

Background:

A common standard surgical treatment for degenerative diseases of the cervical spine is anterior cervical discectomy and fusion (ACDF). However, despite an immediate relief the immobilization is suggested to increase intra discal pressure and stress on neighboring segments causing symptomatic adjacent segment disease (ASD). For this reason, anterior cervical discectomy with arthroplasty (ACDA), that preserves motions of segments, has been suggested to improve the clinical outcome for these patients. Thus far, an assessment of superiority with respect to clinical efficacy is not available and is required prior to selecting a replacement for an effective standard treatment.

Methods:

Patients receiving ACDA at one of the four neurosurgical centres in Denmark, in a seven-year timeframe, were included and matched 1:2 (ACDA: ACDF) with patients receiving ACDF at a neighboring neurosurgical center. Clinical outcomes were assessed by Neck Disability Index (NDI), EQ-5D-3L, Numeric rating scale (NRS) and other patient reported outcomes including paresthesia, muscle weakness, ability to work, post-surgical side-effects and satisfaction of surgery collected by telephone interview.

Results:

152 patients treated for single level cervical pathology were included in the study. Arithmetic mean improvements of three-months follow-up of NRS-neck and long-term follow-up of NDI were significantly better in the ACDA group, with intergroup differences of 1.47 ($p=0.03$) and 4.99 ($p=0.01$) respectively; The difference did not reach minimal important clinical difference level. No significant differences were found in improvement between the two groups regarding EQ5D, NRS-neck at long-term follow-up, NRS-arm and the other patient reported outcomes. A subgroup analysis of the half of the cohort with the earliest surgery dates showed significant differences between the two treatment groups in arithmetic mean improvement of NDI: 8.73 ($p=0.01$), EQ5D: -0.20 ($p=0.03$), NRS neck: 2.21 ($p=0.02$) and NRS arm: 1.96 ($p=0.01$).

Conclusion:

Our study indicated that surgical treatment with ACDA is not superior to ACDF regarding clinical improvements when treating degenerative disease of the cervical spine. However, a subgroup analyses of the cases with the longest follow-up time showed significant differences in NDI, EQ5D and NRS scores between treatment groups, suggesting that ACDA may be long-term clinically superior.