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A Prospective, Comparative Study of Anterior Cervical Discectomy and Fusion (ACDF), Cervical Disc Arthroplasty (CDA) and Hybrid Cervical Surgery (HCS) in the Treatment of Cervical Disc Disease (CDD)

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Background: Currently, 3 main anterior surgical techniques are used for the treatment of patients with CDD: ACDF, CDA and HCS. The optimal approach for CDD still remains a matter of debate worldwide. It seems that the motion preservation of arthroplasty offers several advantages over fusion, but it can't be used in all patients. Therefore, in some cases of multilevel CDD (mCDD), a combination of CDA and ACDF, HCS, can be a good option, but it raises concerns about its long-term effectiveness and safety.

Research question: Does ACDF, CDA, and HCS take into consideration safety and effective treatment for CDD through neck disability index (NDI) and visual analog scale (VAS)?

Design:

1. Comparative clinical outcomes of patients with CDD undergoing the 3 cervical surgical procedures.
2. Investigation of HCS as a viable option for mCDD.
3. Assess the effectiveness of CDA, ACDF and HCS.
4. Analysis of VAS, NDI, clinical and image results after surgical treatment of CDD.

Method: Non-randomized, prospective cohort of 110 patients with CDD, between April 2015 to August 2023. Patients were categorized into 3 groups: CDA, ACDF, and HCS. Evaluation based on clinical and image results, besides NDI and VAS score preoperatively, and postoperatively at 1, 3, 6 and every 12 months.

Results: NDI and VAS scores improved significantly in all patients after surgery ($p < 0.05$). Additionally, no significant difference was found among groups. When comparing ACDF and HCS in the treatment of mCDD, change in VAS right ($p < 0.049$) and VAS left ($p < 0.004$) was significant, favoring ACDF. The change in VAS for cervical pain was not significant.

Discussion: This study suggests that CDA, ACDF, and HCS can be used for CDD, being HCS a non-inferior surgical modality to ACDF when treating mCDD.