Three or More Level Disease

Multi-level ACDF or ACF/ACDF Combo:

“The Pathology is in the Front and Patients Tolerate Anterior Much Better than Posterior”

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Multilevel radiculopathy

- Spondylosis is a normal degenerative evolution of the cervical spine with age.
- Progression of events leads to changes involving disk, vertebral bodies, facet joints and ligaments, that results in compression and inflammation of the nerve roots.
- The term, radiculopathy, refers to the sign and symptoms of nerve root dysfunction.
- In older patients extensive degenerative changes often exhibit signs and symptoms of more than one level.
- Major lack of information concerning « multi level cervical radiculopathy » have been found (Cochrane and Pub Med)
Muti level radiculopathy (as in CSM) is a result of multi factors

- Static
- Dynamic
- Vascular
The « gold standard » is:

No more than 2 levels by anterior approach

**Why?**

According to literature above 2 levels immediate and long term risks of complications are increased.
In the series of Singh: retrospective analysis of 159,590 (2002-2012) from the NIS after anterior cervical fusion: dysphagia: 2.5%.

Risk factors:

- up to 3 levels (x 2 for 1 or 2 levels)
- Patients older than 65 – Male – RhBMP
- Significant pre-op comorbidities

Spine 2013;38(21):1820-1825

In the series of Lee: a 2 years prospective study.

The risk factors were:

- women – previous surgery – more than 2 levels.

Risk of dysphonia

Multilevel : up to 2
In the sery of Frempong-Boadu

Other complications

Upper airway obstruction:
Emery et al: after multilevel corporectomy the authors observed an increasing risk of obstruction due to edema


Dural risks:
Hannallah et Al reviewed 1994 patients undergoing elective cervical spine over an 11 years period. The prevalence of CSF leaks was higher in patients operated by anterior cervical corporectomy and fusion (1.77%)


Mean of operative time and blood loss and ROM:
Shuzhi et Al in a sery of 248 patients conclude that the mean operative time and blood loss in the 2 level group were significant lower than the 3 level group (p<0.05).The 4 level group required a significantly longest operative time than the other 2 groups (p<0.05) and are more operative blood loss

Shunzhi Yu, Fenging Li, Ning Yan, Chaoqun Yuan, Shisheng He, Tiesheng Hou
PLoS One. 2014;9(3) : e91329
Other complications

Epidural hematoma
Kou et al. reported that multilevel surgical procedure was established a significant risk factor for epidural hematoma after operation.


Vertebral artery injuries
Graft complications

Non Union
in the study of Swank et al: Allograft tricortical iliac crest reconstruction and anterior cervical plating were studied in 64 patients (38 ACDF & 26 ACCF): non-union increases with number of levels


Graft dislocation or technical difficulties

This study demonstrated that a greater number of vertebral bodies removed and a longer graft are directly related to an increased frequency of graft displacement. Graft displacement may require revision surgery, but no patient in this study experienced a permanent adverse result from this complication. Corpectomies involving a fusion ending at the C7 vertebral body were associated with a higher rate of graft migration.

CASE PRESENTATION
• 60 years old
• Cervicalgia: Long history of neck pain
• Neuralgia: pain in the left arm
• Left handed.
• More than 6 months of evolution
• Followed and treated in the rheumatology department
• Referred to the surgeon for recent pain aggravation and neurologic impairment
At examination

• Neck stiff
• Major neck pain (VAS 8/10)
• Arm pain unclearly defined: no typical dermatome (left side)
• Pain of the shoulder
• Medial and lateral pain of the arm and forearm
• Hypoesthesia in all arm
• Some weakness in the hand and fore-arm
No Long tract Finding

- No long tract irritation
- No Babinski
- No Hoffman
- No gait disturbance
- No hand inability
- General condition excellent: no comorbidities
Motor evaluation:
- Deltoid: 4/5 (C5)
- Biceps: 4/5 (C5-C6)
- Wrist extension: 4-/5 (C6)
- Triceps: 4/5 (C7)
- Wrist flexion: 5

Sensory loss and pain

Axial pain

Reflex:
Brachioradialis reflex (C6): weak

Brachioradialis reflex (C6): weak
Xrays

flexion and extension film was not possible due to neck pain
Even with local injection
What decision to be taken? Which technique?

- Surgery:
- The natural course of cervical radiculopathy is favorable.
- In the series of Radhakrishnan, only 26% necessitated surgery.
- “A combination of radicular pain and sensory deficit, and objective muscle weakness were predictors of a decision to operate.”


About my patient

- Chronic disease (more than 6 months)
- Failure of medical treatment: even with Rheumatology Department hospitalisation.
- Aggravation of the symptomatology, acute neck pain and arm pain.
- Objective sensory deficit and muscle weakness.
- Major cervical pain.
Which technique?

- Young patient <65 years old
- No risk factors: not a smoker, no asthma
- No comorbidities
- No osteoporosis
- Only multilevel radiculopathy
- No clinical or radiological signs of myelopathy
- Major cervical pain
- Everything is in front
About balance benefit / risk

Dysphagia

Control of endotracheal tube


Bohlmannsery: 122 patients 28 pseudarthrosis
4 need reintervention to repair the non-union


The grade of RASP was not influenced by the number of fusion levels. All HRQoL parameters showed no significant correlation between number of fusion levels, cervical ROM, and SVA.
Significative differences between <2 levels and >2 levels:
1) Blood loss : no  2) operative time  x 2  3) hospital stay : no
4) General complications : no  5) Infection : no
6) Mechanical complications : no  7) Neurological complications : no
8) Death : no
What kind of surgery?

Muti-level A CF

Hybride

Mult-ilevel ACDF

increased fusion rates with cervical plating for 2 level anterior cervical discectomy and fusion

Wang JC, McDonough PW, Endow KK, Delamarter RB.
Final Option: muti level corporectomy with Iliac crest bone graft and plate
Discussion

• Why multi corporectomy for multi level disc diseases?
• Does long corporectomy offer the same sagittal restoration?
• Is long corporectomy more biomechanically appropriate according to long lever arm?
• Is long corporectomy more demanding surgically?
• Is long iliac crest donor acceptable?
THANK YOU and join us at Salzburg for the CSRS-ES May 2017