



## CERVICAL SPONDYLOTIC MYELOPATHY AND ITS FUNCTIONAL OUTCOME IN ANTERIOR VERSUS POSTERIOR DECOMPRESSION.

### Neurosurgery

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### KEYWORDS

#### Aim of Study

Hokuda S, Machizoki T, Ogata M, et al published the first comparative study of long term results of anterior and posterior procedures.

Our Aim is to compare the FUNCTIONAL OUTCOME IN ANTERIOR AND POSTERIOR DECOMPRESSION in cases of cervical spondylotic myelopathy using modified Japanese orthopaedic Association score

#### MATERIALS AND METHODS

Total number of cases diagnosed as Cervical spondylotic myelopathy: 92  
Total number of cases operated : 69  
Total number of posterior decompression: 57  
Total number of Anterior decompression: 15

#### TOTAL NUMBER OF CASES FOLLOWED-UP

Posterior decompression: 44  
Anterior decompression: 12

**Table – 1: Age Group of Patients**

Age group	Posterior Decompression		Anterior decompression	
	Number	Percentage	Number	Percentage
40-50	9	21%	6	50%
51-60	16	36%	3	25%
61-70	14	32%	3	25%
70-80	5	11%	0	0%

**Table – 2: Duration of illness before surgical intervention**

Time Gap	Posterior Decompression		Anterior Decompression	
	Number	Percentage	Number	percentage
Below 1 year	21	49%	4	33%
1 to 2 year	11	25%	3	25%
2 to 3 year	6	13%	4	33%
Above 3 year	6	13%	1	.8%

#### MATERIALS AND METHODS

During a period of seven years, from 1986 to 1992, the number of cases proved to be cervical spondylotic myelopathy by clinical and radiological studies were ninety-two. Of these only sixty-nine cases were operated upon. Barring the three deaths in the early post-operative period only sixty-six cases were available for follow up. Of the sixty-six cases. Only fifty six cases could be traced. There were forty-four cases of posterior decompression and nine cases of anterior decompression. Laminectomy alone or laminectomy and foramenotomy was the procedure done in posterior decompression. Discectomy, osteophyte clearance and fusion was the procedure done in anterior decompression.

The shortest follow up was three months and longest follow-up was seven years. Mean follow-up was forty six-months. The age group of the patients in both the groups are depicted in Table 1. The duration of illness before surgical intervention in both the groups are depicted in Table 2.

All the posterior were done in lying posture under general anaesthesia with endo tracheal intubation with horse shoe support. No one was operated in sitting posture. For all cases, extensive laminectomy, 2

levels above and 2 levels below the site of lesion was done.

In anterior decompression, of the nine cases operated, eight of them had single level decompression and only one had a double level decompression. All the cases were followed up with fusion. Smith Robinson type of Tricortical graft was used for the fusion. No one had any orthotic support post-operatively.

Patients who were followed up were met at their residence and questionnaire was used to assess their functional status and clinical examination done. The questionnaire was also given to one of the members of the family closely associated with the patient. Only a few of them were available for radiological assessment.

Of the fifty six Cases, seven had died during the follow-up period for ailments of varying reasons. The next of kin was given a questionnaire and was used to assess the neurological and functional status before the death and an attempt was made to establish the cause of death.

The questionnaire, is based on modified Japanese orthopaedic association score. Pre operative and post operative score is compared by questionnaire and clinical examination

Radiological improvement was not included because most of the patients denied to come for the radiological examination and also the previous radiological records were not available for comparison

#### Modified Japanese Orthopaedic Association (mJOA) score

##### I. Motor dysfunction score of the upper extremities

Inability to move hands 0  
Inability to eat with a spoon but able to move hands 1  
Inability to button shirt but able to eat with a spoon 2  
Able to button shirt with great difficulty 3  
Able to button shirt with slight difficulty 4  
No dysfunction 5

##### II. Motor dysfunction score of the lower extremities

Complete loss of motor and sensory function 0  
Sensory preservation without ability to move legs 1  
Able to move legs but unable to walk 2  
Able to walk on flat floor with a walking aid (i.e., cane or crutch) 3  
Able to walk up and/or down stairs with hand rail 4  
Moderate to significant lack of stability but able to walk up and/or down stairs without hand rail 5  
Mild lack of stability but walk unaided with smooth reciprocation 6  
No dysfunction 7

##### III. Sensation

Complete loss of hand sensation 0  
Severe sensory loss or pain 1  
Mild sensory loss 2  
No sensory loss 3

##### IV. Sphincter dysfunction

Inability to urinate voluntarily 0  
Marked difficulty with micturition 1  
Mild to moderate difficulty with micturition 2  
Normal micturition 3

**RESULT**

Both anterior and posterior decompression gives near equal incidence of improvement in Motor Weakness.

The duration of illness does not have a say in the preference of anterior or posterior decompression to have a better possibility of improvement.

The time taken for improvement in Motor Weakness in anterior approach is little less than posterior decompression although delayed recovery is possible in posterior decompression than in anterior decompression.

Improvements in sensory symptoms occurred in both anterior and posterior decompression only if the duration of illness was below one year.

Improvement in occupational ability was more with anterior decompression than posterior decompression, No conclusion can be drawn from this study regarding improvement or worsening of disabling neck stiffness, Patient satisfaction was only marginally better with posterior decompression than with anterior decompression.

**DISCUSSION**

**Table 3: Overall improvement in Motor Weakness**

Type if surgery	Total Number	Improved	Percentage
Posterior decompression	44	38	86
Anterior decompression	12	11	91

**Table 4**

Duration of illness	Posterior Decompression			Anterior Decompression		
	Total number	Improved	Percentage	Total	Improved	Percentage
Below 1 year	21	20	95	4	4	100
1-2 years	11	10	90	3	2	66
2-3 years	6	5	80	4	4	100
Above 3 years	6	3	50	1	1	100

**Table 5: Time Between surgery and Improvement in Motor Weakness**

Time Gap	Posterior Decompression		Anterior Decompression	
	Number	Percentage	Number	Percentage
Below one month	4	11	4	56
Below six month	16	42	6	86
Below one year	36	95	7	100
Above one year	38	100	7	100

**Table 6: Relation between duration of illness and time taken for improvement in Motor Weakness Posterior Decompression**

Duration of illness	Total number	IMPROVEMENT							
		Below 1 month		1 to 6 months		6 months to 1 year		Above 1 year	
		No.	Percentage	No.	Percentage	No.	Percentage	No.	Percentage
Below 1 year	21	8	38	6	29	5	23	1	5
1-2 years	11	5	45	3	27	2	19	0	-
2-3 years	6	1	16	2	33	2	33	0	-

**Table 9: Improvement in Sensory symptoms in Relation to Number of involved and Type of surgery**

Type of surgery	SINGLE LEVEL					MULTI LEVEL				
	Total number	Significant improvement		No significant improvement		Total Number	Significant improvement		No significant improvement	
		No.	%	No.	%		No.	%	No.	%
Posterior Decompression	16	9	55	7	45	28	10	37	18	63
Anterior Decompression	8	4	50	4	50	1	1	100	0	-

**Table 10: Improvement in Sensory symptoms in Duration of illness**

Time Duration of Disease	Posterior Decompression		Anterior Decompression	
	Number of cases	Significant Improvement	Number of cases	Significant Improvement

Above 3 years	6	-	-	2	33	0	-	1	16
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**Table 7: Relation between duration of illness and time taken for improvement in Motor Weakness**

**ANTERIOR DECOMPRESSION**

Duration of illness	Total Number	IMPROVEMENT							
		Below 1 month		1 to 6 months		6 months to 1 year		Above 1 year	
Below 1 year	4	2	66	1	33	0	-	1	33
1-2 years	3	1	33	0	-	0	-	1	33
2-3 years	4	2	50	1	25	1	25	0	-
Above 3 years	1	0	-	1	100	0	-	0	-

**DISCUSSION**

**MOTOR WEAKNESS:**

Clinically noticeable improvements in Motor Weakness occurred in eighty six percent of posterior decompression and seventy eight percent of anterior decompression. (Table 3). The results are comparable to most of the large series reported.

The percentage of patients having improvement in relation to duration of illness was significant with posterior decompression. More than eighty percent improved if symptoms were less than three years of duration and if present for more than 3 years it was only fifty percent. (Table 4). But this profile of reduced improvement did not exist with anterior decompression. (Table 4). If the duration of illness was within one year both the groups showed similar percentage of recovery. Ninety five percent in posterior decompression and hundred percent in anterior decompression. Up to 3 years of duration of illness the success rate was almost equal. After three years of the illness out of six cases which underwent posterior decompression only fifty percent showed recovery, while only one who had anterior decompression recovered. (Table 4).

The time taken for improvement in the Motor Weakness were analysed. With posterior decompression only eleven percent showed improvement within first month, whereas in anterior decompression fifty six percent improved. (Table 5). In ninety five percent of improved cases with posterior decompression the improvement was seen within one year. In anterior decompression eighty six percent of the improve patients felt the improvement within six months. In the anterior decompression group improvement occurred essentially within one year. In posterior decompression five percent of the improved patients had it noticed after one year. (Table 6).

The relation between duration of illness and time taken for improvement in posterior and anterior decompression was critically analysed in each group and compared with each other. In posterior decompression, of those who improved in their symptoms with the disease duration of one year sixty seven percent improved within six months and was thirty three percent in more than three year group. (Table 7). In anterior decompression corresponding values were ninety nine percent and hundred percent respectively, which is significant than its counter part.

**Table 8: Sensory symptoms**

Type of surgery	Single level		Multi level	
	Number	Percentage	Number	Percentage
Posterior Decompression	16	36	28	69
Anterior Decompression	8	89	1	11

		No.	Percent-tage		No.	Percent-tage
Below 1 year	21	18	86	4	4	100
1-2 years	11	1	9	3	3	100
2-3 years	6	0	-	4	4	100
Above 3 years	6	0	-	1	0	0

**SENSORY SYMPTOMS**

Of the fifty four patients who underwent posterior decompression thirty six percent had single level lesion and sixty four had multiple level lesions. While eighty nine percent of anterior decompression had single level lesion eleven percent had multiple level lesion.(Table 8).

In posterior decompression of those who had single level lesion fiftyfive percent had significant improvement as with anterior decompression also. When multiple levels were involved posterior decompression showed significant improvement in thirty seven percent while in anterior decompression it was hundred percent, as the only one case done showed improvement.

If the disease duration was less than one year posterior decompression showed improvement in eighty six percent and anterior decompression in hundred percent. It the disease duration was between one and two years anterior decompression again showed hundred percent improvement whereas posterior decompression only nine percent. After two years of illness both the groups showed no significant change in sensory symptoms. (Table 10)

**Table 11: Ability to return to preoperative occupation**

Type of surgery	Total Number	Number Able to take up occupation	Percentage
Posterior Decompression	44	41	90%
Anterior Decompression	12	11	91%

**Table 12: Ability to return to premorbid occupation**

Type of surgery	Total number	Number of patients able to take up occupation	Percentage
Posterior Decompression	44	17	39%
Anterior Decompression	12	10	83%

**Table 13: Disabling Restriction of Movement**

	Total	Number	Percentage
Posterior Decompression	44	8	18
Anterior Decompression	12	1	8

**OCCUPATIONAL ABILITY**

With posterior decompression ninety percent of patients returned to pre-operative occupation. Thirty nine percent showed remarkable improvement to return to pre-morbid occupation. In anterior decompression eighty eight percent of patient returned to pre-operative occupation while a higher percentage. Sixty seven percent were able to return to pre-morbid occupation. (Table 11,12)

**NECK MOVEMENTS:**

A detailed description of the patient's range of neck movements and painful restriction of the movement was not available in record to compare the pre-operative and post-operative status. So the existing range of movements and associated pain was taken into consideration. While almost all patients had restriction of movements when compared to the normal range of cervical movements, disabling pain was noted in eighteen percent of the posterior decompression and twenty two percent of the anterior decompression patients. (Table 13)

When the over-all result, as per score card, was analysed in relation to age of the patient, below 50 years, there was one hundred percent improvement in anterior decompression. But it was only seventy-eight percent in posterior decompression. Between fifty and seventy years, it was one hundred percent in the posterior decompression group and 50% in anterior decompression.

**INFERENCE**

In the younger group patients, whose demands are high, anterior decompression is the approach of choice. In the elderly patients, whose demands are not high, posterior decompression gives as good results as that of anterior decompression.

58 years old patient who had undergone posterior decompression has gross restriction of movements of the neck. But the patient is not much bothered about it because it is painless.

**REFERENCES**

- Brain WR, Northfield DWC, Wilkinson M: Neurological manifestations of Cervical spondylosis. Brain 75:187, 1952.
- Brain L, Wilkinson M: Cervical spondylosis. Philadelphia, WB Saunders, 1967.
- Clarke, Robinson PK: Cervical myelopathy: Complication of cervical Spondylosis, Brain 79:483, 1956
- Smith GW, Robinson RA: The Treatment of certain cervical spine disorders by anterior removal of the intervertebral disc and interbody fusion. J Bone Joint surg 40: 607, 1958.
- Bailey RW, Badjley CE: Stabilization of the cervical spine by anterior fusion. J Bone Joint Surg 42A: 565, 1960.
- Cloward RB: Lesions of the intervertebral disc and their treatment by interbody fusion methods. Clin ortho 27:51, 1963.
- Stoops WI, King RB: Neural complications of cervical spondylosis., Their response to laminectomy and foraminotomy. J Neuro surg 19: 986, 1962.
- Stoops WL, King RB: Chronic myelopathy associated with cervical spondylosis: Its response to laminectomy and foraminotomy. JAMA 192: 281, 1965.
- KLhan FA: The role of the dentate ligaments in spinal cord compression and the syndrome of lateral sclerosis., J Neurosurg 4:19, 1947.
- Adams CBT, Logue V: Studies on cervical spondylotic myelopathy, 3. Some functional effects or operations for cervical spondylotic myelopathy Brain 94: 587, 1971.
- Bishara SN: The posterior operation in the treatment of cervical spondylosis with myelopathy: A long term follow-up study. J Neurol Neurosurg psychiatry 34:393, 1971.
- Tew JM Jr Mayfield FH: Complication of surgery of the anterior cervical spine. Clone Neuro surg 23:424, 1976.
- Gooding Mr. Wilson CB, Hoft JT: Experimental cervical myelopathy: Effects of ischemia and compression of the cranino cervical spinal cord. J Neurosurg 43:9-17, 1975.
- Hoff JT, Wilson CB: The pathophysiology of cervical spondylotic radiculopathy and myelopathy, clin Neurosurg 24:474-487, 1977.
- Gregorius FK, Estrin T, Crandal PH: Cervical spondylotic radiculopathy and myelopathy: A long term follow-up study. Arch Neurol 33:618, 1976.
- Hicks DS, Whitecloud TS, Craco A, et al: Cervical spondylotic myelopathy: Results of anterior decompression and stabilization. Orthop Trans 4,44, 1980.