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Anterior cervical corpectomy and fusion with stand-alone cages in patients with multilevel degenerative cervical spine disease is safe

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Background: In case of spinal cord compression behind the vertebral body, anterior cervical corpectomy and fusion (ACCF) is more feasible than cervical discectomy. The next step was the placement of an expandable titanium interbody to restore the vertebral height. The need for additional anterior plating with ACCF has been debatable and very few studies have evaluated such a technique.

Research question: to evaluate radiographic and clinical outcomes in patients with multilevel degenerative cervical spine disease treated by stand-alone cages for ACCF.

Design: Retrospective

Methods: Thirty-one patients (66.5 ± 9.75 years, range 53–85 years) were analyzed. Visual Analog Scale (VAS) and the 10-item Neck Disability Index (NDI) were assessed preoperatively and during follow-up on a regular basis after surgery and after one year at least. Assessment of radiographic fusion, subsidence, and lordosis measurement of Global cervical lordosis (GCL); fusion site lordosis (FSL); the anterior interbody space height (ant. DSH); the posterior interbody space height (post. DSH); the distance of the cage to the posterior wall of the vertebral body (CD) were done retrospectively. Mean clinical and radiographic follow-up was 20.0 ± 4.39 months.

Results: VAS-neck ($p = 0.001$) and VAS-arm ($p < 0.001$) improved from preoperatively to postoperatively. The NDI improved at the final follow-up ($p < 0.001$). Neither significant subsidence of the cages nor significant loss of lordotic correction were seen. All patients showed a radiographic union of the surgically addressed segments at the last follow-up.

Discussion: The application of a stand-alone expandable cage in the cervical spine after one or two-level ACCF without additional posterior fixation or anterior plating is a safe procedure that results in fusion. Neither significant subsidence of the cages nor significant loss of lordotic correction were seen.

Fig. 1

Tables:

Table 1: Patients' baseline characteristics.

	Number "n=31"	Percent
Age		
< 60	10	32.3
60-70	8	25.8
70+	13	41.9
Range	53.0-85.00	
Mean±S.D	66.5±9.75	
Sex		
Male	21	67.7
Female	10	32.3
Level		
3	2	6.45
4	4	12.90
5	4	12.90
6	7	22.58
7	1	3.23
4+5	6	19.35
5+6	7	22.58

Fig. 2

Table 2: Comparison between anterior DSH, posterior DSH and CD postoperatively and at the follow-up.

* Significant difference at $p < 0,05$

N.S. Non-significant

	Pre-operative	Post-operative	P
Anterior DSH	25.7-63.9	18.6-63.9	0.237 N. S
Range	37.0	34.9	
Mean±S.D.	11.12	11.20	
Posterior DSH	19.3-66.1	15.1-56.9	0.231 N. S
Range	32.9	30.8	
Mean±S.D.	11.90	10.85	
Dist. Posterior wall (CD)	1.0-7.7	0.5-5.7	0.05*
Range	3.4	2.9	
Mean±S.D.	1.51	1.23	

Table 3: Correlation between GCL, ant. DSH and posterior DSH on both VAS and NDI.

	VAS Neck		VAS Arm		ODI	
	Correlation coefficient	p- value	Correlation coefficient	p- value	Correlation coefficient	p-value
Glob. Lordosis	-0.222	0.217	-0.241	0.203	-0.208	0.227
Ant. DSH	-0.017	0.809	-0.113	0.604	-0.012	0.902
Post. DSH	-0.036	0.898	-0.072	0.77	-0.031	0.875

Fig. 3

Figures:



(Fig 1) Measurement of Fusion Site Lordosis (FSL) postoperatively (left) and at last follow-up (right).



(Fig 2) Measurement of cage migration and subsidence 1: anterior DSH, 2: posterior DSH, 3: CD. Modified Gereek et al.



Fig. 4



(Fig 3) Evaluation of fusion:
Changes in flexion and extension of the lateral view of the cervical spine of more than 2 mm indicate nonunion.



(Fig 4) A CT scan at final follow-up shows fusion with presence of bone mass inside the cage.



Fig. 5

(Fig 5) Distance between the tips of the spinous processes on flexion is 12.2 mm and 11.7 mm in extension in lateral views.



(Fig 6) Distance between the tips of the spinous processes on flexion is 44 mm and 43.2 mm in extension of lateral views.