Conflicts

• Examiner FRCS Tr Orth
• Spine Surgeon
Scoliosis

- Three core worries

“Please take a history ....”

- History
  - Age of onset
  - Birth history
  - Family history
  - Menarche
  - Pain
  - Cosmesis
Scoliosis

“Could you now examine please....”

- Examination
  - Describe shape & balance
    - Café au Lait, Dimples
  - Adams forward bend
    - Scoliometer
  - Leg lengths
  - Neurology
    - Reflexes UMN
Scoliosis

“So, what are you going to do next?”

• Investigations
  • Standing Xray
    • Cobb Angle
      • Neutral vertebra
      • End vertebra
    • Risser grade
  • Bending films
  • MRI
    • Syringomyelia
    • Tethering
    • Arnold Chiari Malformation
Scoliosis

“So, what are the options?”

- Conservative vs surgery
  - 10-25° Observe
  - 25-40° Brace
    - Weinstein NEJM 2013
  - >40° Surgery

- Progression
  - >40°, 1-2° deg/yr

- Surgery
  - Posterior fusion

- Read about
  - King/Lenke classification
  - Neuromuscular
    - Quality of life
  - Neurofibromatosis
  - Syndromic
    - VACTERL
  - Congenital
    - Failure of formation
    - Failure of segmentation
  - Duchennes
    - Lung function vs cobb angle

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Area of controversy?

• Early onset scoliosis
  • Growing rods
  • Magec rods
    • Failure to lengthen
    • Metallosis

Complications of Growing Rods - has the Magec Rod overcome all of it?

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Scoliosis
Disc
Sclerosis
Spondy
Trauma
B A
Disc

- Degenerative cascade
  - 80% water
  - Nucleus
    - Loss of distinction between nucleus and annulus
    - Increase collagen in disc
    - Decrease neg charged PG side chains
    - Decreased water
    - Decreased PG aggregates
  - Annulus
    - Decrease cells
    - Decrease metabolic activity
    - Decreased PG’s
    - Larger collagen fibrils appear
    - Overall decreased collagen and shift to type III collagen
  - Facet joints
    - Subchondral sclerosis
    - Osteophyte formation
    - Loss of articular cartilage
    - Joint laxity
  - End plate
    - Calcification of endplate cartilage
    - Decreased supply of nutrients to avascular disc

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Disc

- Disc degeneration
  - Annular fissure
    - Disc protrusion
      - Spinal stenosis
        - Degenerative spondylolisthesis

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Disc

Exiting

Traversing
Disc

Sciatica

NG59
NBPRP

- 80% settle
- NRI
- Surgery for minority
Disc

- “Damage to the cauda equina nerve roots occurs in a continuous and progressive fashion”
  - Todd BJJ 2015
Definitional

A patient presenting with acute (de novo or as an exacerbation of pre-existing symptoms) back pain and/or leg pain, with a suggestion of a disturbance of their bladder or bowel function and/or sacral sensory disturbance, should be suspected of having a cauda equina syndrome. Most of these patients will not have critical compression of the cauda equina. However, in the absence of reliably predictive symptoms and signs, there should be a low threshold for investigation with an emergency scan. The reasons for not requesting a scan should be clearly documented.

Imaging

The appropriate investigation of these patients is an MRI scan except where specifically contraindicated. The investigation should be undertaken as an emergency. It is very difficult to justify waiting until the end of an elective MRI list. The regional societies (BASS and BRASS) strongly recommend that MRI scanning should be undertaken urgently at the hospital receiving the patient in order to ensure timely diagnosis and when appropriate, immediate referral and transfer to a spinal unit.

Surgery

Nothing is to be gained by delaying surgery and potentially much to be lost. Decompressive surgery should be undertaken at the earliest opportunity, taking into consideration the duration of pre-existing symptoms and the potential for increased morbidity whilst operating in the small hours. We recommend reasons for any delay in surgery be documented.

Counselling

All patients undergoing surgery for CES should be counselled that the aim of surgery is to preserve that function present at the time of surgery. There is scope for improvement, but there is a small risk of matters worsening including paralytic symptoms, complete loss of bladder and bowel control and impotence/sexual dysfunction.
Stenosis

- Lumbar
  - History/exam
    - Claudication
    - Neurogenic vs vascular
    - Ankle Brachial Pressure Index
    - LMN

“The degenerative cascade”

- Treatment
  - Analgesic ladder
  - NSAIDS
  - ?Epidural - NG59 not recommended
  - Posterior decompression

Facet joint cyst

Stenosis

- Lumbar

- Posterior decompression
- +/- fusion

A Randomized, Controlled Trial of Fusion Surgery for Lumbar Spinal Stenosis

In summary, in this randomized trial of Swedish patients with lumbar spinal stenosis involving one or two adjacent vertebral levels, with or without degenerative spondylolisthesis, decompression with fusion did not result in clinical outcomes that were superior to those with decompression surgery alone.
Stenosis

- Cervical
  - Myelopathic

“The degenerative cascade”

- Upper motor neurone
  - Decreased power
    - Legs, multiple areas
  - Altered sensation
    - Sensory level
  - Poor proprioception
    - Myelopathic gate
  - Increased reflexes

- Myelomalacia
  - Central $\text{cord}$ syndrome

- Treatment
  - Symptoms plateaued?
  - Cervical decompression
    - Ant vs post
      - 1 level ant
      - 2 levels either
      - 3 levels post
Scoliosis

Disc

Spondy

Spondylolisthesis

Trauma

Endoscopy & Injections

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Spondylolisthesis

• Wiltse/Newman Classification


- Grade I: 0-25%
- Grade II: 25-50%
- Grade III: 50-75%
- Grade IV: 75-100%
- Grade V: greater than 100%

• Dysplastic
• Isthmic or lytic
• Degenerative
• Traumatic
• Pathological
• Iatrogenic

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Spondylolisthesis

• Back Pain
• Nerve Pain
• Investigations?

• the PARS
Spondylolisthesis

• Back Pain
• Nerve Pain

• Spondylisthetic crisis

• How much to reduce?
• Stretching L5

• Spondyloptosis

• a Sagittal Balance crisis
Scoliosis
Disc
Spondylothesis
Stenosis
Trauma
Malignancy & Tumors
Spondylysis
Tumours

• Mechanical vs Non Mechanical pain

• Common tumours going to spine
  • Lung - 31%
  • Breast - 24%
  • GI tract - 9%
  • Prostate - 8%
  • Lymphoma - 6%
  • Melanoma - 4%
  • Unknown - 2%
  • Kidney - 1%
  • Others including multiple myeloma - 13%

• MRI whole spine
  • More than one lesion

• Curative vs palliative
  • NG75

• En bloc vs radiotherapy vs surgery
Tumours

- Malignant Spinal Cord Compression
- Patchell Lancet 2005
- Dexamethasone
- Bisphosphonates

Indications for surgery

- Pain
- Neurology
- Posterior decompression and stabilisation

Myeloma
Infections

- Long term antibiotics
  - 6 weeks IV 6 weeks oral
- Child vs Adult
- Blood supply
- Common organisms
  - St Aureus
  - Gr Negatives
  - TB
- Discitis
- Epidural abscess

This is why we give prophylactic antibiotics in spine surgery

Antibiotics for LBP
Trauma

• Classifications
  • anatomical

3-Column Model of Denis

Denis Classification of Spinal Trauma

Major Injuries
  - COMPRESSION
  - BURST
  - SEAT-BELT-TYPE
  - FRACTURE-DISLOCATION

Minor Injuries
  - articular process fx
  - pars interarticularis fx
  - spinous process fx

• morphological

Algorithm for morphologic classification

AO/MAGERL CLASSIFICATION

<table>
<thead>
<tr>
<th>TYPE</th>
<th>GROUP</th>
<th>SUBGROUP</th>
</tr>
</thead>
</table>
| A (Compression) | • A1: Impaction fractures | • A1.1 end plate impaction
  • A1.2 wedge impaction
  • A1.3 vertebral body collapse |
  • A2: Split fractures
    • A2.1 sagittal split
    • A2.2 coronal split |
| B (Distraction) | | |
| C (Rotation Injury) | | |
Trauma

• Neurology
• ASIA score

TLICS 3 independent predictors

1. Morphology
   - Compression
   - Burst
   - Translation/rotation
   - Distraction
   - Radiographs
   - CT
2. Integrity of PLC
   - Intact
   - Suspected
   - Injured
   - MRI
3. Neurological status
   - Intact
   - Nerve root
   - Complete cord
   - Incomplete cord
   - Cauda equina
   - Physical examination

Predicts
- Need for surgery
  0 – 3
  4
  > 4
- nonsurgical
- surgeon’s choice
- surgical

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Trauma

• Examples

• New technologies in spine: kyphoplasty and vertebroplasty for the treatment of painful osteoporotic compression fractures
  • SR Garfin, HA Yuan, MA Reiley – spine, 2001

“• Most patients with osteoporosis fractures can be managed conservatively. • Balloon kyphoplasty is an option for a small number of patients with vertebral compression fractures.”

NICE 2005

• A1 fracture
Trauma

• Examples

• “Fixateur Interne”

• A3 fracture

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**SPINE**

**Early mobilisation of thoracolumbar burst fractures without neurology**

A NATURAL HISTORY OBSERVATION


From Robert Jones and Agnes Hunt Orthopaedic Hospital, Oswestry, United Kingdom

Aims

The authors present the results of a cohort study of 60 adult patients presenting sequentially over a period of 15 years from 1997 to 2012 to our hospital for treatment of thoracic and/or lumbar vertebral burst fractures, but without neurological deficit.

Method

All patients were treated by early mobilisation within the limits of pain, early bracing for patient confidence and all progress in mobilisation was recorded on video. Initial hospital stay was one week. Subsequent reviews were made on an outpatient basis.

Results

The mean duration from admission to final follow-up was three months, and longer follow-up was undertaken telephonically. The mean kyphosis deformity on admission was 17.4° (5° to 29°); mean kyphosis at final discharge three months later was 19.5° (11° to 28°). Spinal canal encroachment had no influence on successful functional recovery.

Discussion

Pain has not been a significant problem for any patient, irrespective of the degree of kyphosis and no patient has a self-perception of clinical deformity. In all, 11 patients took occasional analgesics. All patients returned to their original work level or better. Two patients died 2.5 years after treatment, from unrelated causes.

Take home message: The natural history of thoracolumbar burst fractures without neurology would appear to be benign.

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Trauma

• Examples

  • Ankylosing spondylitis
    • It is broken until you prove it isn’t!!!!!!!!!

  • Xray
  • CT
  • MRI !!!!!!!!!!
Trauma

• Steroids
  • methylprednisilone

• They are coming back again....
Trauma

• Cervical dislocation
  • Unifacetal
    • 25% displacement
  • Bifacetal
    • 50% displacement
  • Perched

• MRI – Is there a disc?
• Slow Traction
Scoliosis

“So, what are you going to do next?”

- Investigations
  - Standing X-ray
  - Cobb Angle
  - Neutral vertebra
  - End vertebra
  - Tilt
  - Bone density
- MRI
- CT
- Spondylosis
- Tethering
- Arnold-Chiari Malformation

Disc

- Disc degeneration
  - Annulus fissure
  - Disc protrusion
    - Spondylolisthesis
    - Degenerative spondylolisthesis

Stenosis

- Lumbar
  - Is there a degenerative spondylolisthesis or not?

Spondylolisthesis

- Posterior decompression
  - +/- fusion
    - Better decompression & fusion rate
    - Increased risks

Trauma

- Classifications
  - Anaatomical

Tumours

- Malignant Spinal Cord Compression
  - Patchell
    - Posterior decompression and stabilization
    - Dexamethasone
    - Bisphosphonates

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Thank you