

Weakness

Summary from Rosen's By William Fox

Epidemiology

- Linked closely to epidemiology of many other disorders; majority of cases are secondary to underlying medical condition
 - Higher likelihood of weakness as a secondary symptom in patients with cardiovascular or pulmonary dysfunction, diabetes, and cancer
- CNS causes are much less common

Pathophysiology

- Causes of global weakness include alterations in plasma volume and composition, changes in blood composition, variations in cardiac output resulting in decreased substrate delivery, and toxin exposure modifying metabolic demand, global CNS function, or mitochondrial activity
- Localized weakness more likely due to decreased substrate delivery due to hemorrhage or ischemia, aberrant inflammatory processes, in addition to neoplasms and toxin exposures

Differential Diagnosis (with critical diagnoses in bold)

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| • Dehydration | • Ischemic or hemorrhagic CVA |
| • Hypo/hyperglycemia | • Inflammatory demyelination (GBS) |
| • Electrolyte imbalance | • Disc herniation |
| • Myocardial ischemia | • Cord compression (internal) |
| • Vasodilatory shock/sepsis | • Tumor |
| • Organophosphate/Botulism exposure | • Rhabdomyolysis |
| • Vitamin deficiency | • Alcohol |
| • Cord compression (entrapment syndrome, compressive plexopathy) | • Trauma |

Signs and Symptoms

- Specific signs and symptoms depend on underlying cause of weakness
 - General symptoms of weakness include tachycardia or tachypnea, temperature abnormalities, and hypotension
- Important to differentiate global weakness from neuromuscular weakness; global weakness can be accompanied by other signs of myocardial dysfunction such as orthopnea or other CHF symptoms
 - Weakness secondary to anemia may present with history of melena or hematochezia, blood per rectum, pallor, or vital sign abnormalities
- Weakness symptoms secondary to lesions in motor neurons depend on the location of the lesion
 - Upper motor neuron lesions can result in limb spasticity, hyperreflexia, pronator drift, and upgoing Babinski reflexes
 - Lower motor neuron lesions result in flaccidity, decreased reflexes, fasciculation, and muscle cramping
- Patterns of neuromuscular weakness often reveal location of lesion (See Rosen Figure 13-1 for full analysis of patterns)
 - Bilateral Lower extremities → Anterior cord compression/GBS/cauda equina
 - Bilateral Upper extremities → Central cord pattern → hyperextension injuries/syringomyelia
 - Bilateral All extremities, no facial involvement → Cervical cord injury
 - Bilateral Proximal extremities only → Rhabdomyolysis/polymyositis/dermatomyositis
 - Bilateral Distal extremities only → GBS/chronic peripheral neuropathy
 - Unilateral weakness in leg/hand/arm with ipsilateral face → Contralateral cerebral cortex
 - Unilateral weakness in leg/hand/arm with contralateral face → Brainstem lesion → look for CN involvement
 - Unilateral weakness in leg/hand/arm with no face → Brown-Sequard/Internal capsule or homuncular lesion
 - Unilateral weakness in one limb → spinal cord or peripheral nerve lesion
 - Unilateral facial droop → CNVII neuropathy/Bell's palsy/mastoiditis/parotitis
 - Non-CNVII neuropathy facial weakness → brainstem lesions/NMJ problems

Work-up

- Most laboratory testing is best to exclude non-neuromuscular causes of weakness

- Characterization of issue relies on practitioner following the weakness from the myofiber to the CNS and characterizing it as unilateral or bilateral
 - Physical exam should focus on muscle strength and reflexes of specific groups
- Imaging is crucial for new onset weakness attributed to spinal or cerebrovascular incident
 - CT, consider MRI

Empiric Management

- For non-neurological causes of weakness, correction of the underlying issue is important
 - Suspected MIs/CVAs require appropriate, aggressive intervention
- New spinal cord weakness calls for immediate imaging
- Rhabdomyolysis, dehydration, and electrolyte imbalance are treated with fluids

Disposition

- Depends on extent of weakness
 - Mild LMN weakness determined to be benign on work up may be discharged
 - More serious cases of weakness require more aggressive intervention, especially if airway or breathing is compromised
 - Progressive LMN or new-onset UMN weakness should be admitted for full work-up