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Back Pain

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* *Drug doses are a guide only, always check second source and follow local practice guidelines*

Summary Pearls:

- **Upper back pain is more likely to represent serious pathology and should be considered separately from the more common lower back pain**
- **Early analgesia and an empathic attitude are important**
- **Most lower back pain is benign and recurrent. However, critical diagnoses to consider include:**
 - Abdominal Aortic Aneurysm
 - Cancer
 - Cauda Equina syndrome/Cord Compression
 - Infection
 - Fracture
- **Critical red-flags on history and physical examination include:**
 - Constitutional symptoms: fevers, chills and weight loss
 - History or suspicion for malignancy.tuberculosis
 - A pulsatile abdominal mass
 - Progressive motor and sensory loss
 - Bilateral symptoms
 - Bowel incontinence and urinary retention
 - Decreased perianal sensation and rectal tone
 - Midline tenderness of specific vertebra(e)
- **Workup and imaging should follow the history but in general:**
 - A pregnancy test should be obtained on women of child-bearing age
 - MRI is indicated for new or progressive neurological features
 - Plain x-rays are indicated in elderly patients as a screening test
 - CT imaging is helpful to better define fractures and spinal stability
- **Early return to activity and non-narcotic analgesia are central to the management of acute exacerbations of chronic lower back pain**

Introduction

Back pain is one of the most common complaints seen by acute care providers in all settings, including the ED. The vast majority of patients suffer from mechanical or “musculoskeletal” back pain, an ill-defined syndrome of pain from spine without neurological features. After considering the uncommon but life-threatening causes of back pain and an attempt to alleviate the patient’s discomfort, most patients can be discharged with outpatient follow-up.

DDx

- Upper back pain (e.g. pain between the scapulae) is much less common than lower back pain and has a much higher likelihood of serious pathology. In particular, thoracic aortic dissection and metastatic disease may present with upper back pain.
- The vast majority of lower back pain is of benign “mechanical” or “musculoskeletal” origin. Nonetheless, the differential diagnosis of lower back pain must include the following life-threatening entities:
 - Abdominal Aortic Aneurysm
 - Cancer
 - Cauda Equina syndrome/Cord Compression
 - Infection
 - Fracture

MECHANICAL VS. NEUROGENIC BACK PAIN

- Most lower back pain is “mechanical” in nature and does not involve hard neurological deficits
- *Sciatica* is an electrical type pain that radiates down the leg and can often be reproduced on examination with passive straight leg raising
- Sciatica results from a compression of the nerve roots exiting the spinal cord laterally at the L5 and S1 levels
- Subacute and chronic compression of nerve roots may result in

findings of weakness or sensory findings on the side of compression

- When weakness is of acute onset, rapidly progressing or bilateral in nature, it may indicate a central compression of the spinal cord or evolving **cauda equina syndrome**
- **Cauda Equina syndrome** in a surgical emergency
 - *Cauda equina syndrome* occurs when the nerve roots at tail end of the spinal cord (beginning at the L2 level) are compressed, usually by a protruding central disc herniation. Although it is a lower motor neuron (LMN) lesion, it results in permanent neurological injury
 - *Conus medullaris* occurs when the level of compression is above the L2 level, affecting the spinal cord itself. Thus, the lesion is upper motor neuron (UMN). It similarly causes irreversible injury. The difference between these two syndromes is not critical for the EP

Initial Approach

- Unless the patient has abnormal vital signs or appears ill, cardiac monitoring and IV access are generally not necessary
- Analgesia is an initial priority - pain should be addressed prior to an extensive interview if the patient is in any degree of distress.
- In general, the use of narcotics is discouraged in the patient with recurrent mechanical/musculoskeletal back pain. Many other options exist.
- **Abdominal aortic aneurysm (AAA)** should be an early consideration in older patients and those with a history of hypertension. AAA may present with syncope, back, flank or abdominal pain.

History and Physical

- Critical elements of history and examination:
- **AAA**
 - Severe pain, flank radiation, ischemic symptoms in legs (burning pain, cold, painful extremities)
 - Abnormal vital signs, shock state
 - Pulsatile, painful, abdominal mass, bruit
 - Abnormal, asymmetrical femoral, lower extremity pulses
 - Evaluation for AAA is best done up front in the triage process by using physical examination (checking for a **pulsatile abdominal mass**/bruit/unequal leg pulses) together with **point-of-care ultrasound**.
 - Patients with symptomatic aortic aneurysms > 3 cm in diameter warrant emergent surgical consultation. Normal diameter is <2 cm.

- The aorta is measured using its outermost diameter - although the lumen may be narrowed, the extravasated blood and hematoma around the aorta will increase the overall diameter
- Emergent surgical consultation should not be delayed for imaging confirmation when AAA is suspected

• Cauda Equina syndrome

- History of *bilateral* sciatica, lower extremity weakness, urinary retention, bowel incontinence, loss of perineal sensation
- Fully examine motor and reflexes in L4, L5, S1 distribution
 - e.g. Motor:
 - L4: quadriceps
 - L5: foot dorsiflexors
 - S1: plantar flexors
 - Reflexes:
 - L4: knee jerk
 - S1: ankle jerk
- Assess rectal tone
 - S2,S3,S4 nerve roots
 - Digital rectal exam if any doubt'
 - Assessing for sacral anesthesia and anal "wink" reflex may be adequate if no other neuro findings (anal wink is eliciting a puckering of the sphincter with tactile stimulus)
- Assess post-void residual urine
 - After the patient urinates, no more than about 150 cc of urine should remain in the bladder
 - This can be assessed by placing a urinary catheter and measuring the amount of urine that remains
 - Point of care ultrasound is preferred - it is accurate for this purpose and much less uncomfortable for the patient
 - The main confounder is that urine retention may also occur in men with prostate enlargement - care should be taken to differentiate this unrelated issue
- Infection
 - Subtypes of infectious causes of acute back pain include: discitis, vertebral osteomyelitis and spinal epidural abscess as well as psoas (deep muscle) abscess
 - All have similar risk factors and presentations
 - Risks:
 - Circulating bacteria in the bloodstream

e.g. IV drug use, indwelling vascular catheters

- Immune compromise
e.g. DM, HIV
- **Fever** and **new onset back pain** together constitute a major red flag
- **Midline tenderness** over specific vertebra(e) should heighten suspicion of either fracture, cancer or infectious process
- **Malignancy**
 - Risks:
 - History of cancer which typically spreads to bone (e.g. prostate, breast, multiple myeloma)
 - **Constitutional symptoms:**
 - Weight loss, night sweats, fatigue
 - **Midline tenderness** over specific vertebra(e)
 - In addition to the usual neurological exam, check for a **sensory level** - a level where sensation changes at a certain dermatome
- Fracture
 - Risks:
 - History of trauma
 - Osteoporosis
 - **Midline tenderness**
- The **abdominal** and **chest** examinations are important as many causes of back pain are abdominal and even thoracic (e.g. ectopic pregnancy, cholecystitis, appendicitis, pyelonephritis, pancreatitis, pneumonia)

Tests:

- A **pregnancy test** is indicated in any female of childbearing age
- **Urinalysis** and **culture** are indicated if urinary infection is suspected
- Imaging
 - **MRI is generally necessary in patients with evolving neurological features or suspicion for spinal cord compression**
 - An older test for cord compression was a CT myelogram - this involved instilling contrast via an LP prior to a CT
 - **CT** has an important role in trauma and can be used to help in cases where serious infection or malignancy are suspected, however, it can not substitute for MRI when there are neurological signs and the spinal cord needs to be imaged
 - **Plain lumbosacral x-rays** are mostly of limited value but most

authorities still recommend their use in trauma, older patients (>55), those with a history of cancer or chronic infection as an initial screening test

- Blood tests
 - **ESR** (erythrocyte sedimentation rate) is a sensitive (but not perfect!) test to rule out a serious infectious cause in patients with risk factors but a low overall clinical suspicion, it is typically very high in these infections
 - **cRP** is less well studied but also may be helpful
 - **Blood cultures** at two different sites, drawn with good sterile technique, are important to obtain initially in patients with suspicion of an infectious cause of back pain

Management:

Emergent Causes

- **AAA**
 - STAT surgical consultation
 - Good (multiple large bore) IV Access
 - Resuscitation (avoid excess fluids if patient is maintaining perfusion)
- **Cauda equina/cord compression**
 - STAT neurosurgical consultation
 - Steroids (IV Decadron 10 mg) in patients with cord compression
- **Infection**
 - STAT neurosurgical consultation
 - Antibiotics (after blood culture) to cover Staph and Strept species, typically vancomycin
- **Malignancy**
 - Emergent neurosurgical consultation if concern for spinal cord involvement
 - Oncology/primary provider consultation
 - Some patients may be able to be discharged home with prompt follow-up
- **Fracture**
 - Seemingly minimal trauma can result in spinal fractures in the elderly
 - Emergent neurosurgical consultation if concern for spinal cord involvement
 - CT imaging is often required to determine that a fracture seen on plain films is not unstable or threatening the spinal cord

- Patients with simple compression fractures can be discharged home with analgesia, sometimes a brace and follow-up with primary provider

Non- Emergent Causes

- **Mechanical/Musculoskeletal Back Pain**

- Patient education here is important
- Demonstrate empathy and openness
- A gradual return to activities, not bedrest, is the best advice
- Avoid use of narcotic analgesia as much as possible
- Be positive about the effects of lifestyle changes
- Some types of mechanical back pain represent inflammatory conditions (e.g. ankylosing spondylitis) that will require a higher level of care and referral

Notes on Special Populations

- **Pediatric back pain**

- a separate topic
- the above discussion applies to adults

- **Athletes**

- Again, a separate topic
- *Spondylolithesis* is an anterior slippage of the vertebrae on each other at a particular level (e.g. L5 on S1)
- Easy to see on plain films
- This occurs in sports with a lot of hyperextension, such as golf or gymnastics
- Requires referral to orthopedics

- **Elderly**

- A low threshold for obtaining imaging is appropriate