

Original Research Article

COMPARATIVE ANALYSIS OF CLINICAL AND RADIOLOGICAL OUTCOME IN PATIENT UNDERGOING ANTERIOR CERVICAL DECOMPRESSION AND FUSION (ACDF) Vs LAMINECTOMY/LAMINOPLASTY FOR TREATMENT OF CERVICAL SPONDYLOTIC MYELOPATHY IN A TERTIARY CARE HOSPITAL

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ABSTRACT

Background: Cervical spondylotic myelopathy (CSM) is a degenerative cervical spine condition caused by age-related changes, disc degeneration, osteophyte formation, and cervical canal stenosis, resulting in spinal cord compression and progressive neurological impairment. Surgical decompression is the primary treatment for moderate to severe cases. Anterior cervical decompression and fusion (ACDF) provides direct spinal cord and nerve root decompression with stabilization, whereas posterior procedures such as laminectomy or laminoplasty achieve decompression by expanding the spinal canal. The selection of surgical approach depends on factors such as the number of affected levels, cervical alignment, and severity of compression. The aim is to compare the clinical and radiological outcomes of patients undergoing ACDF versus laminectomy/laminoplasty for the treatment of cervical spondylotic myelopathy.

Materials and Methods: This prospective comparative observational study was conducted in the Department of Neurosurgery, RG Kar Medical College, Kolkata, over 24 months. Patients diagnosed with cervical spondylotic myelopathy requiring surgical decompression were included. A total of 60 patients were enrolled, with 30 undergoing ACDF and 30 undergoing Laminectomy/Laminoplasty. Clinical, functional, and radiological outcomes were compared between both surgical groups.

Results: Postoperative radiological evaluation showed improvement in cervical alignment assessed by C2–C7 Cobb's angle in 86.7% of ACDF patients compared with 60.0% of Laminectomy/Laminoplasty patients, with a statistically significant difference ($p=0.020$). Improvement in spinal canal diameter was observed in both groups, with no statistically significant difference ($p=0.739$). Sagittal balance improvement was noted in 83.3% of ACDF patients and 63.3% of posterior decompression patients, showing a significant difference ($p=0.041$).

Conclusion: Both ACDF and laminectomy/laminoplasty are effective surgical approaches for cervical spondylotic myelopathy. ACDF provides better improvement in cervical alignment and sagittal balance, particularly in selected patients with limited-level disease and kyphotic alignment, whereas posterior decompression remains beneficial for multilevel disease with preserved cervical lordosis. Individualized surgical planning and appropriate patient selection are essential for achieving optimal outcomes.

Keywords: Cervical spondylotic myelopathy, Anterior cervical decompression and fusion, ACDF, Laminectomy, Laminoplasty, Cervical spine surgery, Neurological outcome, Radiological outcome, Spinal cord compression, Degenerative cervical disease.

INTRODUCTION

Cervical spondylotic myelopathy (CSM) is a progressive degenerative disorder of the cervical spine that develops due to age-related and pathological changes affecting the intervertebral discs, vertebral bodies, facet joints, and supporting ligaments. Degeneration of cervical structures results in narrowing of the spinal canal and subsequent compression of the spinal cord or its vascular supply. This compression produces a wide spectrum of neurological manifestations, including sensory disturbances, upper and lower limb weakness, impaired coordination, gait abnormalities, increased deep tendon reflexes, pathological reflexes, and in advanced stages, bladder and bowel dysfunction. CSM is considered one of the most common causes of spinal cord dysfunction in adults and is a major contributor to neurological disability worldwide.^[1]

The pathogenesis of cervical spondylotic myelopathy involves a combination of static and dynamic factors. Static compression occurs due to degenerative changes such as disc height reduction, osteophyte formation, ossification or hypertrophy of the posterior longitudinal ligament, and thickening of the ligamentum flavum, leading to decreased canal diameter. Dynamic factors such as repetitive movement of the cervical spine may further aggravate spinal cord injury by causing repeated compression and stretching of neural tissues. Chronic mechanical pressure and compromised blood supply result in ischemic changes, inflammation, demyelination, and neuronal damage within the spinal cord. These pathological mechanisms contribute to progressive neurological deterioration if left untreated.^[2]

Multilevel cervical spondylotic myelopathy (MCSM) refers to degenerative cervical disease involving multiple vertebral levels, causing compression of multiple segments of the cervical spinal cord. Compared with single-level disease, MCSM is associated with more extensive neurological involvement and presents greater challenges in surgical management. Patients frequently present with bilateral symptoms, hand dysfunction, difficulty in fine motor activities, imbalance while walking, and progressive limb weakness. Early diagnosis and timely surgical intervention are essential because prolonged spinal cord compression may lead to irreversible neurological deficits and poor functional recovery.^[3]

Developmental cervical canal stenosis (DCS) is an important predisposing factor in the development of cervical myelopathy. Individuals with congenitally

narrow cervical canals have reduced space available for the spinal cord and are more susceptible to symptomatic cord compression even with moderate degenerative changes. The Pavlov ratio, calculated as the ratio between the sagittal diameter of the cervical spinal canal and the sagittal diameter of the vertebral body, is commonly used for identifying cervical canal stenosis. A Pavlov ratio of less than 0.75 indicates developmental canal stenosis and is considered an important radiological risk factor for cervical spinal cord compression. Magnetic resonance imaging (MRI) further helps in evaluating the degree of stenosis, spinal cord compression, and signal changes suggestive of myelopathy.^[4]

The primary objective of surgical treatment in patients with MCSM and DCS is adequate decompression of the spinal cord, prevention of further neurological deterioration, and improvement in functional ability. Conservative treatment may provide temporary symptom relief in mild cases; however, patients with moderate to severe myelopathy usually require surgical intervention. The selection of surgical approach depends on multiple factors including the number of involved levels, sagittal alignment of the cervical spine, location of compression, presence of kyphosis, and overall patient condition. Surgical procedures are broadly categorized into anterior, posterior, and combined approaches.^[5]

Anterior cervical decompression and fusion (ACDF) is one of the commonly performed anterior surgical procedures for cervical spondylotic myelopathy. In ACDF, the surgeon directly approaches the pathological site from the anterior aspect of the cervical spine, removes the affected disc material and osteophytes, decompresses the spinal cord and nerve roots, and stabilizes the segment using fusion techniques. The major advantage of ACDF is direct removal of anterior compressive pathology and restoration of cervical lordosis. It provides good neurological recovery and improvement in neck and upper limb symptoms. However, multilevel ACDF may increase surgical complexity and is associated with potential complications such as dysphagia, graft-related problems, pseudarthrosis, adjacent segment degeneration, and loss of motion.^[6]

Posterior decompression procedures such as laminectomy and laminoplasty are widely used for multilevel cervical myelopathy, particularly in patients with developmental canal stenosis and preserved cervical lordosis. Laminoplasty involves expansion of the posterior elements of the cervical spine to increase the available canal space without completely removing the lamina. This technique allows indirect decompression of the spinal cord by permitting posterior migration of the cord away from anterior compressive structures. One of the

important benefits of laminoplasty is preservation of spinal motion and avoidance of fusion-related complications. However, postoperative axial neck pain, reduced cervical range of motion, muscle-related complications, and progression of kyphotic deformity remain important concerns.^[7]

Although both ACDF and laminoplasty effectively decompress the cervical spinal cord, the superiority of one approach over the other in patients with multilevel cervical spondylotic myelopathy associated with developmental canal stenosis remains controversial. ACDF may provide better correction of cervical alignment and direct decompression of anterior lesions, whereas laminoplasty offers multilevel decompression with preservation of mobility and shorter operative exposure. Clinical outcomes may vary depending on preoperative cervical alignment, number of affected levels, severity of compression, and presence of spinal cord signal changes on MRI.^[8]

The primary objective of this study is to systematically compare the clinical, functional, and radiological outcomes of Anterior Cervical Decompression and Fusion (ACDF) versus posterior decompression procedures (laminectomy/laminoplasty) in patients with cervical spondylotic myelopathy treated at a tertiary care hospital. Specifically, the study aims to evaluate postoperative neurological recovery using standardized assessment tools, including the Modified Japanese Orthopaedic Association (mJOA) score and Nurick grading, compare radiological parameters such as C2–C7 Cobb's angle, spinal canal diameter, and sagittal balance, and determine the correlation between postoperative radiological changes and clinical improvement to identify the most effective surgical approach for optimizing patient outcomes.

MATERIALS AND METHODS

Study design: Prospective Comparative Observational study

Study Place: Department of Neurosurgery, RG Kar Medical College, Kolkata

Study Period: 24 months

Study population: Patients diagnosed with cervical spondylotic myelopathy who are indicated for surgical decompression

Sample size: A total of 60 patients will be enrolled – 30 undergoing ACDF and 30 undergoing Laminectomy/Laminoplasty.

Study Variables:

- Demographic Characteristics of Study Population
- Comparison of Clinical Outcomes at 6 Months
- Comparison of Radiological Outcomes
- Comparison of Postoperative Complications
- Comparison of Overall Functional Outcome at Final Follow-up

Inclusion Criteria

- Patients diagnosed with Cervical Spondylotic Myelopathy (CSM) based on clinical and radiological findings.
- Age group between 30 to 70 years.
- Patients undergoing either Anterior Cervical Decompression and Fusion (ACDF) or Laminectomy/Laminoplasty as per indication
- Patients with single or multilevel cervical cord compression.

Exclusion Criteria

- Patients with infectious, neoplastic, or congenital cervical spine pathology.
- Patients with previous cervical spine surgery.
- Patients with severe medical comorbidities contraindicating surgery.

Statistical Analysis: For statistical analysis data were entered into a Microsoft excel spreadsheet and then analyzed by SPSS (version 27.0; SPSS Inc., Chicago, IL, USA) and GraphPad Prism version 5. Data had been summarized as mean and standard deviation for numerical variables and count and percentages for categorical variables. Two-sample t-tests for a difference in mean involved independent samples or unpaired samples. Paired t-tests were a form of blocking and had greater power than unpaired tests. A chi-squared test (χ^2 test) was any statistical hypothesis test wherein the sampling distribution of the test statistic is a chi-squared distribution when the null hypothesis is true. Without other qualification, 'chi-squared test' often is used as short for Pearson's chi-squared test. Unpaired proportions were compared by Chi-square test or Fischer's exact test, as appropriate.

Explicit expressions that can be used to carry out various t-tests are given below. In each case, the formula for a test statistic that either exactly follows or closely approximates a t-distribution under the null hypothesis is given. Also, the appropriate degrees of freedom are given in each case. Each of these statistics can be used to carry out either a one-tailed test or a two-tailed test.

Once a t value is determined, a p-value can be found using a table of values from Student's t-distribution. If the calculated p-value is below the threshold chosen for statistical significance (usually the 0.10, the 0.05, or 0.01 level), then the null hypothesis is rejected in favour of the alternative hypothesis.

P-value $\leq$ 0.05 was considered for statistically significant.

RESULTS

The study included a total of 60 patients, with 30 patients undergoing Anterior Cervical Decompression and Fusion (ACDF) and 30 patients undergoing Laminectomy/Laminoplasty. In the ACDF group, the majority of patients were aged 50–59 years (11 patients, 36.7%), followed by 60–69 years (10 patients, 33.3%), 40–49 years (6 patients, 20.0%), and $\geq$ 70 years (3 patients, 10.0%).

Similarly, in the Laminectomy/Laminoplasty group, most patients belonged to the 50–59 years age group (13 patients, 43.3%), followed by 60–69 years (9 patients, 30.0%), 40–49 years (5 patients, 16.7%), and ≥ 70 years (3 patients, 10.0%). The difference in age distribution between both groups was statistically not significant ($p=0.714$). Regarding gender distribution, the ACDF group consisted of 19 male patients (63.3%) and 11 female patients (36.7%), whereas the Laminectomy/Laminoplasty group included 17 male patients (56.7%) and 13 female patients (43.3%). The difference in gender distribution between the two groups was not statistically significant ($p=0.602$).

The clinical outcomes were assessed at 6 months postoperatively among 60 patients, including 30 patients in the ACDF group and 30 patients in the Laminectomy/Laminoplasty group. Improvement in the Modified Japanese Orthopaedic Association (mJOA) score was observed in 27 patients (90.0%) undergoing ACDF compared to 22 patients (73.3%) undergoing Laminectomy/Laminoplasty, while lack of improvement was noted in 3 patients (10.0%) and 8 patients (26.7%), respectively. The difference between both groups was statistically significant ($p=0.041$). Assessment using Nurick grading showed improvement in neurological function among 26 patients (86.7%) in the ACDF group and 21 patients (70.0%) in the Laminectomy/Laminoplasty group. Non-improvement was observed in 4 patients (13.3%) and 9 patients (30.0%), respectively. The difference was statistically significant ($p=0.048$). Regarding postoperative pain relief assessed by Visual Analogue Scale (VAS), improvement was reported in 28 patients (93.3%) after ACDF and 23 patients (76.7%) after Laminectomy/Laminoplasty. Persistent pain was observed in 2 patients (6.7%) and 7 patients (23.3%), respectively. The difference in pain improvement between the two groups was statistically significant ($p=0.038$).

The radiological outcomes were evaluated at postoperative follow-up among 60 patients, including 30 patients who underwent ACDF and 30 patients who underwent Laminectomy/Laminoplasty. Assessment of cervical alignment using C2–C7 Cobb's angle showed improvement in 26 patients (86.7%) in the ACDF group compared with 18 patients (60.0%) in the Laminectomy/Laminoplasty group. Lack of significant improvement was observed in 4 patients (13.3%) and 12 patients (40.0%), respectively. The difference in cervical alignment improvement between the two groups was statistically significant ($p=0.020$). Regarding spinal canal diameter, an increase was observed in 24 patients (80.0%) after ACDF and 25 patients (83.3%) after Laminectomy/Laminoplasty. No significant change was noted in 6 patients (20.0%) and 5 patients (16.7%), respectively. The difference between the two groups was statistically not significant ($p=0.739$). Evaluation of sagittal balance

parameters demonstrated improvement in 25 patients (83.3%) in the ACDF group and 19 patients (63.3%) in the Laminectomy/Laminoplasty group. Non-improvement was observed in 5 patients (16.7%) and 11 patients (36.7%), respectively. The difference was statistically significant ($p=0.041$). The postoperative complications were assessed among 60 patients, including 30 patients in the ACDF group and 30 patients in the Laminectomy/Laminoplasty group. Dysphagia was observed in 4 patients (13.3%) following ACDF, whereas no cases were reported in the Laminectomy/Laminoplasty group (0.0%). The remaining 26 patients (86.7%) in the ACDF group and 30 patients (100%) in the posterior decompression group did not develop dysphagia. The difference in incidence of dysphagia between the two groups was statistically significant ($p=0.038$). Postoperative axial neck pain was reported in 2 patients (6.7%) in the ACDF group compared with 7 patients (23.3%) in the Laminectomy/Laminoplasty group. Absence of axial neck pain was noted in 28 patients (93.3%) and 23 patients (76.7%), respectively. The difference between the groups was statistically not significant ($p=0.072$). Regarding surgical site infection, it occurred in 1 patient (3.3%) after ACDF and 2 patients (6.7%) after Laminectomy/Laminoplasty, while infection-free recovery was observed in 29 patients (96.7%) and 28 patients (93.3%), respectively. The difference was statistically not significant ($p=0.554$). C5 palsy was not observed in any patient undergoing ACDF (0.0%), whereas it occurred in 2 patients (6.7%) following Laminectomy/Laminoplasty. The remaining 30 patients (100%) in the ACDF group and 28 patients (93.3%) in the posterior group had no C5 palsy. The difference was statistically not significant ($p=0.150$). The overall functional outcome at final follow-up was evaluated among 60 patients, consisting of 30 patients in the ACDF group and 30 patients in the Laminectomy/Laminoplasty group. In the ACDF group, 14 patients (46.7%) achieved an excellent outcome, compared with 9 patients (30.0%) in the Laminectomy/Laminoplasty group. A good outcome was observed in 11 patients (36.7%) after ACDF and 12 patients (40.0%) after posterior decompression. The proportion of patients with fair outcome was 4 patients (13.3%) in the ACDF group and 7 patients (23.3%) in the Laminectomy/Laminoplasty group, while poor outcome was seen in 1 patient (3.3%) and 2 patients (6.7%), respectively. The difference in overall functional grading between the two groups was statistically significant ($p=0.036$). Considering the overall satisfactory outcome (Excellent + Good), improvement was achieved in 25 patients (83.3%) undergoing ACDF and 21 patients (70.0%) undergoing Laminectomy/Laminoplasty. Unsatisfactory outcomes were observed in 5 patients (16.7%) and 9 patients (30.0%), respectively. The difference in satisfactory functional recovery

between both groups was statistically significant (p=0.045).

Table 1: Demographic Characteristics of Study Population (n = 60)

	Variable	ACDF (n=30) n (%)	Laminectomy/Laminoplasty (n=30) n (%)	Total n (%)	P value
Age (years)	40–49	6 (20.0)	5 (16.7)	11 (18.3)	0.714
	50–59	11 (36.7)	13 (43.3)	24 (40.0)	
	60–69	10 (33.3)	9 (30.0)	19 (31.7)	
	≥70	3 (10.0)	3 (10.0)	6 (10.0)	
Gender	Male	19 (63.3)	17 (56.7)	36 (60.0)	0.602
	Female	11 (36.7)	13 (43.3)	24 (40.0)	

Table 2: Comparison of Clinical Outcomes at 6 Months (n = 60)

Clinical Outcome	Outcome	ACDF (n=30) n (%)	Laminectomy/Laminoplasty (n=30) n (%)	Total (n=60) n (%)	p-value
Modified JOA Score	Improved	27 (90.0)	22 (73.3)	49 (81.7)	0.041
	Not Improved	3 (10.0)	8 (26.7)	11 (18.3)	
Nurick Grade	Improved	26 (86.7)	21 (70.0)	47 (78.3)	0.048
	Not Improved	4 (13.3)	9 (30.0)	13 (21.7)	
Pain Relief (VAS)	Improved	28 (93.3)	23 (76.7)	51 (85.0)	0.038
	Not Improved	2 (6.7)	7 (23.3)	9 (15.0)	

Table 3: Comparison of Radiological Outcomes (n = 60)

Radiological Parameter	Outcome	ACDF (n=30) n (%)	Laminectomy/Laminoplasty (n=30) n (%)	Total (n=60) n (%)	p-value
Cervical Alignment (C2–C7 Cobb's Angle)	Improved	26 (86.7)	18 (60.0)	44 (73.3)	0.02
	Not Improved	4 (13.3)	12 (40.0)	16 (26.7)	
Spinal Canal Diameter	Increased	24 (80.0)	25 (83.3)	49 (81.7)	0.739
	No Significant Change	6 (20.0)	5 (16.7)	11 (18.3)	
Sagittal Balance Parameters	Improved	25 (83.3)	19 (63.3)	44 (73.3)	0.041
	Not Improved	5 (16.7)	11 (36.7)	16 (26.7)	

Table 4: Comparison of Postoperative Complications (n = 60)

Postoperative Complication	Outcome	ACDF (n=30) n (%)	Laminectomy/Laminoplasty (n=30) n (%)	Total (n=60) n (%)	p-value
Dysphagia	Present	4 (13.3)	0 (0.0)	4 (6.7)	0.038
	Absent	26 (86.7)	30 (100.0)	56 (93.3)	
Axial Neck Pain	Present	2 (6.7)	7 (23.3)	9 (15.0)	0.072
	Absent	28 (93.3)	23 (76.7)	51 (85.0)	
Surgical Site Infection	Present	1 (3.3)	2 (6.7)	3 (5.0)	0.554
	Absent	29 (96.7)	28 (93.3)	57 (95.0)	
C5 Palsy	Present	0 (0.0)	2 (6.7)	2 (3.3)	0.15
	Absent	30 (100.0)	28 (93.3)	58 (96.7)	

Table 5: Comparison of Overall Functional Outcome at Final Follow-up (n = 60)

Overall Functional Outcome	Outcome	ACDF (n=30) n (%)	Laminectomy/Laminoplasty (n=30) n (%)	Total (n=60) n (%)	p-value
Excellent	Present	14 (46.7)	9 (30.0)	23 (38.3)	0.036
Good	Present	11 (36.7)	12 (40.0)	23 (38.3)	
Fair	Present	4 (13.3)	7 (23.3)	11 (18.3)	
Poor	Present	1 (3.3)	2 (6.7)	3 (5.0)	
Overall Satisfactory Outcome (Excellent + Good)	Achieved	25 (83.3)	21 (70.0)	46 (76.7)	0.045
	Not Achieved	5 (16.7)	9 (30.0)	14 (23.3)	

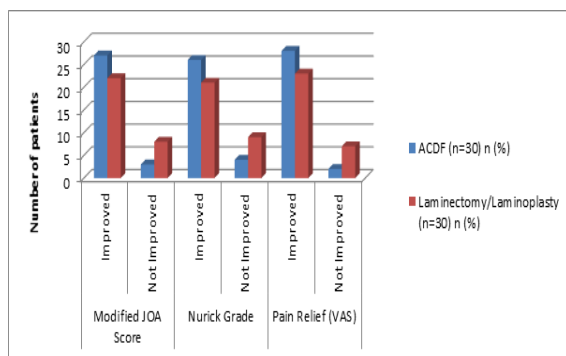


Figure 1: Comparison of Clinical Outcomes at 6 Months (n = 60)

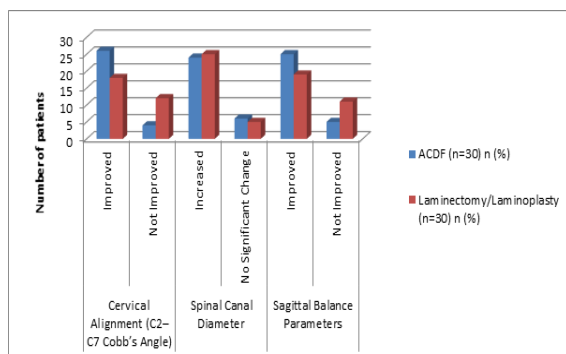


Figure 2: Comparison of Radiological Outcomes (n = 60).

DISCUSSION

In the present study, a total of 60 patients with cervical spondylotic myelopathy were evaluated, with 30 patients undergoing Anterior Cervical Decompression and Fusion (ACDF) and 30 patients undergoing Laminectomy/Laminoplasty. The demographic profile showed that the majority of patients belonged to the 50–59 years age group in both ACDF (36.7%) and Laminectomy/Laminoplasty (43.3%) groups, with no statistically significant difference ($p=0.714$). Similar age distribution was reported by Fotakopoulos G et al,^[9] who observed that degenerative cervical myelopathy commonly affects middle-aged and elderly populations due to progressive degenerative changes of the cervical spine. The present study also demonstrated male predominance in both groups (ACDF 63.3%, Laminectomy/Laminoplasty 56.7%), which is consistent with the findings of Wu JC et al,^[10] who reported a higher incidence of cervical spondylotic myelopathy among males. Regarding neurological recovery, our study found significant improvement in Modified Japanese Orthopaedic Association (mJOA) score after surgery, with improvement observed in 90.0% of ACDF patients compared with 73.3% of Laminectomy/Laminoplasty patients ($p=0.041$). This indicates better neurological recovery following anterior decompression. Similar findings were reported by Fehlings et al,^[11] in the AOSpine North America study, where anterior surgery provided significant neurological improvement in

patients with cervical spondylotic myelopathy due to direct removal of anterior compressive pathology. Bao X et al,^[12] also demonstrated that ACDF achieved better postoperative neurological outcomes in selected patients with multilevel cervical myelopathy compared with posterior procedures.

Assessment using Nurick grading showed improvement in 86.7% patients in ACDF group and 70.0% patients in Laminectomy/Laminoplasty group ($p=0.048$). These findings suggest superior functional neurological improvement after ACDF. Similar observations were reported by Sampath et al,^[13] who found significant improvement in functional disability and neurological status after surgical decompression for cervical myelopathy, with outcomes influenced by surgical approach and severity of disease.

Postoperative pain relief assessed by Visual Analogue Scale (VAS) demonstrated improvement in 93.3% patients after ACDF compared with 76.7% after Laminectomy/Laminoplasty ($p=0.038$). The better pain reduction after ACDF may be attributed to direct decompression of anterior pathology and restoration of cervical stability. Bapat et al,^[14] reported that anterior approaches provide effective relief of axial and radicular pain by addressing the primary source of compression.

Radiological evaluation showed that improvement in cervical alignment (C2–C7 Cobb's angle) occurred in 86.7% patients after ACDF compared with 60.0% after Laminectomy/Laminoplasty ($p=0.020$). ACDF demonstrated superior restoration of cervical lordosis due to anterior column reconstruction and fusion. Similar results were reported by Yoshii et al,^[15] who found that anterior fusion procedures provide better maintenance and correction of cervical sagittal alignment compared with posterior decompression techniques.

In terms of spinal canal diameter, improvement was observed in 80.0% of ACDF patients and 83.3% of Laminectomy/Laminoplasty patients, with no significant difference ($p=0.739$). This indicates that both anterior and posterior approaches effectively achieve spinal canal expansion and decompression. Ali AM et al,^[16] in their study on cervical laminoplasty, reported that posterior decompression significantly increases canal diameter and provides satisfactory neurological recovery in multilevel cervical stenosis.

Evaluation of sagittal balance parameters showed improvement in 83.3% of ACDF patients and 63.3% of Laminectomy/Laminoplasty patients ($p=0.041$). The superior improvement after ACDF may be due to correction of anterior column pathology and prevention of postoperative kyphotic changes. Similar findings were described by Patel PD et al,^[17] who emphasized the importance of maintaining cervical sagittal alignment for better postoperative functional outcomes.

Postoperative complications were also analyzed in the present study. Dysphagia occurred significantly more frequently in the ACDF group (13.3% vs 0%,

p=0.038). This finding is consistent with previous studies, as anterior cervical procedures involve manipulation of prevertebral soft tissues, increasing the risk of swallowing difficulty. Yee TJ et al,^[18] reported dysphagia as one of the commonly observed complications following anterior cervical surgery. However, complications such as axial neck pain, surgical site infection, and C5 palsy showed no statistically significant differences between groups. The final functional outcome showed that excellent outcome was achieved in 46.7% of ACDF patients compared with 30.0% of Laminectomy/Laminoplasty patients, and the difference in overall functional grading was significant (p=0.036). The overall satisfactory outcome (Excellent + Good) was achieved in 83.3% after ACDF and 70.0% after Laminectomy/Laminoplasty (p=0.045). These findings suggest that ACDF may provide better functional recovery in appropriately selected patients with cervical spondylotic myelopathy.

CONCLUSION

The present study demonstrated that both Anterior Cervical Decompression and Fusion (ACDF) and Laminectomy/Laminoplasty were effective surgical procedures for the management of cervical myelopathy, with significant improvement in clinical and radiological outcomes at postoperative follow-up. However, ACDF showed comparatively better neurological recovery, pain relief, cervical alignment restoration, sagittal balance improvement, and overall functional outcomes when compared with Laminectomy/Laminoplasty. ACDF was associated with superior functional recovery and higher rates of satisfactory outcomes, suggesting better postoperative rehabilitation potential. Laminectomy/ Laminoplasty also provided substantial neurological improvement and adequate decompression, particularly in improving spinal canal diameter; however, it showed relatively lower improvement in alignment and functional recovery parameters. Postoperative complications were generally low in both groups, although dysphagia was more commonly observed following ACDF, while axial neck pain and C5 palsy were more frequently associated with posterior decompression procedures. Overall, ACDF may be considered a preferable surgical option in appropriately selected patients requiring cervical decompression, particularly when restoration of cervical alignment and better functional outcomes are desired. Laminectomy/Laminoplasty remains a valuable alternative, especially in patients where posterior decompression is more suitable based on clinical and radiological factors.

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