Herniated Disc Disease

Background

1. Definition
    - Extension of disc material beyond annulus fibrosus
        - +/- extension lateral to posterior longitudinal ligament and spinal column
        - May or may not impinge upon nerve roots, thecal sac or spinal cord[6]

Pathophysiology

1. Pathology
    - Usually preceded by degenerative changes w/in disc
    - Age-related decr in ability of proteoglycans to aggregate w/in disc
        - Leads to decreased disc hydration
    - Tears of annulus fibrosus allow herniation of nucleus pulposus
    - Herniation can be contained by posterior longitudinal ligament or protrude as a free ligament
    - Pain
        - Result of direct pressure by herniated disc on nerve roots or
        - Induced by breakdown products from nucleus pulposus
2. Incidence/prevalence
    - Approx. 4% of pts w/acute low back pain
    - Approx. 30% of MRIs of asymptomatic pts reveal disc herniations
    - Peak incidence between 35-45 yo
3. Risk factors
    - Smoking: risk factor for disc degeneration and herniation
    - Family hx
    - Trauma
4. Morbidity/mortality
    - **Red flag** Cauda equina syndrome
        - Bladder/bowel incontinence, perianal numbness, bilateral neurological deficits
        - Requires immediate surgical Tx w/in 48 hrs[10]
    - Radiculopathy/Sciatica
        - Often resulting from spinal nerve root compression eg, L4-L5; L5-S1
    - Rule out pelvic nerve compression (piriformis syndrome)

Diagnostics

1. History
    - Back pain, sciatica, paresthesia, pseudoclaudication (radiating lower-leg pain after walking, relieved by rest)
    - Symptoms may worsen w/cough, sneezing, Valsalva, prolonged rest
    - Frequently pain begins suddenly after an inciting movement (eg, bending and lifting a heavy object)

2. Physical exam
    - Overview
        - 90% of disc herniations occur at L4-5 and L5-S1
        - Central or paracentral disc herniations commonly affect nerve root below disc
            - eg, S1 root if L5-S1 central herniation
        - Lateral disc herniations affect nerve root at level of disc
            - eg, L5 root if L5-S1 herniation
    - Straight-leg raising test (SLR)
        - Perform by slowly flexing hip of pt lying supine, leg extended
        - Once hip is flexed to ROM of hamstrings, relax flexion slightly and dorsiflex foot
        - Positive if sciatica Sx (L5-S2 nerve roots) reproducible at elevation of less than 60 deg
            - Pain will radiate below knee
        - Do not confuse w/pain of hamstring stretching
        - SLR more specific if pain in contralateral lower limb
            - Ipsilateral SLR; Sx occur w/flexion of symptomatic leg (greater sensitivity; SS:80/40)
            - Contralateral test; Sx occur w/flexion of contralateral leg (greater specificity; SS:20/90)
    - Femoral-nerve stretch test
        - Slowly extend hip of prone pt w/knee flexed
        - Positive if radicular symptoms (L3-L4 nerve roots) reproduce when pts knee flexed while hip slightly extended
    - Neurosensory exam
        - L4 nerve root involvement
            - Pain/paresthesia in anterolateral thigh, antr knee/leg, dorsal-medial foot
            - Decr leg extension, ankle dorsiflexion
            - Decr or absent patellar tendon reflex
        - L5 nerve root involvement
            - Pain/paresthesia in lateral thigh/knee, anterolateral leg, dorsal and plantar foot
            - Decr ankle dorsiflexion, toe extension
        - S1 nerve root involvement
            - Pain/paresthesia in posterolateral thigh/leg, lateral foot
            - Decr leg flexion, ankle plantarflexion, and toe flexion
            - Decr or absent Achilles tendon reflex
3. Diagnostic testing
    - Dx is generally made on H&P
    - Imaging[4]
        - Plain film x-ray; poor soft tissue visualization can detect bony abnormalities useful in trauma, arthritic changes, spondylolisthesis
        - CT
            - Better than plain film focused on bone abnormalities

        - MRI
            - Gold standard for soft tissue imaging
            - Shows disc herniation well
        - Myelography
            - Falling out of favor, left to spine specialists for localization of lesions
        - EMG
            - Assists in localization of lesions in presence of radicular Sx
        - Bone scan of limited value
    - Testing to
        - Rule out neoplasia
        - Hx of cancer, wt loss, night pain
        - CBC, CRP, ESR
        - Rule out infection
        - Fever, chills, sweats, night pain
    - Diagnose if radiculopathy continues after 4 wk of conservative Tx or worsens
    - MRI
        - Preferred study if radicular Sx present
        - Perform if "red flag" Sx present

Differential Diagnosis

1. Key differential diagnoses
    - Muscular pain/strain
    - Spinal fracture
    - Spinal stenosis
    - Cauda equina syndrome[10]
2. Extensive differential diagnoses
    - Ligamentous pain/strain
    - Spondylolisthesis
    - Neoplasia
    - Infection

Acute Treatment

1. Conservative Tx for up to 6 wk
    - Analgesics for pain
        - NSAIDs on scheduled doses preferred (SOR:C)[15]
        - Acetaminophen: 1,000 mg q 3-4 hr
        - Ibuprofen: 600 to 800 mg q 6-8 hr
        - Naproxen: 500 mg q 12 hr
        - Acetaminophen w/codeine (30 mg or 60 mg) q 4-6 hr for more severe pain
        - There is no consistent evidence that NSAIDs are more effective than acetaminophen (SOR:D)
    - Avoid short-acting narcotics for chronic pain (eg, oxycodone, hydrocodone) (SOR:B)[1] or muscle relaxers/benzodiazepines (SOR:C)[11]
        - High risk for dependency
        - If necessary, limited time only

        - Allows time for more definitive Tx (eg, surgery)
2. Chronic pain assoc w/nonsurgical candidate and radiculopathy
    - Consider chronic pain mgmt referral
    - Medication mgmt
        - NMDA receptor blocker
        - Long-acting narcotics/opioids
        - Nerve block/injections
        - TCAs (SOR:B)[2]
        - Lidocaine patches
        - Antiepileptic medications (pt specific)
        - Muscle relaxants (pt specific)
            - May be helpful if severe back spasm
            - Limit use to 2-7 d unless chronic spasm
        - Epidural corticosteroid injections (pt specific)
            - Relief of acute pain and some long-term relief
            - Highly variable response rate
            - Overall role unclear
    - Topical heat wraps
    - Safe/effective for reduction of pain and disability in first wk after acute musculoskeletal low back pain
3. Manipulation or exercise therapy
    - Spinal manipulation, targeted physical exercises, back school, or physical therapy (SOR:B)[13]
    - Directed at relief of disc compression
    - Include soft tissue, stretching, and high-velocity low amplitude of low-velocity/indirect Tx
    - Avoid "high velocity high amplitude" manipulation in presence of neurologic Sx; potential risk of worsening condition[3]
4. Activity
    - Early return to normal activities improves outcomes
    - Bed rest for no longer than 2 days[12]
5. Acupuncture if no other safe alt exist (SOR:C)[12]
    - Short-term pain relief for pts w/chronic low back pain[7]

Surgical Treatment

1. Small minority of pt require surgery
    - In absence of severe/progressive weakness or cauda equina syndrome, surgery is an option if
        - Pt has impaired quality of life
        - Has not responded to conservative Tx[5]
2. Surgical interventions for disc herniation
    - Spinal fusion (SOR:C)[14]
    - Microdiscectomy/open discectomy (SOR:C)[14]
    - Disc replacement
        - 70-80% surgical success rate
        - Reoperation rate 10%
        - Residual low back pain and recurrent herniation are major postop complications

- Randomized trials between discectomy and conservative Tx show
  - Better Sx control w/surgery at 1 yr postop
  - Mixed results at 4-5 yr
  - No difference at 10 yr[8]
- Cauda equina
  - Significant improvement in recovery of sensory and motor function if pt receives surg w/in 48 hr of onset of Sx

Follow-Up

1. Return to office in 4 wk
   - Pain resolution
     - Discontinue medications
     - Encourage regular exercise, wt loss, back muscle reconditioning
   - Pain persists (failed 4 wk conservative tx)
     - Refer to neurosurgeon or orthopedic surgeon
     - MRI
2. Seek urgent neurosurgical or orthopedic consultation if
   - Progressive neurologic deficit
   - Signs of cauda equina syndrome

Prognosis

1. Approx. 90% of pts recover in 3-4 wk w/conservative Tx alone
2. Recurrences common
   - 40% in 6 mo
3. Natural Hx of herniated disc dz
   - With radicular symptoms may be somewhat less favorable than w/o
   - Improvement is norm w/conservative Tx
   - Sx improvement typically slower if radicular Sx present
   - Up to a third of pt show improvement w/in 2 wk
     - 75% usually show improvement w/in 3 mo
   - Among those who seek specialty care, approx 15% undergo surgical intervention w/in 6 mo
   - About 10% of pts undergo surgery
   - Regression of herniated disc occurs in approximately 2/3 of all pts
   - Prognosis is good in a majority of cases[9]
4. Pts w/intractable pain who are not surgical candidates or fail surgical intervention may need referral to physician w/ expertise in chronic pain mgmt

Prevention

1. Preventive measures
   - Wt loss
   - Regular exercise (SOR:A)[17]
   - Back physical therapy (SOR:B)[16]
   - Smoking cessation
   - Other healthy lifestyle modifications
   - Workplace ergonomics
2. Not recommended
   - Back school (SOR:A)[11]

- Lumbar supports/back belts (SOR:B)[11]

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Evidence-Based Inquiry

1. When should an MRI be done for patients with symptoms of sciatica?
2. What is the most effective treatment for acute low back pain?
3. Does surgery relieve the pain of a herniated disc?
4. How effective are epidural steroids for lumbosacral radiculopathy?
5. Is acupuncture effective for treatment of chronic low back pain?
6. Treatment of acute sciatica
7. Are topical heat wraps effective at improving acute low back pain?
8. Are insoles effective in preventing or treating back pain?
9. When should you consider implanted nerve stimulators for lower back pain?

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