CONCISE GUIDANCE TO GOOD PRACTICE

A series of evidence-based guidelines for clinical management

NUMBER 9

Chronic spinal cord injury: management of patients in acute hospital settings

NATIONAL GUIDELINES

February 2008

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Clinical Standards Department

The aim of the Clinical Standards Department of the Royal College of Physicians is to improve patient care and healthcare provision by setting clinical standards and monitoring their use. We have expertise in the development of evidence-based guidelines and the organisation and reporting of multicentre comparative performance data. The department has three core strategic objectives: to *define* standards around the clinical work of physicians, to *measure* and evaluate the implementation of standards and its impact on patient care and to effectively *implement* these standards.

Our programme involves collaboration with specialist societies, patient groups and national bodies including the National Institute for Health and Clinical Excellence (NICE), the Healthcare Commission and the Health Foundation.

Concise Guidance to Good Practice series

The concise guidelines in this series are intended to inform those aspects of physicians' clinical practice which may be outside their own specialist area. In many instances, the guidance will also be useful for other clinicians including GPs, and other healthcare professionals.

The guidelines are designed to allow clinicians to make rapid, informed decisions based wherever possible on synthesis of the best available evidence and expert consensus gathered from practising clinicians and service users. A key feature of the series is to provide both recommendations for best practice, and where possible practical tools with which to implement it.

Series Editors: Lynne Turner-Stokes FRCP and **Bernard Higgins** FRCP

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Guideline Development Group

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Useful sources of information

British Society of Rehabilitation Medicine: www.bsrm.co.uk

Multidisciplinary Association of Spinal Cord Injury Professionals: www.mascip.co.uk

British Association of Spinal Cord Injury Specialists: www.bascis.pwp.blueyonder.co.uk

Spinal Injuries Association: www.spinal.co.uk

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Spinal cord injury (SCI) is a life long condition affecting over 40,000 people in the UK. When an individual with established SCI is admitted to hospital for a procedure or because of illness, hospital teams need to manage both the acute condition and the spinal cord injury. These guidelines aim to assist teams in assessing and managing this potentially vulnerable group of people to avoid the common problems of hospital-acquired morbidity. Key steps are:

- **an understanding of the common patho-physiological consequences of SCI**
- **listening to the patient and members of their family who are often expert in managing the condition**
- **maintaining close contact with the individual's regular team/specialist spinal cord injury centre.**

Introduction and aim of the guidelines

Traumatic spinal cord injury (SCI) in the UK affects an estimated 10–15 people per million population per year[1] so there are around 40,000 individuals in the UK living with a traumatic SCI.[2] Most injuries are in young men but the mean age of injury is increasing, including those injured over the age of 60 years. The majority of injuries now result in tetraplegia and are predominantly incomplete injuries. The prevalence of other conditions causing SCI such as inflammatory, neoplastic and infective conditions is currently unknown.

The life expectancy for people with SCI is less than for the general population although it continues to increase. These individuals are therefore at risk from age-related diseases that affect the general population, including cardiovascular disease, infection and malignancies. Also, the multisystem impairments resulting from SCI can lead to several complications, particularly infections, respiratory complications and pressure sores. Those with SCI are

at greater risk of hospital admission every year following their injury compared with the general population.

As a result, general physicians are likely to find themselves caring for individuals with SCI in acute hospital settings. These guidelines aim to assist in their assessment and management to avoid the common problems of hospital-acquired morbidity in this potentially vulnerable group of people. Although the guidance is based on evidence in those with traumatic SCI, much of it will apply to people with non-traumatic causes of SCI. The guideline development process is shown in Appendix 1 (p 10).

Lack of pain or touch sensation below the level of the lesion in a person with complete SCI may confound diagnosis, for example a severe lower limb fracture or cellulitis may provoke only a slight sensation of nausea. But perhaps more importantly, complications related to the SCI itself (as opposed to the reason for admission) are very common in hospitals where SCI patients are rarely seen and their specialist needs are not addressed. Many people are maintained on finely tuned management routines, eg pressure sore prevention or bladder/bowel management which, if disturbed, can take weeks to re-establish. Quality Requirement 11 of the National Service Framework for Long-term (Neurological) Conditions[3] emphasises the importance of listening to the person and their family, who are often expert in the management of the condition, and of maintaining close contact with the individual's regular team/specialist spinal injuries centre. (Appendix 4 lists spinal centres which offer telephone advice.) Finally, many people with SCI need an accessible environment, their usual equipment, eg a wheelchair, and/or nursing staff familiar with SCI, to optimise their management during intercurrent illness.

Box 1. Typical features of autonomic dysreflexia.

Sudden uncontrolled rise in blood pressure, with other signs of sympathetic overactivity:

- systolic pressures reaching up to 250–300 mmHg
- diastolic pressures reaching up to 200–220 mmHg.

Other features of autonomic imbalance vary, but may include:

- pounding headache
- sweating or shivering
- feelings of anxiety
- chest tightness
- blurred vision
- nasal congestion
- blotchy skin rash or flushed above the level of their spinal injury (due to parasympathetic activity
- cold with goosebumps ('cutis anserina') below the level of injury (due to the sympathetic activity).

Pathophysiological consequences of spinal cord injury

Respiratory system

People with SCI are at risk of chest complications because of a number of factors which include:

- paralysis of ventilatory muscles affecting breathing and coughing capability
- relative bronchoconstriction
- excess secretions due to relative parasympathetic system dominance (from reduced sympathetic function in tetraplegics)
- ventilation/perfusion mismatch from reduced mobility that may exacerbate hypoxia during intercurrent illness.

Cardiovascular system

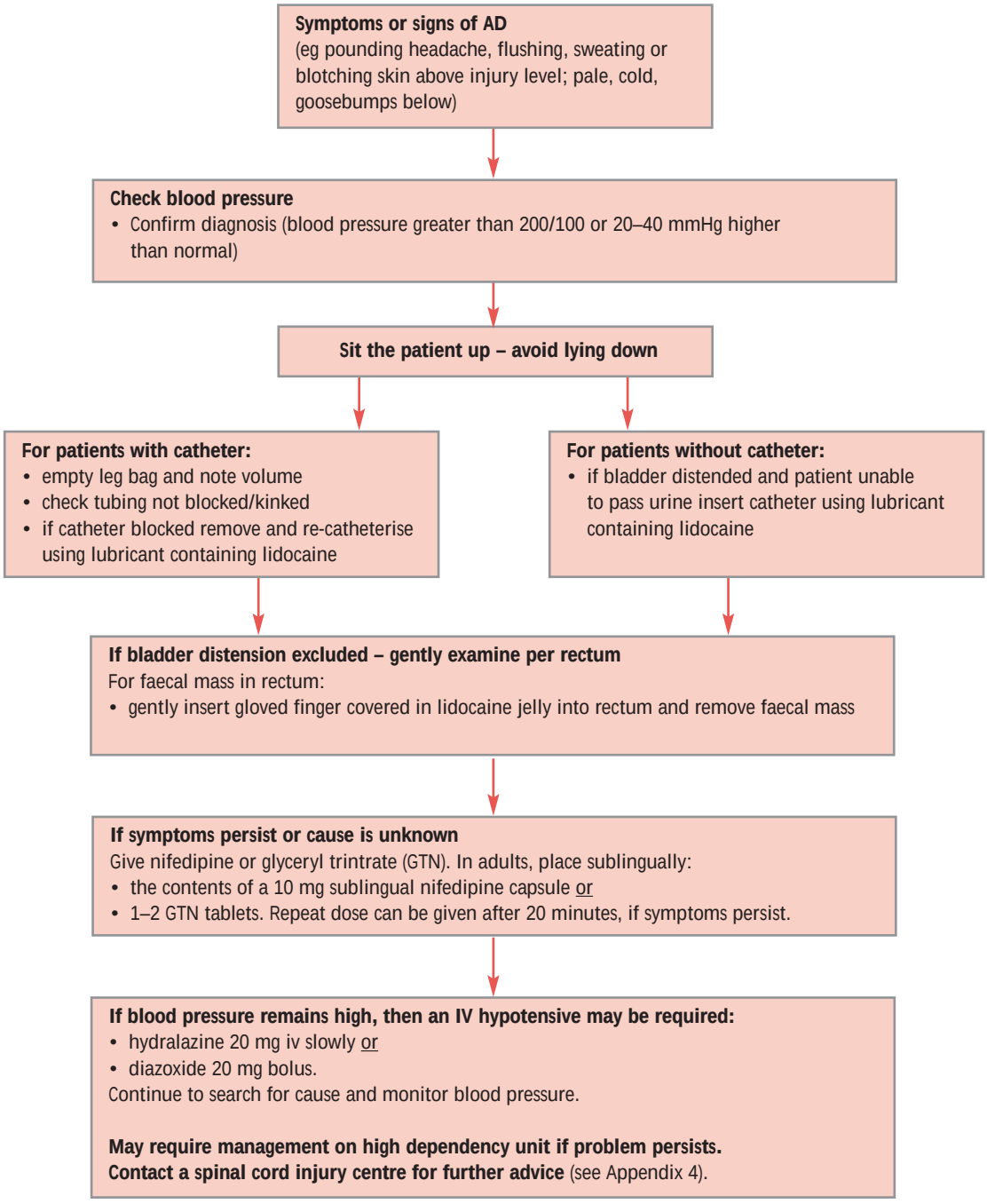
In individuals with tetraplegia, symptomatic bradycardia and, of more concern, asystolic cardiac arrest, are well recognised during the acute phase. This is due to the loss of sympathetic activity with preservation of parasympathetic (vagal) activity. Significant bradycardia usually resolves several weeks after injury, but this mechanism can complicate anaesthetic and chest care in chronic tetraplegia, particularly in hypoxia or during suctioning.

In individuals with high spinal cord lesions (above mid-thoracic level (T7)), hypotension (eg 80/50) and low or relatively low pulse rate (eg 40–50 bpm) can be physiologically 'normal' for that level of spinal

cord lesion and are still compatible with effective tissue perfusion. Hypotension from other causes needs to be distinguished carefully from this picture. Overzealous fluid resuscitation or transfusion can cause pulmonary oedema and increased morbidity/mortality. It is helpful to ascertain individuals' normal resting vital signs before planning intervention.

Individuals with SCI at or above T6 level are at risk of autonomic dysreflexia (AD) – an excessive autonomic response to stimuli below the level of the SCI, such as a blocked catheter or faecal impaction. This is an acute and life-threatening condition which all physicians should be aware of. Typical features are shown in Box 1 (p 2), and a suggested pathway for management is given in Fig 1.

Fig 1. Management of patients with autonomic dysreflexia (AD).



Neurological system

Sensation

Sensory loss will complicate the presentation of acute illness in individuals with SCI as the history will not necessarily include localising symptoms or pain, and localising signs may not be present.

Bladder

The great majority of individuals with SCI also have impairments in bladder function but this will depend on the grade and level of injury. Urinary tract infections are one of the most common complications following spinal cord injury and may require hospitalisation.

The goals of bladder management are to preserve the upper tracts, minimise lower tract complications and be compatible with the individual's lifestyle. In the main, patients are followed up at their spinal cord injury centre and have ongoing assessment of urological needs. Many patients are maintained on intermittent self-catheterisation (ISC) regimens, which may be impossible to maintain during acute illness. In this case, it may be appropriate to pass an indwelling catheter if the admission is short. However, long-term indwelling urethral catheters can lead to complications such as infection or urethral stricture. In the longer term, it is preferable to re-establish them, if possible, on their normal bladder routine, in liaison with their regular team.

A common scenario is the patient with incomplete SCI who has some spontaneous voiding but retains a residual volume which gradually increases: this can eventually lead to complications if not appropriately managed. Figure 2 shows a decision pathway for basic investigation and referral in this situation.

Bowel

Spinal cord injury has a profound impact on the function of the large bowel and on maintenance of faecal continence. Stool transit through the bowel is slowed, placing individuals at high risk of constipation, especially where morphine or codeine-related drugs or anticholinergics are used to control pain or other symptoms in intercurrent illness. Sensory and motor control of the anorectum is impaired and therefore individuals will be unable to feel the need to evacuate the bowel, or control the process of defaecation. Without intervention, individuals will be incontinent of faeces and chronically constipated, with all the secondary complications these imply, including the potential risk of autonomic dysreflexia, in patients with lesions above the level of T5–6. Fig 3 (p 6) provides a flow chart for bowel management.

References

1 Grundy D, Swain A. *ABC of spinal cord injury*, 4th edn. London: BMJ Books, 2002.

2 Kennedy P. Spinal cord injuries. In: Bellack AS, Hersen M (eds), *Comprehensive clinical psychology*. London: Elsevier Science, 1998.

3 Department of Health. *National Service Framework for Long term Conditions.* London: DH, 2005.

Further reading

1 Consortium for Spinal Cord Medicine. *Acute management of autonomic dysreflexia: individuals with spinal cord injury presenting to health-care facilities*, 2nd edn. Washington: Paralyzed Veterans of America, 2001.*

2 Consortium for Spinal Cord Medicine. *Prevention of thromboembolism in spinal cord injury*, 2nd edn. Washington: Paralyzed Veterans of America, 1999.*

3 Royal College of Nursing. *Pressure ulcer risk assessment and prevention.* Clinical practice guidelines. London: RCN, 2001.

4 National Institute for Health and Clinical Excellence. *The prevention and treatment of pressure ulcers.* NICE clinical guideline. London: NICE, 2005

5 Consortium for Spinal Cord Medicine. *Pressure ulcer prevention and treatment following spinal cord injury. A clinical practice guideline for healthcare professionals*. Washington: Paralyzed Veterans of America, 2000.*

6 National Patient Safety Agency. *Bowel care for people with established spinal cord lesions.* Patient Safety Information. London: NPSA, 2004.

7 Multidisciplinary Association of Spinal Cord Injury Professionals. *National guidelines for bowel management after SCI.* MASCIP, 2004.

8 Consortium for Spinal Cord Medicine. *Neurogenic bowel management in adults with spinal cord injury*. Washington: Paralyzed Veterans of America, 1998.*

9 Royal College of Nursing. *Digital rectal examination and manual evacuation of faeces. Guidance for nurses*. London: RCN, 2004.

10 Consortium for Spinal Cord Medicine. *Respiratory management following spinal cord injury. A clinical practice guideline for healthcare professionals*. Washington: Paralyzed Veterans of America, 2005.*

11 Consortium for Spinal Cord Medicine. *Preservation of upper limb function following spinal cord injury. A clinical practice guideline for healthcare professionals*. Washington: Paralyzed Veterans of America, 2005.*

12 Consortium for Spinal Cord Medicine. *Depression following SCI. A clinical practice guideline for primary care physicians*. Washington: Paralyzed Veterans of America, 1998.*

13 Department of Health. *Discharge from hospital: pathway, process and practice*. London: DH, 2003.

* The guidelines can be downloaded from the website of the Paralyzed Veterans of America www.pva.org/site/PageServer?pagename=pubs_main

Fig 2. Bladder management in spinal cord injury patients who void spontaneousy but fail to empty their bladder completely. UTI=urinary tract infection.

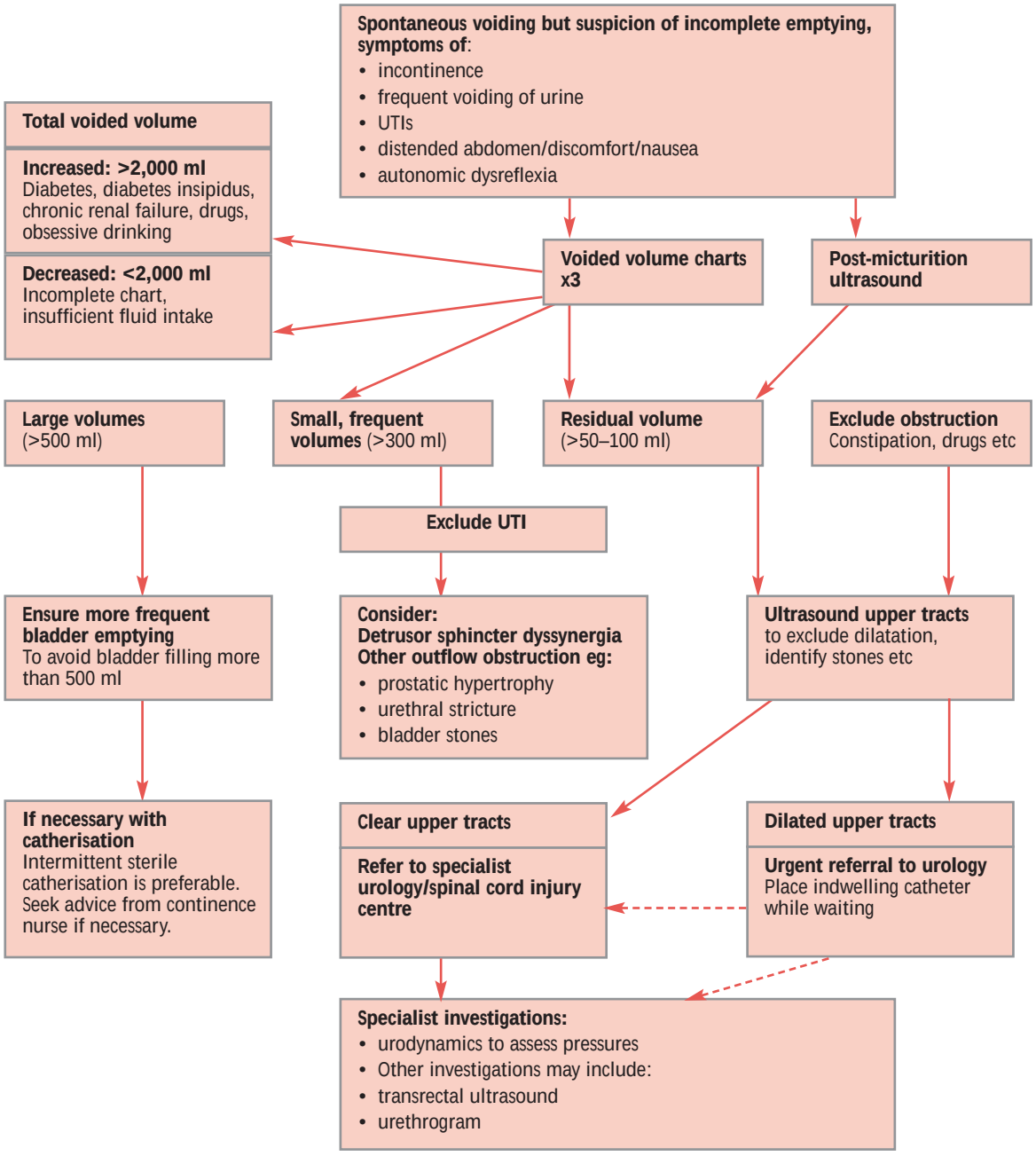
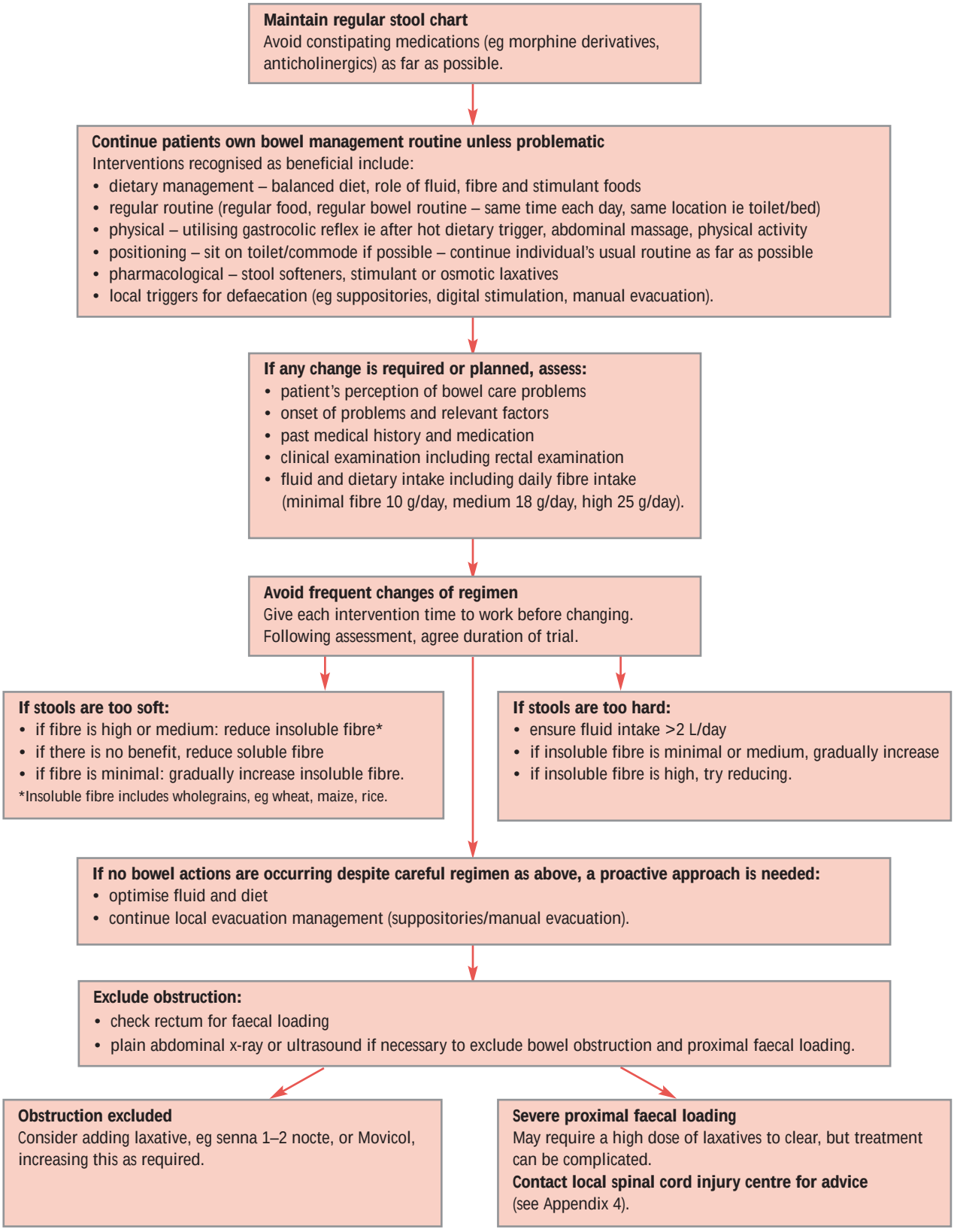


Fig 3. Bowel management for patients with spinal cord injury.



THE GUIDELINES

Recommendation *Grade*

A Staff awareness and training

1 The possibility of the following complications should be considered in any patient with established spinal cord injury (SCI) admitted to hospital: **C**

- respiratory problems – including respiratory failure and infection
- autonomic dysreflexia – in lesions at or above T6
- deep vein thrombosis (DVT)
- pressure sores
- inadequate nutrition
- neurological deterioration
- bowel problems including constipation and incontinence
- bladder problems including urinary retention, infection and calculi
- musculoskeletal problems including pain, injury and contractures
- depression, anxiety and other mood disturbance.

2 Specific staff training

In particular, all nursing and medical staff should have specific training in the recognition of symptoms and management of: **C**

- secondary musculoskeletal pain, injury and contracture including prevention and management of spasticity
- autonomic dysreflexia (AD)
- bladder management techniques including
  - clean intermittent catheterisation
- bowel management techniques
  - appropriate use of suppositories, enemas and laxatives
  - digital stimulation and manual evacuation

  Staff should be aware that some patients are dependent on manual evacuation for their bowel care. Failure to provide this may result in constipation and risk of serious complications, including bowel obstruction and autonomic dysreflexia.
- emotional disturbance.

Continued overleaf

Recommendation *Grade*

B Assessment of patients with SCI

1 Initial assessment of all patients on admission should include the following: **C**

- respiratory assessment: full history and examination including baseline:
  - pulse, respiratory rate, and temperature
  - oximetry
  - vital capacity (VC) and forced expiratory volume (FEV)1 (if possible)
- for perioperative patients, or other increased risk of chest pathology:
  - arterial blood gases and chest x-rays
- skin and pressure ulcer risk assessment:
  - with grading of any existing ulcers
- baseline calf and thigh measurements to allow early detection of DVT
- urinary assessment including:
  - review of voiding method and pattern
  - 24-hour voided volume chart
  - post-void residual volume (by catheter or bladder scan), if voiding on urge or by reflex
  - urinary microscopy and culture, if symptoms or signs of local or systemic infection
- assessment of bowel care needs:
  - plan of management developed within 24 hours of admission
- nutritional assessment including:
  - dietary intake
  - weight and biochemistry (albumin, haemoglobin, haematinics).
- full neurological assessment as soon as possible to identify patient's baseline, thereby ensuring early detection of any deterioration
- musculoskeletal assessment including spasticity assessment, assessment of joint range of movement and pain.
- psychiatric history including screening for depression. Use of at least two questions:
  - 'During the last month, have you often been bothered by feeling down, depressed or hopeless?'
  - 'During the last month, have you often been bothered by having little interest or pleasure in doing things?'

2 Regular assessments thereafter should include the following: **C**

daily assessment of:

- calf and thigh measurements to allow early detection of DVT
- skin and pressure areas

frequent assessment, as appropriate, of:

- respiratory function including:
  - symptom check and examination
  - pulse, respiratory rate, temperature
  - oximetry, VC and FEV1 (if unstable or at risk)
- bowel function, including:
  - stool consistency
  - frequency of bowel action and interventions
- neurological impairments, if there is concern that this is changing.

Continued overleaf

Recommendation *Grade*

C Management of patients with SCI

1 All patients with SCI admitted to hospital should: **C**

be discussed (following their consent) with their spinal cord injury centre for information and advice as indicated (see Appendix 4 for details of centres)

have a written care plan which includes:

- management of autonomic dysreflexia for patients at risk (T5–6 or above) – see Fig 1 (p 3).
- respiratory management to prevent or treat chest complications, developed in conjunction with a chest or neurophysiotherapist. This may include:
  - clearing of airway secretions: assisted coughing, suctioning (be aware of the risk of bradycardia induced by suction)
  - re-expansion of affected lung including deep breathing, positioning, IPPV, BiPAP, bronchoscopy with lavage and medications
- commencing thromboembolic prophylaxis if immobilised with bed rest or admitted for medical illness or surgery (as per hospital policy) including:
  - thromboembolism deterrent (TED) stockings unless contraindicated
  - low molecular weight heparin*
- preventative measures to avoid pressure sores, or full pressure relief in the presence of existing ulcers
- adequate nutrition provided to meet individual needs including calories, protein, micronutrients and fluids.
- aggressive nutritional support if:
  - dietary intake is inadequate, or the individual is nutritionally compromised
- continuation of normal bowel management programme, unless there is reason to change, including
  - diet, use of laxatives and bowel stimulants
  - digital stimulation and manual evacuation as required
- continuation of normal bladder management programme, unless there is reason to change. If an indwelling urethral catheter has been necessary during the admission it should be removed as soon as is possible and the patient's usual bladder care regimen re-established
- management of spasticity and avoidance of secondary musculoskeletal complications including:
  - splinting, stretching and passive movement, if appropriate
  - regular standing programme, if appropriate.

2 All patients with SCI admitted to hospital should have appropriate discharge planning involving: **C**

- the patient and their family
- relevant members of the multidisciplinary team
- direct contact with the community care team (eg GP, district nurse, community rehabilitation professionals) before discharge.

The following should be in place before discharge:

- all required arrangements for transport, care and equipment needs etc
- full reports from all professionals involved with their care
- appropriate transport arrangements made for any future outpatient or review appointments.

IPPV = intermittent positive pressure ventilation; BiPAP = bi-phasic positive airway pressure.

* Patients with established SCI do not require long-term thromboprophylaxis unless there is a history of thromboembolic disease. Therefore normal prophylaxis should be given for the illness/procedure, according to local policy and can be stopped as usual when the patient is medically well.

Appendix 1. Guideline development process

Scope and purpose	
Overall objective of the guidelines	To highlight the important aspects in the assessment and management of individuals with chronic spinal cord injury (SCI).
The patient group covered	Adults with established SCI who present in an acute hospital setting with a related or unrelated condition. These guidelines do not address the management of acute SCI.
Target audience	General physicians and other clinicians involved in the management of adults with SCI when they are admitted to an acute hospital setting.
Clinical areas covered	General assessment of adults with SCI when admitted to hospital with related or unrelated condition. General management principles for adults with SCI when admitted to hospital with related or unrelated condition.
Stakeholder involvement	
The Guideline Development Group	A multidisciplinary group representing: physicians and surgeons practising in spinal cord injury management, physiotherapy, occupational therapy, nursing, psychology and users.
Funding	Funding was kindly provided by the British Society of Rehabilitation Medicine.
Conflicts of interest	None declared
Rigour of development	
Evidence gathering	Evidence for this guideline was provided by review of Cochrane Library, Medline, Embase and other guidelines up to September 2006.
Review process	The evidence was evaluated by members of the GDG.
Link between evidence and recommendations	The system used to grade evidence and guidance recommendations is adapted from that published by the Royal College of Physicians (see Appendix 2).
Piloting and peer review	Not yet piloted although it has been reviewed by stakeholder groups.
Implementation	
Tools for application	This guideline will be made available to hospital clinicians through the Publications Department of the Royal College of Physicians and will appear on the websites of the British Society of Rehabilitation Medicine (www.bsrm.co.uk), the Multidisciplinary Association of Spinal Cord Injury Professionals (www.mascip.co.uk), the British Association of Spinal Cord Injury Specialists (www.bascis.pwp.blueyonder.co.uk) and the Spinal Injuries Association (www.spinal.co.uk).
Plans for update	The guidelines will be reviewed in 2012.

Appendix 2. Levels of evidence

Level	Type of evidence	Grade of recommendation
IA	Meta-analysis of randomised clinical trials or inception cohort studies	A
IB	At least 1 randomised clinical trial or well designed cohort study with good follow-up	A
IIA	At least 1 well designed controlled study without randomisation or a meta-analysis of case control studies	B
IIB	At least one study with quasi experimental design or case-control study	B
III	At least 1 non-experimental study (eg descriptive study)	C
IV	Expert committee reports or reports by recognised authorities	C

Appendix 3. Checklist for assessment and management of individuals with established spinal cord injury

	No	Yes	Date	Signature
Care plan for autonomic dysreflexia				
Respiratory assessment and management plan				
Thromboembolic prophylaxis:				
• thromboembolic deterrent stockings				
• low molecular weight heparin				
Skin assessment and pressure sore prevention strategy in place				
Nutritional assessment and management plan				
Bowel assessment and management plan				
Bladder assessment and management plan				
Neurological assessment				
Musculoskeletal assessment and management plan				
Depression screening questions and follow-up as required				
Discharge planning:				
• care arrangements for discharge				
• GP and community nursing informed				
• discharge reports				

Telephone advice is available from spinal cord injury centres. Local specialist neurorehabilitation teams can also often offer useful practical support 'on the ground'.

Appendix 4. Spinal cord injury centres (SCICs)

Area	Unit	Telephone
England		
Middlesbrough	Golden Jubilee Regional SCIC	01642 282641
Oswestry	Midland SCIC	01691 404000
Pinderfields	Yorkshire Regional SCIC	01924 212358
Salisbury	Duke of York Spinal Treatment Centre	01722 336262
Sheffield	Princess Royal Spinal Injuries Unit	0114 2715609
Southport	Southport Regional Spinal Injuries Unit	01704 704345
Stanmore	London SCIC (Royal National Orthopaedic Hospital)	0208 909 5583/8
Stoke Mandeville	The National Spinal Injuries Centre	01296 315000
Northern Ireland		
Belfast	SCIC Musgrave Park Hospital	02890 902000
Scotland		
Glasgow	The Queen Elizabeth Spinal Injuries Centre	0141 2012530
Wales		
Cardiff	Rookwood Spinal Injuries Rehabilitation Centre	02920 415415