Disclosures

• None
Cervical Spine Injuries

• Categories
  • Nerve Root or Brachial plexus injuries
  • Acute cervical sprains/strains
  • Disk injuries
  • Cervical fractures and dislocations
Nerve Root Injuries

- “stingers” or “burners”
- Most common cervical injury in football
  - ~8% incidence in college football
- Initially complains of total arm weakness, and dysesthetic pain which usually resolves from minutes to 24 hours
- Numbness and muscle group weakness may persist.
Nerve Root Injuries

• Exam:
  • **Positive Spurling’s**
  • Weakness:
    • Deltoid- C5
    • Biceps- C6
    • Triceps- C7
    • Intrinsic- C8
  • Numbness in dermatomal pattern
Nerve Root Injuries

• Treatment
  • Can return to play when symptoms have resolved and player has full, non-painful ROM
  • If player has pain with or limited ROM cervical x-rays should be done to r/o fracture/dislocation
  • If neurological symptoms continue for 3-4 weeks EMG/NCV can be done to evaluate function
Acute Cervical Sprain/Strain

- Sprain/Strain – injury to the paraspinal musculotendinous junction
- The pain is limited to the cervical spine with ROM
  - Does not radiate into arms
- Neuro exam is normal
Acute Cervical Sprain/Strain

- **Treatment**
  - If athlete has **full** ROM and no radicular symptoms
    - Treat with NSAID, and soft collar for comfort
    - May return to play when pain resolves (2-4 weeks)
  - If they have decreased ROM obtain plain films
    - AP, Lat, Flexion and Extension, +/- open odontiod
  - If symptoms persist >4-6 weeks and x-rays are normal, consider MRI to r/o disk injury
Intervertebral Disk Injury

- Spectrum of injuries
  - aggravation of degenerative disease
  - annular tears
  - herniation
Intervertebral Disk Injury

• Degenerative disease and annular tears
  • Axial pain that persists past 4-6 weeks
  • May take months to calm down
  • Can be asymptomatic or incidental finding
    • Albright et al. found 34% of freshman football recruits had (occult fracture, disk narrowing or degenerative changes)
Intervertebral Disk Injury
Intervertebral Disk Injury

- Disk herniations
  - Symptoms can vary
    - Axial
    - Radicular (w/o neurologic findings)
    - Anterior Cord syndrome (rare)
      - Acute paralysis of Upper, Lower or all 4 extremities
      - Sparing of light touch, vibratory, and proprioception
      - Loss of pain and temp at level
Intervertebral Disk Injury

- Treatment based of symptoms
  - soft collar, traction, NSAIDs, Oral steroids, narcotics, muscle relaxer, gentle manipulation, Epidural stroids
- Most improve with conservative care
- Athletes may return to full play when they have full non-painful range of motion
Intervertebral Disk Injury

• Indications for surgery
  • Cord injury
  • **Progressive** neurologic loss
  • Pain not controlled by non-operative measures (6 weeks, failed 2 epidurals)
Intervertebral Disk Injury

• 45 y/o with 2 week h/o neck and right arm pain sustained after jumping her mountain bike.

• Exam
  • decreased ROM (extension limited)
  • Positive Spurling’s for right C7
  • Numbness to right middle and index finger
  • right triceps 4/5
Intervertebral Disk Injury
Intervertebral Disk Injury
Intervertebral Disk Injury
Intervertebral Disk Injury

• Started on Medrol dose pack, Norco, and valium, and scheduled for Right C7 transformational epidural.
• Had 2 epidurals 2 weeks apart
• Was back to work with restrictions couple days after first injection
• Strength returned slowly with PT
• Back to work without restrictions (prison guard) 4 months
Intervertebral Disk Injury

- 31 y/o soldier with 2 month h/o left C7 radiculopathy, after getting tackled playing “flag” football
- Exam
  - decreased ROM (extension limited)
  - Positive Spurling’s for left C7, and periscapular pain
  - Numbness to left middle finger
  - No weakness
Intervertebral Disk Injury
Intervertebral Disk Injury
Intervertebral Disk Injury
Intervertebral Disk Injury

- PT, traction, and oral meds were failing to provide relief
- He underwent a Left C7 and C8 transforaminal injection
  - Good temporary relief, after 2 weeks was 50% better
- Was going to be deployed in 3 months to Iraq and did not want the pain to occur while overseas
- Elected to undergo ACDF at C6-7
Intervertebral Disk Injury
Cervical Fracture/Dislocation

- Fractures and dislocations again are a spectrum of injuries
  - Subluxation w/o fracture or neurologic injury
  - Fracture-Dislocations with cord injury
- Acutely there is painful ROM and guarding
- Immobilize and image.
Cervical Fracture/Dislocation

• Over the last 50 years there has been a significant decrease in morbidity associated with spine fractures due to adherence of spine precautions prior to arriving at the hospital
• Leave all equipment in place
• Log roll onto and transfer on back-board
Cervical Fracture/Dislocation

- Treatment is based on concept of stability
  - Stable – non-operative (immobilization)
  - Unstable – operative treatment/immobilization
- What constitutes spinal stability is sometimes hard to determine
  - White et al described stability as “the spine's ability to limit its patterns of displacement during physiologic loads to prevent damage or irritation to the spinal cord and nerve roots”
Cervical Fracture/Dislocation

- Even among spine surgeons there is controversy
- In general instability is present if
  - Cord injury
  - Greater than 3.5mm of displacement in adult spine with flexion and extension films
  - Greater than 20 deg in angulation with flexion extension films (or 11 deg in static lateral)
Cervical Fracture/Dislocation

- Alanto-occipital dislocation
  - Not reported in non-vehicular sports
Cervical Fracture/Dislocation

- C1 or Atlas Fractures
  - Lateral mass
  - Anterior and Poterior arch
  - Jefferson fracture or “C1 Burst”
- Treatment- Halo for 3 months
Cervical Fracture/Dislocation
Cervical Fracture/Dislocation
Cervical Fracture/Dislocation

- Reading Open Mouth Odoitoid View
Pre-reduction

Post halo
Cervical Fracture/Dislocation

• C2 fractures
  • Odontoid fractures
  • Traumatic Spondylolisthesis
    “Hangman’s fracture”
• Treatment based on classification
  • Hard collar-surgery
Hangman’s fracture
Classification

- **Type I**
  - Min displaced
  - <3 mm translation
  - No angulation of C2
  - Treat - ridged collar

- **Type 2 > 3mm displaced**
  - > 11 deg. Angulation
  - Treat Halo Vest

- **Type 2a C2-3 disk injury**
  - Unstable in traction
  - Halo

- **Type 3 (post C2-3 fusion)**
  - Assoc’d C2-3 facet disloc
  - Posterior C2-3 fusion
Odontoid Fracture

• Anderson classification
  • Type I: small avulsion off superolateral aspect
    • Transverse ligament Avulsion
    • Type I may also be a sign of Occipito-cervical dislocation
    • Collar (isolated)
Odontoid Fracture

Type II: neck fracture
- Halo v.s. Surgery
- High non-union rate
Odontoid Fracture

Type III: fracture extends into body of C2
- Halo v.s. collar
Sub Axial Fracture/Dislocation

- Sub-Axial spine C3-L5
  - Cervical spine have higher risk of neurological injury due to decreased canal
  - Injury pattern determined by:
    - The Load (compression/Distraction/Direct blow)
    - The position of the spine at time load was applied (flexion/Extension/Rotation)
- Again treatment based on stability
  - Boney fractures usually heal stable
  - Ligamentous injuries unstable even after healing
Sub Axial Fracture/Dislocation

Ant. column
Ant Longit Lig
Ant annulus
Ant 2/3 vert body

Middle column
Post 1/3 of vert body
Post annulus,
Post Longit Lig

Post. column
Posterior elements
- pedicles, facets,
- lamina
- spinous proces
Posterior ligaments
Sub-Axial Spine Injuries

- Avulsion Fractures
  - Eccentric muscle contraction
  - Spinous Process
    - most common in C-Spine
    - C7 “clay shoveler’s”
  - Transverse process
    - Can also be direct blow in lumbar
  - Treat in collar/corset for comfort
Sub-Axial Spine Injuries

• Compression Fractures
  • Middle column is intact
  • 30% or less anterior column height loss is tolerated well
    • More than 50% loss in cervical spine is often associated with posterior ligament injury
  • Treat in Collar or brace (hyperextension in T or L spine)
Sub Axial Fracture/Dislocation

- **Burst fractures**
  - Both middle and anterior column compressed and fractured
  - More common in Thoraco-lumbar spine
  - Cord injury can occur due to retropulsed bone
  - Root injuries due to foraminal stenosis
  - Treatment depends on stability
Sub Axial Fracture/Dislocation

• Facet Injuries
• Usually a combination of Flexion and distraction
• Spectrum from non-displaced fractures to dislocations
• Have pain with palpation of posterior ligaments
Analysis of lateral C-spine x-ray

• 4 smooth longitudinal lines
• Prevertebral soft tissues
  • “6 at 2, 22 at 6”
• Must see spine from occiput to T1
  • Swimmer’s lateral
  • CT
Facet Injuries

- Non-displaced fractures and unilateral dislocations may be able to be treated in collar
- After pain as resolved after 4-6 weeks Flexion and extension views will assess stability
Facet Injuries

- 72 y/o fell against kitchen cabinet during an episode of syncope.
- Neurologically intact
- Placed in rigid collar
- 2 weeks later followed up in office with complaints of neck and arm pain
Facet Injuries
Facet Injuries

- Admitted to hospital
- Had an awake closed reduction
- Then fusion
Facet Injuries

• 52 y/o had been drinking up north
  • (valid Wisconsin sport)
• She got up in the middle of the night to use the facilities and slipped on a rug, flipping over backwards landing on her posterior neck
• She had immediate paralysis and lay there for at least an hours before her friends found her.
Uni lateral Facet dislocation (perched facet)
Uni lateral Facet dislocation (perched facet)

- On arrival to Aspirus, she had symptoms of a central cord injury
  - Weakness worse in upper extremity than lower
  - Sensory variable below the level
- Underwent awake closed reduction, and further imaging
Cord contusion and ligament injury
Post-Op
Uni lateral Facet dislocation (perched facet)

- 3 months after she is able to walk and gross use her upper extremities
- But due to weakness and numbness has difficulties with fine motor activities with her hands
Spine Injuries

• Serious injury to the spine during sports is uncommon
• With improvement in equipment, coaching, and pre-hospital care the incidence has decreased.
References


