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Cervical disc arthroplasty for patients with osteopenia: A matched cohort study

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Background: Osteoporosis was unanimously listed as an exclusion criterion for cervical disc arthroplasty (CDA). However, there was a paucity of data on CDA patients with osteopenia.

Research question: This study aims to evaluate postoperative outcomes of single-level CDA in patients with osteopenia and compare these results with a matched cohort of normal bone mineral density (BMD).

Design: This is a retrospective matched cohort study.

Methods: This study included 38 patients with osteopenia who underwent single-level CDA. A 1:1 match was utilized based on gender, follow-up time, and arthroplasty level. BMD was assessed with dual-energy x-ray absorptiometry. Clinical, radiographic data, and BMD-related complications were recorded.

Results: The osteopenia group achieved satisfactory improvements in clinical outcomes, with no significant intergroup differences. Additionally, there were no significant differences between groups in any of the radiological parameters, either in cervical alignment or segmental height, or range of motion. In terms of BMD-related complications, the radiological incidence rate of adjacent segmental degeneration (ASD) and heterotopic ossification (HO) was comparable in both groups, respectively, with a similar composition of ROM-limiting HO. However, the osteopenia group had a tendency of more implant subsidence (2.7% vs. 15.2%). According to the logistic regression analysis, the osteopenia group had a significantly higher incidence rate of anterior bone loss (ABL) than the normal group (OR=5.37, 95% CI: 1.50 - 19.22).

Conclusions: Single-level CDA for patients with osteopenia achieved similar improvements in clinical outcomes compared with the normal BMD group and maintained satisfactory sagittal balance and segmental height. However, the possibility of postoperative ABL and implant subsidence remains a source of concern. Single-level CDA should not be routinely recommended for patients with osteopenia.

Fig. 1

