“DOC I CAN’T SIT…”

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Lumbar plexus: L1-3
Sacral plexus: L4, 5  S1-4
Sciatic nerve: L4-S3
72 y/o man w/ persistent R sciatica status post L4-5 laminectomy/foraminotomy

- Coronal
- STIR

45 year old prisoner
- pain - years - no sitting

Axial CT scan

Sacrum
- Latin “sacer” – sacred
- Offered in sacrifices
- Five vertebrae – fuse 16-18 years – single bone 26 yrs
What is your diagnosis?

- 1) he is a malingering
- 2) metastatic disease
- 3) myeloma
- 4) lymphoma
- 5) chordoma

26 year old male progressive back pain after snowboarding advil and ice - right leg numbness
Why was the biopsy non-diagnostic?

- 1) the biopsy specimen was inadequate
- 2) the cytologist did not perform correct stains
- 3) the patient received steroids

14 year old male back pain difficulty urinating treated for discitis
Ewing Sarcoma

- Metastatic involvement of spine more common than primary
- 10-30 years of age - pain w/ loss of bowel/bladder function
- Sacrococcygeal region most common
- Permeative bone lysis osseous expansion sclerosis
- Chemo, XRT sacral tumors worst px
Chordoma

- Low grade malignant neoplasm
- Axial skeleton - arise notochordal remnant
- 1-4% - lytic with focal bone remnants
- Purely lytic associated with soft tissue
- Slow growing - difficult to cure
- Bubbly physaliphorous cells (glycogen, mucin signet ring)

32 year old male pain in L5-S1 distribution weakness

Axial STIR

Post-gad T1 fat sat
What was pathologist’s dx?

Presence of cartilage - ? Disc fragment?

Chondrosarcoma

- Relatively low-grade
- Characteristic chondroid matrix (rings and arcs)
- Cortical destruction
- Can involve adjacent disc levels, ribs
- May arise from osteochondroma (cartilaginous cap)

Giant Cell Tumor

- Majority in sacrum - can cross joint
- more frequent females (increase size pregnancy)
- Expansile bone lysis - no matrix
- Vertebral body collapse, posterior elements
Spinal paraganglioma

- Extradrenal - primarily head and neck
- Liver, larynx, duodenum, retroperitoneum, orbit, aorta
- >70 cases since 1970s
- All benign tumors
- Zellballen histology - granular cytoplasm, large nucleoli, vascular stroma, arranged cords
- Prognosis good - radiation if incompletely resected
**Benign Notochordal Tumor**

- Notochordal hamartoma
- No bone destruction  soft tissue
- Bony sclerosis
- High T2
- Resect vs. observe?

**70 year old male**

esophageal cancer tailbone pain
CT Scan

Bone Scan

Figure 4

Axial T2

Sag STIR
Bonus: who was Tarlov?

1) radiologist
2) neurosurgeon
3) pathologist
4) neurologist
Isadore M. Tarlov

1905-1970 Neurosurgeon
1938 Incidental finding in study of filum structure

Extraspinal Sciatica

Persistent R sciatica s/p L4-5 laminectomy

Axial T1

Axial STIR

Coronal STIR

Axial STIR
A 51-year-old female with multiple sclerosis and right-sided sciatica.

**Material**
- 22 patients
- 24-87 yrs old, Mean age 52.2
- 17 females, 5 males
- 100% Ipsilateral buttock and leg pain
- 20 (91%) MRIs
- 11 (50%) EMGs
- 7 (32%) surgeries

**Results: MRI Sciatic Nerve**
- 20/22 sciatic nerve MRIs (13 abnormal, 65%).
- **Signal intensity** (mean 497 +/- 958) of the sciatic nerve on the symptomatic side, was **significantly higher** than asymptomatic side (429 +/- 854, P=0.043).
- No significant difference between the size of sciatic nerve on symptomatic side and abnormal side although there was a trend for smaller size on the symptomatic side.
Results: Sciatic Nerve Block

- 19/22 (86%) immediate pain relief
- Duration of pain relief 1-10 days.
- No complications.
- EMG: 11/22 had electrodiagnostic studies, 2 were abnormal (18%)

Surgical Results
(Decompression of the sciatic nerve with sectioning of the Piriformis Muscle)

<table>
<thead>
<tr>
<th>Patients</th>
<th>MRI</th>
<th>Response to Injection</th>
<th>Response to Surgery</th>
<th>Surgical Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Fibrous band or scar tissue with mass effect on the sciatic nerve and flattening of the sciatic nerve.</td>
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<tr>
<td>2</td>
<td>-</td>
<td>+</td>
<td>+</td>
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<tr>
<td>4</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Fibrous band</td>
</tr>
<tr>
<td>6</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>Band of Fascia underneath Piriformis muscle</td>
</tr>
<tr>
<td>7</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>Lipoma, No decompression</td>
</tr>
</tbody>
</table>
Sciatic nerve block

- Sciatic nerve block is a safe diagnostic tool.
- T2 signal intensity of sciatic nerve is significantly higher on the symptomatic side.
- Patients with positive MRI of the sciatic nerve and positive response to sciatic nerve blocks may benefit from surgical decompression.

Lumbar Facet Syndrome

- Standing: carry 16% compressive load
- Relatively unloaded when sitting
- Disc space narrowing - increased load upon facets, esp. in extension
- Ghormley 1933: primarily low back - frequently into groin, hip, thigh and occasionally below

Anatomy medial branch

- Medial branch dorsal ramus
- Passes through small foramen intertransverse ligament
- Lies against bone - bound by connective tissue to periosteum
- Groove - superior articulating process joins base of transverse process

Anatomy medial branch

- Inferior - caudal margin facet - medial branch turns medially passing through notch within mamilloaccessory ligament
- Distally branches innervate facet joints, multifidus muscles, interspinal muscles, interspinal ligaments
Medial branch block

Radiofrequency Ablation

RFA lesioning

- Can be painful - therefore local anesthetic administered prior to lesioning
- Through same needle (recheck position) or additional spinal needle placed
- 80 degrees celsius 90 seconds
- Terminate if pain or contractions in extremity
-Inject 2 mg betamethasone

Facet denervation

- Effects of facet denervation usually not permanent - 1 year +/-
- Best candidate - 80% improvement from facet and medial branch blocks
Continuous RFA - histology

- Wallerian degeneration
  - Swollen degenerating axons
  - Myelin disintegration

Disorders

- Trauma
- Tumor
- Radiation
- Inflammatory
- Entrapment syndromes

34 yo F 2 yrs after delivery pain with sitting
MRN

- TR: 7000
- TE: 60
- TI: 160
- ET: 11
- BW: 130
- FOV: 20-22
- 2/0.5
- NEX: 4

Technique

3D DESS - double echo steady state

- TR: 25
- TE: 9
- flip angle: 35
- FOV: 8-10
- 256x256

STIR

- TR: 11,000
- TE: 60
- TI: 160
- 3mm

Technique

Diffusion

- SE EPI (EPI fact 7)
- TR 2 x pulse-pulse interval
- TE 15 msec
- Flip 90
- NEX 2

- FOV 22
- Mat 256 x 144 (recon 256)
- 5.0/0.5 mm
- B value 400
- ROI analyzed for ADC