



Queen Elizabeth National Spinal Injuries Unit
Medical Staff Handbook

Revised 2019

Useful Telephone Numbers and Contacts

Edenhall Ward	62533/62534
Philipshill Ward	62530/62531
Switchboard	1000
Administrator Mrs Irene McGonigle	62555
Secretary to Dr. McLean	62575
Secretary to Mr. des Etages	62539
Secretary to Dr. Purcell	62536
Database Secretary	62546PM
Neuroradiology Office irene.cook@ggc.scot.nhs.uk	62775
Neuroradiology Page for out of hours requests	17574
Porters' Bleep	17054
Nicola Callaghan, Secretary to Mr Alakandy	67872
Louise Robertson, Secretary to Mr Mathieson	62107
Janice Lafferty Secretary to Mr Barrett	62020
Liz Kerr Secretary to Mr Amato Watkins	62456
Clinical Services Manager Mrs. Gina Clark	62548

Gateways to Clinical Units

Lead Nurse	Mrs Michele Paterson
<i>Edenhall Ward</i>	
Nursing Sister	Sister Lisa MacDonald
Ward Clerkess	Mrs. Adriana Mozzachiodi
<i>Philipshill Ward</i>	
Nursing Sister	Sister Helena Richmond
Ward Clerkess	Mrs. Helen Dargan
Neuropsychologist	Dr Campbell Culley
Physiotherapy	Mr. Jon Hasler
Occupational Therapy	Mrs. Michelle Rankin
Mr Pat McGarvey	Momentum Scotland
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 Queen Elizabeth University 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 receiving hospital and may be transferred by road or by air. The Unit is close to the helicopter rooftop landing facility within the hospital grounds and Glasgow Airport which allows transfer of patients by fixed wing aircraft.

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
- Mezzanine research unit

Staff

The Unit directly employs over one hundred members of staff including doctors, nurses, physiotherapists, occupational therapists, psychologist 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 des Etages)
	PM	OUTPATIENT CLINIC (Respiratory Dr McLean)
Wednesday	AM	OUTPATIENT CLINIC (General Dr. Purcell)
	AM	THEATRE (INS Spinal)
	AM/PM	THEATRE (Orthopaedic Main Block) Mr Mathieson/Barrett
Thursday	AM	OUTPATIENT CLINIC (General Dr. McLean)
	PM	OUTPATIENT CLINIC (Spasm Mr. Des Etages)
Friday	AM	Ward Round (Philipshill and Edenhall) Medication Review
	PM	OUTPATIENT CLINIC (Neurosurgery)

Goal planning

The trainee doctor 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 organized by the key worker 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 completes 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 immobilized patients because they score extremely low regardless of their level of neurological deficit). New spinal cord injured patients are occasionally admitted directly to Philipshill and require a full clerking i.e. admission proforma and database document completion.

There are often elective admissions to the ward for skin care and elective surgical procedures. 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

Trainees will complete IDL at time of discharge.

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.

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 stabilization 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 judgment. 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 February 2019 the post is a one in thirteen full shift rota shared with the trainees working in PDRU, ophthalmology, dermatology and neurology. Frequency of rota may change with each new intake of trainees 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. Hewett (Neurology).

Neurology, dermatology, ophthalmology and PDRU 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. Please do not make any changes to the rota without express agreement of senior staff.

Evening shift

There is one doctor in the evening until 9pm covering the National Spinal Injuries Unit, PDRU and Neurology. From 9pm one doctor covers all three areas. Please prepare a written handover for your colleagues. 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 and neuroanaesthetic team 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

Dermatology (this is under review and may change imminently)

Further details are available on the HAN website. If you are very busy then please let the HAN coordinator 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 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 Hewett (Neurology) or Dr McLean (Spinal) as soon as possible.

All Medical staff: Absence Reporting Procedures

Step 1

In the event of being unable to attend work due to ill health, employees are advised to contact the appropriate line manager or **nominated point of contact Irene McGonigle 0141 201 2555** as early as possible before their starting time or no later than within one hour of their scheduled start time. The employee should indicate the reason for absence, details of GP Appt (where applicable) and an indication of when he/she expects to be fit to return to work and a contact telephone number.

If the line manager or Irene McGonigle is not available the employee must speak to one of the medical

secretaries who can be contacted on the following numbers **0141 201 2536/2539/2575**. The medical secretary will arrange for the line manager to phone the employee back.

It is the employee's responsibility to make contact personally, unless physically unable to do so. If the employee is unable to make contact personally, a relative or friend may phone on their behalf. Do not send text messages, emails and/or voicemails.

If an employee falls ill at work or has to go home due to sickness, he/she must make contact with their line manager to advise before leaving the premises or if urgent treatment is required, at the earliest opportunity.

In the event of a weekend or evening absence, the employee should contact the Consultant On-Call/General Manager On-Call via the main switchboard and adhere to the reporting timeline as described in Step 1 above.

Failure to make contact may result in the absence being treated as unauthorised.

Step 2

For sickness periods of more than 3 days and up to and including 7 calendar days, employees must complete a sickness absence self certificate form and provide this to their line manager within 7 calendar days of the first day of absence

The self certificate form can be downloaded from the following weblink:-

<https://www.gov.uk/government/publications/statutory-sick-pay-employees-statement-of-sickness-sc2>

Step 3

If an employee is absent for more than 7 calendar days a fit note from the GP is required. If an employee does not return to work when the fit note ends then further consecutive fit notes must be provided. A final fit note confirming fitness to resume duties must be sent in before or on the day of return to work, with advance communication being received from the employee confirming their proposed return to work date. All employees must call their line manager or **nominated point of contact Irene McGonigle 0141 201 2555** when returning to work.

Step 4

Upon returning to work the employee will meet with their line manager or delegated other to undertake a return to work interview; this meeting will discuss the recent absence, ensure the employee is fit to return, discuss any problems or underlying concerns that may have caused the illness and discuss the need for further support from Occupational Health Services (if appropriate).

An employee has the right to be represented at this meeting by a BMA representative, or accompanied by a fellow member of staff, friend/relative not acting in a legal capacity.

For further information please see NHSGGC Attendance Management Policy available on HR Connect:

<http://www.nhsggc.org.uk/working-with-us/hr-connect/policies-and-staff-governance/policies/attendance-management-policy-procedure-overview/>

Failure to adhere to absence reporting procedures may be dealt with under the Disciplinary Policy and

Procedure.

All medical staff working in the Unit should complete a personal details form (found in Junior Doctors Room) this should be completed and returned to Irene McGonigle, Unit Administrator.

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

Resuscitation team

The emergency telephone number is 2222.

The page holder (17012) 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.

1.5 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 in the main building 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

A neuroradiologist usually supervises the Monday 12.30 meeting. Please add CHI number of interesting or new films to the PACS worklist for discussion on the Monday. This is best done by the Edenhall doctor.

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 twenty 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 (1)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 may allow 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 (Friday lunchtime in term-time).

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.

1.8 Anaesthetic Protocol of Wednesday am Spinal Patients

Spinal secretaries circulate Opera list to ward sister, consultants, Dr Jig, junior doctors, database secretary and forward details to anaesthetic secretary on 0141 452 3427 (83427).

Doctors or nurses on Edenhall can obtain details of the consultant covering the list from anaesthetic secretaries on 83430 for advance notification of any major issues

On the Tuesday night the NSIU doc calls the oncall senior anaesthetic trainee on 83465 to tell them of the patient(s) planned for the Wed. Anaesthetists will give telephone advice or review as required

At the same time, also on Tuesday night, the NSIU nurse-in-charge also calls the Trauma Co-ordinator to alert them of all patients for Wed

Section 2: Spinal Injury Management

2.1 New referrals and consultations

Referral procedure

Please complete a referral proforma for all new patients referred

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	40mg SC Enoxoparin unless medical contraindication
2	Antacids	Ranitidine 150mg bd or Omeprazole 40mg/day
3	Analgesics	Please avoid oversedation with opiates in tetraplegics with impaired respiration
4	Alcohol Excess	Please follow the protocol on delirium tremens
5	Nebulised Bronchodilators	Please prescribe nebulised saline, Salbutamol 2.5mg 4 hrly and Atrovent 250mcg 4 hrly in all new paralysed tetraplegics and high paraplegics

Cardiovascular complications

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

Management

- Prevention
- Avoid vagal stimulation
- Hyperventilate and hyperoxygenate prior to suctioning
- Pre-medicate patients with known hypersensitivity to vagal stimuli
- Treatment of Symptomatic Bradycardia:
- Glycopyrolate 200-600mcg IV
- Atropine 0.5 - 1.0 mg IV

May need regular sympathomimetic medication:

- regular nebulised salbutamol or terbutaline.
- Vasopressor 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 a long 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, specialty doctor 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 ring 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 stabilizes 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

Pregabalin

Clonazepam

Tramadol

Amitriptyline

MST and other opioids

Duloxetine

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 over activity below the 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

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

diazepam (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

Hydralazine 10mg vial SLOW IV (Reconstitute ~with 1 ml. 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

Phenoxybenzamine /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 and bladder training. 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/1 kg body weight initially

multivitamin preparation (IV or oral)

Consider

Pabrinex 1 pair once daily for at least 3 – 5 days

vitamin K 10mg/day 3/7

folic acid 4-5mg/day (check level)

thiamine 50-100mg tds – once Pabrinex course completed

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.

Laxido (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

evening senna

daily 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

evening senna

daily 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 Outpatient 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 long term 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 volume.

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 QEUEH or local hospital.

Specialised outpatient 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 will be distributing pressure evenly. 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 electro ejaculation which the female partner is then inseminated in the 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 Monday afternoons by request to

Sister at Outpatients. Dr. Jigajinni usually carries these out but medical trainees/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 are rarely used for transfer (vacuum mattress is the preference) 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 pressure 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 medical trainee 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 a formal closure may be performed. 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.