



Queen Elizabeth National Spinal Injuries Unit
Medical Staff Handbook

Revised July 2015

Useful Telephone Numbers and Contacts

| | |
|---|-------------|
| Edenhall Ward | 62533/62534 |
| Philipshill Ward | 62530/62531 |
| Switchboard | 1000 |
| Administrator Ms McGonigle | 62555 |
| Secretary to Dr. McLean | 62575 |
| Secretary to Mr. Fraser | 62539 |
| Secretary to Dr. Purcell | 62536 |
| Ana Bewick, Database Secretary | 62539 |
| Neuroradiology Office | 62045 |
| Neuroradiology Page for out of hours requests | 7574 |
| Porters' Bleep | 7054 |
| Nicola Callaghan, Secretary to Mr Alakandy | 67872 |
| Helen Aikenson, Secretary to Mr Mathieson | 62026 |
| Janice Lafferty Secretary to Mr Barrett | 62020 |
| Clinical Services Manager, Mrs. Gina Clark | 62124 |

Gateways to Clinical Units

| | |
|-------------------------|-------------------------|
| Lead Nurse | Mrs. Michele Paterson |
| <i>Edenhall Ward</i> | |
| Nursing Sister | Sister Lisa MacDonald |
| Ward Clerkess | Ms. Adriana Mozzachiodi |
| <i>Philipshill Ward</i> | |
| Nursing Sister | Sister Liz Grant |
| Ward Clerkess | Mrs. Helen Dargan |
| Physiotherapy | Mr. Jon Hasler |
| Occupational Therapy | Mrs. Michelle Rankin |
| Mr Pat McGarvey | Momentum Scotland |
| Porter | Scott Downs |
| Out-Patients | Sister Karen McCarron |
| Liaison Sisters | Sister Woods/Prempeh |

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Introduction

The Queen Elizabeth National Spinal Injuries Unit, Scotland, was developed to provide specialised care for patients with spinal cord injury from throughout Scotland. It replaces the facilities previously available at Edenhall Hospital, Musselburgh and Philipshill Hospital, East Kilbride.

The modern care of patients requires ready access to diagnostic and investigative techniques such as CT scan, MRI scan and neurophysiological assessments, together with on site availability of specialists in neurosurgery and neuroanaesthesia, orthopaedic surgery, general surgery and urological surgery. The Southern General Hospital provides on campus all essential services and the National Spinal Unit is linked by corridor to the Institute of Neurological Sciences.

Approval in principle for this development was granted by the Secretary of State for Scotland in 1988 and construction began two years later on 17 September 1990. The first patients were admitted on 29 September 1992 and the Unit was formally opened by Her Majesty the Queen on 14 December 1992.

Services

The Unit consists of forty-eight beds which are grouped into three areas: Edenhall Ward (12 beds) provides high dependency facilities, Philipshill Ward (30 beds) provides progressive care and the Respiratory Care Unit (6 beds) for patients with ventilatory problems. The Unit offers the following services:

- The admission of adults with spinal lesions causing paraplegia or tetraplegia whether caused by trauma or non-progressive spinal disease. The Unit will accept patients of both sexes and all ages above the age of twelve years.
- Intensive inter-disciplinary comprehensive care and rehabilitation programmes to facilitate the patients' return to their own community.
- Lifetime care on an out-patient and, if necessary, in-patient basis for life, with the objective of attaining the desired goal of the patient being able to live independently and to the maximum of their potential.
- An open door policy to allow patients with specific problems to seek advice or treatment.

To achieve these aims the Unit encourages the earliest appropriate admission of patients following a spinal injury. The patients normally will be referred from their local accident hospital and may be transferred by road or by air. The Unit is close to the Clyde helicopter landing facility and Glasgow Airport which allows transfer of patients by fixed wing aircraft. Rehabilitation facilities include:

- Out-patient department
- Therapy area for occupational therapy and physiotherapy treatments
- ADL (Activities of Daily Living) kitchen
- Gymnasium/sports hall
- Swimming pool
- Step-down unit for re-integration and family visits

Sports

From the earliest development of spinal units in the United Kingdom, patients have been encouraged to regard sport as part of the rehabilitation programme and now competitive wheelchair sports are part of the international scene. In addition to the sports hall and swimming pool within the Unit itself, a games area has been developed within the hospital grounds. It is hoped that these facilities will actively encourage Scottish patients to participate fully in wheelchair sports.

Staff

The Unit directly employs over one hundred members of staff including doctors, nurses, physiotherapists, occupational therapists, psychologist, social workers, and administrative staff. The Unit is supported by dedicated catering and domestic personnel with other services provided by the Southern General Hospital. In support of the consultants from the other disciplines the Unit also employs the services of radiographers, dieticians, physiological measurement technicians, pharmacists, laboratory services officers and medical physics technicians. The forty-eight beds are therefore supported by a very large number of highly skilled individuals through an arrangement that could only be attained within the campus of a major hospital.

Section 1: Administration and General Information

1.1 Unit timetable

Staff timetable

| | | |
|-----------|-------|---|
| Monday | 0830 | Grand Ward Round, Conference room and wards |
| | 1230 | X-ray Meeting, Neuroradiology Department or Audit meeting, (first Monday of month only) |
| Tuesday | AM | Anaesthetic Review Edenhall Ward |
| | AM | OUTPATIENT CLINIC (General Mr Fraser) |
| | PM | OUTPATIENT CLINIC Thoracolumbar injuries |
| Wednesday | AM | OUTPATIENT CLINIC (General Dr. Purcell) |
| | AM | THEATRE (Spinal) |
| | AM/PM | THEATRE (Orthopaedic Block) Mr Mathieson/Barrett |
| Thursday | AM | OUTPATIENT CLINIC (General Dr. McLean) |
| | PM | OUT-PATIENT CLINIC (Spasm Mr. Fraser) |
| Friday | AM | Ward Round (Philipshill and Edenhall) Medication Review |
| | AM | OUTPATIENT CLINIC Mr. Conn/Ms Granitsiotis(Urology) |
| | PM | OUTPATIENT CLINIC (Neurosurgery) |

Goal planning

The SHO should attend these meetings if possible. These usually take place in the conference room on afternoons. The various departments in the Spinal Unit and our liaison nurses, and from outside i.e., carers, relatives, district nurses and the community team will attend. Goal planning meetings are organised by the keyworker or Discharge Coordinator and marked in the ward diary.

1.2 Paperwork

Accurate note-keeping and communication with GPs and other health professionals is an essential medical skill.

The Unit is a National Service and we are under continual internal and external audit. We continually monitor our performance and look for areas for possible improvement. Accurate recording of a patient's admission and discharge status is a clinical task and is not left to administrative personnel. Accurate recording of power, sensation and functional status also has legal implications and for new admissions you are expected to follow the protocol below. You will be grateful for this if ever called to court as a witness.

Acute patients will usually be examined by the consultant or registrar daily. The trainee doctor should record the findings daily in Edenhall and at least weekly in Philipshill. Notes are multidisciplinary. Medical entries are highlighted by a line drawn above them.

Drug charts

Please:

Write legibly

Write drug name in CAPITALS

Prescribe generically

Clearly document frequency

Record commencement date of drug, not date of rewritten Kardex

SIGN

Admission

Acute admissions usually come through Edenhall Ward. In the front of the notes is a photocopy of the database document. Please complete the clinical section as accurately as possible. The administrative staff complete the patient's details. In the admission proforma the ASIA testing for power, pin-prick and light touch sensation are recorded on admission as well as the SCIM score (Spinal Cord Independence Measure). You will have the instructions from the senior staff on how to complete this. (This is usually very straight-forward for spinal immobilised patients because they score extremely low regardless of their level of neurological deficit.)

There are often elective admissions to the ward for skin care and elective surgical procedures. The name and date of admission are found on the whiteboard above the nurses' station in Philipshill. Please check this regularly so you are aware of any expected patients. The ward clerkess also keeps a record of these. Most elective patients will arrive the day before their procedure and are asked to attend the ward at 10am. You are expected to clerk patient and carry out any routine bloods and investigations required for the following day.

Discharge

The ward clerk makes up the notes and leaves them in the trays in the trainees' room. Discharge summaries are dictated within one working day of discharge following the proforma in the trainees' room. The V3 form is also completed by the trainee. The trainee then takes the notes and tape to the secretaries at the front door who will type out the discharge summary to be signed by the trainee and Consultant in Charge.

All trainees dictate and check a minimum of ten discharge summaries during their attachment and this is recorded as a DOPS assessment on eportfolio.

There are 160 admissions per year which equates to three or four admissions and discharges per week amongst three trainees.

Paraplegic and tetraplegic patients require much more detailed letters than the neurologically intact. You will usually have one or two weeks warning of discharge for the paralysed patients and if you are not aware of their history you will need to familiarise yourself with the important points. All patients should have an ASIA exam in the week before discharge.

The patient's key worker and physiotherapy department will have compiled a discharge SCIM score and it is your responsibility to record this in the notes. You will receive advice about this in the first week or so of your job.

Older Adult Checklist

Please complete the older adult checklist when prompted by the Discharge Co-ordinator, Fiona Brown, act on the positive results and file in the case notes. In the last decade there has been a reduction in the number of young admissions matched by a rise in the older age admissions. Older patients have a higher mortality rate both as inpatients and within the first year of discharge.

Critical Care Patients

You may not have looked after ventilated patients before and may feel nervous when you're faced with the HDU patients in Edenhall. As always a logical, systematic approach is vital and you should always ask for advice if you are uncertain in any way.

You will be looking after two main groups of spinal injury patients in HDU. The largest group are those in the early stages following the injury. They will usually come to Edenhall from another hospital's Critical Care Unit and most will arrive sedated and ventilated for the transfer. These patients have respiratory failure due to a combination of spinal injury and a degree of lung injury due to trauma or infection. Many of them will require a trip to theatre for spinal stabilisation or tracheostomy in the first few days following admission. This group are at particular risk of infective complications of ventilation and management should focus on weaning from ventilation as quickly as practically possible.

The other group of patients you may see are those with an acute deterioration in respiratory function due, for example, to acute infection or general anaesthesia. This leads to a temporary increase in respiratory support in someone who is normally wholly or partially independent of mechanical ventilation. These patients will usually wean relatively quickly.

HDU patients must be examined and assessed thoroughly at least once a day. It is important to be methodical and use your clinical skills and judgement. Each system should be carefully examined and the findings documented in the notes. It's also important to remember to check the drug chart, blood results and microbiology as it is easy to forget to check these areas. Try to make a plan for each patient every day.

1.3 Rota and night duty arrangements

Duty rota

Please see rota and website for details.

In August 2015 the post is a one in fifteen full shift rota shared with the trainees working in PDRU, ophthalmology, dermatology and neurology.

The rota may change during the finalisation of rotas in the new hospital and to ensure continued compliance with national guidance..

To ensure fair allocation of annual and study leave the rota has been drawn up four months in advance.

If you require additional leave please discuss with Dr. McLean (Spinal) or Dr. Panesar (Rehabilitation).

Neurology, dermatology and ophthalmology trainees have a separate leave procedure through the consultants in charge of training

It is your responsibility to cover your duty periods. This is a complex rota. You may not make any changes to the rota without express agreement of senior staff.

Evening shift

There are two doctors in the evening until 9pm. One covers National Spinal Injuries Unit and PDRU, and the other covers Neurology. From 9pm one doctor covers all three areas. Please prepare a written handover for your colleagues. Brief patient details are held on the PC in Edenhall, as well as ward lists on the PC in the trainees room. HAN handovers take place in the coffee room in Ward 61 where there is an opportunity to discuss potentially ill patients with the neurosurgery trainee who is sharing the night duties.

Night duties

A single doctor covers the following wards through HAN:

- PDRU and Ward 53
- National Spinal Injuries Unit:
- Neurology: Wards 67, 68 and 56
- Neurology/2nd on call Acute Stroke-(to be confirmed durinf summer 2015)
- Dermatology (to be confirmed durinf summer 2015)

Further details are available on the HAN website. If you are very busy then please let the HAN co-ordinator know. Help is available from other members of the HAN team and there is always Consultant cover on the National Spinal Injuries Unit when necessary.

All routine work is completed by 9 pm to ensure that the night time doctor is available for emergencies and admissions. During induction you will receive advice on handling referral calls for Neurology, Acute Stroke and the National Spinal Injuries Unit.

If, while on night duty, you are regularly called for routine tasks which could have been done during the day then please complete these but discuss with Dr Tyagi (Neurology), Dr McLean (Spinal) or Dr Panesar (PDRU) as soon as possible.

Resuscitation team

The emergency telephone number is 2222.

The page holder (7012) is part of the resuscitation team for the Institute and National Spinal Injuries Unit. (PDRU is covered by the Medical Resuscitation team. Most arrests occur in Ward 61 and are treated by the neuroanaesthetic staff. You may have to attend arrests outwith the National Spinal Injuries Unit so it would be useful for you to familiarize yourself with the local ward geography.

If you require further medical assistance at an arrest then dial 2222 and ask to fast page 7844; this is the medical middle grade doctor for the site.

1.4 Bleep/telephone system

Bleep: The procedure to call someone from your telephone extension: -

- Dial 8888 You will hear a ringing tone
- Message will then say “please enter user number”
- Dial in the Bleep number you require
- Message will then say “please enter five digit message”
- Dial the telephone extension you wish them to call Message will then say it has been accepted
- Replace telephone and wait for the response call

The procedure for transferring an internal call is as follows:-

- Press the RECALL button on the telephone
- Wait till you hear the tones

- Dial the extension number to which you are transferring the call
- Wait for extension to answer. Replace handset

Please check your bleep is working when on-call

1.5 Radiology department

There are two radiology departments in the Hospital. The Neuroradiology Department performs all spinal and CT head examinations. The General X-Ray Departments performs body CTs, KUB films, non-neurological angiograms etc. The General X-Ray Department is only a 300 metre ambulance trip but if patients are too unwell to attend then Neuro X-Ray may help after discussion with the radiologists. Ill patients can be taken to General X-Ray Department but may need to be supervised by medical staff or one of the anaesthetists if there are ventilation problems.

Film viewing

Films are viewed on Kodak PACS through the hospital intranet. Please contact IT if you do not have a login password.

1.6 Visiting Consultants and referrals

Neuroradiology

Dr. Johann du Plessis usually supervises the Monday 1230 meeting. Please send details of interesting or new films to department on a Friday for discussion on the Monday. This is best done by the Edenhall doctor. CHI number is helpful to view films on PACS.

New fractures

Please inform the secretary of the duty neurosurgeon of all new admissions.

Urology

Mr Conn. Leave message at Spinal Unit outpatients every Friday for ward review.

Hand surgery/tendon transfer and plexus injuries

Mr Hems, Consultant Orthopaedic Surgeon. Contact through his secretary telephone extension 65436 or 201 5436. Mr. Hems is particularly interested in new brachial and lumbar plexus injuries.

Anaesthetic Services for the National Spinal Injuries Unit

The anaesthetic department within the Institute of Neurological Sciences is staffed by eighteen consultants, and up to eight rotational trainees at any one time. It provides

anaesthetic services for emergency and elective neurosurgery and maxillofacial surgery, whilst also covering Ward 61; the neurosurgical intensive care unit.

The department also provides a service for the National Spinal Injuries Unit. This consists of five half-day consultant sessions:

| | |
|-----------|----------------------|
| Monday | PM |
| Tuesday | AM |
| Wednesday | AM (Theatre session) |
| Thursday | AM |
| Friday | AM |

These sessions allow for direct anaesthetic input into the management of ventilated spinal injuries patients in Edenhall, advice and practical help is given on all aspects of clinical care but in particular support is given for weaning of patients from mechanical ventilation and in the provision of sedation. In addition the anaesthetists may help with medical problems which spinal injuries patients may have. Support is also provided for transfer of ventilated patients for further investigation/imaging within the Institute e.g. CT/MRI scanning. The consultants who undertake these sessions will make contact with the Spinal Injuries Unit at the time of their session, but can also be contacted via the coordinating anaesthetist in theatre (Ext 62134), or via the department secretary (Ext 61989 mornings only), or via switchboard. If advice or help is required during the daytime out with the above sessions then the coordinating anaesthetist in theatre should be approached.

Twenty-four hour cover is provided for any emergencies which arise within the Spinal Injuries Unit. Immediate advice can be sought from the on-call anaesthetist (Bleep 7103) or by phoning Ward 61 (62008)

The department also educates both nursing and medical staff within the Spinal Injuries Unit.

1.7 Outline of F2 and GPVTS training

The National Spinal Injuries Unit cares for patients from the first few days of major polytrauma, through rehabilitation, to life-long outpatient care. This provides a wide spectrum of clinical situations and problems, and many opportunities to improve and

practice your clinical skills.

Each trainee will be appointed a consultant Educational/Clinical Supervisor and you should arrange an initial training interview with your consultant within the first week of starting post.

It is your responsibility to update your paper or eportfolio and you will be encouraged to complete and log as many learning episodes as possible during the post.

Subject to clinical requirements the rota allows for a one week taster week and also incorporates the statutory F2 training days. It should be possible also to allow for the obligatory GPVTS training days.

Regular training opportunities include the formal induction, Monday radiology meeting (and Audit Meeting on the first Monday of the month) and the hospital Clinical Society meeting (Tuesday mornings in term-time). You are expected to dictate and log at least ten discharge letters during your attachment and these will count as a single DOPS episode.

You will be expected to complete and present at least one audit project, please discuss with Dr Purcell.

The rehabilitation meetings are an excellent opportunity to work with other professions and you should attend at least two formal goal planning meetings.

Section 2: Spinal Injury Management

2.1 New referrals and consultations

Referral procedure

- Please complete a referral proforma for all new patients
- Obtain relevant information/telephone number.
- Contact spinal registrar or consultant either directly or via hospital switchboard
- Inform Nurse in Charge of Edenhall Ward to make bed available.
- On day of transfer, or evening before transfer, complete a transfer form with doctor at referring hospital
-

Admission policy

When possible new admissions are admitted between 9am and 5pm when all departments of the hospital are fully staffed and senior help is readily available. Occasionally patients may arrive in the early evening due to unavoidable transport delays but this should be avoided if possible. The vast majority of referrals will be from other hospitals with anaesthetic and orthopaedic staff who will be able to manage the patient overnight. Every attempt is made to help the referring doctor manage the patient. If the patient is either ventilated or likely to have breathing problems (any cervical injury with cord damage or thoracic fracture) please forewarn the consultant anaesthetist on Ward 61.

Acute admission

Please follow the assessment as laid out in the acute admissions proforma. This will cover most eventualities. In particular record the neurology on the ASIA chart. There is a small aide-memoire on the back page of the admissions document which covers the common oversights. In particular look out for other undiagnosed spinal fractures, ventilatory failure and signs of other trauma. Beware the unexpected. Non-declared injuries are common in seriously injured patients. We are a national referral centre and a very high standard of care is expected.

Initial investigations:

- FBC
- Arterial blood gases as indicated
- Clotting if history of alcohol/liver disease
- Biochemical profile
- Cardiac enzymes in thoracic lesions
- Amylase in low thoracic/lumbar lesions

- ECG if any suggestion of cardiac injury
- Appropriate review/repeat of vertebral column x-rays
- CT scan/MRI as per discussion with senior staff

Initial management

Immobilisation of fracture site may include sandbags, skull traction.

Turning beds

Vital sign monitoring

Naso-gastric tube - avoid vomiting while supine

Medication:

| | | |
|----|---------------------------|---|
| 1 | Anticoagulation | 40 mg SC enoxaparin unless medical contraindication. |
| 2 | Antacids | Ranitidine 150 mg bd. |
| 3 | Analgesics | Please avoid oversedation with opiates in tetraplegics with impaired respiration. |
| 4 | Alcohol excess | Please follow the unit protocol on delirium tremens |
| 5. | Nebulised bronchodilators | Salbutamol 2.5mg 4 hrly. If history of COAD add Atrovent 250mcg 4 hrly in addition. |

Cardiovascular complications

Patients with cervical/upper thoracic lesions are prone to bradycardia/asystole because of unopposed vagal activity worsened by hypoxia.

Management

Pre-oxygenation before suctioning may help prevent bradycardia Atropine 0.3mg - 0.6mg IV/IM

May need regular sympathomimetic medication:

- regular nebulised salbutamol or terbutaline.
- Adrenaline infusion - only after discussion with senior medical staff

Respiratory complications

Please inform the on-call consultant anaesthetist of new cervical injuries with any cord damage. Please discuss ill patients with senior staff if at all concerned.

Spinal injured patients with cervical and thoracic injuries may have paralysis of their intercostal muscles and possibly diaphragm. As well as being unable to ventilate efficiently they are also unable to cough because of paralysis of abdominal muscles. Cervical injuries may therefore manage one or two days breathing unaided but the diaphragm will often tire after 48 hours when a simple mucus plug may cause a collapse

of a lung with sudden respiratory failure.

Treatment options include nebulised bronchodilators, physiotherapy and assisted pressure ventilation from the Bird devices. Half of cervical cord injuries need ventilation, please have a low threshold for investigation.

There are daily visits by the anaesthetist to review ventilated patients. You will receive instruction on basic ventilator management.

Hypercalcaemia

Newly injured young quadriplegics are prone to hypercalcaemia. Acute episodes usually respond quickly to IV fluids. Pamidronate is sometimes necessary to hold the calcium down. The biochemical abnormality eventually subsides following mobilisation.

Spinal plain films:

Please arrange plain films on all patients: as clinically indicated initially (15% of patients have more than one fracture)

After internal fixation please arrange follow-up films on all continuing inpatients at:

- six weeks
- twelve weeks
- twenty-six weeks
- fifty-two weeks

Skull traction and halo: Please arrange X-rays to check position on ward after traction/halo applied. Assessment of stability: usually on consultant's instruction.

Please arrange routine blood tests on clinically well patients as follows:

- *Edenhall Ward* FBC, U&E's, LFT's weekly
- *Philipshill Ward* Stable new admission, initially monthly. Clinically indicated thereafter and one week prior to discharge.

Investigating patient with new spinal damage

All fractures and ligamentous injuries are unstable to some degree. All new injuries should be treated as unstable and at risk. New patients leave Edenhall Ward only when necessary for investigations. The majority of plain films in acute patients are obtained as portables. Ultrasound examination can be performed at Edenhall Ward after discussion with the general radiology department.

The majority of new patients for MR or CT scans are accompanied by medical staff to

supervise patient handling. Transfer to and from trolleys is kept to an absolute minimum.

MR/CT scanning of spine in acute injuries

Patients are accompanied by medical and experienced nursing staff to supervise transfer and handling of the patient throughout their time away from the ward. If a cervical injury is suspected a stiff collar is worn. Grossly unstable fractures may require sand bags and taping on the journey to and from the scanner.

MRI Scans

Check for history of foreign bodies, pacemakers, metal implants (see list in MR). If in doubt discuss with the radiologist. The radiologist will probably want orbital views of manual workers to exclude metallic foreign bodies

Investigations in general radiology department

Transfer to general radiology for complex investigations requires an ambulance trip in addition to trolley transfer. All such investigations should be discussed with senior medical staff.

2.2 Cranio-cervical Traction

This procedure is performed by trained medical staff. This would usually be consultants and/or registrars. Trainees are encouraged to observe and assist with the application of cervical traction devices and you may acquire the skills to place traction.

Indications

- to stabilise fracture dislocations of the cervical spine either as definitive treatment or as interim management prior to internal surgical fixation
- to maintain normal spinal alignment
- to immobilise the cervical spine to prevent further spinal cord injury
- to decompress the spinal cord and roots

Contra-indications

- open head wounds and fractures of the temporal bone

Precautions

- atlanto-occipital dislocation
- C1–C3 fractures with posterior element fractures, traction may pull the fragments into the spinal canal
- patients with surgically corrected craniosynostosis
- abnormal skull bone quality

Technique

Gardner-Wells tongs are the easiest to apply. If halo-vest immobilisation is anticipated it may be best to use a halo ring for the initial cervical traction, then convert to vest traction/immobilisation at an appropriate later time.

Gardner-Wells Traction

Pins are placed in the temporal ridge (above temporalis muscle) 2 to 3 finger-breadths (3 to 4 cm) above pinna and directly above external acoustic meatus.

Preparation of scalp

Shave hair around proposed pin sites. Prep skin with Betadine then infiltrate local anaesthetic e.g. 2% lidocaine to periosteum. Wait three to five minutes for effect. Incise skin with #10 scalpel; this prevents pins from driving in surface contaminants

Placement of Gardner–Wells Tongs

Open to maximal width to check initial siting of pins. One pin has a central spring-loaded force indicator.

Tighten pins until the indicator protrudes 1 mm. beyond the flat surface. Tongs should now be secure to skull.

When correctly applied slight hand pulled traction will result in no movement at insertion site. The locking nut should then be lightly tightened with a spanner.

Application of weights

Tie cord to tongs and feed through pulley in head of bed. Initially apply 2 lbs. per cervical vertebral level. Increase in 2lb. increments until desired alignment is attained (assess with lateral cervical spine x-ray after each increment). Do not increase traction above 15 lbs unless under specific consultant advice; there is a risk of over distraction with larger weights. If there is no mal-alignment or if reduction has been achieved only 8 lbs should be used to maintain alignment

- IV diazepam or I.M. dihydrocodeine may facilitate reduction by producing light sedation and muscle relaxation.
- the cervical collar may be removed once the patient is in traction
- tighten pins daily until indicator protrudes 1 mm. for three days only, then stop
- pin sites should be cleaned on every shift with half strength hydrogen peroxide and betadine spray
- assess alignment of cervical spine with regular lateral x-rays and after every movement from bed

Complications

- skull penetration from placing pins too low in the thin squamous portion of temporal bone
- osteomyelitis in pin sites (reduced with good pin care)
- over distraction from excessive weights

2.3 Halo System

Patients attend spinal outpatients once weekly to have halo system checked and all pins and bolts tightened. This is usually performed by nursing staff but you may occasionally be asked to see out-patients out of hours.

Procedure for weekly maintenance of halo system

1. Check all pin sites are clean and dry.
2. Check alignment of halo system.
3. Check with patient for any change in neurological status.
4. Ensure patient is sitting comfortably in a suitable chair which allows easy access to all halo screws and pins requiring adjustment.
5. Using ring spanner slacken lock nuts on all four halo ring pins.
6. Tighten halo pin pins using torque screwdriver (set at 8 inch/lbs).
7. Turn pins in a clockwise direction until screwdriver “clicks”. When click is heard then pins are adequately tightened.
8. When tightening pins work diagonally, e.g. Front left, Back right, Front right, Back left. Turn screws slowly.
9. If pins regularly loosen seek advice.
10. Tighten lock nuts using ring spanner while at the same time use torque screwdriver to hold halo ring pins in position to prevent over tightening of pins.
11. Tighten all other bolts on Halo jacket using ring spanner until adequately tightened.
12. Report any neurological changes to senior medical staff in Spinal Injuries Unit e.g. increase in neck pain, increased pins and needles in arms or legs, further loss of sensation in arms or legs.

Pin slippage

If a pin slips the ring will twist askew and all pin sites will be very painful.

1. Transfer patient lying flat
2. Disconnect ring from jacket via the locking nuts attaching the jacket to the Halo ring and remove scaffolding
3. Use Philadelphia collar to immobilise cervical spine
4. Remove all pins and halo ring
5. Arrange x-rays of cervical spine

Infected pin site

Pins will be very loose and will not tighten, purulent discharge around pins with pain at pin sites.

Action

1. Return to National Spinal Injuries Unit
2. Remove infected pin
3. Re-site and insert new pin

PATIENT INFORMATION SHEET

Halo system,

Your halo jacket stabilises your neck. It is usually needed for up to twelve weeks after injury or surgery.

Pin sites cleaning

Have the pin sites cleaned once a day with a Betadine swab. If the pin site oozes it may be infected. Call the Spinal Injuries Unit for advice.

Loose pins

Loose pins may be noticed as: “I felt something move” “I heard something click” or the pin site may be painful. If you think a pin site is loose call the Unit within 24 hours.

Restricted vision

Your halo limits what you can see by restricting your head movements.

You should NOT DRIVE! Be aware of this when moving around and be especially careful when crossing the road.

Bathing

Use a flannel to wash yourself. Try to avoid getting the halo sheepskin lining wet. If it does get wet it may need to be changed or dried with a hair drier.

Movement

Do not try to forcibly nod your head while in the halo as this may cause loosening and inflammation at the pin sites.

Eating

Avoid very heavy meals and drinking several pints of fluid quickly. The jacket is quite tight and you may feel over full.

Out-patients

You will be given out-patient appointments so that your progress can be monitored. Usually you will need to come to the unit every week to have the pins tightened and checked.

2.4 Analgesia)

Patients with nociceptive pain (ie musculoskeletal pain from trauma) are treated with “normal” analgesics including morphine which is very useful for fractures, but watch for respiratory depression. Neuropathic pain is much more difficult to treat. Major changes in analgesic therapy are best done weekly on the Friday drug round as most neuropathic pain agents take several days to start working.

- Simple analgesia, paracetamol,
- Morphine pump is helpful post surgery.
- NSAIDs particularly useful in acute injury
- Arthritic pain as in other wards, ie NSAID’s ibuprofen or diclofenac

Neurogenic pain

This is usually described as a sharp, or shooting or burning paraesthesia pain occurring in a nerve distribution area below or at level of paralysis

- Gabapentin
- Carbamazepine
- Clonazepam
- Tramadol
- Amitriptyline
- MST and other opioids

2.5 Autonomic dysreflexia (AD)

(All patients with tetraplegia might suffer attacks of AD. Even if they have not had an attack please include Nifedipine PRN on pass drug prescription. Please read the following advice and refer to ward nurses or senior medical staff if unsure.)

This is a form of malignant hypertension found only in spinal cord injured patients with a level at T6 or above. The nurses and patients are usually aware that the patient is prone to AD but you might recognise the first attack. It can cause a stroke. Reflex sympathetic overactivity below level of cord lesion results in vasoconstriction and systemic hypertension stimulation of carotid and aortic baroreceptors increases vagal tone and bradycardia. Peripheral vasodilatation which would normally relieve the hypertension cannot occur because of the injured cord. BP continues to rise until cause removed.

Symptoms

- pounding headache
- flushing & sweating above level
- nasal stuffiness
- anxiety
- flushing and/or blotching above level of cord lesion.

Signs

- hypertension and bradycardia, occasionally cardiac dysrhythmia.
- pupillary dilatation
- flushing head & neck

sweating in area above and around the lesion

Below lesion

cold peripheries
pilo erection
contraction of bladder and large bowel
penile erection and seminal fluid emission

Causes

Bladder distension (Full bladder, blocked catheter, full leg bag)
Bowel distension
Other common stimuli;
ingrowing toenail
pressure sore
orchitis

Action

Relieve cause (95% due to blocked catheter)

| | |
|---------------|-------------------------|
| Elevate head | sit up or tilt bed |
| Start monitor | B.P./ Pulse |
| Empty bladder | (check with ultrasound) |
| Check rectum | |

TREATMENT

Control severe hypertension

nifedipine 10-20 mg by crushed capsule will help but may only give temporary relief
if cause is not removed
labetalol
hydralazine
diazoxide

Treat associated spasms

diazemuls (also for control of fits)
Block afferent input
lignocaine gel per rectum / per urethra (consider spinal epidural block)

Control/prevent further episodes (increased sensitivity after acute episode)

Labetalol 100mg in 20ml SLOW IV

give 2mg per minute until satisfactory response onset of action within minutes
duration 1-3 hours
can be used in pregnancy

Caution asthma, heart failure

Hydrallazine 10mg vial SLOW IV (Reconstitute ~with 1ml. water for injection, then dilute in 10ml normal saline)

5-20mg over 20 minutes

may be repeated after 30 minutes: onset 10-20 minutes

peak: 20-40 minutes

duration: 2-6 hours

Caution: ischaemic heart disease A/E headache, flushing, vomiting

Diazoxide 300mg in 20mls bolus IV

give 50-100mg IV Bolus

repeat after 15 minutes

onset: 10 minutes

peak: 2-4 hours

duration: 4-12 hours

Caution: Ischaemic heart disease, diabetogenic, Na & H₂O retention

2nd line drugs

Phenoxymethamine /prazosin (alpha-blockers) useful if bladder outlet problem contributing

Reserpine, depletes noradrenaline stores in nerve endings

Clonidine, useful if dysreflexia and spasticity problematic

Chlorpromazine, sedative plus alpha blocker (hypotension)

Furosemide, volume depletion

Spinal epidural. For use in refractory situations especially if noxious input cannot be removed, (consider early insertion of epidural cannula for management of labour)

2.6

Alcohol and illegal drugs

Alcohol is banned on the unit. Patients are discouraged from drinking heavily on pass as this can interfere with medication. Illegal drug use is not permitted on the Unit.

Please do not ignore drug and alcohol use in the Unit. Illegal drug and alcohol use is disruptive and dangerous and compromises the safety of inpatients and staff. Report any suspicions to senior medical staff or the senior nurse manager. If necessary the Police will be informed and will caution patients on the ward.

Acute alcohol withdrawal in SCI patient

Approximately one-third of patients sustain their spinal injury under the influence of alcohol. There is no satisfactory way of predicting the severity of alcohol withdrawal in a given patient. Please have a high suspicion of alcohol withdrawal in all new agitated

patients. Refer to the Directorate prescribing policy for guidance on management.

Nutritional support for alcoholics

- 25-50 Kcal/kg body weight
- 1g protein/lkg body weight initially
- multivitamin preparation (IV or oral)

Consider

- vitamin K 10mg/day 3/7
- folic acid 1.5mg/day (check level)
- thiamine 50-100mg tds
- potassium levels
- calcium as biochemically indicated
- magnesium

Please restrict hepatotoxic drugs

2.7

Bowel management

Aims

Bowels moving regularly and predictably, with continence of faeces the rest of the time.

Bowel care completed within short time (no more than 1 hour a day)

All new patients are started on a daily bowel routine:

Usual starting doses,

senna 15 mg in the evening

lactulose 15 ml twice daily

bisacodyl 1 or 2 supps in the morning

Stimulants

Senna

stimulates motility & also alters electrolyte transport

Bisacodyl

polyphenolic derivative

Bulking agents

Ispaghula husk (Fybogel)

Bran

Osmotic agents

Lactulose

short-chain carbohydrate.

metabolism by gut flora may cause flatulence.

Movicol (Polyethyleneglycol and electrolytes)

Avoids electrolyte disturbance

Non irritant

Rectal agents

Suppositories

bisacodyl

glycerin (glycerol and gelatin)

Enemas

micralax (contains citrate, glycerol, sorbitol)

phosphate (sodium acid phosphate)

Recommended regimes for spinal patients

T6 injury level and above:

Bowel reflexes intact but risk of dysreflexia

twice daily lactulose

alternate evening senna

alternate day supps (bisacodyl or glycerine) & digital stimulus Ensure nifedipine available

T7 to T12:

As for higher lesion, but without risk of dysreflexia

L1 and below including cauda equina:

bowel relies on myenteric reflexes, rectum much less likely to expel all stool without manual evacuation. Sphincter patulous & atonic. Risk of impaction & overflow

twice daily lactulose

alternate evening senna

alternate day supps & manual evacuation. Repeated PR check and stimulus until rectum clear

abdominal pressure & straining

add Fybogel or alter lactulose as needed to adjust stool consistency.

avoid excessive senna doses in long term.

For neurologically intact patients prescribe senna and lactulose daily with prn suppositories until regular motions are re-established.

2.8

Out-patient clinics

The outpatient clinics are nurse led and run by Sister Karen McCarron and Staff Nurse Laura MacLean. Usually medical problems are seen by a senior doctor but occasionally you may be asked to help at the clinic. In any event you are most welcome to join the clinics to learn about some of the rehabilitation issues.

Following discharge the spinal unit patients are reviewed at six weeks, then three months, six months, with a view to eventually reviewing the patients annually. Some may go on to two yearly reviews if there are no problems. Some patients require to be seen frequently.

ROUTINE ANNUAL REVIEWS.

Patients are seen by nurses who follow an assessment sheet.

Skin

Is it intact? What is the patient sitting/sleeping on? If there is a sore – Dressing?
Bed rest? (See SKIN CHECK)

Bowel

What routine? Any change?

Bladder

A major obsession because renal problems are the main cause of avoidable death in spinal injured people.

Urine drainage options include:

Intermittent catheterisation

Sheath/condom urinal

Indwelling catheter

Suprapubic catheter

Check when urinary tract was last investigated.

Baseline KUB and renal ultrasound should have been done on admission thereafter yearly or every 2 years depending on results. An ultrasound machine is available in the clinic for doctors to assess residual urine.

Social and mobility

Is housing adequate? Is sexual function satisfactory? Wheelchair: Is it in good shape? Needs new cushion? Should be checked annually by OT

This is important because poor seating results in scoliosis, pressure sores and discomfort.

Investigations:

Bloods

Check for U & Es, LFTs, Proteins, Ca⁺⁺, FBC

Urine

Sample for bacteriology, only if you would act on the result.

Bladder/U/S: If you have been taught, check bladder residual volume after patient voids. Arrange routine KUB and renal ultrasound either at SGH or local hospital.

Specialised out-patient clinics

Skin Clinic

Nurse led. Assess the depth, extent, etc., of pressure sores and possible dressings. Remember the value of bed rest – keep the patient in bed and they won't be applying pressure to their heels etc. Remember also that beds, wheelchair cushions and turning regimes contribute to good skin care and you should ask what system of protection the patient normally uses. Liaise with OT and liaison sisters.

Sexual function

Erectile dysfunction post SCI is common. See outpatient nurses for details.

Fertility

Para/Tetraplegic male patients are able to procreate children post injury and have a sex life. Fertility in females is normal or near normal.

We help achieve conception. When the female partner is ovulating (clearplan kit) we bring both partners into the clinic to obtain a specimen of semen by vibration or electroejaculation which the female partner then inseminates herself in her posterior fornix. The male partner is catheterised to prevent retrograde ejaculation. Dysreflexia can be a problem so blood pressure is monitored throughout. Nifedipene 10 – 30mg orally pre-ejaculation often is necessary.

Urodynamics

The unit has its own fully equipped urodynamics laboratory. Those patients who require

urological work-up can have appointments made on Tuesday afternoons by request to Sister at Outpatients. Dr. Jigajinni usually carries these out but SHOs/ Locums are welcome to come and learn the technique.

2.9 Skin care

All patients on the Unit are at risk of pressure sores. However, for the neurologically intact patients this should not be a major problem. Patients with neuropathic skin are particularly vulnerable to pressure problems. Decisions on skin care will normally be taken by senior medical or nursing staff but you should be aware of the underlying principles.

Acute Management

Most patients will be nursed on turning beds which provide a firm support to the spine. Patients are moved from side to back to side on a regular basis thus preventing prolonged pressure on any one area. This firm support reduces movement at the fracture site, reduces pain and the chance of further cord damage.

Spinal Boards

Spinal boards are very good at keeping the spine straight preventing further movement but are bad for the skin. Spinal boards must only be used for transfer and patients are taken off spinal boards as soon as they are transferred to the Unit.

Long Term Skin Management

Most paralysed patients will tolerate a foam mattress with regular turning but some will need specialised mattress overlays or air mattresses. Patients and nursing staff should regularly check the skin. The earliest sign of pressure sore is a red non-blanching hardened mark. If this occurs the patient will need to return to bed with regular turning to keep weight off the affected area. The nursing staff will usually take the initiative for this. You may be asked about management of a reddened area especially on the sacrum, ischia or hips. The best course is to advise complete bed rest and regular turning until the skin is reviewed by a more senior member of staff.

Pressure Sores

Senior medical and nursing staff will decide on mattress selection and treatment strategy. The role of SHO is very important in ensuring that the patient's haemoglobin and albumin are within normal limits to maximise natural healing. If the wound is clean Mr. Fraser may perform a formal closure. This will usually be done on a Wednesday morning theatre list.

2.10 Spasm medication

After the acute period spinally injured patients with UMNLS develop spastic paralysis with increasing spasm in muscle groups. This may decrease in time and so

antispasmodics are not always indicated. Spasm tends to become worse during acute infection, constipation etc. so a cause for spasm should be sought.