

Autonomic Dysfunction

What kind of autonomic dysfunction does my patient have?

- Spinal cord injury/lesion (T6 or higher) → Autonomic dysreflexia [**life threatening**]
- Brain injury/lesion (esp TBI, hypoxia, stroke) → Dysautonomia/Cerebrally-mediated autonomic dysfunction/Paroxysmal Sympathetic Hyperactivity, aka "storming"

	Autonomic Dysreflexia	Dysautonomia/PSH
Definition	Exaggerated autonomic response to stimulus below the lesion that can lead to life-threatening elevation in blood pressure	Paroxysmal dysautonomia or autonomic "storming" <i>without other identifiable causes of symptoms</i> (ddx includes pain (most common!), infection, dehydration, drug fever, heart disease, rhabdo, narcotic withdrawal)
Causes	Any noxious stimuli below the level of injury <ul style="list-style-type: none"> - Bladder: distension, UTI, stones, kinked catheter, detrusor/sphincter dyssynergia - Bowel: constipation, distension, anal fissure, enemas or suppositories, colonoscopy - Other: acute abdomen, tight clothing or device, ingrown toenail/hair, hair tourniquet, pressure ulcer, laceration, PE/DVT, fracture/MSK trauma, GU causes (including menstruation), meds 	Mostly unknown! Hypothesized causes include: <ul style="list-style-type: none"> - Loss of central inhibitory regulation of control centers in medulla that control VS - Hyperreflexic autonomic response due abnormal processing of stimuli Common provoking factors: constipation, full bladder, kinked foley, UTI, fracture, heterotopic ossification, splints too tight/been on too long, pressure ulcers, IV site irritation, long fingernails/toenails, mucus plugs, increased secretions, inappropriate vent settings, cold feeds, GERD, dehydration
Signs/ Symptoms	<ul style="list-style-type: none"> - Elevation in BP >15-20mmHg above baseline (recall that baseline may be low for age) - Headache (pounding, behind eyes), blurry vision - Flushing/sweating above lesion - Bradycardia > tachycardia - Nasal congestion - Paresthesias - Increased spasticity - Metallic taste in mouth - Anxiety <p>Typically occur between 2-6 months after injury and frequently subside within 3 years.</p>	<ul style="list-style-type: none"> - Increased HR, RR, temperature - BP changes (though not usually an emergency like autonomic dysreflexia) - Sweating - Hypertonia, dystonia, posturing <p><i>Acute phase (as early as 1 week after injury)</i></p> <ul style="list-style-type: none"> - Provoked or unprovoked - Varying intensity and duration but typically short <p><i>Subacute phase (1-3 mo after injury)</i></p> <ul style="list-style-type: none"> - Variable frequencies but typically less <p><i>Chronic phase (up to years after injury)</i></p> <ul style="list-style-type: none"> - Typically only provoked and overall less frequent/intense - Can result in life-long tone issues
Call Experts!	Call PM&R ASAP at the first suspicion for either pathology and before starting medication.	
Manage & Treat	Monitor BP every 5 minutes <ul style="list-style-type: none"> - First: Sit patient up, loosen restrictive clothing/devices - Evaluate bladder: If catheter in place, check for kinks/obstruction; if not, bladder scan or catheterize - Evaluate bowel- for impaction (may need to treat BP prior to complete evaluation): Instill topical anesthetic (like lidocaine jelly), wait 5 minutes, then perform rectal exam and possible manual disimpaction - If BP still elevated, call PM&R on-call team Medication: Nitropaste (NG ointment) most common <ul style="list-style-type: none"> - Fast-acting and short duration of action - Can be wiped off once cause of AD is determined and corrected - Apply 1/2 inch strip above the lesion level (ie could be forehead if cervical injury) - Can continue applying 1/2 inch every 5 minutes until BP in normal/safe range 	<p><i>Decrease external stimulation:</i> Dim the lights, decrease noise, limit visitors, rest</p> <p><i>Decrease internal stimulation:</i> Remove noxious stimuli, attempt to treat underlying cause, cool with environmental controls (<i>antipyretics often don't help</i>)</p> <p><i>Pharmacologic</i></p> <ul style="list-style-type: none"> - Pain → analgesics, agitation → benzodiazepines, withdrawal → opiates/benzos - <u>1st line:</u> beta blockers (propranolol, if prominent HTN; if bradycardia after, can give Albuterol, but if on Albuterol for pulm disease and hypertensive, can switch to Xoponex instead; if NPO, can give labetalol IV), benzos (Diazepam, short term), dopamine agonists (bromocriptine, long term), - <u>2nd line:</u> alpha agonists (clonidine, often patch), Ca channel modulators (gabapentin, can help manage tone/neuropathic pain; dantrolene, no cognitive suppression and doesn't affect seizure threshold but can cause hepatotoxicity), gaba B agonists (baclofen), opioids (morphine, methadone) <p><i>Consider unmasked dysautonomia vs. withdrawal if symptoms with weaning of opiates/benzos.</i></p> <p><i>If sleeping well, dose during daytime (shouldn't storm while asleep). If not sleeping well, given around-the-clock dosing.</i></p>
Identify Potential Complications	Seizures, MI, CVA, intracerebral hemorrhage, SAH, retinal hemorrhage, neurogenic pulmonary edema, arrhythmias, coma, death	<p><i>Immediate</i> → Increased energy expenditure, feeding intolerance, longer duration of posttraumatic amnesia/mechanical ventilation/coma</p> <p><i>Increased duration</i> → increased risk of 2° brain injury, nosocomial infection, spasticity, fractures/dislocations, development of heterotopic ossification</p>