

Disclosures

- Nothing to declare
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- Significant ownership interests
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A Clinical Approach to the Evaluation of Back Pain

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LBP/Radiculopathy: Importance

Annual Cost = \$100 billion

Most common cause of disability under 45 years

1% of population disabled from back pain

Back Pain – Goals

- Objectives:
 - Risk factors by history and exam for serious causes of acute LBP
 - Reflex, motor, sensory findings for L4-S1 radiculopathy
 - Surgical indications for discectomy
 - Back pain into legs not from root path

Case 1 - Acute Low Back Pain (LBP)

A 33 yo man develops intermittent, midline low back pain over 2 weeks.

What other questions do you want to ask the patient?

What specific aspects of the examination are important?

LBP: Use of History and Examination

- Serious vs. benign source
- Rational approach to patient management

**Acute LBP:
Risk Factors for Serious Cause - History**

Pain worse at rest or at night
Prior history of cancer
 History of chronic infection
 History of trauma
Age > 50-70 years
 Intravenous drug use
 Corticosteroid use
 History of rapidly progressive neurologic deficit

**Acute LBP: Risk Factors for Serious
Cause - Examination**

Unexplained, documented fever
 Unexplained, documented weight loss
 Percussion tenderness over spine
 Abdominal, rectal, or pelvic mass
 Patrick's sign or heel percussion sign
 Straight-leg or reverse straight-leg raising signs
 Rapidly progressive focal neurologic deficit

Case 1 - Acute LBP

A 33 yo man develops intermittent midline low back pain over 2 weeks.
 What other questions do you want to ask the patient?
 -Historical risk factors for serious underlying cause? No
 What specific aspects of the examination are important?
 -Examination risk factors for serious underlying cause? No

Case 1 – Acute LBP

- 33 yo man develops intermittent low back pain over 2 weeks
- No risk factors for a serious cause
- *Father died of cancer metastatic to the spine*
- *Patient requests a spine MRI*
- *Are diagnostic tests necessary?*

Case 1 - Acute LBP

33 yo man with 2 weeks of LBP. Requests spine MRI; concerned about cancer because father died of metastatic spine cancer

- Historical or examination risk factors? No
- Are diagnostic tests necessary? No

Resolution: treat symptoms, reassurance

ALBP-Natural History/Treatment

- 85-90% back to functional baseline in 12 weeks
- Treat symptoms
 - NSAIDs or acetaminophen for pain
 - Limited bed rest; progressive ambulation
 - Muscle relaxants if back pain interferes with sleep
 - Reassurance!

LBP – General Examination

Abdomen
Pelvis
Rectum
Spine
Costovertebral angles
Hips

LBP: Abdominal Aortic Aneurysm

- Back pain, abdominal pain, shock; back pain only in 20%
- Misdiagnoses – non-specific back pain, diverticulitis, renal colic, myocardial infarction
- Pulsatile abdominal mass on exam in 50-75%

Case 2 - Back and Leg Pain

55 yo man with low back pain and intermittent, posterior left leg and calf pain for two months

- Hx - no trauma, nocturnal pain, chronic infection, intravenous drug use, steroid use
- General exam - Positive left straight-leg raise sign
 - No fever. Stable weight. No spine tenderness.
 - Normal abdominal/rectal exam
 - Absent Patrick's/heel percussion signs

Low Back/Buttock Pain: Patrick's/Heel Percussion Signs

Patrick's Sign - Hip or buttock pain elicited by internal rotation of the hip with flexion of the leg at the knee

Heel percussion - Leg extended at knee, heel percussion elicits hip/buttock pain

LBP: Stretch Signs

Straight-leg raising – Traction on the L5 or S1 roots, or sciatic nerve (all posterior to hip); reproduces patient's symptoms

Reverse straight-leg raising – Traction on the L2-L4 roots or femoral nerve (all anterior to hip); reproduces patient's symptoms

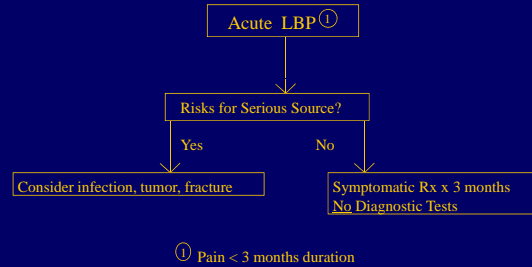
Case 2 - Back and Leg Pain

- 55 yo man with low back, left posterior leg and calf pain for two months. Risks for "serious" cause:
History – patient age
General exam – left straight-leg raising sign
Neurologic exam – diminished sensation over dorsum of left foot, weak left foot eversion, normal reflexes

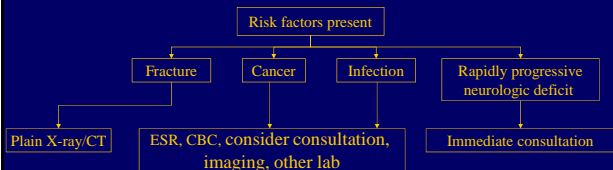
Algorithm for Acute LBP

- Identify patients at risk for serious etiology
- Exclude appropriate patients from unnecessary diagnostic testing
- Create a practical management tool
- Create a model for further study

Initial Approach to Acute LBP



Algorithm 2 -ALBP Suspected Serious Etiology



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Lumbosacral Radiculopathy -
Neurologic Findings

Root	Motor	Reflex	Sensory	Pain Distribution
L4	Quadriceps (knee extension)	Knee	Medial calf	Medial calf
L5	Peronei (foot eversion)	None	Lateral calf, dorsal foot	Posterolateral thigh; Lat calf, dorsal foot
S1	Abductor hallucis (toe flexors)	Ankle	Sole foot	Posterior thigh/calf Sole foot

L/S Radiculopathy-Motor

- Quadriceps-femoral, **L4**, anterior horn cells
-Position leg in slight flexion at the knee, then have patient extend the leg at the knee
Peronei/TA/EHL-peroneal nerve, sciatic nerve, **L5** root, anterior horn cells
-Dorsiflex foot (TA) at ankle
-Great toe extension (EHL)
-Eversion of the foot (peroneii)

L/S Radiculopathy-Motor

Toe Flexors-tibial nerve, sciatic nerve, S1 nerve root, anterior horn cells
 -Overcome flexion of toes with fingers-do not test the big toe; do not test foot plantar flexion
 Tip-Use smallest bulk muscle to test nerve root of interest!
 Tip-Distinguish upper motor neuron weakness from L5 radiculopathy (spasticity, Inc reflexes)

L/S Radiculopathy-Sensory

- Decreased sensation (negative sensory symptoms) indicates a decrease in sensory function;
- Paresthesias/pain (positive sensory symptoms) reflect alive nerve cells firing inappropriately
- Elicit either a decrease in quantity or quality of sensation (decrease = loss of sensory axons)
- Compare light touch from side-to-side
- Sensation scale (0 to 10; 0=None, 10 = normal)

L/S Radiculopathy-Sensory

- Medial calf-saphenous, femoral, L4
- Lateral calf or dorsal foot-superficial peroneal, sciatic, L5
- Sole foot-tibial, sciatic, S1
- Sensory loss from root injury occurs in a patch
- Circumferential loss below the knees suggests spinal cord or brain lesion, or polyneuropathy

L/S Radiculopathy-Reflexes

- Symmetry of the reflex is more important than absolute value (3+ throughout vs. right 3/left 2)
- Limbs in analagous positions to compare sides
- If you can't get a reflex, add stretch to the tendon and reinforcement
- L4-sitting or supine, knees bent if supine
- S1-strike Achilles or ball of foot with leg at rest



Radiculopathy - Caution!

Radiculopathy ≠ Disk Disease

Herniated Disk on Imaging ≠
Definitive Proof for Cause of LBP

Case 2 – Back and Leg Pain

55 yo man with back and left leg pain for two months
Neurologic exam suggests L5 root injury
Imaging confirms lateral L5-S1 disk herniation
Surgical consultation for this patient?

Disk Herniation: Surgical Indications

- Cauda equina syndrome
- Spinal cord compression (C/T-spine)
- Progressive motor weakness *by exam*
 - Define progressive
 - Define weakness
- Intractable Pain - Controversial

Case 2 – Back and Leg Pain

- 55 yo man with back and leg pain, plus exam and imaging findings of L5 radiculopathy
- Undergoes surgical discectomy
- Follow-up 1 year: pain almost resolved, power normal; sensation abnormal
- What would happen without surgery?

Natural History of Acute Disk-Related Radiculopathy

- Weber (1983)- If deficit and pain tolerable while waiting, spontaneous recovery common
- Saal (1989)-Focal motor deficits improve with rehab; pain improves over time-not as fast as with surgery
- Bottom Line: If patient can function with the pain, then the long term outcome is about the same with and without surgery

Acute Disk Herniation and Nerve Root Injury: Compression or Inflammation?

Usually Not Compression

- Mobile nerve roots
- Nerve roots move during lumbar puncture
- Gelatinous nucleus pulposus
- Favorable response to steroids

Evidence for Inflammation: Epidural nucleus pulposus → inflammation → demyelination

Referred Pain is a Common Source of Back and Limb Pain

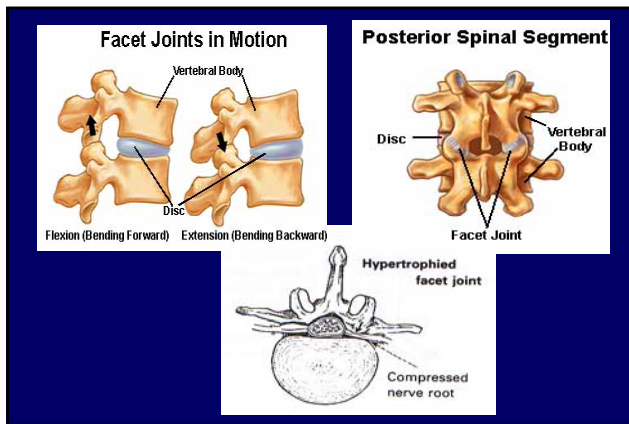
- Back and leg pain, without nerve or nerve root compression, is often referred from pain-sensitive structures of the spine
- “Sclerotomal”-A term often used to describe this type of referred pain

Local Pain Generators in the Spine

- Capsules of facet and sacroiliac joints
- Ligaments: posterior longitudinal, interspinous
- Periosteum: vertebral bodies and arches
- Dura mater and epidural fibroadipose tissue
- Spinal arterioles (especially to joints and vertebral bodies)
- Veins: epidural and paravertebral

LBP-Patient Education

- Goal: Validate the impact of the patient’s pain on their life (e.g., help the patient save face)
- Not all back and leg pain is due to nerve tissue injury (e.g.-the arm fracture analogy); referred pain is common
- Unless the source of the pain can be identified reliably, surgery doesn’t help
- Prolonged bed rest worsens the function of patients with back pain



Causes of Intervertebral Foramen Narrowing

- Lateral disc herniation
- Uncovertebral hypertrophy
- Loss of disc height
- Lateral recess stenosis
- Facet joint hypertrophy
- Osteophytes
- Listhesis
- Mass lesions (eg-trauma, infection, neoplasm)

Spondylolysis and Spondylolisthesis

- Spondylolysis-multiple microfractures in the pedicles of either L4 or L5
 - Congenital predisposition
 - Common in teenage athletes-back pain in a teenager is a “different” entity
- Spondylolisthesis-Slippage of one vert body on another; max with flexion/extension; often painful

Back Pain-Conclusions

- A directed history and examination informs initial patient management and rational ordering of tests
- Learn an algorithm for ALBP and modify with evidence and experience
- Know the exam findings in L4, L5, S1 radiculop
- Question the strength of evidence for “standards” of management

