Red Flags in Pain

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Disclosure Statement

• I have no financial relationships with any commercial interest related to the content of this activity.
• I will not discuss off-label use during my presentation.

Objectives

• Identify and describe:
  • Pertinent history, physical, and diagnostic findings of serious medical conditions accompanied by pain
  • Medical disorders that require immediate or urgent treatment
  • Mental health disorders that may present as or complicate treatment of painful conditions
  • Initial evaluation for urgent conditions

Which serious disorders could we miss?

• Cancer
• Infection
• Inflammatory arthritis
• Visceral disease
• Abdominal aortic aneurysm
• Life-threatening headaches

Serious Extraspinal Disorders

Emergent Conditions
• Dissecting arterial aneurysm
• Ectopic pregnancy
• Myocardial infarction
• Cardiac tamponade
• Acute meningitis
• Carotid / vertebral artery dissection

Urgent Conditions
• Acute pancreatitis
• Duodenal ulcers
• Pyelonephritis
• Visceral trauma
• Acute meningitis

Serious Spinal Disorders

• Infection
  • Discitis
  • Epidural abscess
  • Osteomyelitis
  • Herpes zoster
• Primary tumors of spinal cord or vertebrae
• Metastatic vertebral tumors
  • Most often from breast, lung, or prostate Ca
• Spinal cord or nerve root compression
  • Tumors
  • Epidural abscess
  • Hematoma
  • Mechanical spine disorders
    • (disc herniation, Fractures, listhesis, hypertrophic anatomy)
Causes of Back Pain

### Mechanical (97%)
- Strain/Sprain, no imaging abnormalities 7%
- Degenerative Disc/Facets, age related 10%
- Herniated Disc 4%
- Spondyloolisthesis 2%
- Traumatic Fracture 1%
- Congenital 1%
- Kyphosis/Scoliosis 1%
- Transitional Vertebrae
- Spondylolysis
- Discogenic pain
- Presumed instability

### Non-Mechanical (1%)
- Neoplasia 0.7%
- Multiple Myeloma 0.7%
- Metastatic Cancer 0.3%
- Lymphoma 0.3%
- Leukemia 0.3%
- Spinal Tumors
- Retroperitoneal tumors
- Primary vertebral tumors
- Infection 0.01%
- Chlamydia

### Visceral (2%)
- Septic discitis
- Pericardial effusion
- Peritoneal effusion
- Perihepatic abscess
- Epidural abscess
- Shingles
- Inflammatory arthritis 0.3%
- Ankylosing spondylitis
- Psoriatic arthritis
- Reiter Syndrome
- Inflammatory bowel disease
- Paget disease
- Pelvic organ pain
- Prostatitis
- Endometriosis
- Chronic PUD
- Renal involvement
- Neoplastic
- Pyelonephritis
- Perihepatic abscess
- Aortic aneurysm
- GI involvement
- Pancreatitis
- Cholecystitis
- Cholelithiasis

Frequency of Back Pain Causes

- Visceral 2%
- Tumor, infection, inflammatory arthritis 1%
- Other 97%

How do we avoid missing serious disorders?

- Perform a thorough history
- Explicitly seek red flags
- Perform a thorough physical exam
- Order appropriate labs and imaging
- Make appropriate referrals
- Never assume it has already been done!

Referred Visceral Pain

Cardiac ischemia (common)
- Dissecting abdominal aortic aneurysm, visceral injury
- Pyelonephritis, renal stones
- Deep-seated pelvic pain
- PID
- Ectopic pregnancy
- Fibroids
- Endometriosis
- Prostatitis
- Tumors

Cardiac ischemia (atypical)
- Cholelithiasis, peptic ulcer disease, pancreatitis
- Classic low back pain, Lumbar spondylosis
- Activity-related, paresthesia
- Severe, burning, cutaneous
- Cramping, spasmodic, abdominal

Referred Back Pain

- Cardiac ischemia
- Dissecting abdominal aortic aneurysm, visceral injury
- Pyelonephritis, renal stones
- Deep-seated pelvic pain
- PID
- Ectopic pregnancy
- Fibroids
- Endometriosis
- Prostatitis
- Tumors

Red Flags by History

- Back/Neck Pain with:
  - Unexplained weight loss
  - Cancer or Metabolic bone disease
  - Age of first onset < 20 or > 55 years
  - Corticosteroid use
  - Fever and/or chills
  - Violent physical trauma
  - IV drug abuse or HIV history
  - Progressive neurologic deficit
  - Infection history

- Complaints of:
  - Excruciating or increasing pain
  - Abdominal pain
  - Nocturnal Pain Dominant
  - Thoracic pain
  - Acute, tearing mid-back pain
  - Constant, non-mechanical pain
  - Severe headache
  - Severe pain > 4.6 weeks
  - Pain with sneeze, cough or Valsalva
Risk Factors for Infection

- IV drug use
- Immunosuppression
- Recent surgery
- Penetrating trauma
- Severe constipation
- Recent UTI
- Diabetes
- HIV/AIDS

Red Flags by Physical Exam

**Observation**
- Diaphoresis
- Cachexia
- Skin erythema
- Fever
- Structural deformity
- Pain behavior

**Palpation**
- Lymphadenopathy
- Costovertebral angle tenderness
- Abdominal aorta that is > 5 cm (particularly if tender)
- Localized abdominal tenderness
- Lower-extremity pulse deficits

**Testing**
- Persisting severe restriction of forward trunk flexion
- Spine tenderness to percussion
- Lhermitte’s sign
- Nuchal rigidity

Red Flags by Neuro Exam

**Sensory**
- Loss of pain and temperature sensation in extremities
- Loss of position, vibration sense (long tract signs)
- Sensory deficits in dermatomal pattern
- Pain or deficits in “stocking glove” pattern
- Saddle anesthesia
- Loss of perineal/perianal sensation
- Loss of bulbocavernous or anal wink reflexes

**Strength**
- Severe weakness in extremities or in myotomal pattern
- Muscle atrophy
- Widespread or progressive loss of strength in the legs
- Gait disturbance

**Reflexes**
- Hyperreflexia with clonus
- Hoffman’s reflex/Babinski
- Asymmetric reflexes

Specific Conditions

Headaches: SNOOP Long Version

- Systemic symptoms or illness
  - Fever
  - Altered level of consciousness
  - Anticoagulation
  - Pregnancy
  - Neutropenia especially new diagnosis, poor control/compliance or unfever
- Neurologic symptoms or signs
  - Papilledema
  - Asymmetric Cranial Nerve function
  - Asymmetric motor function
  - Abnormal Cerebellar Function
  - Confusion, impaired alertness or consciousness
- Onset: new onset, abrupt, split-second and progressive headache
- Older: Older after age 40 years (focal tenderness over temporal artery)
- Prior Headache History: first headache or different (change in attack frequency, severity, or clinical features) (first or worst)

Life-threatening Headache Etiology

- Intracranial hemorrhage
  - Subarachnoid hemorrhage
  - Subdural hematoma
  - Intracerebral hemorrhage
  - Tumor or mass
  - Meningitis

- Life-threatening Headache Etiology

<table>
<thead>
<tr>
<th>Condition</th>
<th>Clinical Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encephalitis</td>
<td>Fever, altered mental status, seizures, focal neurologic deficits</td>
</tr>
<tr>
<td>Giant cell arteritis</td>
<td>Age &gt;50; Unilateral throbbing pain, pain when combing hair, visual disturbances, jaw claudication, fever, weight loss, sweats, temporal artery tenderness, proximal myalgias</td>
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<tr>
<td>Idiopathic intracranial hypertension</td>
<td>Neuroimaging, followed by measurement of CSF opening pressure, usually preceded by lumbar puncture analysis</td>
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<tr>
<td>Subarachnoid hemorrhage</td>
<td>Peak intensity a few seconds after headache onset (thunderclap headache), first and worst, papilledema</td>
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<tr>
<td>Subdural hematoma</td>
<td>Sleepiness, altered mental status, hemiparesis, loss of spontaneous venous pulsations</td>
</tr>
<tr>
<td>Intracerebral hemorrhage</td>
<td>Sudden onset, vomiting, focal neurologic deficits, altered mental status</td>
</tr>
<tr>
<td>Tumor or mass</td>
<td>Eventually altered mental status, seizures, diplopia when looking laterally, loss of spontaneous venous pulsations or papilledema</td>
</tr>
<tr>
<td>Meningitis</td>
<td>Fever, meningismus, altered mental status</td>
</tr>
</tbody>
</table>

Lumbar puncture analysis (LP) or head computed tomography (CT) imaging is not diagnostic.
Cervical Myelopathy

**History**
- Insidious progression of symptoms usually

**Physical Exam**
- Gait disturbance; clumsy or weak hands; loss of sexual/bladder/bowel function
- Lhermitte's sign (flexing the neck causes electric shock-like sensations that extend down the spine and shoot into the limbs)
- Upper motor neuron signs UEs: Hoffman's reflex
- Upper motor neuron signs LEs: Ugoing toes/ Babinski, hyperreflexia, clonus, spasticity)
- Lower motor neuron signs in the upper limbs (atrophy, hyporeflexia)

Cerebral Vascular Insufficiency

**History**
- Vertebral artery compression on MRI
- Dizziness and blackouts (restriction of vertebral artery) on movement, especially upward gaze
- Fainting or drop attacks
- Headaches or unusually severe headache
- Confusion, disorientation or memory loss
- Numbness, weakness in an arm, leg or the face, especially on one side
- Abnormal or slurred speech
- Difficulty with comprehension
- Loss of vision or difficulty seeing
- Loss of balance, coordination, or the ability to walk

Cerebral Vascular Deficiency

**Physical Exam**
- Limb or truncal ataxia
- Nystagmus
- Ipsilateral Horner syndrome in as many as one third of patients with VAD (i.e., impairment of descending sympathetic tract)
- Ipsilateral hypogeusia or ageusia (i.e., diminished or absent sense of taste)
- Ipsilateral impairment of fine touch and proprioception
- Contralateral impairment of pain and thermal sensation in the extremities (i.e., spinothalamic tract)
- Nystagmus
- Tongue deviation to the side of the lesion (impairment of CN XII)
- Contralateral hemiparesis

Abdominal Aortic Aneurysm

**History**
- Age greater than 60 years
- Atherosclerotic vascular disease
- Abdominal pain at rest or nocturnal pain

**Physical Exam**
- Abdominal pulsating mass
- Bruit

Visceral Pathology

- Renal
- GU
- GI
- Hepatic
- GYN
- Cardiopulmonary

Spinal Fractures

**History**
- Sudden onset of severe central pain, relieved by lying down
- Recent significant trauma at any age
  - Ejection from motor vehicle
  - Fall from substantial height
- Minor trauma, or even strenuous lifting, in people with osteoporosis
- Prolonged use of Corticosteroids
- Mild trauma over age 50 years
- Age greater than 70 years

**Physical Exam**
- Structural deformity of the spine
- Pain to palpation over the structure
- Possible severe radiculitis with weakness

• Refer quickly!!
**Compression Fractures**

- **History**
  - History of cancer
  - Onset in a person over 50 years, or under 20 years, of age
  - Constitutional symptoms, such as fever, chills, or unexplained weight loss
  - Recent bacterial infection (e.g., urinary tract infection)
  - Intravenous drug abuse
  - Immune suppression
  - Pain that remains when supine
  - Aching night-time pain disturbing sleep
  - Thoracic pain (which also suggests aortic aneurysm)
  - Failure to improve with therapy
  - Pain persists for more than 4 to 6 weeks

- **Physical Exam**
  - Structural deformity of the spine
  - Vague low back pain
  - Non-mechanical back pain
  - Systemic symptoms

**Cancer**

- **History**
  - Metastatic / primary tumors such as multiple myeloma, prostate, breast cancer more common than spinal infections / inflammatory conditions
  - 80% of patients with an underlying malignancy are over age 50
  - Predilection for vertebral body and pedicles
  - Cancer associated with lumbar pain include:
    - pancreas, duodenum, colon, uterus, cervix, and ovary
  - Systemic Corticosteroids
  - Immunosuppressed states
  - Human Immunodeficiency Virus (HIV)
  - Rest Pain

- **Physical Exam**
  - Persistent fever (temperature over 100.4°F)
  - Pain on bony palpation or vibration (use tuning fork)
  - Pain with spine flexion

**Infection**

- **History**
  - History of intravenous drug abuse
  - Recent bacterial infection
  - Urinary tract infection or Pyelonephritis
  - Cellulitis
  - Pneumonia
  - Immunocompromised states
    - Systemic Corticosteroids
    - Organ transplant
    - Diabetes Mellitus
    - Human Immunodeficiency Virus (HIV)
    - Rest Pain

- **Physical Exam**
  - Persistent fever (temperature over 100.4°F)
  - Pain on bony palpation or vibration (use tuning fork)
  - Pain with spine flexion
Infection Facts

- Discitis, osteomyelitis, and epidural abscess
- Hematogenic spread (bacterial translocation from bowel, bladder, or infection site)
- Post-op symptoms 2 to 4 weeks after surgery
- One third have fever
- 3% to 15% present with neurologic deficit
- Infections typically involve intervertebral disc/vertebral body endplate
- Occur in about 1% of patients
- More frequently in diabetics/immunocompromised

Infection: Imaging & Labs

**Imaging**
- Radiographic changes at 2 to 4 weeks
- Bone scan positive as *early as 2 days*, 75% specific.
- MRI appearance is abnormal in infected disc
- Enhancement after gadolinium

**Labs**
- WBC count
- ESR
- MRI or CT
- Culture of infected tissue

Cauda Equina Syndrome

**History**
- Saddle anesthesia (inability to feel toilet paper when wiping or feeling between the leg)
- Bladder dysfunction (distended bladder; loss of sensation when passing urine, loss of full bladder sensation, inability to start, stop or control urination)
- Fecal incontinence (loss of sensation of rectal fullness)
- Erectile dysfunction

**Physical Examination**
- Pelvic/perineal sensory loss
- Unilateral or progressive neurological deficit in the lower extremities
- Motor weakness with knee extension, ankle inversion, or foot dorsiflexion
- Bilateral lower extremity weakness or numbness

**Causes**
- Usually disc, spondylolisthesis, rarely tumor, abscess, advanced AS

**Diagnosis/Treatment**
- Urgent MRI and surgical decompression
Cauda Equina Syndrome

Psychosocial Disorders “Yellow Flags”

History
- Negative attitude that back pain is harmful or potentially severely disabling
- Fear avoidance behavior and severely reduced activity levels
- An expectation that passive, rather than active, treatment will be beneficial
- History of severe depression, catastrophizing, and social withdrawal
- Severe social or financial problems
- Intolerance/ineffectiveness of all treatments
- Constant, non-fluctuating pain (10/10 always)

Physical Findings
- Superficial tenderness to light touch
- Non-dermatomal numbness / sensory loss
- Increased pain with axial loading / rotation distraction
- Emotional and overt pain behaviors
- SLR improves with distraction
- Non-anatomic pain complaint

“Yellow Flag”

Review: Labs & Imaging
- Possible infection or cancer
  - WBC count, ESR, MRI or CT, and culture of infected tissue
  - CBC, UA, SPEP, C-reactive protein, thyroid function test, alkaline phosphatase, or uric acid may be indicated rarely
- Possible cancer, aneurysm, and objective neurologic deficits
  - MRI or CT done ASAP
- Possible aortic dissection
  - Angiography, CT, or MRI
- Disabling symptoms or persist > 6 wks.
  - Imaging (usually MRI or CT)
- Possible inflammatory conditions
  - Antinuclear antibodies and serum antigens including HLA.B27

Indications for Advanced Imaging
- New, objective neurologic deficits
- Pain / neuro deficit in new location
- Potential surgical treatment
- Signs of spinal stenosis
- Pathological reflexes
- Cervical myelopathy
- Chest/Abdominal pain
- *Previous local surgery, concerns for infection or tumor require use of contrast

Key Points I

Although serious extraspinal disorders (e.g., cancers, aortic aneurysms, epidural abscesses, osteomyelitis) are uncommon causes of back pain, they are not rare, particularly in high-risk groups.
Key Points II

• Serious underlying pathology not common (remember 3%)  
• Red flags should be explicitly sought and ruled out  
• Cannot rely on referring practitioners to rule out these conditions

Key Points III

• Most neck and back pain is caused by mechanical spinal disorders, usually nonspecific, self-limited musculoskeletal derangements  
• Back pain is often multifactorial, making diagnosis difficult  
• Patients with segmental neurologic deficits suggesting spinal cord compression require MRI or CT myelography as soon as possible  
• Normal spinal cord function during physical examination is best confirmed by tests of sacral nerve function  
• Pain not worsened by movement is often extraspinal, particularly if no vertebral or paravertebral tenderness is detected  
• AAA should be considered in any elderly patient with low back pain, even if no physical findings suggest this diagnosis

Evidence Based Practice

• http://www.cochrane.org  
• http://www.ahrq.gov  
• http://www.cebm.net  
• http://www.evidencebasedradiology.net  
• http://www.merck.com/mmpe/sec04/ch041/ch041a.html  
• emedicine.com

Thank You!

Any Questions?

Reference Slides for Students
Ankylosing Spondylitis

**History**
- Morning stiffness and pain >1 hr
- Better with activity
- Peripheral joint involvement, especially SIJ
- Inflammatory bowel disease
- Recent GI or GU infection
- Family history of similar problems
- Gradual onset before the age of 40 years

**Physical Exam**
- Peripheral joint involvement
- Eye inflammation, usually unilateral
- Psoriasis
- Colitis
- Decreased spinal range of motion in all planes

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Evaluation Guideline

- General: Because the cause is often multifaceted, a definitive diagnosis cannot be established in many patients. However, clinicians should always be looking for a treatable problem.
- Whether pain has a spinal or extraspinal cause
- Whether the cause is a serious disorder

**History:**
- History of present illness should include:
  - Pain characteristics (e.g., location, quality, severity, duration, radiation)
  - Social history: Work status, smoking, alcohol use, current medications
  - Recent injury or overuse
  - Family history of similar problems
  - Recent GI or GU infection
  - Inflammatory bowel disease
  - Recent or remote trauma
  - Infection risk factors
  - Systemic symptoms

**Past medical history**
- Includes known neck or back disorders (including osteoporosis, osteoarthritis, disk disorders, neurogenic claudication, and radiculopathy), as well as other past medical problems.

**Physical Examination**
- Temperature and general appearance are noted. When possible, patients should be unobtrusively observed as they move into the examination room, undress, and climb onto the table. If symptoms are exacerbated by psychological issues, true functional level can be assessed more accurately when patients are not aware they are being evaluated.

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Headache Red Flags—“SNOOP”

- **SYSTEMIC**
  - Symptoms:
    - Fever, weight loss
    - With secondary risk factors: HIV, systemic cancer
  - Neurologic symptoms (or abnormal signs):
    - Confusion, impaired alertness or consciousness

- **ONSET**:
  - Sudden, abrupt, or split-second

- **OLDER Person**:
  - New onset and progressive headache
  - Especially in middle age >50 yr. (Giant cell/Temporal arteritis)

- **PREVIOUS**
  - Headache History: First headache or different (change in attack frequency, severity, or clinical features) (first or second)

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Ankylosing Spondylitis