Intermediate Clinical Outcome of Bryan Artificial Cervical Disc Replacement in the Treatment of Cervical Spondylosis and its Effect on Adjacent Segment Discs

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Objective: To observe the clinical outcome and effect of Bryan artificial cervical disc replacement on adjacent levels in intermediate and long term.

Method: From Nov 2004 to Dec 2007, 34 patients (38 discs) underwent Bryan cervical disc replacement in our hospital, single level 30 cases, bi-level 4 cases. The follow-up period was from 29 months to 66 months, average 46.4 months. The data was collected before surgery and 1 week, 3, 6, 12, 24, 36, 48 months after surgery. Clinical outcome was evaluated by SF-36 score, NDI score, neck/arm pain VAS score, Odom's scale. Neutral lateral and dynamic cervical radiographs were made to measure the flexion-extension range of motion (ROM) and the intervertebral height of adjacent segments. Adjacent segment degeneration was assessed with a new quantitative scoring system. Intraoperative and postoperative complications, reoperations were also recorded.

Results: The neurological function of each patient was significantly improved after the operation. SF-36 physical component score and SF-36 mental component score were 37.7±11.8, 35.4±15.4 respectively before the operation and significantly increased to 67.9±13.0, 68.0±15.6 respectively at 1-week follow-up, 75.2±14.7, 75.8±19.8 respectively at 48-month follow-up (p< 0.05); NDI score, neck/arm pain VAS score also decreased significantly (p< 0.05); According to Odom's scale, the rate of excellent and good outcome was 84.6% at 48-month follow-up. Flexion-extension ROMs of upper and lower segments were 11.28±0.97°, 9.11±1.24° respectively before the operation and significantly decreased to 9.27±0.89°, 7.47±1.17° respectively at 24-month follow-up, 9.03±0.96°, 6.96±1.33° respectively at 48-month follow-up (p< 0.05). The postoperative intervertebral height of adjacent segments showed no statistical difference with the preoperative data (p>0.05). The new degeneration scoring system showed that 22% adjacent levels occurred mild degeneration at the last follow-up. 5 artificial discs in 5 patients migrated forward, but the range of motion of 5 discs preserved. There was no prosthesis subsidence or excursion, no heterotopic ossification or spontaneous fusion and no reoperation.

Conclusion: Bryan artificial disc replacement has a good clinical outcome in intermediate term and seems to protect against acceleration of adjacent segment degeneration.

Keywords: Cervical spondylosis, artificial cervical disc replacement, Bryan artificial cervical disc, clinical outcome, adjacent segment degeneration