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E-mail: [shashanknsangoli@gmail.com](mailto:shashanknsangoli@gmail.com)**Date of submission:** 7<sup>th</sup> January 2020**Date of acceptance:** 4<sup>th</sup> April 2020DOI: <https://doi.org/10.3126/njn.v17i1.28340>**HOW TO CITE****Sangoli S. Outcome of Anterior Cervical Discectomy and Fusion in Single Level Cervical Disc Prolapse. NJNS. 2020;17(1):28-31**

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## Outcome of Anterior Cervical Discectomy and Fusion in Single Level Cervical Disc Prolapse

**Abstract**

**Background:** Cervical disc disease and spondylosis is a common pathological entity and is characterised by increasing degeneration of the intervertebral disc with subsequent changes in the bones and soft tissues.

**Aim:** To determine functional outcome of anterior cervical discectomy with fusion and plating in single level degenerative cervical disc prolapse.

**Methods and Materials:** This study was done at the Department of Neurosurgery, Medical Trust Hospital, Kochi over a period of three years after receiving institutional ethical clearance. 60 patients aged between 20 to 60 years, both male and female, who had degenerative disc disease with single level herniation with worsening or non-improving neck pain with radiculopathy, corresponding neurologic deficit, who were admitted in our unit were included in the study. Baseline data like name, age and gender were recorded for all the patients included in the study. Clinical examination consisted of history, thorough neurological examination and corresponding radiological evaluation. A visual analogue scale was used to make a subjective assessment of the patient's complaints (pre-operative and post-operative).

**Results:** A total of 60 patients were included in the present study, among them 40 were males and 20 were females with male to female ratio of 2:1. All of them showed a significantly better improvement in visual analogue scale score of neck pain and UE radicular pain ( $p < 0.05$ ). The post-operative improvements in the clinical presentation of the patients were also noted.

**Conclusion:** A single level of anterior discectomy and cervical fusion for degenerative cervical disc prolapse with and without radiculo-myelopathy is an effective, successful and safe operation with minimal complication rate. The visual analogue scale following surgery was significantly improved.

**Key words:** Anterior discectomy, Cervical disc, Intervertebral disc, Neck pain, Spondylosis, Visual Analogue Scale (VAS)

## Introduction

Cervical disc disease and spondylosis is a common pathological entity and is characterised by increasing degeneration of the intervertebral disc with subsequent changes in the bones and soft tissues. Smith and Robinson in 1955 described anterior approach involving the removal of a cervical disc followed by an arthrodesis of the involved segment, which would pave the way for one of the most commonly performed spinal procedures today.<sup>1</sup> Significant contributions were made early on by the likes of Bailey and Badgley<sup>2</sup> and Cloward.<sup>3</sup>

Anterior discectomy without fusion was described in 1960 by Hirsch.<sup>4</sup> Since then numerous modifications have been made in the treatment of cervical spondylosis through an anterior approach. The treatment options available for the management of cervical spondylosis are medical therapy and surgery. Medical management of cervical spondylosis includes pharmacological and rehabilitation components and mainly targets at pain relief. The use of these components is largely empirical as controlled studies are lacking. In the vast majority of cases cervical pain will improve with conservative measures. Non-steroidal anti-inflammatory drugs (NSAIDs) are a frequently utilized initial measure. Physical therapy that focuses on isometric exercises has demonstrated benefit in patients. A majority of patients with non-myelopathic cervical radiculopathy respond to non-operative care consisting of analgesic, anti-inflammatory therapy and physiotherapy.

Studies have demonstrated an overall very good result with surgical intervention for radiculopathy, with more rapid pain relief and higher patient satisfaction than other measures.<sup>5</sup> In patients with mild or subtle myelopathy, non-operative treatment can be used with regular monitoring of neurological deterioration. Surgical intervention is indicated for patients with spondylosis who have disabling pain refractory to conservative measures, acute cord compression, signs of progressive cord dysfunction and progressive muscular weakness or sensory impairment.

**Aim:** To determine functional outcome of anterior cervical discectomy with fusion and plating in single level degenerative cervical disc prolapse.

## Methods and Materials

This was a prospective study performed at the Neurosurgery Department, Medical Trust Hospital, Kochi for a period of three years after receiving clearance of institutional ethics. Sixty patients between 20 and 60 years of age, both male and female, with deteriorating or non-improving radiculopathic neck pain, accompanying neurological impairment (asymmetric depressed reflex,

decreased sensations in a dermatomal distribution or weakness in myotomal distribution) at initial visit, progressive myelopathy and intractable pain, with single level disc prolapse were included in the study. Patients with spine infection or tumours, psychiatric illness, age less than 20 or more than 60 years and patients who denied participation were excluded from the study. Patients with severe canal stenosis requiring corpectomy were also excluded from the study.

All the patients who met the inclusion criteria were included in the study. Baseline data like name, age and gender, onset and duration of symptoms were recorded for all patients included in the study. The clinical examination of patients consisted of history, thorough neurological examination and corresponding radiological evaluation.

All the patients were subjected for radiological evaluation including lateral and antero-posterior X-rays and MRI cervical spine. A 1.5-Tesla magnetic resonance (MR) system (Sigma, General Electric Medical Systems, Milwaukee, WI) was used for all studies, and all MR evaluations were conducted on one system. The MR sequences included axial and sagittal T1 fat saturation and T2 images from which the measurements were obtained. The images were 3 mm thick with a 1 mm interslice gap. The matrix was 256 by 192. The field of view was 14 cm for the sagittal images and 18 cm for the axial images. All MR interpretations and measurements were performed on our PACS/AFGA (picture archiving workstation (AFGA-Gevaert Group, Mortsels, Belgium).

Consent was taken as per the Institutional Review Board. Patients underwent anterior cervical discectomy and fusion surgery in standard manner with tricortical iliac bone graft. Titanium based plates were used and fixed with screws to the adjacent vertebral body to avoid graft migration. Patients were discharged on seventh post-operative day and were followed at six weeks, three months and one year. The assessment at the end of one year was considered for the comparison with pre-operative evaluation. A visual analogue scale (VAS) and multiple outcomes questionnaire was used to make a subjective assessment of the patient's condition (pre-operative and post-operative). Cervical spine radiographs were taken at three months and at the end of one year. Presence of continuous trabeculation and less than 1 mm splaying at tips of spinous process was considered as solid fusion.

Statistical analysis: Data collection and entry was done in Excel sheet. Data analysis was done with the help of Statistical Package for the Social Sciences (SPSS) Software version 23. Quantitative data was presented with the help of mean, standard deviation, median and IQR. Comparison among study groups was done with student t-test and intra group comparison with the help of one-

way ANOVA. Wilcoxon Signed – rank Test was used to assess the difference in pre and post-operative scores. Qualitative data was presented with the help of frequency and percentage table. p-value less than 0.05 was taken as significant.

Result

A total of 60 patients who fulfilled inclusion criteria were included in the present study. Among them 40 were males and 20 were females, with male to female ratio of 2:1 (male preponderance). Mean age of the participants in the present study was 44 ± 9.9 years. (Table 1)

Among all the participants, the level of cervical herniation was most common at C5/6 with 31 patients (51.66%), followed by 12 patients with C4/5 (20%), 10 patients with C6/7 (16.66%) and 7 patients with C3/4 level (11.66%). (Table 1)

Age in years (Mean ± SD)	44 ± 9.9
Gender (n)	
Male	40
Female	20
Level of disc herniation	
C3/4	07
C4/5	12
C5/6	31
C6/7	10

Table 1: Demographic details of study participants (n=60)

There was improvement in the mean neck pain VAS and upper limb radicular pain VAS from a mean of 7.32 ± 0.84 and 7.72 ± 0.60 to 1.79 ± 1.43 and 1.56 ± 0.94 at the end of one year, which was statistically significant. (Table 2)

The clinical presentation of the patients with limb weakness, lower extremity tightness, sensory complaints and micturition problems had significantly reduced post-operatively. (Figure 1). Post-operative complications were not noticed and most of the patients had attained satisfactory fusion at one year follow-up.

	Pre-operative	Post-operative	p-value
Neck pain (VAS)	7.32 ± 0.84	1.79 ± 1.43	<0.001*
UE radicular pain (VAS)	7.72 ± 0.60	1.56 ± 0.94	<0.001*

VAS - Visual analogue scale for pain; \* p-value <0.05 is statistically significant.

Table 2: Visual analogue score (mean ± SD) of pre-operative and post-operative patients

Discussion

A chronic condition that progresses with age defines cervical spondylotic myelo-radiculopathy.<sup>6</sup> Due to pain and neurological deficits, the disease impairs the functioning and daily life activities of the patient. Physicians are worried about an effective management strategy. The extent of the disease and the level of neurological recovery after the procedure is of major importance. If left untreated, almost all conditions worsen, and most reports show significant numbers (over 50 percent) of patients progressing to severe disability.<sup>7</sup>

In our study, the most frequently affected age was 40 to 50 years. The most common level of disc prolapse noted in this study was with male preponderance and C5/C6 disc prolapse, which was comparable to previous literatures.<sup>8</sup>

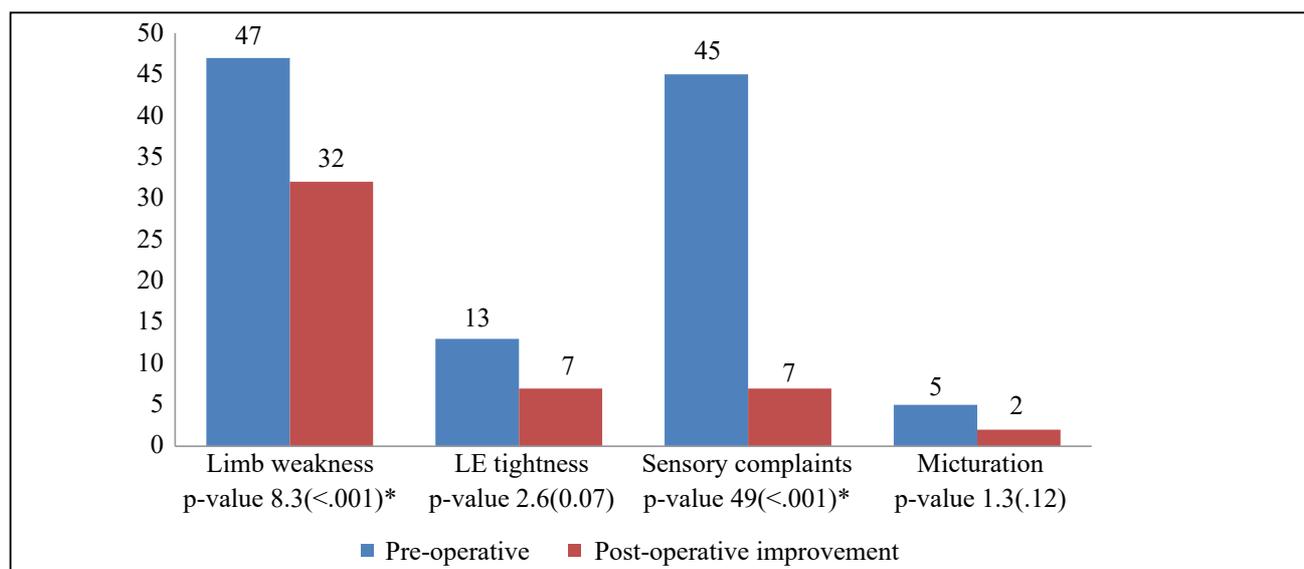


Figure 1: Clinical presentations at pre-operative and presence of improvement post-operatively (\* p-value <0.05 is statistically significant)

Post-operative complications ranging from 4.4% to as high as 20% are reported following ACDF.<sup>9</sup> Post-operative complications after ACDF include oesophageal, tracheal, vascular and neural injury, wound hematoma, wound infection, bone graft extrusion, instrumentation failure, pseudoarthrosis etc.<sup>10</sup>

Majority patients showed significant improvement in pre-operative symptoms such as neck pain, radicular pain, and post-ACDF motor / sensory deficits.<sup>11-13</sup> Significant clinical progress (neck pain, arm pain, mechanical, sensory, and reflex) was comparable to that of Wang et al.<sup>14</sup> In their case series of performing ACDF in 129 cases, Ali et al reported 71.43 percent of excellent results.<sup>8</sup> After anterior cervical discectomy with fusion, Shiban E et al reported high fusion rates and low follow-up rates.<sup>15</sup>

### Conclusion

A single level of anterior discectomy and cervical fusion for degenerative cervical disc prolapse with and without radiculo-myelopathy is an effective, successful and safe operation with minimal complication rate. The visual analogue scale rating following surgery was significantly improved. However, longer follow-up is required to assess the late complications of the procedure like adjacent segment disease.

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