DEGENERATIVE CERVICAL SPINE:
PREOPERATIVE ASSESSMENT
OF ARM PAIN

DENIS L. KAECH
NEUROCHIRURGIE KSGR, CH 7000 CHUR
denislkaech@ksgr.ch
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You will have to declare the CONFLICT OF INTEREST STATEMENT, by choosing one of the six sentences listed hereafter.

The sentence concerning the conflicts of interest is to be placed (copied and pasted) on the first slide of your PowerPoint presentation after the full contact details of the corresponding author.

1°) No funds were received in support of this study.
NO FUNDS WERE RECEIVED TO SUPPORT THIS WORK!

NO CONFLICT DUE TO "UNAPPROPRIATE" VISUAL STIMULATION

"APPROVED DOPING" WHICH IS BEST?

= ACTUAL CONFLICT OF INTERESTS!
Checklist:
What to do?
What to look for?
Recommended investigation!
Timing of investigations?
What do they demonstrate?
Arm pain: what shall I do?

- Take a **history**:
  Acute onset, preliminary neck pain, + **neck pain**?
  Focus on *mechanical factors* aggravating pain
  Exclude malignancy, fever, immuno-suppression,
  metabolic disease, coagulopathy

+ **Neurological examination**:
  Radicular syndrome?
  Signs of cervical myelopathy?
• The Neck Pain Task Force has recently recommended a triaging of patients into 4 groups or grades:
  • I and II Common neck pain,
  • III neck pain with neurologic signs of nerve compression (arm pain!) and
  • IV neck pain with signs of major pathology

MYELOGRAPHY = LAST CENTURY MAGING

Arm Pain:

Increased by Hyperextension Rotation?

C5: Shoulder

C6: "Hitchhiker"

C7: "Victory"

C8: Fingers -
DDD: What to look for?

• Cervical Disc herniation
• Stenosis
• Instability ➔ Dynamic Imaging!

• Single or multilevel pathology?
• Recurrent problem after prior surgery
  (other pathologies....?)
INVESTIGATIONS / IMAGING

• MRI
• DYNAMIC RADIOGRAPHS = RECOMMENDED
• UPRIGHT-MRI = FUNCTIONAL IMAGING
• CT-SCAN: EXCEPTION, WHEN PRECISE BONY ANATOMY NEEDED, OR IF CONTRA-INDICATION FOR MRI
• + CONTRAST = MYELO-CT
Timing of investigations
What do they demonstrate?

• **CERVICAL SPINE MRI**: IN EMERGENCY
  ACUTE PROGRESSIVE NEUROLOGY
  Tetraparesis, Brown-Séquard …(rare)
  ➔ MRI WITHIN DAYS – 1 WEEK:
  
  major radiculer deficit + intractable pain
  ➔ MRI „IN DUE TIME“: OTHER CASES

ADDITIONAL DYNAMIC RADIOGRAPHS?
(MYELO-CT: WHEN MRI IS CONTRAINDICATED)
UPRIGHT-FUNCTIONAL MRI: IF AVAILABLE FOR
LOAD AND POSITION DEPENDENT PATHOLOGIES
MRI SHOWS:

DISC HERNIATIONS AND STENOSIS, THE CORD AND THE NERVE ROOTS, VERTEBRAL ARTERY, + SOFT TISSUES

E.G. DRAWING SHOWING HARD DISC BARS C3/4 AND C4/5, CALCIFIED PLL MYELOPATHY!
PLUS

SOFT C5/6 HERNIA
CHOICE OF APPROACH based on IMAGING FINDINGS

MAIN COMPRESSION
- ANTERIOR OR
- POSTERIOR?

CHOOSE APPROACH

LIG. FLAVUM

SPONDYLRARTHROSIS

PLL
ANTERIOR, PARAMEDIAN DISC FRAGMENT
\(\Rightarrow\) ANTERIOR APPROACH
AXIAL MAGING ➔ SIZE OF THE SPINAL CANAL! FOR BONE: CT > MRI

Basic approaches, J.T. Hoff, p.2236, but avoid „facetectomy“!
RIGHT ARM PAIN ➔ RIGHT FORAMINAL STENOSIS

+ Calcification/Ossification of PLL with cervical myelopathy (A. spinalis ant.!)  
DILEMMA: CORPECTOMY OR LAMINOPLASTY?  
STABILITY? CURVES? = YOUR DECISION…..
IMAGING ➔ CHOICE OF C-SPINE APPROACHES

POSTERIOR APPROACH: FORAMINOTOMY
  FORAMINAL DH, LATERAL DH C7/D1
  PATIENTS WITH SHORT NECKS + LAT. DH
  PROFESSIONAL SINGERS (N. Recurrens)
  CAROTID STENOSIS, PLAQUES
  PREVIOUS SURGERIES, RADIOTHERAPY, SCARS
  BUT INADEQUATE DECOMPRESSION IN CASE OF
  ANTERIOR COMPRESSION & MYELOPATHY!
  BUT E.G. MIXED COMPRESSION + STABILITY + LORDOSIS
  ➔ POSTERIOR LAMINOPLASTIC DECOMPRESSION = OPTION
CAUDAL

CERVICAL FORAMINOTOMY

INFERIOR MARGIN OF R. C7 ROOT

EPIDURAL FAT

RAUSCHNING: NO PLEXUS, NO EPIDURAL FAT LATERALLY = DIFFERENCE TO LUMBAR!

HEMOSTATIC AGENTS: LYOSTYPT, SURGICEL, (BIPOLAR)
C5/6 DISC HERNIATION WITH RADICULAR PAIN, C6 DEFICITS, BUT ALSO NECK PAIN KYPHOSIS!

ROUTINE JOB = C5/6 DISCECTOMY AND CAGE
ANTERIOR APPROACH, DISCECTOMY + CAGE = ROUTINE
HARD DH+PLL STENOSIS C3-5

SOFT DH C5/6

OK

CORPECTOMY C4
DISCECTOMY C3/4 + C4/5
CAGE, PLATE & SCREWS

LORDOTIC C5/6 CAGE

ANTERIOR APPROACH
CASE EXAMPLE: C6+C7 RADICULOPATHY + (MYELOPATHY) DISC HERNIATION C5C6, PLUS CRANIALLY MIGRATED C6/7 DH ➔ C6 CORPECTOMY
Plain and **dynamic radiographs** show

- Bony structures
- Curves
- Disc height
- Alignement (you can measure angles)
- (Previous surgeries = fusions, implants)

  **Instability** = dynamic flexion-extension Rx.
  = additional informations to MRI

or you are lucky and can send patients to
  Upright, multiposition = functional MRI
  [www.upright-mri.ch](http://www.upright-mri.ch)
PLAIN X-RAYS:
BONE
DISC HEIGHT
CURVES
ALIGNMENT

C6 DEFICITS
C5/6 DH ➔

DISCECTOMY
AND CAGE

C5/6 KYPHOSIS ➔ “OVERCORRECTED“ = HYPERLORDOSIS
ENDPLATES AT RISK ➔ HIGHER RISK OF SUBSIDENCE!
DYNAMIC X-RAYS: 5 years follow-up after C5+C6 laminectomy for myelopathy: excellent result, no symptomatic “adjacent segment disease”!

R approach ➔ foraminotomies C5/6, C6/7, time-consuming approach with preservation of spinous process tips and muscle attachments on the left
Upright (kinetic) MRI: Cervical Spine

Full Range of Physiologic Motion: Extension-Flexion
Functional MRI = upright, multiposition
see also refs. „Elsig JP, Kaech DL“ and Jinkins et al.

UPRIGHT-EXTENSION                      UPRIGHT-FLEXION

F, 56 Y, ACIF C4/5 12 YEARS AGO, LEFT SIDED NECK PAIN WORSE IN ANTEFLEXION ➔ UPRIGHT FLEXION–EXTENSION
L C3/4 ANTE- & ROTO-LISTHESIS = DYNAMIC STENOSIS IN ANTEFLEXION
IMAGING GIVES INFORMATIONS

Evaluation of clinical and radiological results

➔ SYNTHESIS

SURGICAL DECISION

SURGEON‘S TASK

POSSIBLE DILEMMAS
Case example: rare pathologies

• 85 years old lady
• Anticoagulation for atrial fibrillation
• Fall on 28.9.08, “right hemiparesis“
• CT Head 30.9.08: no subdural hematoma!
  no cerebral hemorrhage, no stroke
  but
  - the lady is fully awaken
  - she has a right sided arm pain!
Right arm pain ➔

- Sensory deficit (C5) < C6, C7 R
- Motor deficit C6-C8 R
- Weakness of R leg: Foot extension++
- Hyperreflexia of the legs ➔ MRI of cervical spine:
posterolateral compression on the R
SPINAL SUBDURAL HEMATOMA
OPENING OF THICKENED ARACHNOID (C5 LEVEL)
Subdural hematoma at C5 level, Histology: No AVM
Microsurgical removal, Histology : no cavernoma
Intradural-extramedullary hematoma
FU: Mild residual C5 sensory deficit
Kaech DL: Arm Pain 2009

• Please read my paper about his topic

• 7 minutes presentation
  ➔ incomplete, can’t show and tell you all!
THANK YOU!

THE DOCTOR TOLD ME
BOY YOU DON’T NEED
NO PILL’S! (CARL PERKINS)
PLAY WITH YOUR BAND
(DENIS KAECH & ROLLIN’ FIFTIES)
THAT WILL CURE OUR ILLS!

(e.g. for „benign“ neck pain)