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Risk factors of bone loss after Prestige-LP cervical disc arthroplasty

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Background: Cervical disc arthroplasty (CDA) is widely employed for patients diagnosed with cervical degenerative disc disease (CDDD). Postoperative bone loss (BL) represents a radiological alteration that is a relatively novel consideration in the realm of CDA.

Research question: This study aims to examine the risk factors associated with BL following CDA, elucidating the underlying mechanisms and the impact of BL on surgical outcomes.

Design: A retrospective and comparative study.

Methods: A retrospective study was undertaken, encompassing consecutive patients subjected to one-level CDA, two-level CDA, or two-level hybrid surgery (HS) for the treatment of CDDD at our institution. Patient demographic and perioperative data were systematically recorded. Radiological images obtained preoperatively, at 1-week post-operation, and during the last follow-up were collected and evaluated, following with statistical analyses.

Results: A total of 295 patients and 351 arthroplasty segments were involved in this study. Univariate logistic regressions indicated that age $\geq$ 45 years and two-level HS was associated with lower risk of BL; and a greater Δ DA (change of disc angle before and after surgery) was correlated with an increased risk of BL. Multivariate logistic regression determined that two-level HS and greater Δ DA were independent preventative and risk factors for BL, respectively. Further analysis revealed that severe BL significantly elevated the risk of implant subsidence compared to non-BL and mild BL.

Conclusion: This study posited bone remodeling and micromotion as potential underlying mechanisms of BL. Subsequent research endeavors should delve into the divergent mechanisms and progression observed between lower- and higher-grade BL, aiming to prevent potential adverse outcomes associated with severe BL.

Fig. 1 The number of segments distributed by different BL grades.

Fig. 1

