

## Guidelines for Acute Management of Spinal Cord Injury

**Background:** During the first few days when life-saving interventions dominate the care of the spinal cord injured (SCI) patient, efforts at preventing secondary complications become vital. Preventive measures administered during the acute phase may have lifelong benefits. Below are guidelines to care for the spinal cord injured patient in the acute setting.

### Definitions:

**Acute SCI:** SCI requiring ICU level of care

**Autonomic dysreflexia:** Hypertension and bradycardia. Rare in acute period. Common few weeks after injury. Only occurs with injuries above neurologic level of T6 with greatest severity in quadriplegics.

**Chronic SCI:** SCI who has completed rehabilitation

**Orthostasis:** symptomatic and drop in SBP by 10 mmHg when torso is mobilized into upright position

**Subacute SCI:** New SCI who is out of ICU and not requiring further surgery

### Clinical Practice Guidelines:

#### Hemodynamics

1. MAP goals of 85 mmHg x 5 days from injury
  - a. Only for vertebral level L1 and above
  - b. Preferred IV vasopressor – norepinephrine
  - c. Must ensure euvolemic status prior to initiation and titration of vasopressors
  - d. If having considerable difficulty in maintaining MAPs and potential of serious adverse effects from vasopressors, can consider dropping to MAP goal of 80 mmHg after consultation with the spine service.
    - a. Can utilize Midodrine 10 mg PO every 4 hours around the clock in place of IV vasopressors
2. Orthostasis
  - a. Abdominal binder
  - b. Midodrine 10 mg every morning, noon, and 4 PM

#### Pulmonary

1. Have respiratory therapy obtain baseline respiratory parameters (vital capacity, FEV1) and ABGs when patients are first evaluated and at intervals until stable
2. Perform tracheostomy early in hospitalization of patients who are likely to remain ventilator dependent or to wean slowly from mechanical ventilation over an extended period of time
3. Treat retained secretions due to expiratory muscle weakness with manually assisted coughing (“quad coughing”), pulmonary hygiene, and mechanical insufflation-exsufflation
4. Initiate VAP bundle.
5. Consider mucomyst or sodium bicarbonate nebulizer treatments for thick secretions

### **DVT prophylaxis**

1. Apply mechanical compression devices early after injury- as soon as feasible.
2. Begin LMW heparin plus intermittent pneumatic compression, in all patients once primary hemostasis is evident.
3. Consider placing vena cava filter only in those patients with active bleeding anticipated to persist for more than 72 hours and begin anticoagulants as soon as feasible
4. Consider weekly lower extremity duplex study
5. DVT prophylaxis only indicated for 12 weeks post-injury if no acute ongoing issues.
6. Once patient is a subacute SCI patient, Lovenox 40mg per day, instead of Lovenox 30mg BID, is sufficient.
7. If chronic SCI patient readmitted for any reason in their lifetime, can start Lovenox 40mg per day.
8. When to start DVT prophylaxis?
  - a. Nonoperative spine fracture – HD#2
  - b. Operative spine fracture
    - i. Can start HD#2
    - ii. Hold day of surgery
    - iii. Restart POD#1
    - iv. Spine surgeon will document/communicate if there should be a delay in restarting

### **Nutrition**

1. Provide appropriate nutrition when resuscitation has been completed and there is no evidence of ongoing shock or hypoperfusion and off of IV vasopressors.
  - a. Enteral nutrition is preferred over parenteral nutrition when not contraindicated.
  - b. Initiate Impact tube feed within 24 to 48 hours after admission, using the semirecumbent position when possible to prevent aspiration.
    - a. Can consider Impact Peptide (low-carb formula) for mechanically ventilated quadriplegics
  - c. Determine the caloric requirements for nutritional support in acute SCI using a 30-minute energy expenditure measurement by indirect calorimetry (metabolic study)
    - i. Acquire metabolic study 24 hours post-surgical stabilization or 24-48 hours after admission in non-operatively managed patients who are mechanically ventilated
    - ii. This provides confirmation that nutritional intake matches caloric needs (basal metabolic rate)
    - iii. Can also acquire metabolic study to determine respiratory quotient if having difficulty with liberation from ventilator
2. Maintain glucose < 180 in critically ill mechanically ventilated patients.

### **Rehabilitation**

1. PM&R consult on admission
2. PT/OT consults as soon as hemodynamically stable and ready for mobilizing
3. Speech consult to evaluate swallowing function prior to oral feeding in any acute SCI patient with cervical spinal cord injury, halo fixation, cervical spine surgery, prolonged intubation, tracheostomy, or concomitant TBI

### **Bowel**

1. Initiate stress ulcer prophylaxis
  - a. Continue for two weeks regardless of enteral nutrition or mechanical ventilation
2. Initiate a bowel program:
  - a. Start senna and Colace on admission
  - b. Once enteral feeding has begun, add daily enemas with manual disimpaction

### **Bladder**

1. Place indwelling urinary catheter as part of the initial patient assessment unless contraindicated. Secure catheter to abdomen unless patient has lower midline incision. If indwelling urinary catheter is contraindicated, use emergent suprapubic drainage instead.
2. Leave indwelling urinary catheters in place at least until the patient goes to rehabilitation center or bladder training has been initiated by PM&R.
3. Priapism is usually self-limited in acute SCI and does not require treatment. There is no evidence to support avoidance of a urethral catheter in the presence of priapism secondary to acute SCI.

### **Skin**

1. Assess areas at risk for skin breakdown every shift.
2. Use a pressure-reducing Roho cushion when the patient is mobilized out of bed to a sitting position.
3. Provide meticulous skin care:
  - a. Reposition to provide pressure relief or turn at least every 2 hours while maintaining spinal precautions
  - b. Keep the area under the patient clean and dry and avoid temperature elevation
  - c. Assess nutritional status on admission and regularly thereafter
  - d. Inspect the skin under pressure garments and splints every shift
4. Educate the patient and family on the importance of vigilance and early intervention in maintaining skin integrity

### **Spine precautions**

1. Nonoperative spine fracture
  - a. Cervical spine fracture – C-collar
  - b. Thoracic or lumbar spine fracture – molded TLSO brace donned supine

- i. May log roll, maintaining T/L spine precautions until TLSO brace
2. Operative spine fracture
  - a. Cervical spine fracture – C-collar before and after surgery
  - b. Thoracic or lumbar spine fracture
    - i. Preoperative – may log roll, maintaining T/L spine precautions
    - ii. Postoperative – may sit up

**References:**

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3. Blood pressure management after acute spinal cord injury. [No authors listed] *Neurosurgery.* 2002 Mar;50(3 Suppl):S58-62.
4. Ploumis et al. A systematic review of the evidence supporting a role for vasopressor support in acute SCI. *Spinal Cord.* 2010 May;48(5):356-62.