Red Flags & Differential Diagnosis of Low Back Pain

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Red Flags

- Red flags are a list of prognostic variables for serious pathology

CSP Guidelines 2007:

- AGE <20, >45 with no precipitating event
- Night pain
- Pain that causes the patient to be constantly moving or curled up in the sitting position
- Back pain with constitutional symptoms – fatigue, nausea, diarrhoea, fever etc
Red Flags continued

- Back pain with unexplained weight loss
- Back pain with bladder/bowel dysfunction or leg weakness
- Insidious onset/progression
- Sacral pain – in absence of trauma
- Back pain not eased by lying/bedrest = (0.9 sensitivity)
- Back pain that doesn't vary with activity
- Back pain that is eased by sitting up and leaning forward (pancreas)
Red Flags continued

- Back pain with multiple joint involvement or sustained morning stiffness
- Severe persistent back pain with full painfree ROM
- Sudden localised back pain, not easing, in post-menopausal women – osteoporotic/fracture
## Differential Diagnosis of Low Back Pain

### Mechanical Low Back Pain or Leg Pain (97%)
- Lumbar strain (70%)
- Degenerative process of discs / facets, usually age related (10%)
- Herniated disc (4%)
- Spinal stenosis (3%)
- Osteoporotic compression # (4.5%)
- Spondylolisthesis (2%)
- Traumatic # (1%)
- Congenital disease (<1%)
  - Severe kyphosis
  - Severe scoliosis
  - Transitional vertebrae
- Spondylolysis
- Internal disc disruption or discogenic low back pain
- Presumed instability

### Non-Mechanical Spinal Conditions approx (1%)
- Neoplasia (0.7%)
  - Multiple myeloma
  - Metastatic carcinoma
  - Lymphoma & leukemia
  - Spinal chord tumour
  - Retroperitoneal tumours
  - Primary vertebral tumours
- Infection (0.01%)
  - Osteomyelitis
  - Septic discitis
  - Paraspinous abscess
  - Shingles
- Inflammatory Arthritis (often assoc with HLAB27 (0.3%)
  - Ankylosing Spondylitis
  - Psoratic spondylitis
  - Reiters syndrome
  - Inflammatory bowel disease
- Scheuermann’s disease
- Paget’s disease

### Visceral Disease (2%)
- Disease of Pelvic organs
  - Prostatitis
  - Endometriosis
  - Chronic pelvic inflammatory disease
- Renal disease
  - Nephrolithiasis
  - Pyelonephritis
  - Perinephritic abscess
- Aortic aneurysm
- Gastrointestinal disease
  - Pancreatitis
  - Cholecystitis
  - Penetrating ulcer

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Mechanical
Low Back or Leg Pain:

97%
Differential Diagnosis of Low Back Pain

- **Mechanical low back or leg pain (97%)**
- Lumbar strain, sprain (70%)
- Degenerative processes of disks and facets, usually age-related (10%)
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- Spinal stenosis (3%)
- Osteoporotic compression fracture (4%)
- Spondylolisthesis (2%)
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- Severe kyphosis, Severe scoliosis, Transitional vertebrae Spondylolysis, Internal disk disruption or diskogenic low back pain
Evaluation in older adults

- Probabilities change
- Cancer, compression fractures, spinal stenosis, aortic aneurysms more common
- Osteoporotic fractures without trauma
- Spinal Stenosis secondary to degenerative processes and spondylolisthesis more common
- Increased AAA associated with CAD
- Early radiography recommended
Manual Therapy:

Not always the best option…
Trauma
Imaging

- Plain Radiography limited to patients with:
  - findings suggestive of systemic disease
  - trauma
- Failure to improve after 4 to 6 weeks
- CT and MRI more sensitive for cancer and infections – also reveal herniation and stenosis
- Reserve for suspected malignancy, infection or persistent neurologic deficit
CT Scan

- Shows bone (e.g., fractures) very well
- Good in acute situations (trauma)
- Sagittal reconstruction is mandatory
- Soft tissues (discs, spinal cord) are poorly visualized
- CT-myelogram adds contrast in the CSF and shows the spinal cord and nerves contour better
Spinal stenosis

- Epidural steroid injections may be effective for reducing symptoms four months at a time

- In most cases, physical therapy is not helpful, but occasionally...

- Tolerance for standing and walking will decrease slowly with time in most cases

- Surgical decompression results are excellent and this should be considered earlier in the course of the disease than it often is.
Spondylolysis

- Pain at first with activity, later may be constant
- Fracture may heal, may not
- In those that do not heal, instability can develop over time and become symptomatic
- Spondylolisthesis may develop and needs to be followed at intervals to assess for progression
Spondylolysis
Spondylolisthesis
Osteoporotic Stabilisation

3A

3B

3C
Lumbar instability

- L4-L5 is the most common level in degenerative instability, followed by L3-L4, and less common L5-S1

- L5-S1 is the most common level affected in younger patients with spondylolysis
Waddell Signs For Non-organic Pain

- Superficial non-anatomic tenderness
- Pain from maneuvers that should **not** elicit pain
- Distraction maneuvers that should elicit pain **BUT** don’t
- Disturbances not consistent with known patterns of pain
- Over-reacting during the exam
- Not definitive to rule out organic disease
Non - Mechanical

1%
Clues To Systemic Disease

- Age
- History of Cancer
- Fever
- Unexplained Weight Loss
- Injection Drug Use
- Chronic Infection Elsewhere
- Duration and Quality of Pain
  - Infection and Cancer not relieved supine
- Response to previous therapy
- Hx inflammatory arthritis elsewhere
General clues to systemic LBP

- Previous history of Ca, Chron's disease or bowel obstruction
- Long-term use of NSAIDs (GI bleeding), steroids or immunosuppressants (infection)
- Recent/previous history of surgery
- History of osteoporosis/vertebral compression fractures
General clues continued

- History of heart murmur or prosthetic valve in an older patient (bacterial endocarditis)
- History of intermittent claudication and heart disease, with deep mid lumbar pain (AAA)
- History of diseases associated with hypercalcaemia such as hyperparathyroidism, multiple myeloma, senile osteoporosis, hyperthyroidism, cushings disease or renal disease
Tumours

Three groups:

- **extradural** (outside of the dura) 60%
- **intradural-extramedullary** (between the spinal cord and the dura) 30%
- **intramedullary** (within the substance of the spinal cord itself) 10%
Neoplasia
Multiple myeloma

- Primary malignant bone tumour.
- Excessive plasma cell growth in the bone marrow resulting in bone re-absorption, leading to osteoporosis.
- Normal blood forming functions of the bone marrow affected – leads to anaemia, fatigue, and problems with clotting, and reduced resistance to infection.
Multiple myeloma - subjective

- Increasing age is most significant risk factor for multiple myeloma
- 95% cases diagnosed after 50 years
- Average age of onset 65
- Males twice as likely to develop myeloma compared to females
- More common in some families, especially if sibling or parent has had it, as increases risk by 4x
Multiple myeloma - subjective

- HPC
- Myeloma can remain dormant for as long as 3 years
- Prodormal phase can last 5-20 years
- Most common presentation = bone pain in the back, commonly associated with lower limb radiculopathy; these may be associated with fractures
Infection
Osteomyelitis
Shingles takes advantage of a stressed immune system.
A.S.

Bath Ankylosing Spondylitis Disease Activity Index
D.I.S.H.

Diffuse Idiopathic Skeletal Hyperostosis
Scheuermann’s Disease
Paget’s Disease

- Affects an estimated 3 percent of people over the age of 40.
- More common in men than in women and is more prevalent in Europe and Australia.
Cauda equina syndrome

- **2 MAIN CAUSES**
  - prolapsed disc
  - malignant spinal cord compression

- Nerve roots in CE covered in a sparse layer of connective tissue as opposed to the thick epineurium found in peripheral nerves, offering little protection against tensile forces.

- Lack of regionalised segmental blood supply also compounds the vulnerability of the anatomical region.
Cauda equina

Most common cause is central disc prolapse which occupies all or most of the spinal canal compressing lumbar and sacral nerves at that level and lower levels of the spinal column. Compression of the nerves leads to a potential loss of sphincter tone, incomplete emptying of the bladder and compromise of the stretch receptors and difficulty initiating micturition or defecation.
Cauda equina symptoms

- Back pain with nerve root distribution of pain (one or more nerve roots involved)
- Sciatica
- Saddle parathæsia and/or anesthesia around the anus, perineum or genitals
- Faecal incontinence
- Bladder dysfunction—e.g. urinary retention with or without overflow incontinence, difficult voiding
- Sexual dysfunction e.g. erectile dysfunction, dyspareunia (pain during intercourse)
- Weak/ heavy legs
- Gait disturbance
Sensitivity of Symptoms of Cauda Equina Syndrome

- Urine retention: sensitivity 0.90
- Unilateral or bilateral sciatica: >0.80
- Sensory/motor deficit and reduced SLR: >0.80
- Saddle anaesthesia: 0.75

OBJECTIVE EXAMINATION
- Decreased anal sphincter tone (60-80% cases)
- Sacral sensory loss (85% cases)

(Lurie 2005)
Malignant spinal cord compression

- Pain almost always first presenting symptom
- Can start of as mild but escalates out of control despite analgesia
- Constant progressive severe pain 8-10/10
- New pain or described as different to existing long standing pain
- Pain can be referred around the abdomen or chest in band like manner often bilateral. Described as being squeezed
Malignant spinal cord compression

- Pain usually located in the back but radicular pain can be caused by valsalvas manoeuvre e.g. straining, coughing
- Pain described as shooting, sharp, deep
- Pain may be aggravated by lying down, bone pain sometimes less if lying prone
- Night pain
- Pain may be eased by sitting
- Nerve pain in upper thighs
Subjective

- Highest prevalence 40-65 years
- (89% patients over 50
- Men less likely to consult for medical advice and therefore often present late
- Patients with cancer who describe severe back or spinal root pain require urgent assessment
- Altered sensations in legs
- Heaviness in the legs often associated with muscle weakness or legs may feel odd or strange
Objective

- Neurological deficit often occurs late in disease process
- Muscle weakness can begin in lower limbs regardless of level of cord compression
- Difficulty in mobility such as climbing stairs, reported falls, difficulty walking.
- May no correlation between severity of pain and extent of neurological deficit
Compression at thoracic or cervical levels can result in upper limb weakness.

L'Hermittes signs may be present with a tingling/shock like sensation passing down the arms or trunk when the neck is flexed.

Autonomic dysfunction such as constipation and/or retention along with ataxic gait and uncoordinated movements are usually late presenting symptoms.

Thoracic spine most common site (68%) followed by lumbar (21%), cervical (7%) sacral 4%.
Visceral

2%
Referred Pain Regions

- Liver and gallbladder
- Lung and diaphragm
- Heart
- Stomach
- Pancreas
- Ovary (female)
- Colon
- Kidney
- Ureter
- Urinary bladder
- Small intestine
- Appendix
Kidney Disease

- 23 million American adults over age 20 suffers from chronic kidney disease > 10%.
- More than a half-million patients are under treatment for end-stage renal disease.
Renal/Urologic

- Renal and urethral pain -T9 -L1 dermatomes
- Back pain at the level of the kidneys – can be caused by ovarian or testicular cancer
- Back and shoulder pain, alternate/together
- Associated signs and symptoms – blood in urine, frequency, hesitancy, testicular pain
Cardiovascular

- Throbbing back pain
- Back pain with leg pain that is eased by standing still or rest
- Back pain in all spinal positions and increased with exertion
- Back pain with a pulsing sensation or palpable abdominal pulse
Cardiovascular continued

- Low back pain / or leg pain with temperature changes from one leg to the other (involved side warmer – venous occlusion or tumour, involved side colder – arterial occlusion)

- AAA – may present with severe LBP, addition of testicular pain ominous and often precedes fatal rupture
Aortic aneurysm
Back and abdominal pain at the same level (together/ alternate) ?associated GI symptoms
- Back and abdominal pain at lower level than back pain
- Back pain associated with meals
- Back pain with heartburn (reduced with antacids)
- Associated with GI symptoms- early satiety with weight loss, tender over McBurney's point, blood in stools, dysphagia
- Sacral pain during bowel movements
Pulmonary

- Associated signs and symptoms (dyspnoea, cough etc)
- Back pain eased by respiration- deep breathing, coughing etc
- Back pain eased by lying on affected side, or fixing ribs
- Weak and rapid pulse with fall in BP - pneumothorax
## Finding Balance

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<td>Iliocast, Hamstring</td>
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<tr>
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<td>Upper Trapezius</td>
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References:


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