Shepherd Center

Reducing Complications After *Brain Injury*

Early prevention strategies can reduce secondary complications and improve patient outcomes.

Paroxysmal Sympathetic Hyperactivity (PSH) - Dysautonomia or Neurostorming

- Assess symptoms and patterns to determine cause or trigger (suctioning, position, infection, medical issue).
- Treat sympathetic overactivity (fevers, sweating, tachycardia and hypertension) with fever reducers, beta blockers and alpha-2 agonists, as necessary.
- Treat pain aggressively to decrease PSH effects. Consider acetaminophen (IV or enteral), anticonvulsants, short or long-acting narcotics.
- Monitor and treat spastic dystonia with oral medications, botulinum toxin, and consider intrathecal baclofen in severe cases.
- Pre-medicate to prevent or lessen neurostimulation during interventions or treatment.
- Provide additional padding and frequent position changes.
- Change wet linens due to diaphoresis and use fans or cooling blankets to reduce body temperature.
- Monitor for risk of skin breakdown at bony prominences due to motor restlessness.
- Increase hydration, caloric, and nutritional intake.
- Reduce environmental stimulation: sounds, light, room temperature, extra physical handling.

TIP: While PSH generally indicates a more severe injury, in the majority of cases it decreases over time and interventions should be tapered off.

Provide Aggressive Pulmonary Care and Protect Airways

- Control secretions with oral and deep suctioning.
- Provide oral care twice per day, including swabbing with normal saline or oral chlorhexidine.
- Elevate head of bed.
- Evaluate the patient for extubation.
- Provide trach care daily, including swabbing around tracheostomy with hydrogen peroxide solution and changing split gauze.

Prevent Aspiration

- Consult speech therapy regarding swallowing.
- Elevate head of bed for all tube feeds and monitor residual levels.
- Consider GJ tube placement for feedings.

Prevent Venous Thromboembolism (VTE)

- Use appropriate pressure-grade/ sequential stockings.
- Administer low-molecular-weight heparin when the patient is stable and the risk of bleeding is low.
- Assess extremities frequently for swelling, discoloration, temperature or asymmetry.
- Consider a vena cava filter, especially for patients who are not candidates for anticoagulation or have not responded to prophylaxis.

For additional education on these topics, visit Shepherd Center NeuroRehabilitation Learning Institute at ***education.shepherd.org.***

Neuropharmacology

- Manage autonomic overactivity and/or agitation with amantadine in individuals in DoC and propranolol for severe brain injury. This is suggested usage, though solid evidence-based studies are lacking in acute period.
- Eliminate drugs that are sedating.
- Regulate the sleep/wake cycle to improve alertness and agitation.
- Use medications with the least detrimental effect on sleep and seizure threshold.
- Weigh the benefits and risks of medications. The side effects may contribute to other complications (e.g., seizure).
- Treat spasticity systemically with oral medications before considering other interventions.

Maintain Skin Health

- Check bony prominences after every turn. Examine the entire body for signs of bruising, redness, or abrasions.
- Keep skin clean and dry. Control moisture. Take careful consideration of skin folds and the perineal area.
- Implement an every 2-hour turn schedule for padding and positioning, unless medically contraindicated.
- Use draw sheets and lifts to reposition the patient, reducing risk of shear.
- Promote early out-of-bed schedules and routine weight shifts while up.
- Provide foot hygiene or care; trim nails, monitor for thick callouses, as there may be a pressure injury underneath.
- Consider supplemental nutritional support.
- Routinely check that pressure-relieving equipment, seat cushions, and mattresses are working and being used properly.

Environment of Care

- Encourage a low-stimulation environment and rest breaks.
- Keep environment calm and comfortable. Assess room temperature, sounds, lighting, and extra people in the room.
- Provide consistent routine, avoid rushing care, use a calm voice, redirect as needed, and be mindful of your body language.
- Look for patterns that impact overall status and vital signs.
- Provide patient with a clear explanation of any interaction before beginning.
- Remove objects in the environment that could cause harm to the patient or others.

Behavior Management

- Manage agitation. If sedatives, benzodiazepines, or antipsychotics are ordered, consider drug interactions and half-lives of medications.
- Monitor behavior in conjunction with medication changes. Observe agitation, participation, and wakefulness.
- Address pain and other personal care needs that may lead to increased agitation.
- Use constant visual observation, telemonitoring, behavior plan, or physical restraints to ensure safety.
- See 'Environment of Care' section.

Notify physician immediately if patient exhibits:

- ***Hydrocephalus:*** impaired consciousness, behavioral changes, ataxia, and incontinence.
- ***Increased Intracranial Pressure (ICP):*** *vomiting, slowed or irregular respirations, bradycardia, systolic hypertension, decorticate/decerebrate posturing.*
- ***Cerebral Spinal Fluid (CSF) Leak:*** clear drainage from nose, eyes and/or ears.
- ***Sunken flap syndrome (Syndrome of the Trephined):*** common in patients after decompressive cranioplasty, especially after shunt placement for hydrocephalus. Complications can occur with a midline shift. Consider early cranioplasty if shunt adjustment, lowering the head of the bed and hydration are unable to resolve sunken flap.
- ***Seizures:*** may present atypically. Follow hospital guidelines for seizure response.
- ***Endocrine disorders:*** monitor strict I/O, weight changes, fluid/electrolyte imbalance, urine and serum sodium, and osmolality.

Bowel and Bladder

- Consider the impact of cognition, communication and mobility impairments on incontinence.
- Monitor for constipation and impaction. Discontinue medications that cause constipation.
- Remove indwelling catheters as soon as possible to lower risk of infection. Use intermittent catheters when appropriate and monitor for urinary retention.
- Introduce bowel and bladder elimination programs as early as possible.

Pain Management

- Treat acute pain to prevent chronic pain.
- Consider how pain affects cognitive and emotional functioning.
- Consult with therapy to coordinate interventions such as ice, heat, positioning, splinting, and other modalities.
- Be aware that excessive complaints of pain could be confabulation or real pain.

Intervene with Early Therapy

- Provide early range of motion (ROM) activities and splinting to prevent contractures, maintain skin integrity and preserve joint mobility.
- Promote out-of-bed schedules and early mobility to reduce the risk of complications such as venous thromboembolism (VTE), respiratory infection, and bowel impaction.
- Preserve abilities through therapeutic activity, which promotes and improves arousal, communication, strength and endurance.
- Consult with a speech-language pathologist (SLP) regarding swallowing and communication strategies.
- Use the Coma Recovery Scale - Revised to assess patients with severe brain injury.

Refer to the DoC Practice Guidelines and Recommendations for an evidence-based approach to care for severe brain injury. **Please reference https://www.neurology.org/doi/10.1212/WNL.0000000000005926**

Rev. 06/2026