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Assessment of artificial disc replacement versus discectomy and fusion in the treatment of cervical disc disease

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Introduction: Radiographic evidence of adjacent segment degeneration (ASDeg) following anterior cervical discectomy and fusion (ACDF) has been recognized to reach 50% within ten years, while the annual incidence of symptomatic adjacent segment disease (ASDis) is approximately 2.9%, the problem which inspired the development of motion sparing surgeries, of which cervical disc arthroplasty (CDA) is a debatable issue.

Objectives: The objective of this research was to study the specific indications, limitations, technique, pitfalls, and complications of the procedure of CDA, compared to ACDF and the relative predisposition of both procedures to the ASDis process.

Methodology: This non-randomized clinical trial was conducted in the period between January 2015 and January 2017, on a group of 40 patients who suffered cervical disc disease (CDD), divided into two groups (ACDF and CDA groups), with 20 patients per each. Clinical outcomes were evaluated using the Visual Analog Scale (VAS), and the Neck Disability Index (NDI). Operative data, complications, hospital stay, return-to-work intervals, and the pre and six-months postoperative superior and inferior adjacent segments range of motion (ROM), and changes occurring to it were assessed.

Results: No statistically significant differences were found between the two groups regarding clinical outcome functional scores, complications, hospital stay, and return-to-work intervals ($P > 0.05$). Operative time was significantly longer in CDA group ($P < 0.05$), while ACDF group showed a statistically significant postoperative/preoperative difference in the mean ROM in the C5-6 superior and inferior adjacent segments, compared to the insignificant mean difference in the CDA group ($P < 0.05$).

Conclusions: Although not sufficiently proved to be significantly superior to ACDF, the surgical experience of CDA concerning the technique practice, specific indications, limitations, complications and postoperative outcome including the impact on ASDis, compared to the ACDF gold standard, may ought to be included in the collective experience of any modern neurosurgical center.

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