Dorsal Instrumentation of the Cervical Spine with the “neon® occipito-cervical system”

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Introduction

• **neon® Instrumentation System:**
  New modular polyaxial system for the posterior stabilization of the cervical spine from C0 to thoracic levels
  Occipital screws, atlas claws, transarticular, transpedicular, and lateral mass screws, rod system

• **Aim of the study:**
  To study the suitability of the novel instrumentation system neon® for dorsal instrumentation of the cervical spine in traumatic, degenerative, infectious or neoplastic disease

Patients and Methods

• **Patient Population:**
  54 patients (m=31, f=23) included from 07/01 to 12/03
  Median age: 63 years (min:21 y.; max:89 y.)
  80% high risk patients (reduced general condition/poor bone quality)

• **Pathology:**
  Neoplastic disease n=14
  Traumatic instability n=11
  Degenerative disease n=25
  Infectious disease n=4

• **Surgical stabilization**
  Prior ventral fixation followed by posterior approach: n=16
  Sole posterior stabilization: n=38

• **Study Design:**
  Prospective, consecutive database using standard scales

• **Parameters:**
  Neurological status (Frankel scale, Nurick classification)
  Pre- and postoperative pain (VAS)
  Operating time
  Screw and rod placement (postoperative thin-cut CT scans and plain films)
  Follow-up: clinical exam (Nurick, Karnofsky, VAS, SF-36), plain cervical and cervicothoracic x-ray

Results

• **Operating Time:**
  Median 155 min (range 85-335 min) including decompression by laminectomies and fusion

• **Stabilized segments:**
  Median 4 (range 1-6), reaching from C0 to Th5

• **Implanted material:**
  A total of 315 screws were implanted, 306 with optimal position in the post-op CT, 9 with suboptimal position out of which 3 had to be corrected surgically.

• **Clinical outcome I (mean follow-op: 9 mo):**
  Nurick: All patient remained stable or improved after operation except 1, who transiently changed from Nurick 3 to 4.

• **Posterior decompression**
  Laminectomies in n=25, Median 3 levels (range 1-5)
  Hemilaminectomies in n=4, Median 2 level (range 1-3)
  2 level laminoplasty in n=1

• **Spinal alignment:**
  Correct in all cases postoperatively, without significant secondary loss of correction/material loosening during follow-up

• **Clinical outcome II:**

Long term outcome (i.e. ≥ 12 mo.):
Pending

Case Illustration

• **Preoperative status**
  79 yo female pt. with severe myelopathic symptoms, Nurick grade 5.

• **Surgical therapy**
  Decompressive laminectomy C3-C6
  Posterior stabilization from C2 (pedicle screws), to C5 and C7 (lateral mass screws) connected with a rod system

Conclusion

• neon® is convenient and extraordinary versatile for posterior instrumentation from the occiput to the upper thoracic spine
• thereby, it enables to avoid the anterior approach with its increased perioperative morbidity in high-risk patients
• provides substantial additional stability to multi-segment anterior constructs
• Study limits at present: long term results are still pending