

Factors Affecting large developed Anterior Subsidence after Standalone Cage Assisted Anterior Cervical

Fusion and Changes of Cervical Sagittal Alignment

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ACDF

✓ Anterior cervical discectomy & fusion (ACDF)
: firstly described by Smith and Robinson
standard op. procedure for cervical degenerative disc disease



ANTERIOR SUBSIDENCE

✓ Regional kyphotic deformity
→ Global cervical sagittal kyphotic change (?)



PURPOSE

- ✓ Factor associated with anterior subsidence
- ✓ Regional alignment change (Fusion level)
- ✓ Global cervical alignment
- ✓ Clinical outcome

MATERIALS & METHODS

✓ 2006. 1. ~ 2010.12. 80 pts (F/U duration > 12 months)

Inclusion Criteria

Age from 20 to 60 years
Single level
Degenerative disease
Radiculopathy
Myelopathy
Symptoms between C3 and C7

Exclusion Criteria

Recent infection
Prior cervical lesion surgery history
Osteoporosis
Cervical instability

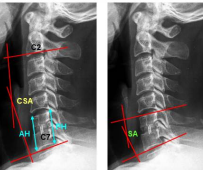
- ✓ Radiographs : preop, immediate postop, 6M, 1year, annually
- ✓ Clinical outcome : VAS and JOA

RADIOLOGIC ASSESSMENT

- ✓ Fusion state evaluation (CT or X-ray)
 - Trabecular continuity
 - Bridging
- ✓ Segmental stability
 - No movement or less than 2° of motion
 - Interspinous difference less than 3mm
- ✓ Segmental angle of fusion level (SA)
- ✓ Overall cervical sagittal angle (CSA)
- ✓ Interbody height (IBH)
 - Anterior (AH) & Posterior (PH)

GROUPING

I : Large anterior subsidence
(>1mm compared to posterior)
II : Others



RESULTS

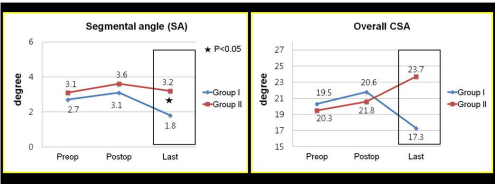
	Group I	Group II	P Value
Number	29	51	
Sex (M/F)	16/13	33/18	
Age	54.1 ± 9.7	50.4 ± 11.5	
Preop overall CSA	20.3 ± 5.0	19.5 ± 6.7	0.199
Preop SA (treated level)	2.8 ± 1.5	3.1 ± 1.7	0.583
Preop VAS of neck pain	7.1 ± 2.5	7.5 ± 2.3	0.846
Preop VAS of radicular pain	7.8 ± 2.4	7.2 ± 2.4	0.572
Preop JOA score	13.4 ± 2.5	13.1 ± 2.2	0.746

RESULTS (RISK FACTOR)

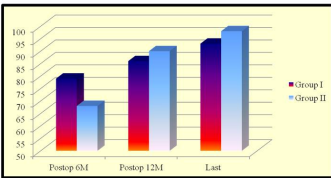
	P Value
Sex (M/F)	0.273
Age	0.246
Operative level	0.676
Operation time	0.571
Cage height	0.898
Cage species	< 0.05
Cage location	< 0.05
Cage length to AP body diameter	< 0.05



SAGITTAL ALIGNMENT

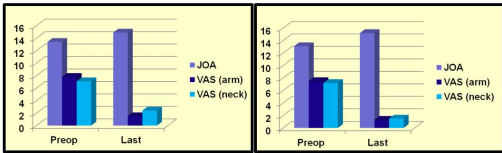


FUSION RATE



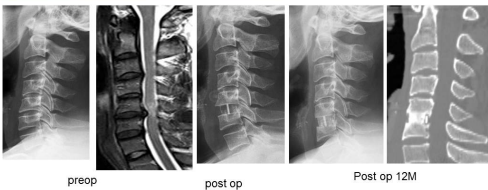
No difference between Group I and II

CLINICAL OUTCOME



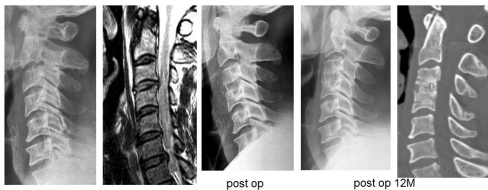
No difference between Group I and II

CASE 33/M C5-6 HNP c MYELOPATHY



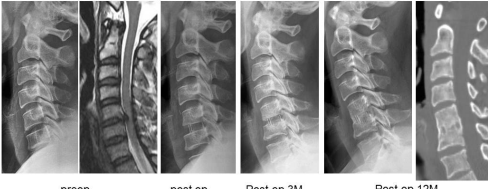
- Cage : Non-lordotic cage
- AP percent : 81.4%
- Anterior position

CASE 53/M C3-4 HNP c MYELOPATHY



- Cage : Lordotic cage
- AP percent : 76.2%
- Anterior position

CASE 48/M C5-6 HNP c MYELOPATHY



- Cage : Lordotic cage
- AP percent : 63.6%
- Posterior position

CASE 56/F C6-7 HNP



Post op 6M

- Cage : Lordotic cage
- AP percent : 61.9%
- Posterior position

DISCUSSION

- ✓ Stand alone synthetic cage packed with bone substitutes
 - No requirement autologous bone harvesting
 - : donor site morbidity → No
 - No graft collapse
 - Avoid plate-related complication
- ✓ Subsidence ?
 - Loss of segmental angle
 - Sagittal malalignment
 - Fusion rate or ASD development
 - Poor clinical outcome

ANTERIOR SUBSIDENCE

✓ Risk factors (in our series)

- Lordotic shape cage
- Posterior located cage
- Cage length to AP body diameter (78% vs 62%)



- ✓ No correlation overall cervical sagittal angle
- ✓ No adverse effect to clinical outcome
- ✓ Future
 - Long-term F/U c large number
 - Functional outcome
 - Fusion rate and ASD development

Conclusion

- Clinically, ACDF using stand-alone PEEK cage is a safe and reliable surgical option.
- Anterior subsidence developed incases with cage shape, length to AP body diameter, cage location.
- Anterior subsidence significantly increased loss of segmental lordosis, but overall CSA was not correlated with anterior subsidence.

Thank you very much.