BACK PAIN

RESIDENT PEM CONFERENCE

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A previously healthy 4 y/o male presents to the ED with a complaint of abdominal pain
  - PMHx of seasonal allergies
Upon further questioning has also been complaining of lower back pain for 3 weeks
  - No trauma or prior history
Intermittent fevers for 3 ½ weeks
  - Most recently 101.2
  - Tmax 103, occur q2-3 days
Seen by PMD 2 weeks ago, Dx w/ constipation and started on Miralax
  - Stools have since been regular in frequency and consistency
The case

- Parents concerned because he came out of the bathroom in daycare crying with abdominal and back pain
- He has been drinking and eating less for 2 days
- Difficulty walking up stairs and picking things up off of the ground
- Denies fatigue or weight loss

- No respiratory, urinary, or GI Sx
- No allergies
- Tylenol has helped the pain somewhat
- On Miralax and Claritin
- Daycare attendee, family history of thyroid disease, arthritis, and diabetes
They also state that he has been walking like an old man.
Physical exam

- **General:** alert, NAD, well appearing
- **Head and Face:** head atraumatic, normalcephalic
- **Eyes:** conjunctivae and lid normal
- **Pharynx:** oral mucosa moist
- **Ears:** tympanic membranes normal
- **Throat:** normal
- **Respiratory:** breath sounds equal bilaterally, no rales, rhonchi, or wheezes, normal respiratory effort/excursion
- **Cardiovascular:** distal pulses present, strong, cap refill <2 seconds, NL S1/S2
Physical exam

- **Gastrointestinal**: abdomen soft, nontender, nondistended, positive bowel sounds, normal rectal tone
- **Lymph**: Bilateral shotty inguinal lymphadenopathy
- **Genitourinary**: normal external genitalia
- **Skin**: skin pink, warm, and dry
- **Neuro**: sensation normal, normal reflexes, mildly antalgic gait, GCS=15, normal muscle strength
- **Spine**: normal curvature, no point tenderness over spine; he points to posterior hips as site of pain
In summary

- 4 year old male with 3 weeks of intermittent fever and low back pain
- ‘Walks like an old man’
- No neurologic abnormalities
- What would you like to do?
How many of you have seen a child with back pain?

What comes to mind when you hear ‘back pain’ as the chief complaint?
Back pain in children

- According to a Scandinavian study of over 29,000 children
  - 7% of 12 year olds experienced low back pain
  - Cumulative incidence at 50% 
    - By age 18 in females, 20 in males

- Associations
  - Female gender, increased TV time, negative affect scores, family Hx

Leboeuf-Yde C; Kyvik KO  Spine 1998 Jan 15;23(2):228-34
Back pain: point prevalence

Point prevalence of low back pain, individuals aged 12 to 41 years. Data from Leboeuf-Yde, DC, Kyvik, KO. Spine 1998; 23:228.
Back pain is the presenting complaint in 0.4% of ED visits
- 90% present for <4 weeks

- 50% musculoskeletal
- 9% infection (UTI or viral)
- 13% idiopathic
- 13% sickle cell pain crises
- 6% miscellaneous
Overloaded school backpacks are a potential cause of back pain in children, particularly if the weight of the backpack is >15 percent of the child's weight.

The AAP says that backpacks should weigh no more than 10-20% of child's weight.
Red flags

- Young age
  - prepubescent, especially before school-age
- Fever
- Acute trauma
- Weight loss
- Constant pain
- Night pain
- Progression of symptoms over time
- Significant pain or disability

- Sciatica
- Repetitive microtrauma, especially lumbar hyperextension
- History of malignancy
- History of TB exposure
- Bowel or bladder symptoms
- Abnormal neurological examination
  - asymmetric reflexes, Babinski, low rectal tone
Oh the pain, the pain of it all!

- Location?
  - Sprains and strains lead to nonspecific pain that can radiate to the buttocks
Location of pain

- Nerve root - brief; sharp and shooting, increased by straining, better supine
- Severe, constant back pain, persisting at night, suggests neoplasm, infection, or nerve root compression
- Sciatica suggests herniated disc – usually stops at the knee
- Pain radiating below the knee – true radiculopathy
Physical exam

- Signs of spinal pathology
  - postural shift of the trunk
  - neurologic abnormality
  - limitation of motion
Physical exam

- Range of motion
  - Limitation/Pain in flexion suggests tumor, spondylolisthesis, herniation, discitis
  - Pain with extension suggests spondylolysis (pars interarticularis defect)

Hold on a second, spondylowhatzit? Listhesis? I’m among those of us confused by lots of letters
The **pars interarticularis** is the part of vertebra located between the inferior and superior articular processes of the facet joint. In the transverse plane, it lies between the lamina and pedicle.

- Defect in the pars interarticularis
- Most common in L5
- Stress fractures
- 6% of population
- Most common cause of spondylolisthesis in pediatric patients
Spondylolisthesis

- Anterior displacement of a vertebra in relation to the vertebrae below
- Due to a pedicle fracture
Back to physical exam

- **Neuro exam**
  - Reflexes – KNEE L3-4, POST TIBIAL L5, ANKLE S1
  - Can’t rise from squatting? Proximal muscles
  - Gastrocnemius strength (S1) rising up on the toes.
  - Ankle dorsiflexion weakness L4 or L5 nerve root
  - Sciatic pain may be increased by testing foot dorsiflexion with the knee extended - stretches the S1 or L5 root
  - Great toe extensor weakness is indicative of L5 nerve root involvement
  - Gluteus maximus weakness (S1) may cause one buttock to sag
  - Gluteus medius weakness (L5) may cause a lurching or waddling (Trendelenburg) gait
Back to physical exam

- **Straight leg raise**
  - Detects nerve root impingement by herniated discs
  - Supine, uninvolved foot on table w/ knee at 45 degrees
  - Raise effected side w/ ankle at 90 degrees
  - In adults sens 80% spec 40% (LOTS OF FALSE POSITIVES!)
    - Likely due to hamstring tightness
Causes of back pain

- Musculoskeletal
  - Fractures
  - Nonspecific sprains/strains
    - Backpacks, overly soft mattress, large breasts
  - Spondylolysis
    - Inherited or repetitive microtrauma (lumbar hyperextension in gymnasts, dancers, divers, weight lifters, and football linemen)
    - Aching low back pain exaggerated by extension
  - Spondylolisthesis
    - From bilateral spondylolysis
Causes of back pain

- Musculoskeletal
  - Scoliosis
    - Musculoskeletal pain is more common in patients with scoliosis
    - One cohort of 2000 patients had 23% with pain at presentation
  - Scheuermann kyphosis (juvenile kyphosis)
    - Anterior wedging of 5 degrees or greater in at least three adjacent vertebral bodies, as measured on lateral spine radiographs
    - Onset in adolescence (hunchback)
    - Inherited and common
- Disc disease
  - Degenerative most common in L4-5, L5-S1
  - Very rare less than age 10
Scheuermann's Kyphosis
Causes of back pain

- Infections
  - Discitis
  - Vertebral osteomyelitis
  - Epidural abscess
  - Paraspinal abscess
  - Pyelonephritis
  - Pneumonia
  - PID
  - Endocarditis
  - Viral illness induced myalgias
Causes of back pain

- Inflammatory arthritis
  - Ankylosing spondylitis, psoriatic arthritis, the arthritis of IBD, and reactive arthritis
  - Characterized by
    - Morning stiffness
    - SI joint pain
  - HLAB-27 is common – but most back pain in HLAB-27 + patients is not from sacroiliitis
Causes of back pain

- **Neoplastic**
  - #1 is osteoid osteoma – benign, nocturnal pain relieved by NSAIDs
    - Can lead to scoliosis
  - Leukemia, Lymphoma, Ewing sarcoma, neuroblastoma, osteoblastoma, osteosarcoma, neurofibroma, and Langerhans cell histiocytosis
    - constant pain, nocturnal pain, and duration of pain less than three months were associated with tumors

- **Miscellaneous**
  - Sickle cell pain crisis, syringomyelia, cholecystitis, pancreatitis
  - Chronic pain syndromes – 10-15% of Rheumatology referrals
    - Most are adolescents, isolated back pain uncommon
Labs
- Inflammatory or infection? CBC, ESR, CRP, B/C, urine studies

Radiology
- Plain films – congenital or acquired pathology
  - Usually include AP and lateral only
  - Add oblique view for pars (spondylolysis)
- MRI
  - Test of choice for evolving neurologic changes or known malignancy
  - Nonbony spinal tumors, discitis, and sacroiliac (SI) joint inflammation
- CT
  - Paraspinal or intrabdominal pathology
- Bone scan
  - Osteomyelitis, discitis, and early stress reactions in the pars
Osteoid osteoma
Work up – a pearl of wisdom

- Children with...
  - A short duration of symptoms
  - A clear musculoskeletal precipitant
  - A normal neurologic examination
  - A benign appearance
- Can be managed conservatively without labs or radiographs
In the ED we obtained CBC, B/C, U/A, U/C, ESR, and CRP

ESR 66
CRP 0.7
Electrolytes, Cal, Mag, Phos normal

Abdominal and Spine XRay both normal
Back to the case

- We consulted Ortho and Radiology and obtained an MRI of the spine
- It showed L5-S1 discitis and S1 vertebral osteomyelitis
Admitted to General Pediatrics with Ortho and ID consults with Dx of Osteomyelitis/discitis

ID consulted and recommended treating with Clindamycin for 6 weeks via PICC

Pain: Ibuprofen, with Tylenol #3 for breakthrough pain

After D/C weekly CBC with diff, CRP

Doing well
The big 5

- Take home points about back pain
  - Half of all kids will have had back pain at some point before adulthood
  - **Spondylolysis** is a stress fracture in the pars whereas **Spondylolisthesis** is anterior displacement of a vertebra in relation to the vertebrae below
  - Red flags - Young age, fever, neurologic symptoms
  - Children with a short duration of symptoms, a normal neuro examination and a suspected musculoskeletal cause can be managed conservatively without labs or radiologic testing
  - Workup starts with labs if you are considering inflammatory or infectious diagnoses while the best imaging test varies based on the clinical scenario