Care of Patients with Spinal Cord Injuries Practice Guideline

Purpose: To optimize the care of the spinal cord injured patient and prevent secondary complications.

Admission: All traumatic SCI patients will be admitted to ICU level of care with either Neurosurgery or Ortho Spine consult.

Spine Stabilization:

Patients with SCI should have unstable spinal injuries stabilized as early as possible, goal is within 24-48 hours post injury.

Optimize other injuries in multisystem injured patients with SCI to facilitate early spinal surgical stabilization.

Patients with SCI should be on bedrest until cleared by Neurosurgery/Ortho Spine. Once spinal injury is stabilized, activity should be liberated.

	Phase 1: ICU	Phase 2: Step-down or Floor
Neurological	• Neuro assessments per unit protocol. • Additionally, a neuro assessment should be performed and documented by nursing after any transfer (to new bed, new room, any procedure, etc). • Provider should be immediately notified of any changes in neuro exam.	• Follow phase 1.

Pain/Spasticity	• Assess pain per unit protocol. • Initiate multimodal pain regimen. **Neuropathic Pain:** • Pregabalin 75mg po q12h (can increase to 150 mg q12h at one week if needed) (reduce dosage if creatinine clearance is < 60mL/min) OR • Gabapentin 300 mg po q8h; > 65 years, 100 mg q8h (max 3600mg/day) • Consult pharmacy for titration. Should be weaned off over 1-2 weeks before discontinuing. • Initiate medication soon after injury. **Spasticity:** • Baclofen 10mg PO TID (max 120mg/day). • If minimal response to Baclofen, start Dantrolene 25mg PO Q 24 hrs; may titrate every 7 days to max of 400mg/day. **Monitor LFTs weekly while actively titrating Dantrolene.** **Muscle Spasms:** • Carisoprodol 350 mg po q6h PRN OR • Cyclobenzaprine 10 mg po q8h PRN	-

Respiratory	**All Patients:** • Monitoring: Continuous pulse oximetry & EtCO2 for 7-10 days in patients with high cord injury and/or risk of respiratory compromise. Assess neurological level of injury daily. • **For high cervical spine injuries (C6 and above): Consider daily ABG for 1-2 weeks post injury, with indications for escalation of respiratory support (including intubation) if PaO2 < 50 or PaCO2 > 50 on room air.** • Consider monitoring with serial determination of the vital capacity, FEV1, the peak expiratory flow rate, the negative inspiratory force (NIF). If declining trend, order CXR and ABG with considerations as above. • Pts with weak cough, initiate manually assisted coughing (quad cough) Q 4 hrs. • Implement strict oral cares routine: every 2-4hrs and prn for intubated or unconscious patients; all other patients at minimum once per shift. **Non-Intubated:** • Incentive spirometry (IS) Q 1hr while awake. Nursing to document volume achieved. • If achieved IS volume < 50% predicted, consult Respiratory Therapy (RT) for lung volume expansion. RT Consult in all C spine and upper thoracic injuries- Pulmonary function test + possible addition of oscillatory positive expiratory pressure (OPEP), chest percussion therapy (CPT). Assisted Cough, IPV **Intubated:** • In adults: Implement adult ventilator management EPIC order set which includes VAP bundle and ventilator weaning protocol. • Assess need for respiratory suctioning frequently to avoid mucous plugging. • Consider higher tidal volumes (TV) of 10-15 cc/kg to resolve or prevent atelectasis, if no contraindications. • Consider early tracheostomy who are likely to remain ventilator dependent or to wean slowly from mechanical ventilation. (<7 days) • Consult Speech Therapy (ST) to start Passy Muir Valve (PMV) trials • If not unable to tolerate or inappropriate for PMV, consult ST for alternate communication	• Follow phase 1 non-intubated patient. **Trach:** • Consider larger TV (see phase 1 for parameters). • If remains on ventilator, continue weaning per protocol. • If not completed in phase 1, consult ST for PMV and/or alternate communication methods. **Secretions:** • Same as phase 1. • Discontinue therapies when secretions become thin.

Cardiac	• Vital signs per unit protocol. • Prevent and treat hypotension. **Hypotension:** • MAP Goal ? 80 x minimum 3-7 days (per Spine consult recommendations) from injury for ASIA A-D injuries. • Utilize Norepinephrine as first line agent. • Place arterial line for accurate hemodynamic monitoring. • Obtain central access if utilizing vasopressors. • If persistent vasopressor requirement > 3 days: Consider Midodrine 5 mg po q8h, titrate up to 40 mg/day. • Apply TED hose and /or ACE wraps to bilateral extremities when getting out of bed to chair, remove once back in bed. **Bradycardia:** • Assess for presence of mucus plugs (most common cause of acute bradycardia). • Order Atropine 0.5mg IV q1h prn for HR < 40 and have available at bedside. *If persistent symptoms of bradycardia:* • Start Robinul 0.1-0.2 mg IV or 1-2 mg po q8h to q12h. • Consider external or temporary pacemaker to maintain HR > 60. • If pacing required, consult cardiology.	**Hypotension:** • Must be weaned off vasopressors prior to transfer out of ICU. • Continue or initiate Midodrine doses from phase 1 if needed. • Monitor for need or wean dose as tolerates. • Continue TED hose and/or ACE wraps from phase 1 when out of bed. **Bradycardia:** • Follow phase 1.

Gastrointestinal	• Gastrointestinal assessment per unit protocol. Monitor for nausea, vomiting, signs and symptoms of an ileus. Monitor for incontinence.
	• Initiate bowel regimen on admission.
	• Nursing to notify provider if patient goes more than a day without BM
	Stress Ulcer Prophylaxis:
	• Initiate and continue while patient remains ventilated.
	• Discontinue once patient off ventilator and tolerating goal tube feeds or regular diet x 48 hrs.
	Bowel Care (Prevent and Treat Constipation):
	• Initial upper motor neuron (UMN) regimen: Colace 100 mg po tid, Senna 17.6 mg 8-12 hours prior to digital simulation (typically given at lunch for nighttime digital stimulation) and Dulcolax 10 mg per rectum given along with digital stimulation.
	• Lower motor neuron (LMN) and mixed UMN/LMN injury regimen: Metamucil and manual stool evacuation.
	• No large volume enemas scheduled or routine.
	• Once enteral feedings have begun, bowel care should be done consistently at the same time each day, regardless of involuntary stooling between scheduled bowel care.
	  • Schedule Bowel Routine: Dulcolax suppository at the same time daily with digital/manual stimulation. Discontinue only if excessive diarrhea.
	  • Digital/Manual stimulation: Position patient left side down. Always use lubricant for comfort and to prevent autonomic dysreflexia. Should be done with scheduled Dulcolax suppository.
	  • No BM by 72 hrs of admission: Check for impaction by positioning left side down. No impaction then increase Dulcolax to Q 12 hrs and start Lactulose 20grams PO Q 12 hrs until first BM.
	Diarrhea (liquid >500cc every Q 8 hrs or > 3 stools/day for 2 days):
	• Hold bowel regimen.
	• Start Metamucil 1 packet PO Q 12 hrs
		• Follow phase 1.
		• Cervical level SCI requires 4 weeks of GI ppx

Nutrition	• Consult Speech Therapy for swallow evaluation prior to initiating any oral intake in any SCI patient with cervical spinal cord injury, prolonged intubation, tracheostomy, halo fixation, or after any cervical spine surgery. • Obtain feeding access and initiate enteral support within 48 hrs of injury if no evidence of ongoing shock or hypoperfusion and off IV vasopressors. • Nutrition consult for assessment of calorie and protein needs. Also to provide nutrition support recommendations. • Once full estimated needs are being consistently provided consider ordering indirect calorimetry and/or 24 hour urine urea nitrogen to determine adequacy of nutrition. • Order calorie count when transitioning patient off enteral nutrition to oral intake to assist with titration. • Obtain prealbumin, CBC, CMP, folate and vitamin B12 every Sunday. • Maintain normoglycemia.	• Follow phase 1 - continue current diet orders. • Nutrition to continue to monitor/intervene as per consult. • Transition to oral diet, if not on one, once patient passes ST swallow evaluation.

Genitourinary	• Genitourinary assessment per unit protocol. • Place indwelling catheter unless contraindicated, catheter cares per policy. • Remove indwelling catheter once patient is hemodynamically stable and no longer needs strict I&Os – then assess for volitional bladder control. <u>For patients without volitional bladder control:</u> • Once Foley is removed: STRICT q4h straight cath & 2L fluid restriction. • If volumes are consistently less than 400 mL, can stop fluid restriction and go to q6h straight cath schedule. • Nursing or OT to teach self-cath technique. • **Once patient is on the floor, closely follow ins/outs to ensure cath schedule is followed.** <u>For patients with some volitional bladder control:</u> • Check PVR after emptying bladder to assess need for above regimen. <u>For all patients:</u> • Outpatient urodynamic evaluation with Urology to be scheduled 3 months following injury.	• Follow phase 1. Work towards schedule for time straight caths. • Encourage moderate fluid intake spaced out throughout day to facilitate timed straight caths.

Integumentary	• Skin checks Q shift, pay close attention to bony prominences and under medical devices.
	• Give extra caution when assessing darker skin complexions as early signs of pressure injuries can go unnoticed.
	• If wound or skin concern identified, notify primary team and consult wound care per protocol.
	• Reposition pt at least every Q 2 hrs while maintaining spinal precautions (this includes all SCI pts –pre & post spine fixation, halo traction).
	  • Position wedges above & below bony prominences to offload pressure.
	• Order and utilize TAPS turning system.
	• Patient with c-spine injury must be turned WITH wedges, not pillows to at 30+ degrees. Side lying preferred.
	• Sand beds for c-spine patients. Consider for high T-spine injury or patients with BUE weight bearing restrictions and consult with PT/OT.
	• Place on low air loss mattress.
	• Avoid friction, shearing, moisture and heat. Keep areas under patient clean and dry.
	• Implement pressure injury prevention skin bundle.
	  • Consider placing Mepilex sacral dressing to coccyx/sacrum.
	• Order PRAFO and Prevalon boots. Alternating between the two Q 2 hrs.
	• Incision and drain wound care per orders.
	• Maintain normothermia.
		• Follow phase 1.
		• Consider specialty bed for floor
		• Order ROHO or GeoMatt cushion for wheelchair, utilize any time pt out of bed in chair.

Mobility & Rehab	• Consult physical therapy (PT) and occupational therapy (OT) for evaluate and treat. (should be seen within the first week, even if sedated/intubated) • Consult PM&R. • For cervical spine injuries, continue c-collar at all times. • Utilize brace, if ordered, when HOB > 30° and out of bed (confirm with neurosurgery). • Splinting should be considered for all patients at risk of contracture. • Let fingers flex passively and DO NOT overextend. This can cause loss stretch-induced paresis. • Sip and puff call light if pancake call light isn't sufficient. Can consult OT for assistance with hydration system. • Consult SLP for communication needs (eye gaze system, etc.) • Early and aggressive mobilization. **Head of Bed:** • A gradual increase in HOB elevation, beginning at 15–30 degrees and advancing to 45 degrees or higher as tolerated, to promote upright tolerance and reduce the risk of orthostatic hypotension. • Unstable spinal injury requiring surgical fixation: Do not elevate HOB. Keep patient in reverse Trendelenburg unless contraindicated. • Stable fractures or post spinal fixation: HOB should remain elevated to at least 30° unless contraindicated. **Activity:** • Unstable spinal injury requiring surgical fixation, bedrest until fixation occurs. • Once spinal stabilization has occurred, discontinue bedrest order and place activity order. • Passive ROM should be performed daily for all major joints to prevent contractures. Active ROM when able. • Assess patient with the Bedside Mobility Assessment Tool before initiation of out of bed mobility. • Goal: Out of bed to chair or wheelchair Q 12 hrs once medical and spinal stability has been achieved. • For best practice, while in chair	• Follow phase 1, continue to increase activity as tolerates. • PT/OT to assess need for orthotics of UE/LE.

VTE Prophylaxis	• Pneumatic compression +/- Graduated compression stockings- ASAP when no LE injury C/I. Order SCDs, to be worn while in bed or sitting. (Including children of all ages) • No routine DVT screening. • Consider IVC filter if delay in starting chemical prophylaxis; otherwise no routine IVC filter placement. **Chemical VTE prophylaxis** • **First line acute phase – Lovenox 30 mg BID. Recommendation against Heparin unless LMWH not available or contraindicated** Timing of initiation • Stable spinal injury requiring no surgical fixation: Initiate Lovenox 30mg BID 24 hr. after admission. • Unstable spinal injury requiring surgical fixation: Start DVT PPX 24 hrs. post injury, if no other C/I and there is delay in OR for spine fixation. Hold morning dose on the day of surgery. • Unstable spinal injury post spinal fixation: <48 hrs. (as early as 24 hrs. post is safe) after surgery initiate Lovenox 40mg Q daily for 5 or 7 days then can transition to Lovenox 30mg BID dosing. (Check with Surgeon) • For patients with renal dysfunction, utilize Heparin 8000u SQ Q 8hrs. • Continue chemical prophylaxis for at least 8 weeks post injury in patients with limited mobility. Consider longer duration in motor complete injuries, lower-extremity fractures, older age, previous VTE, cancer, and obesity • Rehab phase – LMWH preferred, other options warfarin (INR 2-3) or DOAC. • Chemical VTE prophylaxis should be held prior to drain removal post-surgical fixation. Neurosurgery or Ortho spine to place this hold order.	• Continue SCDs and chemical DVT prophylaxis.

Psychosocial	• Consult psychology. • Assess for depression. • Foster effective coping strategies. • Utilize assistive devices including specialty call lights and communication boards. • Identify, educate, and support family/caregivers. • For pediatric patients or patients with children or younger siblings consult child life.	• Follow phase 1.
Discharge Planning	• Communicate early with care transitions to determine disposition options. • Consult social work to facilitate placement.	• Continue discharge planning.
Education	• Begin teaching family and/or family/caregiver cares early on in stay once patient medically stable. **Respiratory:** How to manually assist coughing. Trach – suctioning and trach cares. **Cardiac:** How to apply TED hose or ACE wraps prior to getting patient out of bed. **GI:** Importance of bowel care schedule and how to manually stimulate. **GU:** How to preform clean straight caths and catheter cares. **Integumentary:** Importance of maintaining skin integrity and frequent assessments of skin. **Autonomic Dysreflexia (typically develops a few months post-SCI):** Signs and symptoms, causes, prevention and treatment.	• Continue to follow phase 1. Reinforce education and practice.

Author and last update

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