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Cervical sagittal balance after consecutive three-level hybrid surgery versus anterior cervical discectomy and fusion: Radiological results from a single-center experience

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Title: Cervical sagittal balance after consecutive three-level hybrid surgery versus anterior cervical discectomy and fusion: radiological results from a single-center experience

Background: According to the different numbers and relative locations of cervical disc replacement (CDR) and anterior cervical discectomy and fusion (ACDF), three-level hybrid surgery (HS) has many constructs.

Research question: The purpose of this retrospective study was to compare the sagittal alignment parameters of HS and ACDF for cervical degenerative disc disease (CDDD) and the association of the respective parameters.

Design: A retrospective study.

Methods: This follow-up included one-level CDR and two-level ACDF (type I group), two-level CDR and one-level ACDF (type II group) and three-level ACDF. Cervical sagittal alignment parameters included cervical lordosis (CL), segment alignment (SA), T1 slope (T1S), C2-C7 sagittal vertical axis (SVA), T1S-CL, C2 slope (C2S), occipital to C2 angle (O-C2A) and segment range of motion (ROM).

Results: The three groups with a total of 106 patients were better matched in terms of demographics. Patients who underwent HS had significantly higher CL than those who underwent ACDF at 1 week, 6 months, 12 months and the final follow-up after surgery, as well as significantly better SA at 12 months and the final follow-up. The T1S-CL was significantly associated with C2S in the type I and type II groups at the preoperative and final follow-up. There was no significant difference in postoperative complications among the three groups.

Discussion: Most improvements in cervical sagittal alignment were observed in all three groups postoperatively. HS was more advantageous than ACDF in the maintenance of postoperative CL and SA. Thus, three-level HS may be better for maintaining cervical curvature. The number of replacement segments differed in those who underwent HS but did not affect the correlation between T1S-CL and C2S, both of which are well balanced.