of spinal cord injured people are beyond the scope of local rehabilitation services and are best met by a Specialised Spinal Cord Injury Centre^{2,10,11,12,15}.

Rehabilitation programmes must focus on the facilitation of independence and optimal reintegration back into the individual's chosen community role and lifestyle^{15,33,34,35,36}. This requires extensive partnership working with multiple community agencies to ensure the appropriate provision of support, care and necessary specialised equipment.

If the patient is unable to be transferred to a spinal cord injury centre, rehabilitation must commence in the acute setting, with the input and advice of the Spinal Cord Injury Centre Outreach Team.

Support must be available for families throughout the process.

Recommendations

Please read in conjunction with section 5.3 of the NHS Clinical Advisory Groups Report on Regional Networks for Major Trauma (September 2010)

- Trauma Networks must ensure staff have training in care of the SCI patient.
- Trauma Networks must ensure that the necessary equipment and resources are in place to optimise the care of the SCI patient.
- The early advice of the SCIC must be obtained and followed, particularly in respect of prevention of pressure sore, SCI bowel and bladder management, and psychological support.
- The SCIC must provide outreach support, both face to face and by telephone, to the patient, family and treating team.
- If the patient is ventilated, the SCIC must assess the patient and add advice about the possibility of weaning, and the weaning programme to be followed.
- Joint protocols must be agreed with the SCIC

Implementation considerations

Access to SCI Centres is problematic due to a lack of capacity, especially for patients who are ventilated.

It is recommended that the NSCISB and commissioners address the capacity problem. Trauma Networks must assist, particularly in the provision of data aimed at determining the shortfall.

6. Network Organisation

National Spinal Cord Injury Strategy Board report summary

When planning Networks, commissioners must be aware that there are relatively few spinal cord injury centres, that the numbers of people affected by spinal cord injury are small, and that 28% of people admitted to SCICs have SCI of non-traumatic origin. Each specialised SCI Centre will therefore have to serve a number of Trauma Networks, as well as non-trauma referral pathways.

Some SCICs are able to provide stabilisation surgery and others are not.

There must therefore be flexibility in how local Networks develop joint working and joint protocols with SCICs.

Recommendations

Please read in conjunction with section 6.3 of the NHS Clinical Advisory Groups Report on Regional Networks for Major Trauma (September 2010)

Every Trauma Network must be actively linked to a SCIC, and work with the SCIC on a continuous basis to develop and implement protocols for the treatment of patients with SCI.

Implementation considerations

Link SCI Centres for all trauma networks

At each stage of the patient pathway, audit data should be collected, to facilitate quality assurance and service improvement.

All SCI patients should be reviewed individually within the QA programme, given the complex pathway.

A collaborative working link needs to be established between TARN and the developing National SCI Database.

7. Spinal Cord Injury in Children

Please read in conjunction with Management of Children with Major Trauma NHS Clinical Advisory Groups Report (February 2011)

Traumatic spinal cord injury is rare in children.

Children with acute injury must be managed acutely at the Children's or Combined MTC with the facilities to manage polytrauma in children.

Surgery if required must be carried out by a senior spinal surgeon, (orthopaedic or neurosurgeon) who has been appropriately trained and is familiar with spinal cord injury interventions. The surgeon must be supported by a senior anaesthetist and team familiar with spinal cord injury interventions.¹⁶²

Centres undertaking surgery on people with SCI must work in partnership with SCICs to ensure appropriate techniques, and have adequate staffing and facilities to prevent complications and optimise medium and long-term outcomes. Management of people with SCI in the acute setting must be by a team competent in managing the multiple system involvement and preventing complications. This will include nurses, physiotherapists and occupational therapists.

The principles above about early dialogue with the SCIC, and SCIC involvement in decision-making, apply to children of all ages.

Due to the small number of cases, it is not appropriate for all SCICs to provide care to children. Some centres can admit adolescents and some can admit all ages. In most areas, the linked SCIC for adults may not be best placed to care for the child, and it may be in the best interests of the child to be cared for a SCIC with dedicated childrens' facilities. Each network must have a protocol for the management of children with SCI.

The typical adult pathway of acute care, SCIC rehabilitation, reintegration and follow-up is adapted to meets the needs of the developing child.

Loss of family involvement and schooling due to long stays in hospital must be avoided.

Recommendations

Networks must develop, in partnership with specialised children's services and SCI services, a protocol for managing a child with a new spinal cord injury.

As with adults, policies and guidelines for managing the altered physiological complications in children with SCI need to be developed and shared with acute hospitals.

SCI Acute Outreach services must be developed to support teams, children and families in MTCs and specialised centres.

Implementation considerations

Development of SCIC Acute Outreach services for children with SCI.

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References

1. Sapru H (2002) Spinal Cord Injury: Anatomy, physiology & pathophysiology. In: Kirschblum S et al (eds) Spinal Cord medicine. Lippincott. Williams & Wilkins. Philadelphia. Specialised Services National Definition Set: 6. Specialised Spinal Services. Part 1. 2009
2. FMD Barr (2009) Preserving and Developing the National Spinal Cord Injury (SCI) Service. Spinal Injuries Association.
3. Specialised Services National Definition Set Definition No. 6 Specialised Spinal Services (all ages) (3rd Edition)
4. East (2009) Practice Management Guidelines for the Evaluation of CS Injury J Trauma. 67: 651–659
5. Managing spinal cord injury. The first 48 hours. (2009) SIA Academy.
6. Managing spinal cord injury. Critical care (2010) SIA Academy
7. Convention on the Rights of Persons with Disability. World Health Organisation. 2008
8. British Orthopaedic Association (2006) The initial care and transfer of patients with spinal cord injuries
9. Newton DA (2011) Cervical spinal cord injury in rugby is an absolute emergency. Journal of Bone and Joint Surgery - British Volume, Vol 90-B, Issue SUPP_III, 460.
10. De Vivo MJ, Katus PL, Stover SL et al (1990) Benefits of early admission to an organised spinal cord injury care system. Paraplegia. 28 (9) 545 -555
11. Whalley Hammell K (2007) Experience of rehabilitation following spinal cord injury: a meta-synthesis of qualitative findings. Spinal Cord. 45. 260 – 274
12. Smith M (2002) Efficacy of specialist versus non-specialist management of spinal cord injury within the UK. Spinal Cord. 40: 10-16
13. Harvey LA, Lin C-WC, Glinsky JV & De Wolf A (2009) The effectiveness of physical interventions for people with spinal cord injuries: a systematic review. Spinal Cord. 47. 184 – 195.
14. Dorsett P & Geraghty T (2008) Health related outcomes of people with spinal cord injury – a 10 year longitudinal study. Spinal Cord. 46. 386 – 391.
15. Care Pathways for Management of Spinal Cord Injury: Development of a National Model (2011) National Spinal Cord Injury Strategy Board

16. Standards for Patients Requiring Spinal Cord Injury Care. South of England Spinal Cord Injury Board, Revised 2010
17. Goodwin-Wilson C, Watkins M & Gardner-Elahi C. (2010) Developing evidence-based process maps for spinal cord injury rehabilitation. *Spinal Cord*. 48. 122 – 127.
18. Ravichandran G, El Masri WS (2005) Management of individuals with spinal cord injury in general hospitals. BASCIS. www.BASCIS.blueyonder.pwp.co.uk
19. Putz C, Schuld C, Gantz S et al (2011) The effect of polytrauma as a possible confounder in the outcome of monotraumatic vs polytraumatic paraplegic patients: a clinical cohort study. *Spinal Cord* 49:721 - 727
20. Standards for Patients Requiring Spinal Cord Injury Care. Kent, Surrey and Sussex Local Specialist Commissioning Group. 2010
21. UK Ambulance Service Clinical Practice Guidelines (2006) Published by Royal Joint Colleges Ambulance Liaison Committee (JRALC) www.jrcalcguidelines.org.uk
22. Advanced Trauma Life Support (ATLS®) Guidelines http://www.rcseng.ac.uk/education/courses/trauma_life_support_advanced.html
23. Moving and handling patients with actual or suspected spinal cord injury (2009) SIA Academy
24. Early acute management with adults with spinal cord injury: A Clinical Practice Guideline for Health-Care Professionals (2008) Consortium for Spinal Cord medicine http://www.pva.org/site/PageServer?pagename=pubs_main#CPG
25. Berney S, Bragge P, Granger C et al (2011) The acute respiratory management of cervical SCI in the first 6 weeks after injury: a systematic review. *Spinal Cord*. 49: 17 - 29
26. Bagnall AM, Jones L, Richardson G, Duffy S, Riemsma R (2003) Effectiveness and cost-effectiveness of acute hospital-based spinal cord injuries services: systematic review. *Health Technol Assess.*;7(19):1-288
27. Carvell JE, Grundy DJ (1994) Complications of spinal surgery in acute spinal cord injury. *Paraplegia* 32: pages 389-395
28. Kato S, El Masry WS, Jaffrey D et al (1996) Neurological outcome in conservatively treated patients with incomplete closed traumatic cervical spinal cord injuries. *Spine*. 21: 2345 - 2351
29. Wang D, Teddy PJ, Henderson NJ, Shine BS, Gardner BP (2001) Mobilization of patients after spinal surgery for acute spinal cord injury. *Spine (Phila Pa 1976)*. Oct 15;26(20):2278-82.

30. Reducing the risk of venous thromboembolism (deep vein thrombosis and pulmonary embolism) in patients admitted to hospital. Clinical Guideline 92. NICE. January 2010
31. Guidelines for management of neurogenic bowel dysfunction after spinal cord injury (2009) SIA Academy
32. Management of the older person with a new spinal cord injury (2010) SIA Academy
33. Rehabilitation after critical illness. Clinical Guideline 83. NICE. March 2009
- 1 34. BSRM Standards for Rehabilitation Services Mapped on to the National Service Framework for Long-Term Conditions. British Society of Rehabilitation Medicine. 2009
35. Gall A, Horne D, Kennedy P, Turner-Stokes L and Tussler D (2008). No. 9: Chronic spinal cord injury: management of patients in acute hospital settings: National Guidelines. Concise Guidance to Good Practice: RCP, BSRM, MASCIP and BASCIS
36. Experience of rehabilitation following spinal cord injury: a meta-synthesis of qualitative findings. K Whalley Hammell. Spinal Cord. 45. 260 – 274. 2007.