Myelopathy vs Radiculopathy

Sarah Sullivan, DO
Northwest NeuroSpecialists
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Spinal cord

- Anatomy
  - Terminates at L1-2 - conus/filum terminale
  - Segments with dorsal/ventral rootlets, form roots, fuse to form spinal nerve - 31 pairs
  - Gray matter: posterior/lateral/anterior columns

Spinal cord

- Vascular: 1 anterior spinal aa/2 posterior spinal aa; anterior and posterior spinal veins

Spinal Cord Syndromes

- Complete cord transection
- Brown Sequard Syndrome
- Anterior Spinal Artery Syndrome
- Posterolateral Column Syndrome

Spinal Cord Syndromes

- Central Lesion
- Posterior Column Syndrome
- Anterior Horn Cell Syndrome
- Combined Anterior Horn cell Pyramidal Syndrome

Conus vs Cauda

- Conus medullaris lesion
  - symmetric sensory/motor; bladder/bowel/sexual fxn early; sudden and bilateral
- Cauda equina lesion
  - pain more prominent; gradual and unilateral

Infectious/Inflammatory Myelopathy

- Acute/subacute sx's
  - MRI: intramedullary lesions without evidence of extrinsic cord compression
- Sx: fever, meningismus, encephalopathy, known systemic infection, rash, immunocomp
- Infectious: Viral/Bacterial

Infectious/Inflammatory myelopathy

- Inflammatory: most commonly demyelinating
- MS, NMO, post-infections/vaccinial, ADEM, auto-immune disease associated, neoplastic/paraneoplastic
- IV steroids, plasmapheresis, disease-modifying medication

Hereditary Myelopathy

- Spinocerebellar degeneration
- Motor neuron disorders
- Leukodystrophies
- Distal motor-sensory axonopathy

Vascular Myelopathy

- Spinal cord ischemia
  - Sx: sensory first, then weakness (flaccid)
  - Cause: physical activity, vascular manipulation, systemic hypotension
  - Dx/Management: MRI/prevent recurrence
- Hemorrhagic
  - Sx: sudden, severe pain; meningeal irritation
  - Cause: ? spinal angioma; vascular malformations
  - Dx/ Management: MRI, LP/alleviate the local cause of hemorrhage

Metabolic/Toxic Myelopathy

Nutrient Deficiency	Geographic Predilection/Toxin	Non-Geographic Predilection/Toxin	May present as Metabolic Myelopathy
Vit B12 deficiency	Lathyrism	Cehmotherapy related myelopathy	Adult polyglucosan body disease
NO toxicity	Fluorosis	Organophosphate toxicity	Mitochondrial disorders
Folate deficiency	Tropical myeloneuropathies	Superficial siderosis-related myelopathy	Hexosaminidase A deficiency
Vitamin E deficiency	Recurrent optic neuromyelitis with endocrinopathy	Hepatic myelopathy	Arginase deviciency (AR)
AIDS-assoc myelopathy			Biotinidase deficiency (AR)
Copper deficiency			

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Compressive/Traumatic Myelopathy

- Causes:
  - Neoplastic - spinal mets, intradural tumors
  - Non-neoplastic - cervical spondylosis
  - Traumatic
- Imaging: MRI, CT Myelogram
- Management: potentially treatable!

Compressive Myelopathy

- Image

Spinal Nerve Root Disease: Anatomy

- Spinal nn roots: sensory and motor axons as they exit the spinal cord
  - oligodendroglial myelination to Schwann cell myelination
- 31 pairs of spinal nn roots: 8 cervical, 12 thoracic, 5 lumbar, 5 sacral, 1 coccygeal
- Nutrients from arterial circulation and diffusion from CSF
- Vascular from dorsal branch of segmental aa

Spinal Nerve Root Disease

- Image

Nerve Root Disease: Pathophysiology

- Vulnerability to entrapment, compression, transection, invasion, ischemia
- Compression
  - focal demyelination-conduction block vs conduction velocity slowing
  - axon loss

Radiculopathy

- Leading cause of nerve root disease: intervertebral disc disease and spondylosis
  - damage at the disc, uncovertebral joints, facet joints
- Risk factors: physical exertion or trauma, male
  - L5/S1, C7
- Localization: significant variability

Radiculopathy

- Clinical diagnosis: H&P
  - neck/shoulder; back/buttock
  - exacerbation with Valsalva, Spurling's, straight-leg raise
  - Reconsider with Lhermitte's, bowel/bladder
  - pain, paresthesias, weakness
- Diagnostic testing
  - MRI/CT myelogram
  - EMG/NCS

Radiculopathy: Clinical findings

Root	Pain/Sensory	Weakness	Reflex
C5	Neck/shoulder	Shoulder abduction; ext rotation; forearm supination	Biceps/brachioradialis
C6	Lat arm/forearm/thumb	As with C5 and pronation	Biceps/brachioradialis
C7	Middle finger/hand	WE/WF/forearm pronation	Triceps
C8	Medial forearm/hand	Finger/wrist extension/abduction/adduction	Triceps
L2-3-4	Back/ant thigh/medial LE	Hip flexion/adduction/knee extension	Patella
L5	Buttock/lat thigh/dorsum foot/great toe (webspace)	Hip abduction; DF, foot inversion/eversion	
S1	Buttock/lat-post thigh/post calf/lat-plantar foot	Hip extension/ PF	Achilles

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Radiculopathy

- Image

Cervical Radiculopathy: Management

Acute Sensory	**Cervical imaging** **Avoid triggers and bedrest** **NSAIDs, steroid taper** **Cervical traction if foraminal stenosis** **Re-eval in 4 weeks**
Acute Motor	Cervical imaging Neruosx/ortho consult Avoid triggers, avoid bedrest NSAIDs, steroids Cervical traction if foraminal stenosis
Subacute Chronic	PT TENS Neurosx/Ortho consult

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Lumbar Radiculopathy: Acute Management

Pain/Sensory Loss	**NSAIDs, brief narcotics, brief Bedrest (<2 days), avoid trigger, oral steroids x 10-14 days, gradual mobilization**
Mild Motor Deficit	As above with MRI, EMG if no improvement in 3 weeks, PT when pain is stable
Marked Motor Deficit	As above with urgent MRI, neurosx/ortho consult, EMG in 3 weeks, PT when pain is stable

Lumbar Radiculopathy: Subacute Management

Medical/Neurologic Re-eval
MRI +/- Neurosx/Ortho eval
More agressive mobilization/PT
Medical management: NSAIDs, prn gabapentin, Lyrica, Cymbalta, tricyclics for neuropathic pain

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Polyradiculopathy

- Damage to multiple root segments simultaneously or progressively
  - single limb/bilaterally/diffusely

Polyradiculopathy: Differential Diagnosis

	Myelopathy	Polyradiculopathy	Polyneuropathy
Diabetes		+	+
Adrenal Insufficiency		+	+
Paraneoplastic syndrome	+	+	+
Lyme disease	+	+	+
Viral infxn (HSV, CMV, VZV, EBV)	+	+	+
Spinal cord infarction	+		
Motor Neuron Disease	+		+
Vasculitis	+	+	+
Syrinx, MS	+		

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Questions?

http://www.adzuna.co.uk/blog/2012/01/24/graduate-competition-intensifies-how-are-you-managing/end-is-near-cartoon-9/