The Complex/Challenging Spine Patient

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Disclosures

• None
Learning Objectives

• Review indications for obtaining imaging studies in patients with spine conditions
• Discuss imaging evaluation of patients with neck pain after trauma
• Review the clinical presentation/work-up for patients with possible spondyloarthritis
Case 1

• 62 y.o. female with a 2 month h/o of right low back and thigh pain
• No h/o trauma, fevers/chills, weight loss
• No weakness/N/T, bowel/bladder changes
• Constant pain, worse with any activity
• Pain worsening, especially past few weeks: ER x 2; requiring opioids
• Previous X-rays: degenerative changes
• PMH: diabetes, polysubstance abuse, hep C
Case 1

- Physical exam: tender over mid/lower lumbar spine in midline and to the right; normal strength, reflexes, sensation, (-) hip exam

- Plan?
  - Physical therapy?
  - Change meds?
  - Further W/U?
Imaging in Spine Disorders

- When do I order imaging in spine patients?
- What cervical spine imaging is indicated after trauma?
- When do I order flexion/extension radiographs?
Imaging in Spine Disorders

• When do I order imaging in spine patients?

• What cervical spine imaging is indicated after trauma?

• When do I order flexion/extension radiographs?
Imaging in Spine Disorders

• Why not image everyone with spine pain?

• $$$

• Radiation

• Imaging abnormalities extremely common
  
  - most findings are clinically irrelevant; can lead to additional tests, referrals, procedures/surgeries that are of limited or questionable benefit (Choi, et al, Ann Intern Med 2011)

• Routine imaging: doesn’t improve outcomes
Imaging in Spine Disorders

• MRI imaging in asymptomatic subjects > 60 y.o. (Boden et al., JBJS, 1990)
  - 36% had a herniated disc
  - 21% had spinal stenosis
  - > 90% had disc degeneration, disc bulge

• Prospective MRI study among patients with MRI abnormalities prior to onset of LBP (Carragee et al., Spine Journal, 2006):
  - 84% had unchanged or improved imaging findings after symptoms
Imaging in Spine Disorders

- **Search** for RED FLAGS
- If no “red flags”, treat conservatively for one month without diagnostic studies
Red Flags

- Fever
- Unexplained weight loss
- h/o Trauma
- Urinary retention/overflow incontinence
- Fecal incontinence
- Saddle anesthesia
- Progressive/severe weakness
- h/o cancer
- Advanced age
- Pain not relieved with rest
• History and physical guide imaging decisions

• Indications for immediate diagnostic imaging
  - Major risk factors for cancer
  - Risk factors for spinal infection
  - Signs/symptoms of cauda equina
  - Severe or progressive neurologic deficits

• Otherwise trial of conservative treatment (physical therapy, etc.) first

Annals of Internal Medicine, 2011
Case 1 Follow-up

- 62 y.o. with right low back and thigh pain
- Constant pain, requiring opioids
- Two ER visits
- Previous X-rays: degenerative changes
Case 2

- 26 y.o. male with neck pain
- Involved in a MVC 1 week ago
- Rear-ended at highway speeds: immediate onset of neck pain
- Taken via ambulance to emergency dept.
- Normal neurologic exam; midline cervical tenderness
- CT of cervical spine: negative
- Placed in hard cervical collar, F/U 7-10 days
Case 2

- Neck pain “about the same”, no new symptoms; wearing cervical collar
- Physical exam: normal neuro exam; midline tenderness at C5-C7

**Now what???

- Remove collar?
- Continue collar?
- Further imaging?
Imaging in Spine Disorders

• When do I order imaging in spine patients?

• **What cervical spine imaging is indicated after trauma?**

• When do I order flexion/extension radiographs?
Neck pain after trauma

• Common situation after trauma (MVA, etc.):
  - Neck pain, no neurologic symptoms
  - Normal neurologic exam
  - Midline cervical tenderness

• CT is imaging study of choice, not X-rays

• Normal CT scan with persistent midline tenderness: spine is not cleared

• Cervical collar and further evaluation needed
Neck pain after trauma

- Rest/protection of C-spine in cervical collar for 7-10 days; then follow-up
- Able to clear cervical spine/remove collar without further imaging if:
  - No neuro deficits
  - No cervical tenderness
  - Full, pain-free cervical range of motion
Neck pain after trauma

• Neck pain and negative CT, options:
  - Continue cervical collar
  - MRI
  - Flexion/extension X-rays

• **Flex/ext X-rays: must have minimum 60° of cervical movement

Threshold Cervical Range-of-Motion Necessary to Detect Abnormal Intervertebral Motion in Cervical Spine Radiographs

HoSun Hwang, MD, John A. Hipp, PhD, Peleg Ben-Galim, MD, and Charles A. Reitman, MD
Adult Cervical Spine Trauma Guideline - Mayo Clinic

Adults with potential C-spine trauma

- Patient meets all of the following:
  - Alert (GCS 15)
  - Stable and normal vital signs
  - Neuro intact
  - No painful distracting injury

- Age ≥ 65 yrs or dangerous mechanism + OR Known vertebral dz (AS, RA, stenosis, or previous surgery)

- 1 view C-spine with swimmer's view as indicated (AP, LAT, odontoid)
- CT if severe osteoporosis, injury identified, ≥6/10 pain, suspicious areas, midline TTP, or poor visualization of C-T junction

No → Imaging negative for injury
Yes → Imaging positive for any injury

- No midline tenderness
  - Remove C-collar
  - F/u with PCP in 7-10d

- Midline TTP with negative CT and plain films
  - Spine consult

- Able to actively rotate neck 45 degrees left and right regardless of pain?
  - No radiographs needed
  - Remove C-collar
  - F/u with PCP in 7-10d

Yes → Neuro intact
No → Neuro deficit

- Imaging negative for injury
  - Imaging positive for any injury

- If return of normal mental status not anticipated for ≥2d
  - Remove C-collar
  - F/u with PM&R

- MRI
  - No ligamentous injury
  - F/u with PM&R

- Ligamentous injury PRESENT
  - Spine consult

- Spine consult
  - Remove C-collar
  - F/u w/ PCP in 7-10d

- Persistent midline TTP
  - Spine consult

- Able to actively flex/extend 30 degrees?
  - Flex/ext views
    - No
    - Yes

- >3.5 mm displacement or >11 degrees angulation
  - No
  - Yes

CT C-spine
Imaging in Spine Disorders

• When do I order imaging in spine patients?
• What cervical spine imaging is indicated after trauma?
• When do I order flexion/extension radiographs?
Imaging in Spine Disorders

• When are flexion/extension radiographs indicated?

• Flexion/extension radiographs indicated if:
  - Recent trauma
  - Rheumatoid arthritis
  - Previous surgery/fusion
  - Pre-operative

• What about everyone else?
• Purpose of study:

1) What % of flex/ext. radiographs reveal pathology not appreciated on AP/lateral?

2) How often do flex/ext views change patient management?
206 consecutive patients underwent AP/lateral, flex/ext radiographs; excluded pts. with:

- recent trauma
- rheumatoid arthritis
- prior cervical fx
- prior surgery
- inadequate X-rays
- congenital anomalies

Evaluated AP/Lateral views first

- Listhesis (2 mm or greater) was observed on 23 of the neutral lateral images
- Two patients had spondylolisthesis not visualized on neutral lateral radiographs (2 mm and 3 mm): No change in management based on these findings

- Six patients with listhesis on lateral view had changes on flex/ext films (2-4 mm): No change in management based on these findings
Case 3

- 34 y.o. female with 6 year h/o low back pain, R > L gluteal pain
- No h/o trauma, fever/chills, bowel/bladder control difficulties, cancer
- No leg pain, paresthesias, weakness
- Pain occasionally wakes her up at night
- Pain worse in the morning; improves with exercise
- Only previous imaging (3 years ago): lumbar spine MRI- “bulging discs”
Case 3

• Previous treatment:
  - Physical therapy: some help
  - Massage: some help
  - NSAIDs: helpful, but GI side effects
  - Frequent opioids, muscle relaxants during flares of pain

• Physical exam: tender over R SI joint, bilateral lower lumbar paraspinal muscles; o/w normal

• Now what???
Spondyloarthropathy/Spondyloarthritis

• Groups of diseases with common clinical/genetic features
  - axial skeleton involvement
  - peripheral arthritis
  - enthesitis
  - dactylitis
  - uveitis
  - psoriasis/inflammatory bowel disease
  - presence of HLA-B27 antigen
Spondyloarthritis

- 5% of young patients with chronic low back pain
- Ankylosing spondylitis: estimated prevalence of 0.5% in caucasian population
- Psoriatic arthritis
- Reactive arthritis
- Enteropathic arthritis
- Undifferentiated spondyloarthritis

Spondyloarthritis (SpA)

• Symptoms usually start in 3rd or 4th decade of life

• Males > females ????

• Diagnosis of AS often delayed 8-10 years after first symptoms; why?
  - X-ray changes: late finding (years)
  - Lack of physical exam findings (often no synovitis, rash, etc.)
  - LBP common/Lack of awareness
SpA - why is early diagnosis important?

- Level of pain/stiffness similar in patients with early versus advanced SpA
- Proper treatment: NSAIDs, TNF-α blockers, physical therapy
- Prevent inappropriate testing/procedures/surgeries
Early SpA: Making the diagnosis

- Main symptom: back pain
- **Inflammatory back pain**
  - Onset before age 45
  - Insidious onset
  - Chronic (> 3 months)
  - Morning stiffness (> 30 minutes)
  - Pain improves with exercise (not rest)
Early SpA: Making the diagnosis

• Other helpful clues:
  
  - Major improvement in back pain within 48 hours of full dose NSAID
  
  - Peak intensity in 2\textsuperscript{nd} half of night/early AM
  
  - Alternating buttock pain
  
  - Positive family history of SpA
  
  - History of psoriasis, inflammatory bowel disease, uveitis
  
  - Peripheral arthritis, dactylitis, recent urogenital/GI infection
  
  - Limited spinal mobility (later finding)
Early SpA: Making the diagnosis

- Lab tests:
- HLA-B27
  - Present in > 80-90% of patients with AS
  - Present in 8% of the caucasian population without disease
  - AS develops in approx. 5% of people that are HLA-B27 positive
- CRP/Sed rate
  - not that helpful
Early SpA: Making the diagnosis

- Imaging studies:
  - Sacroiliac joint X-rays
    - Months/years for changes
  - Spine X-rays
    - Changes usually seen late (after SIJ)
  - MRI scan of sacroiliac joints
    - Earliest imaging findings: signal change/inflammation
    - Sensitivity/Specificity 90%
Chronic low back pain > 3 months
First symptoms < 45 years

- Inflammatory back pain
- or - HLA-B27+
- or - Sacroiliitis on imaging

Refer to rheumatologist for further evaluation
Case 3 Follow-up

• Young female, chronic low back/gluteal pain, better with exercise

• Work-up:
  - Sed rate/CRP: normal
  - HLA-B27: positive
  - Sacroiliac joint X-rays: normal
  - Pelvis MRI scan: sacroiliitis R > L

• Referred to Rheumatology: treated with etanercept with excellent results
Summary

• No red flags: trial of conservative treatment prior to imaging

• Normal cervical spine CT does not rule out significant injury after trauma

• Flexion/extension X-rays: usually not helpful unless trauma, rheumatoid arthritis, previous surgery

• In young patients with chronic back pain: consider spondyloarthritis
Questions?