Spinal Emergencies

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Spinal Emergencies.

- Trauma
- Infection
- Tumor
- Cauda Equina Syndrome
Goals of Spine surgery.

- Early Recognition of spinal injury.
- Stabilization of injuries.
- Prevention of additional neurological injuries.
- Relief of symptoms.
- Correct deformity.
- Early mobilization.
Diagnosis:

- History of Present illness.
- Thorough history.
- Thorough physical exam.
- Medical records.
- Order appropriate labs and imaging
Neurologic examination

The key muscles and reflexes to establish neurologic level are as follows:

- **Upper limb**
  - Biceps C5
  - Wrist extensors C6
  - Biceps reflex C5-6
  - Triceps C7
  - Triceps reflex C7-8
  - Long finger flexors C8
  - Small finger abductors T1

- **Lower limb**
  - Hip flexors L2
  - Knee extensors L3
  - Knee jerk L3-4
  - Ankle dorsiflexors L4
  - Extensor Hallucis L5
  - Ankle plantar flexors S1
  - Ankle reflex S1-2.
Neurologic examination

The sacral roots may be evaluated by documenting the following:

- Perineal sensation to light touch and pinprick
- Bulbocavernous reflex (S3 or S4)
- Anal wink (S5)
- Rectal tone
- Urine retention or incontinence
- Priapism
The American Spinal Injury Association recommends use of the following scale of findings for the assessment of motor strength in SCI:

- 0 - No contraction or movement
- 1 - Minimal movement
- 2 - Active movement, but not against gravity
- 3 - Active movement against gravity
- 4 - Active movement against resistance
- 5 - Active movement against full resistance

ASIA Scale:
Acute low back pain include:

- Compression fractures to the spine from osteoporosis.
- Cancer involving the spine.
- Muscle spasm.
- Herniated disc.
- Infection.
- Strain or tears to the muscles or ligaments.
Referred Back Pain patterns:

- Cardiac ischemia
- Cholelithiasis, peptic ulcer disease, Pancreatitis.
- Dissecting abdominal aortic aneurysm, visceral injury.
- Pyelonephritis, renal stones
- Deep-seated pelvic pain
- PID, Ectopic pregnancy, Fibroids, Endometriosis, Prostatitis, Tumors.
Causes of Neck and Back Pain:

- 70% due to: muscle strain, ligament sprain, myospasm, or combination without anatomic abnormality.
- 25% involve specific structural problems:
  - Herniated disc.
  - Facet and disc degeneration
  - Compression fractures (trauma or osteoporosis)
- Spinal stenosis
- – Osteoarthritis
- – Spondylolisthesis
Emergent spine disorders:

- Infections: discitis, epidural abscess, osteomyelitis
- Primary tumors of spinal cord or vertebrae
- Metastatic vertebral tumors: Most often from breasts, lungs, or prostate
Compression of neural structures:

- Spinal cord or nerve root compression from:
  - Tumors
  - Epidural abscess
  - Hematoma.
  - Mechanical spine disorders (disc herniation, fractures, cysts)
Emergent extra spinal disorders:

- Dissecting arterial aneurysm.
- Ectopic pregnancy.
- Myocardial infarction.
- Cardiac tamponade.
- Acute meningitis.
- Carotid or vertebral artery dissection.
Low Back Pain

Adult patient with < 3 months of activity intolerance because of low back pain and/or back-related leg symptoms

Obtain a focused medical history and perform a physical examination (including neurologic screening and straight leg raising to search for "red flags" indicating possible spinal injury).

Red flags present? → No → In the absence of red flags, diagnostic testing is not clinically helpful in the first four weeks of symptoms.

Yes

Red flags for spinal fracture

Plain-film radiograph of lumbosacral spine

If, after 10 days, fracture is still suspected or patient has multiple sites of pain, consider bone scanning and consultation before defining the anatomy with CT scanning.

Red flags for cancer or infection

Perform complete blood cell count, erythrocyte sedimentation rate, and urinalysis.

If cancer or infection is still suspected, consider consultation or seek further evidence with a bone scan, radiograph, or additional laboratory tests. (Note that a negative radiograph alone does not rule out disease. If possible, define the anatomy with MRI.)

Evidence of serious disease?

Yes

Arrange appropriate treatment or consultation

No

Evidence of nonspinal medical problem causing referred back symptoms?

Yes

No
Red Flags:

- Cancer history.
- Unexplained weight loss.
- Long term use of steroids.
- Recent report of serious illness.
- Recent report serious infection.
- History of trauma.
- IV drug use.
- Immunosuppression.
Red flags:

Neck and back pain with:

- Reported Progressive neurologic deficit
  - Loss of sensation
  - Saddle anesthesia
  - Loss of power
  - Urinary or bowel incontinence.
  - Urinary retention.
Red flags:

- Abdominal pain
- Nocturnal Pain Dominant
- Thoracic pain
- Pain with sneeze, cough or valsalva
- Severe pain > 4-6 weeks
  - Acute, tearing mid-back pain
  - Constant & Increasing Pain
  - Constant, non-mechanical
Red flags:

- Spinal deformity.
- Severely limited ROM.
- Myospasm with scoliosis or deformity
- Neurological deficit: myotome or dermatomal abnormality;
  Babinski + Hoffmans and clonus = upper motor neuron lesion.
Red flags:

- Fever
- Structural deformity
- Spine tenderness to percussion.
- Meningismus
- Lhermitte’s sign
- Severe weakness in extremities or in myotomal pattern
  - Muscle atrophy
  - Widespread or progressive loss of strength in the legs
  - Gait disturbance
Red flags:

Reflexes
- Hyperreflexia with clonus
- **Hoffman’s reflex**: test which verifies the presence or absence of problems in the corticospinal tract. It is also known as the **finger flexor reflex**
- **Babinski sign**: Considered a pathological sign of upper motor disease *except* for infants, in whom it is normal.
- Asymmetric reflexes

Sensory
- Loss of pain and temperature sensation in extremities.
- Loss of position, vibration sense (long tract signs).
- Sensory deficits in dermatomal pattern.
  - Saddle anesthesia
  - Loss of perianal/perineal sensation
  - Loss of bulbocavernous or anal wink reflexes
Cauda Equina Syndrome

- Cauda equina syndrome refers to a characteristic pattern of neuromuscular and urogenital symptoms resulting from the simultaneous compression of multiple lumbosacral nerve roots below the level of the conus medullaris.
Cauda Equina Syndrome

- Saddle anesthesia
- Bladder dysfunction (distended bladder; loss of sensation when passing urine)
- Fecal incontinence (loss of sensation of rectal fullness)
- Erectile dysfunction
Cauda Equina Syndrome

- Perianal / perineal sensory loss.
- Decreased or absent anal sphincter tone.
- Severe or progressive neurological deficit in the lower extremities:
  - Weakness with knee extension, ankle eversion, or foot dorsiflexion.
  - Bilateral lower extremity weakness or numbness.
Cauda Equina Syndrome

Causes:
- Common: disc, spondylololisthesis, rarely tumor, abscess.

Diagnosis/Treatment:
- Urgent MRI and surgical evaluation and possible surgery.
Cervical Myelopathy

- Disorders usually caused by spondylosis or by ossification of the posterior longitudinal ligament and is characterized by compression of the cervical spinal cord or nerve roots by varying degrees and number of levels.
Cervical Myelopathy

- Insidious progression of symptoms.
- 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: Upgoing toes/babinski, hyperreflexia, clonus, spasticity.
- Lower motor neuron signs in the upper limbs (atrophy, hyporeflexia)
Cervical Myelopathy

- Amyotrophic lateral sclerosis, multiple sclerosis, syringomyelia, and spinal tumors.

Neurosurgical Evaluation, surgery.
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
Concerning Mechanism of Injury

- Violent impact to the head, neck, torso, or Pelvis
- Sudden acceleration, deceleration, or lateral bending forces to neck or torso
- Any fall
- Ejection or fall from any motorized or human powered transport device
- Shallow-water diving incident
Spinal Immobilization

- Manual stabilization in neutral inline position
- Assess neurologic function
- Apply cervical collar
- Secure torso
- Apply padding where needed
- Secure head
- Secure extremities
- Reassess primary survey/neurologic function
Case J.C.

- 50 yo Male s/p fall from ladder 25 feet, 2 days ago.
- Walks in your clinic with sever neck pain. Unable to straighten his neck.
- Head Tilted to right. Bilateral Biceps 3/5, Triceps 2/5, rest of the motor examination is 5/5. Brisk reflexes patellar and ankle reflexes.
Cancer:

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)
- Immune suppression
- Pain that remains when supine
- Aching night-time pain disturbing sleep
- Thoracic pain \((\text{which also suggests aortic aneurysm})\)
- Failure to improve with therapy
- Pain persists for more than 4 to 6 weeks
Cancer:

Cancer

- Metastatic / primary tumors such as multiple myeloma 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
Case K.V.

- 52 yo Female with progressive thoracic pain.
- Pain that radiates to her chest. She was admitted for MI workup. Refers progressive weakness in her lower extremities.
- Did not seek medical care because of lack of insurance.
- Mild kyphosis.
- Brisk patellar reflex and Babinski.
- Urinary retention.
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)
Infection

- Discitis, osteomyelitis, and epidural abscess
- Hematogenic spread
- 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
Case E.R.

- 50 yo Male that is Bipolar. Frequent ER visitor for pain meds. Diabetic.
- Complaining of right hand pain.
- Progressive weakness. Unable to ambulate. Family brings him to the emergency department because he is unable to take care of himself. Multiple episodes of bowel and bladder incontinence.
- Motor strength in both lower extremities 2/5.
CONCLUSIONS:

Imaging:

- Plain films – fracture (AP, Lateral) Evaluate alignment and gross bony detail.
- MRI – Best visualization of lesions in the vertebral bodies, soft tissue, spinal canal, spinal cord, of disc disease.
- CT - Best to evaluate bony spine details. Vertebral fractures, facet joints, and the posterior spinal elements of the spine.

If your patient has a pacemaker or any other contraindication for an MRI:
- CT myelogram: Invasive diagnostic test that uses x-rays and CT to examine the spinal canal. Dye is injected into the spinal canal through a hollow needle. Myelograms can show conditions affecting the spinal cord and nerves within the spinal canal.
References


- Handbook of Neurosurgery by Mark S. Greenberg MD (Feb 22, 2010)
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Contact me anytime!