

Acute Traumatic Spinal Cord Injury (SCI) Care Guidelines Emergency Department Management

Inclusion Criteria: Acute Spinal Cord Injury Patients (up through the first week of injury)

Assessment: Mechanism of injury, vital signs, place patient in c-spine, neuro exam, assess and support airway, breathing and circulation. Assess any additional injuries

Laboratory: Type and Cross, CBC, PT, PTT

Radiology: Appropriate images to be determined by trauma team

TRIAGE
ESI Level 2
Spinal
Immobilization at
1st contact

GOAL First 24 Hours of Injury

- Stabilize vital signs
- Volume resuscitate and support airway and breathing
- Monitor for unidentified injuries,
- LABS: serial CBCs and coags q 6 hours and ABGs q 6 hrs

Neurosurgery should be consulted immediately

Patients presenting to the ED with suspected SCI with complete or incomplete injury will undergo acute trauma evaluation by the trauma surgeon.

ED Physician Management

- Assess and support airway, breathing, circulation
- Perform serial neurological exams (to include pre and post resuscitation exam)
- Document the level of injury
- Consult neurosurgery for spine stabilization priorities
- Perform a full neurological survey as a baseline for comparison with future exams
- Optimize perfusion
 - Maintain age appropriate median MAP or greater
 - First administer crystalloid or colloid IV and consider the use of dopamine and/or norepinephrine
- Administer clotting components to correct any coagulopathy
- Assess and monitor for other unidentified injuries
- Order appropriate specialty bed for spine immobilization (Rotorest bed) and/or orthotics per request of neurosurgery (i.e. halo or tongs)

ED Nursing Assessment and Management

- **Perform Trauma Nursing Process (1° & 2° Assessment)**
- **Establish** 2 large bore IVs, insert Foley catheter and NG tube
- **Monitor** neurologic status (motor function, sensation, and reflexes), vital signs, respiratory, GCS and hemodynamic status as indicated
- **Notify** physician of any changes in neurologic functional status, hemodynamic status, or respiratory status
- **GOAL: Maintain age appropriate MAP (per MD order) to optimize perfusion**
- Maintain normothermia
- Assess patient's pain,
- Assess and monitor for other unidentified injuries or internal bleeding
- Keep HOB flat and move patient using sliding sheets and log roll to turn patient with adequate number of personnel while maintaining spinal alignment.

Recommendations/ Considerations

- Loss of thoracic sympathetic innervation (T1-T5) may inhibit tachycardia and vasoconstriction as signs of hypovolemia and thus disguise hemorrhagic injuries
- During the resuscitation and critical care phases, analgesic agents and sedatives are typically required
- The use of steroids is not proven as a standard of care. Evidence of the drug's efficacy and impact is controversial and administration is at the discretion of the neurosurgeon.
- Closely monitor respiratory status and intubate early, as indicated. For patient with uncleared c-spine, collaborate with neurosurgery/anesthesia as necessary to assure proper alignment during intubation
- Monitor for autonomic dysreflexia

Respiratory Assessment

- **Respiratory involvement depends on the level of injury:**
- **C1-C4:** Paralysis of diaphragm- will need mechanical ventilation
- **C5-T6:** Paralysis of intercostals, diaphragm OK- may need some form of respiratory support
- **T6-T12:** Abdominal muscles paralyzed- may have some decreased function
- **Monitor respiratory status including:** pattern, effort, ability to cough, auscultated chest, monitor SpO2, ETCO2, blood gas, intubate as soon as clinically indicated
- **Optimize respiratory status:** decompress abdomen via salem sump, perform CPT, incentive spirometry, assisted coughing per MD orders

Spinal Immobilization

- Immobilize spine with c-collar and maintain until cleared by Trauma Services. **Refer to CHOC Pediatric Trauma C-Spine Clearance Guidelines**
- Keep patient on back board until an order is received from neurosurgeon to remove board. Maintain neutral spinal alignment for small children. Assess skin frequently. **Goal to get the patient off the backboard within hour (prior to transport to PICU) unless otherwise directed by neurosurgery.** Set-up cervical traction and/or immobilization devices for cervical spine fractures
- Assist physician in immobilization and postural reduction of spinal fractures
- Prepare for operative intervention based on physician recommendations

Autonomic Dysreflexia (AD)

MEDICAL EMERGENCY

that most commonly occurs in patients with SCI above T6. Characterized by remarkably high BP, intense HA, sweating, flushing of skin above lesion. Most commonly caused by full bladder or bowel.

Management of AD: Notify the physician if suspected, treat the BP and the causative factor (noxious stimulus, i.e. bladder distention, stool impaction, skin issue), loosen tight clothing, sit patient upright (if previously cleared to do so), check for sources of pain

Acute Traumatic Spinal Cord Injury (SCI) Management Inpatient PICU Nursing Assessment and Management



Inclusion Criteria: Acute Spinal Cord Injury Patient
(up through the first week of injury)

First 24 Hours of Injury

- Stabilize vital signs
- Volume resuscitate and support airway and breathing
- Monitor for unidentified injuries,
- **LABS:** serial CBCs and coags q 6 hours, and ABGs q 6 hrs

24-72 Hours Post Injury

- Ongoing stabilization and Monitoring/Prevention of complications associated with SCI
- Monitor for unidentified injuries

72 Hours – 1 Week Post Injury

- Rehabilitation and continued support
- Determining extent of injury/prognosis
- Transitioning patient and family into chronic phase of injury

Vital Signs and Autonomic Control

- Place CVP and A-line upon arrival to PICU (consider removing after 48 hours)
- Monitor VS continuously while in the PICU
- **Goal: Maintain age appropriate MAP (per MD order) to optimize perfusion**
- First administer crystalloid or colloid IV to maintain CVP 4-8 mm Hg then consider the use of dopamine and/or norepinephrine

Assess for complications including:

- Other unidentified injuries
- Loss of autonomic control, particularly in cervical or high thoracic injuries
- **Bradycardia** with ETT or trach suctioning due to unopposed vagal activity (thoracic sympathetic input may have been damaged)
- **Neurogenic shock:** loss of autonomic control/vasomotor tone. Patient may be vasodilated, hypotensive, with a widened pulse pressure. Can last several weeks. Avoid hypotension as this can result in poor perfusion to the spine.
- **Loss of temperature control**

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Neurologic Assessment

- **Neurological assessment and documentation** should be performed hourly for 1st 24 hours then per unit standard of care (if condition stabilizes):
- Sensory level
- Motor function
- Glasgow coma scale
- Pupil response (with pupillometer)

Additional Recommendations/Considerations

The use of steroids is not proven as a standard of care. Evidence of the drug's efficacy and impact is controversial and administration is at the discretion of the neurosurgeon.

Activity/Rehabilitation

- Ensure that rehabilitation services (**PT/OT/Speech**) are consulted within 24 hours of admission
- **Consult Hematology** to collaborate on VTE prevention within 24 hours of admission (patient is at high risk)
- **C-Spine precautions** (with c-collar) until cleared by Trauma Services. **Refer to CHOC Pediatric Trauma C-Spine Clearance Guidelines**
- Place patient on specialty bed (i.e. Roto Rest bed) per provider order
- **Keep patient HOB flat** until otherwise ordered by neurosurgery
- **Log roll** with adequate personnel to turn patient while maintaining spinal alignment
- **Move patient** using sliding sheets with adequate number of personnel maintaining spinal alignment
- **Apply** sequential compression devices while in bed (for VTE prevention)
- Once patient is cleared by neurosurgeon to sit up:
- **-Consult rehab** for specialty cushion for sitting upright
- **-Perform pressure relief** (for 30 seconds every 30 minutes) while patient is in the sitting position

Optimal management requires the comprehensive expertise of the inter professional team. **The goal of treatment is to maximize function and provide the necessary family education to allow optimal home management.** Occupational therapy and physical therapy interventions should be provided throughout the continuum of care

Acute Traumatic Spinal Cord Injury (SCI) Management Inpatient PICU Nursing Assessment and Management

Bladder Management (Neurogenic Bladder)

- In the early acute phase of injury (< 3 days), an indwelling catheter is indicated
- Once the patient has stabilized and on reduced opioids, consider changing to intermittent catheter every 4-6 hours. If bladder volumes consistently exceeds expected capacity, increase frequency of intermittent catheterization and/or consider alternative bladder management method

Estimated pediatric bladder capacity
(2 x age (years) + 2) x 30 = capacity (mL) for children less than 2 years old

(age (years) divided by 2 + 6) x 30 = capacity (mL) for those 2 years old or older with a normal adult capacity of approximately 500 mL

- Long term bladder management may include: use of suprapubic catheter, condom cath, continued intermittent caths, and/or medications to reduce bladder spasm

Potential Complications: recurrent UTI, renal and bladder calculi, vesico-ureteric reflux, and autonomic dysreflexia. Priapism may occur in boys and is usually self-limiting and not a contraindication to catheterization. **Consult urology if priapism is prolonged (>1 hour).**

Prevention of Complications: Maintain adequate patient hydration, good hand hygiene; provide perineal care once a shift and after bowel movements (**Refer to infection Prevention Policy #337: CAUTI-Prevention Strategies**).

Bowel Management (Neurogenic Bowel)

- Bowel may be affected by damage to the nerves that control its function. Constipation can trigger complications such as autonomic dysreflexia. Maintain oral/nasal gastric tube to low continuous suction until GI function returns
- Consult dietitian to assist with bowel management plan
- H2 blocker or PPI for gastric ulcer prevention
- Administer pro-motility medications as prescribed
- Establish nutrition per PICU Enteral Feeding Guidelines and guidance of dietitian

Upon initiation of enteral nutrition, choose one of the following:

Docusate sodium (Colace®) PO BID, or Polyethylene glycol (Miralax™) PO at bedtime
IF ON OPIATES, add senna (Senokot®) PO at bedtime or may substitute Peri-Colace® (fixed dose combination of docusate sodium and senna) PO BID

-If NO stool after 48 hrs on enteral nutrition, choose one of the following:

- Increase Miralax™ to BID, or
- Consider glycerin suppository or bisacodyl suppository once daily

-If NO stool after 24 hrs of increasing Miralax™ or adding suppository, choose one of the following:

- Start Senokot (stimulant) PO daily or BID (if not already started)
- Consider phosphate enema

For impaction: Contact stimulant or osmotic laxative, lubricant and assisted evacuation only if necessary

For diarrhea: Adjust diet, reduce aperients, stool specimen, abdominal X-ray if impaction suspected, consider probiotics

Skin Assessment and Management

Patients with SCI are high risk for altered skin integrity due to loss of sensation of pain, pressure, temperature, and motor function

- Place patient on specialty (Rotorest) bed as ordered
- High risk for pressure ulcers-initiate care plan
- Consider Mepilex border on bony prominences (i.e. scapula, sacrum, heels, elbows) to prevent pressure ulcers, discuss with PT
- Reposition patient at least every 2 hours
- Remove c-collar to clean skin underneath every day (manually immobilize head while collar is off)
- Assess and document full skin assessment (including under c-collar) at least once per shift

Once patient is cleared by neurosurgeon to sit up:

- Consult rehab for specialty cushion for sitting upright
- Perform pressure relief (for 30 seconds every 30 minutes) while patient is in the sitting position

References

Acute Traumatic Spinal Cord Injury Care Guideline

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