Clinical: Cervical new motion preservation technologies

PEEK on PEEK Cervical Disc Replacement (POPCDR): Clinical and Radiological Results of 36 Patients with More than One Year Follow up


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Background: In the recent years, anterior cervical disc replacement (ACDR) has gained popularity as the treatment for patients with cervical radiculopathy and myelopathy. The superiority of ACDR over anterior cervical decompression and fusion (ACDF) in obtaining optimum clinical and radiological results has been reported by several authors. We present the results of a single centre, prospective study to evaluate the clinical and radiographic outcomes of ACDR using the NuNec™ Cervical Arthroplasty System (Pioneer Surgical Technology, Marquette, Mich., USA), a novel PEEK on PEEK articulating disc.

Materials & methods: All patients with radiculopathy/myelopathy caused by degenerative disc disease at C3-7 levels, who failed to respond to conservative measures, were included. Pain and function were evaluated by Visual Analogue score for Neck pain (VAS-NP) and Arm pain (VAS-AP), Neck disability index (NDI) and SF-36 questionnaires; these were completed pre-operatively and at final follow up. Radiological outcomes include anterior and posterior disc height and range of movement (ROM); these were measured pre and post-operatively. Statistical analysis was completed using SPSS 16.0 statistical package (SPSS Inc, Chicago, IL). A paired t-test was used after confirming the normal distribution of the data (NDI scores). In cases where data (SF 36 Bodily pain, VAS-NP, VAS-AP) was non-parametric, Wilcoxon signed-rank test was used.

Results: 36 patients received the ACDR at 78 levels. There were 22 male patients with an average age at operation of 51 years (range 35 - 77 years). 33 patients had pure cervical arthroplasty whereas three had ACDR + ACDF. The level distributions were C3-4 (7), C4-5 (12), C5-6 (32), and C6-7 (24). 8 patients received ACDR at one-level, 15 had 2-level surgery, 12 had 3-level surgery and 1 had a 4-level surgery. At the time of final follow-up (Mean 14.25 months, Range 12- 22.5 months) the mean NDI improved from 49.35; to 33.78 [(p< 0.001, 95% confidence interval (9.60, 21.53)]. The mean post-operative VAS -NP and VAS-AP scores were reduced to: 3, (Pre-op: 8, p< 0.001) and 3 (Pre-op: 7, P< 0.001) respectively. The average improvement in SF-36 bodily pain component was 8.03 (pre-op BP: 29.15, post-op:37.18, p=0.002). Anterior disc height improvement at C3/4, C4/5, C5/6 and C6/7 were 82%, 78%, 102% and 181% respectively. Posterior disc height improved to 95%, 98%, 104% and 140% at C3/4, C4/5, and C5/6 and C6/7 levels. The pre-op ROM was 46.80 ±10.52 and there were no significant changes noted at the final follow-up (Mean 45.04±11.53).

Conclusion: Our results of ACDR using the NuNec™ disc show statistically significant improvement in the clinical and radiological outcomes that are comparable to other types of ACDR reported in literature. In addition, our results show preservation of global cervical spine ROM despite single or multiple levels ACDR. This may be attributed to preservation of ROM at the adjacent segments. Furthermore, NuNec™ ACDR has the added advantage of safe use of MRI during follow-ups with excellent image quality. In all the patients who underwent post-operative MRI clear visualization of cord, canal and foramen was possible. In our preliminary results, we report that NuNec™ ACDR device is safe, effective and has added design benefits.