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

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Background: Anterior cervical discectomy and fusion (ACDF) 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 study.

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). 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. 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.

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.