Peggers’ Super Summaries: Spinal Fractures

Spine fractures:

INTERPRETATION OF CERVICAL SPINE X RAY – ABCS

- A – adequacy
- A – Alignment
- B – Bones
- C – Cartilage discs
- S – Soft tissues

C1

- Anatomy
  - Apical ligament
  - Transverse ligament
  - Alar ligament
- Classification
  - Jefferson – burst
  - Lateral mass #
  - Hyperextension injury to lamina
  - Ligamentous injury
- X-ray
  - Lateral x ray C1 to peg distance <3 adults <5mm in children
    - > 3mm – transverse ligament injury
    - > 5mm – TL / alar / tectorial membrane injury
  - AP lateral mass overhang
- Mx
  - Conservative
    - Halo 6-12 weeks needs intact transverse 1rapezie
    - Cervical collar needs regular flexion and extension views
  - Surgical
    - Anterior vs posterior
    - Wiring, trans-articular screws, lateral mass or pedicle screws

C2

- Classification
  - Odointoid peg
  - Hangman
- Odointoid peg
  - Overview
    - Old falls
    - Young flexion/extension injuries
  - Displacement
    - Extension fix posteriorly
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- Flexion fix anteriorly
  - Types
    - Tip
    - Base RF for slip
      - >5mm displacement
      - >10° angulation
      - >40 years
      - >2mm gap
      - Posterior displacement
  - Into body
  - Healing
    - 80% young and undisplaced
    - 50% if displaced or old

- Hangman
  - Overview
    - Hyperextension # to pedicles
  - Classification – Levine & Edwards
    - 1 - <3mm displacement
    - 2 – angulation >3mm displacement
    - 2A – severe angulation with ALL intact
    - 3 – neural arch fracture post fracture dislocation of facets

TORTICOLIS

- Congenital theory
  - Interuterine packaging problems
  - Or intra-uterine ischaemic event

- Acquired
  - Sternocleidomastoid spasm
  - Qunisey
  - Cancer
  - Trauma – cervical fracture or dislocation
  - Cranial nerve problem ie eye looking the wrong way

BOAST GUIDELINES

- For all cervical spines fine slice 2mm helical CT
- For lumbar and thoracic x ray 2 views unless CT scan of chest abdo, pelvis is being organised

TYPES OF SHOCK

- Neurogenic – autonomic dysfunction for spinal cord injury
- Spinal shock – loss of reflex pathways from temporary injury (may last from hours to days)

LUMBAR SPINE
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- **AO classification**
  - A – anterior column compression >50% wedging or 30° coronal angulation or collapse on standing x rays = unstable
  - B – tensile or chance injury – unstable
  - C – rotational – unstable

**DANIS 3 COLUMN**
- Anterior column – AL and anterior of posterior cortex
- Middle column – posterior cortex and PLL
- Posterior column – pedicles/lamina/facets

**EPONYMOUS NAMES**
- Jeffersons’ – C1 burst fracture from axial force
- Hangmans – hyperextension causing pedicle fracture
- Tear drop – flexion and compression ALL with vertebral injury must MRI all
- Clay shovlers – Spinous process injury flexion injury stable (rule out facet dislocation of lamina injury)
- Burst fracture – middle column injury on axial CT unstable

**Imaging modalities:**

**INFECTION:**
- Discitis – infection starts in end plate
- Vertebral – osteomyelitis
- Epidural
- TB
  - Skip lesions
  - > 2 levels
  - Preserving of disc space
- Lymphoma
  - Medullary with cortex preserving

**CANCER:**
- Infiltration and destruction into soft tissues
- Infection and cancer often look the same and need biopsy

**INFLAMMATION**
- RA
- Sacroiliitis
- Ankylosing spondylitis
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TRAUMA

- Fracture
- Dislocation
- Cord
- Root
- Avulsion

Spine Injury:

SPINAL SHOCK

- Cord concussion
- Temporary
- Preservation of basic reflexes

NEUROGENIC SHOCK

- Complete cord transection
- Resulting in flaccid paralysis with failure of autonomic system
  - Ie bradycardia and hypotension

1st VS 2nd INJURY

- At time of injury
- In Hospital
  - Hypoperfusion
  - Hypoxia
  - Further damage from instability
  - Swelling – no evidence for steroids

 IMAGING

- Boasts standards for trauma – fine sliced helical CT for cervical spine
- Plain imaging for thoracic and lumber unless injury identified
  - However Sell et al JBJS 2012 found 17% thoracolumbar fractures on CT 3.5% in total were unstable
  - RF for missed injuries High ISS, decrease GCS, and haemodynamic instability
- CT better than x ray Nunez et al 1996
- MRI found 77% additional injuries Green et al 2004

STABILITY

- Defined by Panjabi 1975 – “the ability to withstand physiological loads”
- Danis 3 column theory
- Essentially comes down to 3 factors
  - Pain
  - Deformity
  - Neurological deficiency

OUTCOME
**Peggers’ Super Summaries: Spinal Fractures**

- Largely determined by motor function
- C3/4 has chin control
- C5/6 elbow and shoulder
- C7/8 Hand

**CAUSES OF DETERIORATION**

- Undiagnosed injury
- Progressive neurological insult
- Cord oedema –
  - NASCIS 1-3 trials showed no evidence for steroids and may actually increase mortality
- Cord haemorrhage or extra axial haemorrhage
- Systemic hypoxia or hypotension
- Instability
- Syrinx formation

**Mx**

- Non-surgical
  - Skin care
  - Bladder flaccidity
  - Bowel Mx
  - Respiratory care
  - Skeletal mobility
  - Autonomic dysreflexia
    - Signals go up cord stopping a level of injury
    - Sympathetic system over activates
    - Para-sympathetic cannot down regulate
    - BP increases and HR decreases and patient arrests

- Surgical
  - Bone stability