



## FUNCTIONAL OUTCOME OF ANTERIOR CERVICAL DECOMPRESSION AND FUSION SURGERY IN CERVICAL COMPRESSIVE DISEASES: A 6 MONTHS FOLLOW UP

**Dr. Pratik Kawde**

Junior resident, Department of Orthopaedics, JNMC, Sawangi (M), Wardha

**Dr. Nitin N Samal**

Professor, Department of Orthopaedics, JNMC, Sawangi (M), Wardha  
\*Corresponding Author

### ABSTRACT

**Background:** Neck pain with radiculopathy and neurodeficit is a common problem in working population.

**Methods:** 50 patients underwent ACDF with C5-C6 the commonest level to be affected. The cases were analyzed preoperatively and at 3 months, 6 months using NDI and VAS. Decrease in pre operative and 1 year post operative VAS score, Preoperative and postoperative NDI was statistically significant. **Conclusion:** Symptoms of neck pain, tingling, and weakness reduced after 1 year follow up. **Discussion:** From our study, it is evident that there is significant decrease in parameters like neck pain, tingling and radiculopathy postoperatively also there was significant decrease in NDI at 6 months follow-up.

### KEYWORDS :

#### Introduction:

Disabling neck pain is a common condition in the adult population with prevalence which ranges from 2 to 14%.<sup>1,2,3</sup> Anterior cervical decompression and fusion relieves pressure on nerve roots through decompression and is thought to help prevent further irritation at that level by fusing the vertebra together<sup>4,5</sup>. The outcomes are evaluated with clinical assessment and radiological evaluations, but patient-reported questionnaires of pain and disability are also recommended<sup>6</sup>. ACDF is regarded as one of the standard treatment option for cervical spondylosis with myelopathy and/or disc herniation. Reported results of ACDF are excellent for patients as stated in literature. In vast majority of cases it successfully reduces neck and arm pain, restores both vertebral disc height and foraminal height and also leads to osseous fusion.

#### Aim:

To study aimed to analyse the patients with clinical and radiological diagnosis of cervical compression in terms of functional outcome after anterior cervical decompression and fusion surgery.

#### Materials and methods:

Retrospective and prospective cohort study carried out in Department of Orthopaedics, Jawaharlal Nehru Medical College, Sawangi (Meghe), Wardha, from August 2016 to July 2018 in 50 patients of cervical myelopathy and radiculopathy.

#### Inclusion criteria:

Patients with grade 3 and above Nurick clinical scale who underwent Anterior cervical decompression and fusion for the following:

1. Pain in one or both arms indicating nerve root involvement with or without sensory and motor deficit, caused by protrusion of disc with or without osteophytes or by stenosis of cervical canal due to osteophytes and confirmed by MRI.
2. Compressive myelopathy
3. Single or multiple symptomatic disc levels
4. In working population age ranging between 18-85 years

#### Exclusion criterion:

1. Malignancy, inflammatory joint disease or psychiatric disorder
2. Previous cervical spine surgery
3. Traumatic cervical spine injuries

#### Intervention:

As per departmental protocol for Degenerative Cervical Disc Disease patients were evaluated by complaints, clinical examination, visual analogue score (VAS) and Neck Disability index (NDI).

A standard Antero-posterior and Lateral radiograph of cervical spine followed by MRI of cervical spine were obtained. The patients were operated in the operation theatre and managed as per protocol set for the patients for Cervical spine surgeries.

Patients were categorised into two major diagnostic groups:

1. Cervical disc disease
2. Cervical canal stenosis.

The selected cases for our study, underwent pain measurement using VAS scale and disability measurement using Neck Disability index.

#### Observation and results:

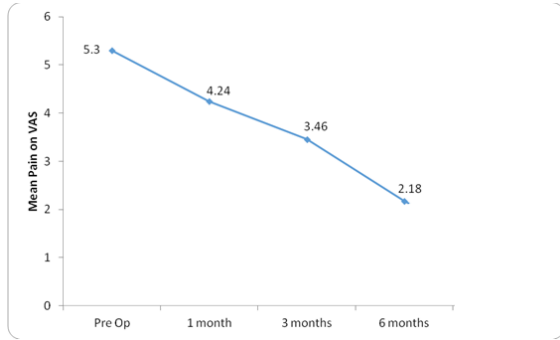
In our study, we determined post operative outcome after ACDF in view of pain, function, and cervical Range of Motion measured preoperatively and postoperatively after 6 months follow up in cases of cervical canal stenosis and cervical disc herniation.

The mean age (mean  $\pm$  s.d.) of the patients was 47.94 $\pm$ 13.80 years with range 20 – 85 years and the median age was 50 years. Most of the patients (52.0%) were with age  $\geq$ 50 years which was significantly higher than other age group ( $p < 0.001$ ). These findings were comparable to the following studies: S. Kapetanakis et al<sup>7</sup>- 49.6 $\pm$  7; SL Spanos et al<sup>8</sup>-50.09 $\pm$ 13.54; A Sharma et al<sup>9</sup>- 51.07 $\pm$ 9.39.

The study includes 50 patients of which 42 were Male and 8 were Female showing male preponderance, as the male population is more frequently associated with driving two wheeler, cigarette smoking, lifting heavy weight etc. These findings were comparable to studies done by M. Kamani et al<sup>10</sup>, A Sharma et al<sup>9</sup>, Q Guo et al<sup>11</sup> and A. Tasiou et al<sup>12</sup> which also showed male predominance.

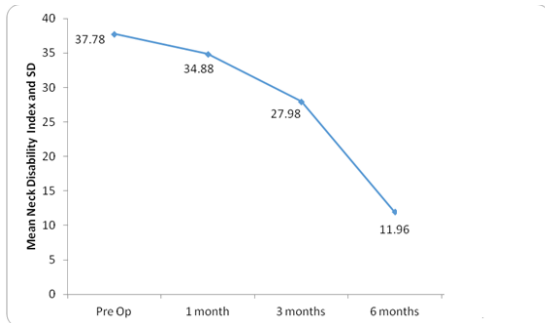
Level of fusion was evaluated according to clinical and radiological diagnosis. 62.0% of the patients had undergone one level of fusion followed by two levels of fusion (36.0%) which were significantly higher than that of three levels of fusion (2.0%).

There was significant difference in mean pain score (VAS score) of the patients at different time intervals ( $p < 0.0001$ ). The mean pre-operative VAS score was 5.30  $\pm$  1.74 which was decreased significantly at 6 months follow up to 2.18  $\pm$  1.24 ( $p < 0.0001$ ) (Fig. 1). Similar results were also obtained in the study done by Omidi Kashani F et al<sup>13</sup>, mean pre-operative VAS score was 6.2  $\pm$  1.4 and decreased after 6 year to 2.7  $\pm$  3.1. Other studies which showed significant decrease between preoperative and follow up pain score is A Peolsson<sup>14</sup>.

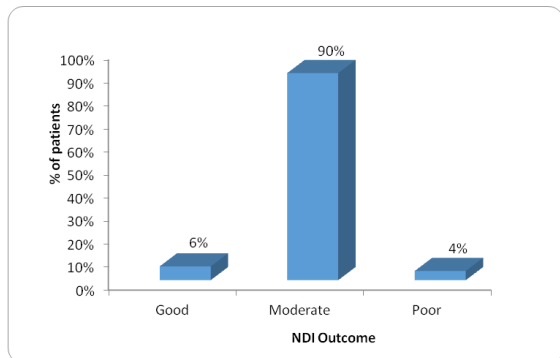


**Fig. 1: Distribution of patients according to VAS**

The functional outcome of patient was seen by neck disability index. The mean pre operative neck disability index was  $37.78 \pm 2.625$  (Fig. 2) which was significantly decreased at 6 months follow-up to  $11.96 \pm 6.63$  with a P value of 0.0001. On the basis of increase in NDI preoperatively and postoperative 6 months follow up, outcome scores were calculated (Fig. 3). Our study showed 96 % cases with good and moderate outcome and only 4 % cases with poor outcome at final follow-up.



**Fig. 2: Distribution of patients according to NDI**



**Fig. 3: Distribution of patients according to NDI Outcome**

On cross tabulation of age and outcome, the correlation of patient's age and functional outcome score was found to be insignificant. Thus it was concluded that age did not influence the outcome of the patient.

Out of total male patients in our study, 82% had good and moderate outcome. Out of total female patients in our study, 14% had moderate outcome. Correlation of gender with outcome was not significant but in a study conducted by Hermansen<sup>15</sup> male gender was the only predictive factor of a successful outcome.

Preoperatively, tingling was present in 74% patients which was reduced to 62% postoperatively and 42% after 6 months. Hence, the tingling of the patients at Pre Operative period and 6 months follow up decreased significantly over time interval ( $p < 0.0049$ ). After 6 months follow up, radiculopathy was decreased to 12% which was

34% pre operatively. The tingling of the patients at Pre Operative period and 6 months follow up decreased significantly over time interval ( $p < 0.009$ ).

18 % patients in this study developed complications in post operative period which included infection in 4%, dysphagia in 2%, soft tissue haematoma in 8% and recurrent laryngeal nerve injury in 4% patients. All the complications occurred in the early postoperative period of which infection, dysphagia and soft tissue haematoma resolved after 1 month and 3 month follow up but recurrent laryngeal nerve injury persisted at 6 months follow up.

#### Discussion and conclusion:

Anterior cervical discectomy and fusion is associated with satisfactory outcome in cases of cervical disc herniation and cervical canal stenosis.

From our study, it is evident that there is significant decrease in parameters like neck pain, tingling and radiculopathy postoperatively at 6 months follow-up and there was significant decrease in Neck disability index showing good and moderate functional outcome in majority of cases. Functional outcome was found to be independent of factors like age and diagnosis but male gender was the only predictive factor of a successful outcome.

#### REFERENCES:

- Côté, P., Cassidy, J. D., & Carroll, L. (2001). The treatment of neck and low back pain: who seeks care? who goes where?. *Medical care*, 956-967.
- Mäkela, M., Heliövaara, M., Sievers, K., Impivaara, O., Knekt, P., & Aromaa, A. (1991). Prevalence, determinants, and consequences of chronic neck pain in Finland. *American journal of epidemiology*, 134(11), 1356-1367.
- Radhakrishnan, K., Litchy, W. J., O'Fallon, W. M., & Kurland, L. T. (1994). Epidemiology of cervical radiculopathy: a population-based study from Rochester, Minnesota, 1976 through 1990. *Brain*, 117(2), 325-335.
- Jacobs, W., Willems, P. C., Kruyt, M., van Limbeek, J., Anderson, P. G., Pavlov, P., ... & Oner, C. (2011). Systematic review of anterior interbody fusion techniques for single- and double-level cervical degenerative disc disease. *Spine*, 36(14), E950-E960.
- Gore, D. R., & Sepic, S. B. (1984). Anterior cervical fusion for degenerated or protruded discs. A review of one hundred forty-six patients. *Spine*, 9(7), 667-671.
- Bono, C. M., Heggeness, M., Mick, C., Resnick, D., & Watters III, W. C. (2010). North American Spine Society: newly released vertebroplasty randomized controlled trials: a tale of two trials. *The Spine Journal*, 10(3), 238-240.
- Kapetanakis, S., Thomaidis, T., Charitoudis, G., Pavlidis, P., Theodosiadis, P., & Gkasdaris, G. (2017). Single anterior cervical discectomy and fusion (ACDF) using self-locking stand-alone polyetheretherketone (PEEK) cage: evaluation of pain and health-related quality of life. *Journal of Spine Surgery*, 3(3), 312.
- Spanos, S. L., Siasios, I. D., Dimopoulos, V. G., Paterakis, K. N., Mastrogiannis, D. S., Giannis, T. P., & Fountas, K. N. (2018). Correlation of Clinical and Radiological Outcome After Anterior Cervical Discectomy and Fusion With a Polyetheretherketone Cage. *Journal of clinical medicine research*, 10(3), 268.
- Sharma, A., Dhake, M., Singh, V., Natraj, B., & Mahajan, R. (2015). Study of Functional Outcome of Anterior Cervical Decompression and Fusion Using Tricortical Iliac Bone Graft for Degenerative Cervical Spondylotic Myelopathy with Modified Japanese Orthopedic Association Score. *J Spine*, 4(255), 2.
- Kamani, M. M., Ballal, A., Shetty, V., Rai, H. R., & Hegde, D. (2016). A prospective study of the functional outcome of anterior cervical discectomy with fusion in single level degenerative cervical disc prolapse. *Journal of clinical and diagnostic research: JCDR*, 10(5), RC01.
- Guo, Q., Bi, X., Ni, B., Lu, X., Chen, J., Yang, J., & Yu, Y. (2011). Outcomes of three anterior decompression and fusion techniques in the treatment of three-level cervical spondylosis. *European Spine Journal*, 20(9), 1539-1544.
- Tasiou, A., Giannis, T., Brotis, A. G., Siasios, I., Georgiadis, I., Gatos, H., & Fountas, K. N. (2017). Anterior cervical spine surgery-associated complications in a retrospective case-control study. *Journal of Spine Surgery*, 3(3), 444.
- Omid-Kashani, F., Ghayem Hasankhani, E., & Ghandehari, R. (2014). Impact of age and duration of symptoms on surgical outcome of single-level microscopic anterior cervical discectomy and fusion in the patients with cervical spondylotic radiculopathy. *Neuroscience journal*, 2014.
- Peolsson, A. (2007). Investigation of clinically important benefit of anterior cervical decompression and fusion. *European Spine Journal*, 16(4), 507-514.
- Hermansen, A. (2015). Clinical and patient-reported outcomes after anterior cervical decompression and fusion surgery: A focus on functioning and daily life (Doctoral dissertation, Linköping University Electronic Press).