TRAUMA OF THE CERVICAL SPINE

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RADIOLOGIC EVALUATION

- Cross-table lateral
- Swimmers: if necessary to see C7/T1
- AP
- Odontoid
- CT: better detection and detail of fractures
- MRI: ligament injury, disc herniations, cord injury

RADIOPHGRAPHS

Key Points

- Lateral
  - Alignment
  - Soft tissue swelling
    - ½ body C1-C4
    - Full body width C4-C7
- AP
  - Smooth lateral margins
  - Spinous processes aligned
- Odontoid
  - Base of dens intact
  - Lateral masses of C1 and 2 align

CERVICOCRANIAL INJURIES

Atlas (C1)

- Neural arch fractures: hyperextension
- Jefferson fractures: burst
- Anterior arch avulsion: hyperextension
- Beware
  - Congenital variants
  - Pseudo-Jefferson fracture

Axis (C2)

- Dens fractures
- Hangman’s fractures

Harris JH, Mirvis SE. Radiol Acute Cervical Spine Trauma.

Rogers LF. Radiol of Skeletal Trauma.
INJURIES OF THE LOWER CERVICAL SPINE (C3-7)

Mechanism: Hyperflexion

- Anterior subluxation (hyperflexion sprain)
- Bilateral interfacetal dislocation
- Simple wedge compression fracture
- Clay shoveler’s fracture
- Flexion teardrop fracture

Anterior Subluxation (Hyperflexion Sprain)

- Unstable
- Predominantly soft tissue disruptions
- Wide posteriorly/kyphosis

Bilateral Interfacetal Dislocation (Facet Jump)

- > 50% anterior translation
- Both facets jumped
- Severe neurologic injury common

Clay Shoveler’s Fracture

- Spinous process avulsion
- C7 > C6 > T1
- No neurologic sequelae

Flexion Teardrop Fracture

- Swimming pool injury
- Combo flexion and axial load
- Characteristic “teardrop” fragment
- Anterior inferior corner
- Kyphotic angulation
- Neurologically devastating
Mechanism: Simultaneous Flexion and Rotation

- Unilateral interfacetal dislocation
  - < 50% anterior translation
  - Spinous processes deviate
  - Bow-tie/bat-wing/butterfly appearance of facets
- Unilateral interfacetal fracture-dislocation

Mechanism: Hyperextension

- Hyperextension dislocation
- Avulsion fracture of the anterior arch of the atlas
- Fracture of the posterior arch of the atlas

Mechanism: Hyperextension

- Extension teardrop fracture
- Laminar fracture
- Hangman’s fracture
- Hyperextension fracture-dislocation

Hyperextension Dislocation

- Often elderly
- Widened anteriorly
- Soft-tissue swelling universal, but usually obscured by intubation
- Neuro problems common: central cord syndrome

Extension Teardrop Fracture

- C2
- Taller than it is wide

Mechanism: Hyperextension and Rotation

- Pillar fracture
- Pedicolaminar fracture-separation
Mechanism: Vertical Compression

- Jefferson fracture
- Burst fracture

This burst fracture involves the posterior wall of the vertebra and the laminae, which is typical.

Mechanism: Lateral Flexion

- Unilateral occipital condyle fracture
- Unilateral lateral mass fracture, C1
- Uncinate process fracture
- Transverse process fracture

REASONS TO OBTAIN MRI

- Neurologic impairment (MR shows cord damage)
- Suspect ligament injury (CT doesn’t show soft tissue damage)
- Suspect herniated disc (MR superior to CT)

NOTE: CT is the study of choice to evaluate for fracture!

EVALUATION OF PELVIC RING AND ACETABULAR FRACTURES

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Radiologic Evaluation

- AP radiograph
- CT
  - If have known fractures
  - If radiographs uncertain
- Inlet/outlet (45 degrees)
- Judet (45 degrees)

As needed for treatment and follow-up

Key Areas to Look

- Femoral neck/inter-trochanteric
- Obturator ring
- Pubic symphysis (< 6mm)
- Iliopubic and ilioischial lines
- Posterior wall acetabulum
- SI joints (< 4mm)
- Sacral foramina
- L4 and L5 transverse processes