

Original Research Article

Comparison of anterior and posterior surgical approaches in multi-level cervical spondylotic myelopathy

Paruvakkattil Kunjan Balakrishnan, Tinu R. Abraham*, Ajax John

Department of Neurosurgery, GMC, Kottayam, Kerala, India

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*Correspondence:

Dr. Tinu R. Abraham,

E-mail: tinuraviab@gmail.com

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ABSTRACT

Background: Cervical spondylotic myelopathy (CSM) is one of the most common dysfunctions of spinal cord which occurs due to degenerative changes in cervical spine disc and facet joints. The management of multilevel spondylotic myelopathy is always controversial. The posterior approaches are always preferable in multiple level spondylosis. But according to newer studies, anterior approaches have similar results. Aim of the study was to compare the efficacy of posterior and anterior approaches in multilevel cervical myelopathy.

Methods: This study includes all patients with multilevel cervical spondylotic myelopathy who have undergone decompression surgery with fusion. Detailed preoperative and post-operative assessment was done according to modified Japanese Orthopedic Association scoring system.

Results: Eighty eight patients of CSM surgical cases were selected for this study and 29 cases of multi-level CSM were observed. And they were randomly selected for anterior and posterior approaches. Sixteen cases anterior approach was done either ACDF or Corpectomy with fusion. Mean age of study was 51.63 years with 64 males and 24 females. The spinal cord level at which most surgeries did was C5/6, 62 cases. While at level C4/5, it was 49 and at level C3/4 and C6/7, it was 35 and 36 respectively.

Conclusions: Both anterior approach and posterior approaches were associated with betterment in postoperative neurological function for multilevel CSM. And there is no significant advantage in doing anterior approach in multilevel CSM.

Keywords: Cervical spondylotic myelopathy, ACDF, Corpectomy

INTRODUCTION

Cervical spondylotic myelopathy (CSM) is one of the most common dysfunctions of spinal cord occurs due to degenerative changes in cervical spine disc and facet joints.¹ The management options of cervical myelopathy include either conservative treatment or operative. Operative management is indicated for most of is recommended for patients who have either substantial or progressive impairment of neurological function without sustained remission. Surgical procedures includes decompression procedures like laminectomy and laminoplasty and decompression with fusion procedures

like anterior cervical discectomy and fusion (ACDF), Anterior cervical corpectomy with fusion and fusion and posterior cervical laminectomy with Lateral mass fixation.²

Timely intervention by decompression surgeries may decrease the progression of disabilities and help in functional recovery. Management of multiple level cervical myelopathy management is always debatable. If patient have posterior compression, facet hypertrophy, posterior approach and patients having anterior compression with kyphosis anterior approach is recommended.^{3,4}

In case of anterior compression with 3 or more level spondylotic disease with maintained cervical lordosis, posterior laminectomy with lateral mass fixation is conventionally done.^{5,6}

Objective

The aim of this study is to compare the efficacy of posterior and anterior approaches for multilevel cervical myelopathy.

METHODS

This prospective cohort study was conducted in the Department of Neuro Surgery from December 2018 to January 2020 in Government Medical College, Kottayam. This study includes all patients with multilevel cervical spondylotic myelopathy who have undergone decompression surgery with fusion under general anaesthesia. Detailed preoperative and post-operative assessment was done according to modified Japanese Orthopedic Association (mJOA) scoring system.^{7,8} Post-operative assessment was done immediately after surgery, at 6 months and 1 year of follow up.

Inclusion criteria include all multi-level CSM patients above age of 18 years with cervical myelopathy undergoing decompression surgeries with fusion and fixation. And exclusion criteria include patients above 75 years and all traumatic spinal cord disease.

According to mJOA scoring system, patients were grouped into 3 groups: mild=15-17, moderate=12-14 and severe ≤ 12 .^{9,10}

Sample size was calculated as convenient sampling. Data assessment was done using statistical package for the social sciences (SPSS) software and Microsoft excel. Descriptive statistics were ascertained for the included studies. Means standard deviations and proportions were calculated for all outcomes of interest.

RESULTS

Eighty eight patients with CSM were observed in this study including 29 cases of multilevel CSM. Mean age of study was 51.63 years with 64 males and 24 females. The spinal cord level at which most surgeries did was C5/6, 62 cases. While at level C4/5, it was 49 and at level C3/4 and C6/7, it was 35 and 36 respectively.

Out of 88 cases of CSM surgeries, ACDF were done in 47 cases, while corpectomy with fusion for 27 cases and laminectomy with lateral mass fixation done for 14 cases. Multi-level CSM was observed in 29 cases. And they were randomly selected for anterior and posterior approaches. Sixteen cases anterior approach was done either ACDF or corpectomy with fusion and the results are depicted in Table 1 and Table 2.

Table 1: Comparison of anterior and posterior approach.

Parameters	Anterior	Posterior
Mean age	50.5	60
No. of cases	16	13
Mean m-JOA score	13.9	13.5
Mean Nurick score	2.32	2.2
Post op m-JOA after 1 year	15.9	15.25
Post op Nurick score after 1 year	1.38	1.4
Difference in mean score- m-JOA	2	1.75
Difference in mean score- Nurick	0.94	0.8

The difference in mean score of mJOA in anterior and posterior approaches for multilevel CSM is 2 and 1.75 respectively, while that of Nurick score is 0.94 and 0.8.

Table 2: Surgical technique and statistics.

Approach	Improvement in Nurick score	No improvement
Anterior	11	4
Posterior	8	4

*Chi square statistics=0.142, p value=0.7061

DISCUSSION

In this study out of 88 cases, 29 cases were three or more level cervical myelopathy anterior approach surgery done in 16, posterior approach done in 14. In the anterior group, an increase of 2 mJOA score observed after 1 year, while posterior group it was 1.75. Three complications were there in anterior group and two were there in posterior group.

In CSM patients irrespective of surgical approaches, the goal is to decompress the spinal cord and preserve the stability and alignment. The posterior approaches are usually considered for multiple level cervical diseases in which lordosis is maintained.^{11,12}

Many studies have compared the outcome of anterior and posterior approaches for CSM showed in the above Table 3.^{1,13,14,16} In this study, 29 cases were observed of multiple cervical level diseases. In which 14 cases were done through anterior and 13 through posterior and 2 cases global fusion were done. There was no significant difference were observed in both groups (p value=0.706) Table 2.

In Table 3, difference in mJOA score of anterior and posterior approaches were compared. In most of these studies there is no significant difference between both approaches, except in Yonenobu et al where anterior approach have got significant benefit. In this study there was no significant difference in betterment of mJOA score for both approaches.

Table 3: Comparison of different studies.

Study	Approach	mJOA before surgery	mJOA after surgery 1 year	Difference in mean mJOA
Yonenobu et al ³³	Anterior	8.2±2.2	13.3±2.6	5.1
	Posterior	9.3±3.0	12.8±2.7	3.5
Wada et al ³⁴	Anterior	7.9±1.8	13.3±1.6	5.4
	Posterior	7.4±2.2	13.1±2.0	5.6
Liu et al ³⁵	Anterior	8.16±3.14	13.2±2.72	5.04
	Posterior	8.59±2.98	13.67±2.70	5.08
Ghogawala et al ³⁶	Anterior	13.4±0.44	15.44±0.39	2.04
	Posterior	11.6±0.5	13.54±0.45	1.96

Limitation

The sample size is not adequate to commend on which procedure to choose. The surgery done by different surgeons were not standardised.

CONCLUSION

Both anterior approach and posterior approaches were associated with betterment in postoperative neurological function for multilevel CSM. The complication and reoperation rates were higher in the anterior group compared with the posterior group. Hence there is no significant advantage in doing anterior approach in multilevel CSM.

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