

20-year Clinical Outcomes of Cervical Disc Arthroplasty: A Prospective, Randomized, Controlled Trial

Background Anterior cervical discectomy and fusion (ACDF) has long been the standard of treatment for degenerative cervical disc disease. Complications including loss of index level motion and adjacent level disease prompted development of alternative treatments, such as cervical disc arthroplasty (CDA). Previous comparison of the two treatments proves noninferiority of CDA and suggests its superiority with long term follow up.

Research Question What are the of 20-year outcomes of patients with degenerative cervical disc disease treated with CDA compared to ACDF?

Design A prospective, randomized, single-center, clinical trial.

Methods 47 patients with single level cervical disease were randomized 1:1 to either CDA or ACDF. 46 patients were eligible for analysis at 20 years. Patient reported outcomes including visual analog scales (VAS) for neck and arm pain, neck disability index (NDI), and reoperation rates were analyzed.

Results At 20 years, VAS neck pain and VAS arm pain scores were available for 21/25 patients in the ACDF group (84%) and 17/21 patients in the CDA group (81%). Comparison of VAS arm scores at 20 years showed a significant difference between ACDF and CDA (2.48 vs 0.67, $p=0.036$). VAS neck scores were not significantly different (2.73 vs 0.98, $p=0.068$, power=0.448).

NDI scores were available for 18/25 (72%) ACDF patients and 16/21 (76.2%) CDA patients. The difference in NDI scores at 20 years was not significant (19.00 vs 9.25, $p=0.053$, power=0.497).

Reoperation data was available for 24/25 (96.00%) ACDF and 18/21 (85.71%) CDA patients. Reoperations occurred in 10/24 (41.67%) ACDF patients and 2/18 (11.11%) CDA patients ($p=0.03$).

Discussion CDA patients demonstrated significantly improved arm pain scores and less reoperations than ACDF at 20 years. The arthroplasty device proved to withstand 20 years of motion in all patients, as shown by the lack of index site reoperations, while offering continued radiculopathy relief.