Spinal Cord Disorders
MHD Clinical Correlation – Neuroscience Block

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Anatomy Review
Anatomy Review

Clinical Localization – motor and sensory

Motor level determination (strength and MSRs)  Sensory level determination (dermatome)
Clinical Localization – UMN vs LMN

<table>
<thead>
<tr>
<th>Sign</th>
<th>Upper motor neuron lesion</th>
<th>Lower motor neuron lesion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weakness</td>
<td>More diffuse</td>
<td>More focal</td>
</tr>
<tr>
<td>Atrophy</td>
<td>Slight, general (often from disease)</td>
<td>Focal, severe</td>
</tr>
<tr>
<td>Atrophy versus weakness</td>
<td>Severe weakness occurs with relatively little atrophy</td>
<td>Some strength may be preserved despite severe atrophy</td>
</tr>
<tr>
<td>Fasciculations</td>
<td>Never seen</td>
<td>Can be present</td>
</tr>
<tr>
<td>Muscle tone</td>
<td>Increased (except in spinal shock)</td>
<td>Decreased</td>
</tr>
<tr>
<td>Muscle stretch reflexes</td>
<td>Increased (except in spinal shock)</td>
<td>Decreased</td>
</tr>
<tr>
<td>Clonus</td>
<td>Can be present</td>
<td>Never present</td>
</tr>
<tr>
<td>Pathological reflexes (Babinski sign)</td>
<td>Present (except in spinal shock)</td>
<td>Absent</td>
</tr>
</tbody>
</table>

Clinical Localization – Intra- vs extramedullary

**Intramedullary vs. Extramedullary Lesions**

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>INTRAMEDULLARY</th>
<th>EXTRAMEDULLARY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>Diffuse or none</td>
<td>Radicular</td>
</tr>
<tr>
<td>Sensory loss</td>
<td>Suspended</td>
<td>To a level or sacral</td>
</tr>
<tr>
<td>Sacral sparing</td>
<td>Present</td>
<td>Absent</td>
</tr>
</tbody>
</table>

Clinical Localization - Radicular

- Radicular (root) pain lightning, stabbing, shooting pain in the dermatomal distribution
- Motor, reflex or sensory abnormalities correlate with a specific root level
- Originates from inflammation or extramedullary compression (e.g., herniated disc)
- A dull, local pain may occur from an extramedullary lesion itself and an intramedullary spinal cord lesion may produce diffuse pain or none at all.
Transverse myelopathy

Clinical Features
- LMN signs and level of sensory loss localize the spinal level of the lesion
- UMN signs develop in limb muscles innervated by anterior horn cells below the level of the lesion

Etiologies
- Trauma
- Viral infections
- Multiple sclerosis
- Extramedullary tumors
- Cervical spine degenerative disease

Spinal cord hemisection

Clinical Features
- Contralateral spinothalamic deficit of pin, temperature
- Ipsilateral weakness (corticospinal tract), ipsilateral dorsal column deficit of vibration and position sense

Etiologies
- Trauma
- Extramedullary tumors
- Cervical spine degenerative disease

Central cord syndrome

Clinical Features
- Initial suspended (vest like) spinothalamic sensory loss with sacral sparing
- Position sense & vibration spared
- Lesion may then disrupt anterior horn cells (LMN signs), or may cause paraparesis if corticospinal tract involved

Etiologies
- Syringomyelia
- Intramedullary tumors
**Anterior cord syndrome**

**Clinical Features**
- Sudden hyperreflexia, spastic paraparesis, loss of pain and temperature below the lesion level (lower thoracic or upper lumbar)
- Position sense & vibration spared

**Etiologies**
- Anterior spinal artery occlusion

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**Dorsal column syndrome**

**Clinical Features**
- Impaired vibration and position sense
- Spares pain and temperature sensation
- Spares strength (may develop areflexia)

**Etiologies**
- Infection (Syphilitic cord disease – *Tabes dorsalis*)
- Vascular (posterior spinal arteries)
- Trauma
- “Early” delayed radiation myelopathy
- Chemotherapy

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**Posterolateral syndrome**

**Clinical Features**
- Impaired vibration and position sense
- Spares pain and temperature sensation
- UMN signs in the lower extremities

**Etiologies**
- Vitamin B12 deficiency, Vitamin E deficiency, Copper deficiency
- Substance abuse (Nitrous oxide exposure, heroin)
- Infection (HIV and HTLV-1)
- Chemotherapy (Methotrexate)
- Vascular (Spinal dural arteriovenous fistula)
Anterior horn syndrome

Clinical Features
- LMN signs (can involve cranial nerves as well)
- Sensation spared
- UMN signs appear in ALS

Etiologies
- Hereditary (Spinal Muscular Atrophies)
- Infectious (Poliomyelitis, West Nile virus)
- Amyotrophic Lateral Sclerosis (ALS)