The Immediate Management of Adults with Spinal Cord Injuries

AIRWAY
- Anaesthetic concerns: maintain MAP 80-90mmHg, anticipate bradycardia and hypotension when intubating or suctioning, avoid succinylcholine, maintain temperature

BREATHING
- SCI causes hypersecretion and reduced vital capacity due to reduced intercostal/abdominal muscle function
- Nurse flat; maximum of 15 degrees if ventilated
- Hourly observation for signs of respiratory distress/fatigue
- Humidify oxygen, consider bronchodilators, early use of incentive spirometry, non-invasive ventilation, etc
- If FVC < 1 litre consider ventilator support
- For cervical SCI requiring invasive ventilation early tracheostomy is recommended
- For ventilated cervical SCI please see the RISCI website http://www.risci.org.uk for Ventilator Free Breathing Guideline

CARDIOVASCULAR
- Patients are at risk of neurogenic shock (resulting from peripheral vasodilation)
- Log rolling, repositioning and tracheal stimulation can result in vasovagal stimulation or asystole
- Prescribe Atropine for the emergency treatment of bradycardia:
  - 300-600 microgram IV
  - repeated after 3-5 minutes if required, maximum 3mg
  - If prolonged or repeated bradycardia, glycopyrrolate may be better – discuss with SCIC
- Fluid resuscitate if needed but do not chase blood pressure as likely to be lower than normal parameters
- Maintenance fluids, titrated to urine output (not blood pressure), aiming for 0.5ml/kg/h
- For persistent hypotension: TEDS and abdominal binder, Midodrine 5 or 10mg TDS or Ephedrine 30mg PRN < TDS

BEWARE AUTONOMIC DYSREFLEXIA
- An emergency hypertensive crisis (approx 30-40 mmHg above baseline) secondary to sympathetic chain disruption
- Patients with injuries above T6 are at risk: http://www.sci-info-pages.com/ad.html
- Monitor for signs: relative hypertension, bradycardia, flushed face and upper extremities, stuffy nose, pounding headache, sweating
- Identify stimuli eg kinked catheter, UTI, impacted bowel, pressure sore, other noxious stimuli
- Treatment:
  - Nifedipine/GTN spray/GTN tablets
  - Monitor cardiovascular signs continuously until resolution of signs
  - Heightened awareness of a repeat attack

NEUROLOGICAL ASSESSMENT
- Neurological assessment and digital rectal examination on all patients – document voluntary anal contraction and pin prick sensation at S4/5 (best predictor for recovery). Neuro-documentation guidance: www.asia-spinalinjury.org

MOVING AND HANDLING
- Remove from spinal board within 20 minutes
- Transfer between surfaces using a spinal board or scoop plus head blocks
- Maintain full spinal alignment at all times and re-check every time patient is moved
- Turn every 2 hours. Guidelines on how to turn: www.mascip.co.uk

GASTROINTESTINAL AND BLADDER
- Place urinary catheter immediately and leave on free drainage
- NBM initially but start feeds when bowel sounds return
- Commence a PPI and bowel regime: daily insertion of glycerine suppositories 15-30 minutes prior to rectal examination and evacuation if the rectum is full. When bowel sounds return, passage of flatus occurs or bowels move then aperients may be started
- Quick guide to neurogenic bowel management: http://www.mascip.org.uk/guidelines.aspx

SKIN: RED MARKS ARE SIGNIFICANT!
- Complete Waterlow Score: http://www.judy-waterlow.co.uk/waterlow_score.htm
- Review all pressure areas after every turn and areas of splints, plaster casts and orthoses

THROMBOEMBOLIC PHENOMENA
- Mechanical prophylaxis (TEDS and pneumatic compression stockings)
- Prophylactic low molecular weight Heparin by Day 3 (eg Enoxaparin 40mg od)

SURGERY
- Low velocity injury with facet joint dislocation: reduction in less than 4 hours is indicated
- Surgical advice from the on-call consultant at RNOH is available on a consultant to consultant basis

Autonomic Dysreflexia after Spinal Cord Injury

Any patient with SCI resulting in paralysis at T6 or above is at risk of reflex stimulation of the autonomic nervous system leading to increased peripheral vasoconstriction, increased cardiac output and an acute hypertensive crisis. Autonomic dysreflexia is often associated with bradycardia since there is normal vagal control of the heart and the only mechanism to reduce cardiac output is to slow the heart rate. Autonomic Dysreflexia (AD) is a life-threatening event that must be treated immediately.

Symptoms of Autonomic Dysreflexia:

- A severe pounding headache that gets worse
- High blood pressure (it is essential to know the patient's normal blood pressure). Usually there is a 20 to 40mmHg rise in blood pressure above the normal level but it may be much higher
- Red blotches above the level of injury (face, neck, arms)
- Sweating above the level of injury
- Goose bumps below above the level of injury
- Stuffy nose

Causes of Autonomic Dysreflexia:

- Bladder or bowel when they are too full
- Bowel program when done too long or too hard
- Pressure on skin or pressure sores
- Ingrown toenails
- Bladder infections
- Sexual activity
- Other medical causes: stomach ulcers, heart attack, asthmatic episodes, lung infections and blood clots in legs or lungs

Management of Autonomic Dysreflexia:

- Sit up (this helps to lower the blood pressure)
- Remove or loosen tight clothing, such as a binder, TED stockings, socks and shoes
- Do an intermittent catheter. If the patient has a urethral or suprapubic catheter, check tubing for kinks. Change the catheter if the urine passage is blocked
- Do the patient's bowel programme to clear any faecal impaction. You may need to insert a numbing ointment like Instilagell. If doing a bowel programme causes dysreflexia, stop the bowel programme
- Check skin, eg for something that may be irritating skin. This may include sharp or hard objects, hot or cold objects, tight clothes or shoes

If dysreflexia will not go away, and blood pressure remains high, medication can be given to lower the blood pressure, e.g. Nifedipine 10 mg capsules which can be bitten or pierced and the contents squirted under the tongue.

How to prevent Autonomic Dysreflexia:

- Empty bladder on schedule
- Empty bowel on schedule
- Stay free of bladder infections - know the signs of a bladder infection and notify a doctor if they occur
- Stay free of constipation
- Prevent skin sores
- Do good foot care and clip toenails straight across to prevent ingrown toenails