

Comparative Radiological Outcomes of Stand-Alone Cage versus Cage and Plate in Anterior Cervical Discectomy and Fusion (ACDF): A Retrospective Analysis

Amgad Elshoeibi¹, Isam Sami Moghamis², Abduljabbar Alhammoud³, Abedallah Abudalou², Jawad Derbas², Salahuddeen Abdelsalam², Abdulmoeen Baco²

¹*College of Medicine, QU Health, Qatar University, Doha, Qatar*

²*Department of Orthopedic Surgery, Hamad General Hospital, Doha, Qatar*

³*Department of Orthopedic Surgery, University of Arizona, Tucson, AZ, United States*

Background: Anterior cervical discectomy and fusion is widely performed for cervical decompression. Augmentation with an anterior cervical plate (ACDF-CPA) may improve stability, but many surgeons prefer stand-alone cages (ACDF-SA) due to concerns about complications and cost. Data comparing these techniques' outcomes remains limited.

Research Question: Does ACDF-CPA lead to superior radiological outcomes compared to ACDF-SA in single-level degenerative cervical disc disease?

Design: Retrospective cohort

Methods: We retrospectively reviewed data for adult patients undergoing single-level ACDF from January 2011 to December 2019, with at least 12 months of follow-up. Exclusion criteria included systemic infection, trauma, malignancy, inadequate radiographs, and follow-up under 12 months. Radiological outcomes assessed included fusion rate, cage subsidence, and adjacent segment degeneration (ASD). Adjusted risk ratios (ARRs) were calculated for comparisons between ACDF-SA and ACDF-CPA, adjusting for age and gender.

Results: A total of 43 patients were included (58% ACDF-SA, 42% ACDF-CPA) (table 1). The fusion rates at 6 months was higher in the ACDF-SA group (88%) compared to ACDF-CPA (61%). At 12 months, fusion rates equalized between groups at 81%. Cage subsidence and ASD rates were comparable at both time points (fig 1). Inferential analysis showed a 50% higher probability of fusion at 6 months for ACDF-SA compared to ACDF-CPA (95% CI: 1.01–2.22), though this difference was not significant at 12 months (ARR: 1.22; 95% CI: 0.90–1.64). Female patients demonstrated higher fusion rates and lower subsidence risk at 12 months (fig 2).

Discussion: ACDF with an anterior cervical plate did not demonstrate superior radiological outcomes compared to a stand-alone cage. Fusion was faster in the ACDF-SA group at 6 months, while subsidence and ASD rates were similar. These findings suggest that ACDF-SA may provide equivalent fusion outcomes in single-level cervical decompression.

Fig. 1

Variable	ACDF-SA	ACDF-CPA	Overall	p-value
N	25	18	43	
Age, mean (SD)	47.0 (9.6)	52.9 (13.1)	49.5 (11.5)	0.092
Gender				
Male	12 (48%)	11 (61%)	23 (53%)	0.4
Female	13 (52%)	7 (39%)	20 (47%)	
Operating Surgeon				
Orthopedics	18 (72%)	14 (78%)	32 (74%)	0.74
Neurosurgery	7 (28%)	4 (22%)	11 (26%)	
Operated Level				
C3 - C4	2 (8%)	3 (17%)	5 (12%)	0.24
C4 - C5	1 (4%)	1 (6%)	2 (5%)	
C5 - C6	11 (44%)	10 (56%)	21 (49%)	
C6 - C7	11 (44%)	3 (17%)	14 (33%)	
C7 - T1	0 (0%)	1 (6%)	1 (2%)	
Smoking Status	7 (28%)	2 (11%)	9 (21%)	0.26
Cortisone Use	1 (4%)	0 (0%)	1 (2%)	1
Diabetes	3 (12%)	7 (39%)	10 (23%)	0.067
Operation time , mean (SD)	143.2 (39.2)	152.8 (38.0)	147.2 (38.6)	0.42

Fig. 2

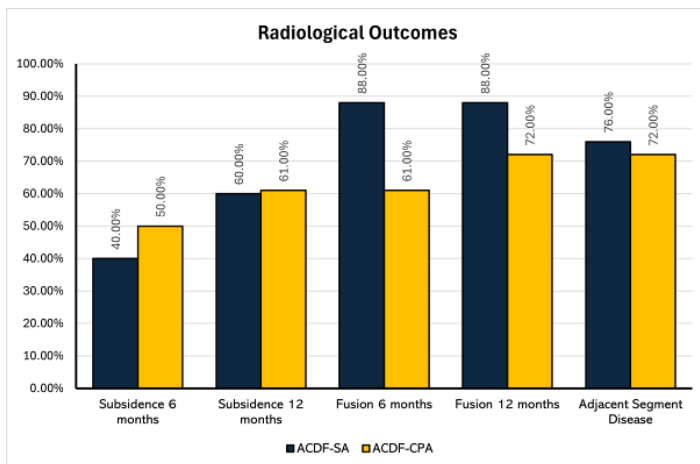


Fig. 3

