

## Study of current pattern of Cervical Spondylotic Myelopathy and to evaluate the modalities of treatment

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### Abstract:

**Introduction and purpose:** It is always seen that the difficulty is encountered by physician in arriving at definite diagnosis and etiology of Cervical Spondylotic Myelopathy. Accurate and early diagnosis is of paramount importance for proper treatment and better outcome. Clinical manifestation is different with some special signs such as Hoffman's sign, finger escape sign and inverted supinator sign which guide to further investigate patient with radiological modalities to understand its severity level and to decide possible management such as non-operative or operative

**Study design:** We have done 42 patients study with cervical spondylotic myelopathy who were operated with different modalities in B.J. Medical college, Ahmedabad between 2013-2014 , out of which 32 were completely followed –up regularly and statistical data with functional outcome was collected and compared with other study.

**Method:** In operative management, various options available such as Anterior discectomy with fusion, anterior corpectomy with fusion , posterior laminectomy , laminoplasty out of which procedure should be done out in which particular patient, is very important to raise post –operative result.

**Results:** Our study shows that most of the patients at the time of primary presentation are having average 6 to 8 months duration of illness with Nurick's grade III or IV and JOA Score between 8 – 10. Majority of patients , 20 were operated with posterior approach. Anterior discogenic pathology usually affects up to 2 segments but Posterior pathology usually produces multiple level compressions. Number of segments involvement is important for decision making regarding anterior and posterior procedure. Though majority of patients are having anterior pathology, only 38% patients were operated by anterior procedure. Two patients with 2 segments involvement and with anterior pathology only were operated by posterior procedure. Nurick's grade I patients having Excellent outcome, Grade II & III having good to excellent outcome and Grade IV & V having fair to good outcome after surgery. This study shows that patients with JOA Score >10 having Excellent outcome and <10 is having good to excellent outcome after surgery.

**Conclusion:** Anterior procedure and posterior procedure both are having good outcome if done in properly indicated patients considering the site of pathology, alignment of cervical spine and number of segments involvement.

**Key words:** cervical myelopathy, cervical spondylotic myelopathy, Anterior corpectomy , cervical discectomy , cervical fusion

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### I. Introduction

Since time immortal man has tried to defeat this worst enemy the aging process but in vain age ultimately catches up with everybody bringing with it a multitude problems and disorders including degenerative cervical spine diseases.

The incidence of degenerative spine disease is more common in cervical spine region owing to the inherent mobility of this region of vertebral column.

Clumsiness in hands and difficulties in walking and performing routine activities is the usual presentation of patients with Cervical Spondylotic Myelopathy. Torland (1893) first described myelopathic changes in cord due to spondylosis. Since then surgeons are searching for accurate methods of definite diagnosis and operative treatment of the same.

It is always seen that the difficulty is encountered by physician in arriving at definite diagnosis and etiology of Cervical Spondylotic Myelopathy. Accurate and early diagnosis is of paramount importance for proper treatment and better outcome.

Various imaging techniques are available now days to find the cause of this illness, starting from plain x-rays to the new world of advanced MRI technique. Perception is not synonymous with sight but rather implies intellectual interpretation of visual pattern. In order to fully understand the investigation, a surgeon should process a full knowledge of variation pattern in cervical spine disease.

We have taken up this topic to assess current pattern of Cervical Spondylotic Myelopathy and to evaluate the modalities of treatment (Anterior Discetomy/Corpectomy with fusion and Laminectomy) and the outcome of patients after rehabilitation.

## II. Clinical Manifestations

All five syndromes are characterized by clinical symptoms or signs and radiographic evidence of compression of the spinal cord[1].

- **Lateral or Radicular syndrome** is predominated by nerve root symptoms (redicular pain or neurological deficit).
- **The medial or myelopathic syndrome** is characterized by long-tract signs and symptoms.
- **A combined syndrome** includes both nerve-root and long-tract signs and symptoms and is the most common presentation of cervical spondylotic myelopathy.
- **The Vascular Syndrome** is least common syndrome. It may not present any clear sensory or motor pattern because of the variable injury to the cord resulting from vascular ischemia.
- **The Anterior Syndrome** presents with painless weakness in the upper extremities without accompanying symptoms in the lower extremities. It does not include redicular or long-tract signs on symptoms, to pressure affecting only the anterior horns of the gray matter of the spinal cord'. the findings in this fifth syndrome to overstretching of the spinal cord with flexion of the neck, which causes local damage to the cells of the anterior horns at the levels of posteriorly bulging intervertebral discs.

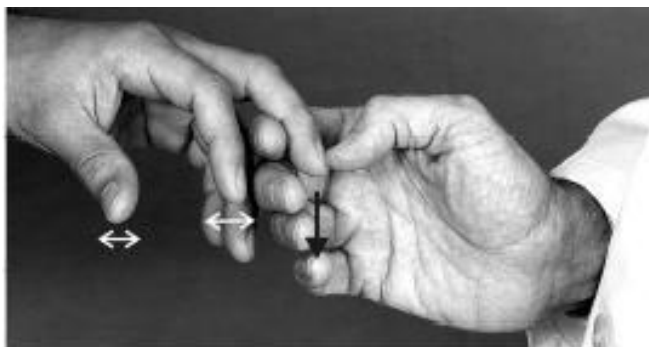
The differential diagnosis includes multiple sclerosis, cerebrovascular disease, hydrocephalus, intracranial tumor, syringomyelia, congenital malformation of the brain stem, tumor of the spinal cord, vascular ischemia of the spinal cord, tabes dorsalis, myopathies (such as amyotrophic lateral sclerosis), and neuropathies[2].

Management includes proper investigation to confirm the diagnosis of cervical spondylotic myelopathy and treatment modality accordingly.

### 1) Clinical Examination

Proper clinical assessment is very important in suspected case of cervical spondylotic myelopathy. It includes

- a) General examination
- b) Local examination of neck: tenderness, deformity and movements of neck.
- c) Neurological examination: higher function, cranial nerves, Motor examination including nutrition, tone, power (MRC Grading), Sensory level, Reflex including superficial and deep tendon reflex and clonus.
- d) Pathological reflexes include
  - i. Inverted supinator reflex:
  - ii. Hoffman's reflex:



- e) Special test like finger escape sign (deficient adduction and/or extension of the ulnar two or three fingers),



- f) kinetic elements of hand (rapid movements of hand, normal is >20 in 10 seconds)
- g) L'hermitte's test
- h) Bowel, bladder examination.
- i) Gait of the patient

## 2) Radiological investigation

### a) X-ray Cervical spine:

- i. Standard anteroposterior view
- ii. Lateral view
- iii. Lateral Flexion and Extension view, will demonstrate narrowing of the disc space, osteophytes, spondylolisthesis, and instability[3].

### Flexion - Extension Radiographs:-

This is useful in evaluation of patient who has neck pain despite of normal neurological and radiographic findings. The radiographs should be made under supervision of physician with patient moving head and neck through a pain free range of motion.

**Suggests instability**

### b) CT Scan And CT Myelography:

### c) MRI:



It is the investigation of choice in diagnosis and decision making in cervical spondylotic myelopathy. It helps in detecting

- i. Central canal diameter and compression, whether anterior or posterior, level of compression.
- ii. Cord changes inform of edema, ischemia, demyelination, gliosis, microcavities, and cavities.
- iii. Foraminal stenosis.
- iv. Ossified posterior longitudinal ligament (OPLL).
- v. Ligamentum flavum thickening or ossification
- vi. Prediction of cervical cord drift. (it is a calculation from MRI to predict how much cord will shift posteriorly after posterior procedure)



Anterior with Posterior PathologyAnterior pathology

#### d) EMG/NCV study

It can be useful to monitor objectively the progress of compression of the cord and nerve roots with electrophysiological studies with quantitative assessment. It also helps to rule out peripheral nerve problems from cervical myelopathy. MEPs associated with SEPs are a valuable tool for assessing the presence and severity of cervical cord involvement in combined cervical cord compression and peripheral neuropathy lesions[4].

### III. Definitive Management

#### Non-Operative Management

Cervical spondylotic myelopathy usually develops insidiously. Non-operative treatment can be helpful in the early period, which may be characterized by episodes of pain in the neck and upper extremities.

Modalities of non-operative treatment include immobilization with a firm cervicothoracic orthosis (a collar or brace), intermittent bed rest, medications such as non-steroidal anti-inflammatory agents and muscle relaxants, epidural injections and physical therapy.

Immobilization in a Philadelphia collar decreases the motion of the vertebral bodies. Immobilization at night is especially important because, during sleep, conscious control of movement of the neck is absent. .

Cervical epidural injection of a local anesthetic (four milliliters of 0.5 per cent lidocaine) and corticosteroid (forty to sixty milligrams of triamcinolone diacetate) has also been temporarily effective in reducing the pain from radiculopathy secondary to cervical spondylosis.

#### Operative Management:-

##### Indications for surgery

1. Symptoms and signs of long tract dysfunction, including motor weakness, hyperreflexia, spasticity, ataxia, pathologic reflexes, and myelopathic hand findings etc.
2. Long term symptoms with acute worsening
3. On flexion extension x-ray vertebralolisthesis of >3.5 mm between adjacent cervical vertebral bodies.
4. On MRI midsagittal diameter from C3 to C7 is <13 mm with symptoms.

#### Choosing the Operative Procedure

**The primary goal** of surgical intervention in patients with cervical spondylotic myelopathy, regardless of whether an anterior or posterior approach is used, is **expansion of the spinal canal**. Appropriate and early decompression restores and improves spinal cord morphology, reverses cord edema, and likely improves blood supply to the cord, aiding neurological recovery[5].

The choice between an anterior, posterior, or combined approach for decompression of a stenotic spinal canal is based primarily on

1. The sagittal alignment of the spinal column,
2. The extent(level) of disease,
3. The location of compressive abnormality,
4. The presence of preoperative neck pain, and
5. Previous operations.

Additional considerations that influence the choice of approach include

- a. The increased risk of postoperative dysphagia and laryngeal nerve injury following multiple-level or prolonged anterior surgery,
- b. Injury to the stabilizing posterior muscular and ligamentous structures with the posterior approach, and

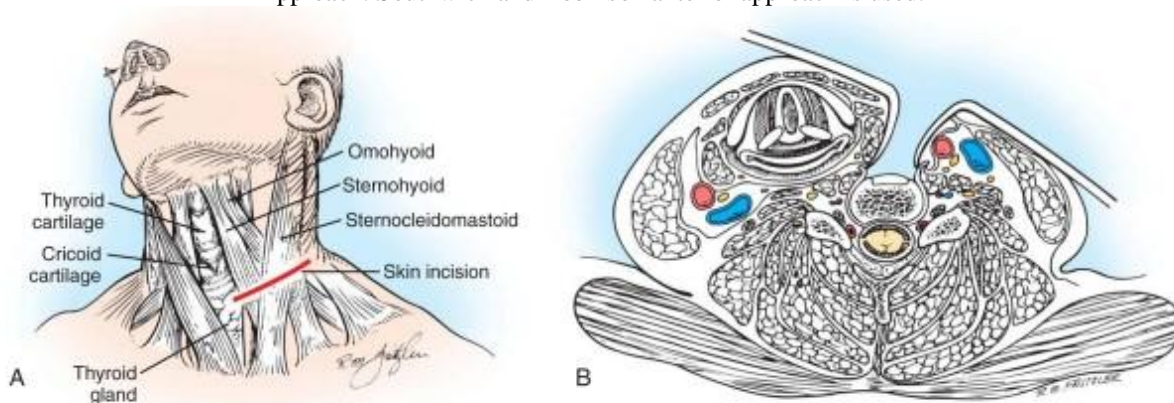
- c. Inadequate exposure at the C7-T1 level through the anterior approach in individuals with a short, muscular neck.

**Anterior procedure:**

It is indicated in

- i. One or two segment involvement
- ii. Neutral or Kyphotic alignment of cervical spine
- iii. Pre operative neck pain
- iv. Previously operated posterior procedure.

Approach: Southwick and Robinson anterior approach is used.



**Southwick and Robinson anterior approach**

**1) Anterior Cervical Discectomy and Fusion**

Removal of disc material and posterior osteophytes impinging on the spinal cord and nerve roots at or immediately adjacent to the level of the disc space, followed by insertion of an appropriately sized bone graft into the interspace (in most cases is 2 mm more than the initial disc height).

The advantages of the procedure are the ability to decompress the anterior spinal cord through an approach along fascial planes, the relative preservation of the stability of the spinal column, and the low prevalence of graft extrusion or migration.

**2) Anterior Cervical Corpectomy and Fusion**

The term subtotal corpectomy refers to removal of a 15 to 19 mm anterior midline trough in the vertebral body down to the posterior longitudinal ligament or dura, with removal of the cephalad and caudal discs.

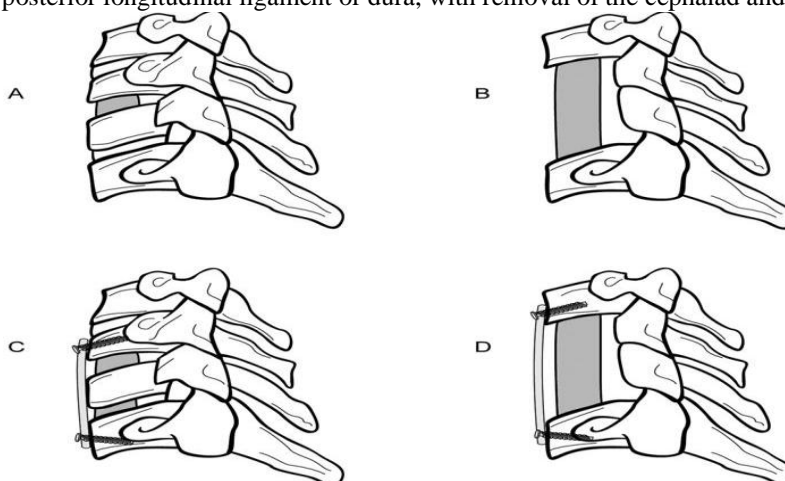


Illustration depicting common anterior procedures used in cervical myelopathy. A, Anterior cervical discectomy and insertion of a bone spacer for fusion. B, Anterior cervical corpectomy and insertion of a bone strut graft. C, Anterior cervical discectomy followed by insertion of a bone spacer for fusion and anterior plating. D, Anterior cervical corpectomy, strut graft insertion, and anterior plating.

Corpectomy allows expansion of a narrow osseous canal and allows for simultaneous removal of large osteophytes from the vertebral end plates impinging on the spinal cord or nerve roots.

Corpectomy may be considered (1) for a patient with developmental stenosis as evidenced by an osseous anteroposterior canal diameter of <13 mm, (2) for a patient with a large posterior osteophyte adjacent to the end plate, (3) for a patient who has a free disc fragment that has migrated posterior to the vertebral body, and (4) as an alternative to multiple level interbody fusion to reduce the number of required fusion surfaces.

Intraoperative indicators of an adequate decompression are (1) a 15 to 19-mm-wide trough that allows for the placement of an appropriately sized graft or cage, (2) symmetric proximity to the lateral edges of the disc space as identified by the uncus, and (3) visual confirmation of spinal cord decompression.

Autogenous iliac crest bone is the preferred graft choice to span the defect created by a one-level or two-level corpectomy. For patients with longer corpectomy defects or those in whom the iliac crest is mechanically insufficient, a fibular strut or cage with bone graft is preferred. Anterior cervical corpectomy is usually followed by anterior cervical plating.

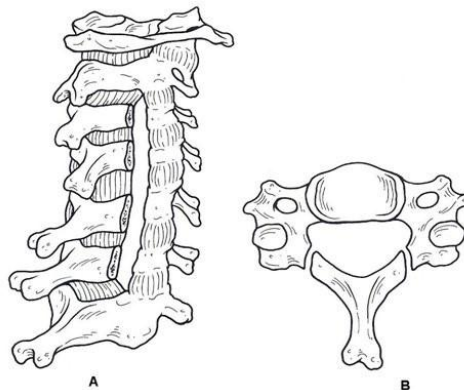
### **Posterior procedure:**

The posterior approach is generally recommended in patients who have

1. Compression of the spinal cord at multiple levels (usually three or more),
  2. Alignment of cervical spine should be either lordotic or neutral (cervical kyphosis is contraindication for posterior surgery) and
  3. in those who have developmental stenosis (a Pavlov ratio of less than 0.8 on a mid-sagittal diameter of less than eleven millimeters)
  4. Only posterior compression
- Approach: Midline Posterior approach is used.

### **1) Laminectomy:**

This procedure includes removal of lamina of third through the sixth or seventh cervical vertebra, with the addition of appropriate **foraminotomies** for specific nerve-root decompression when radiculopathy is present[6].

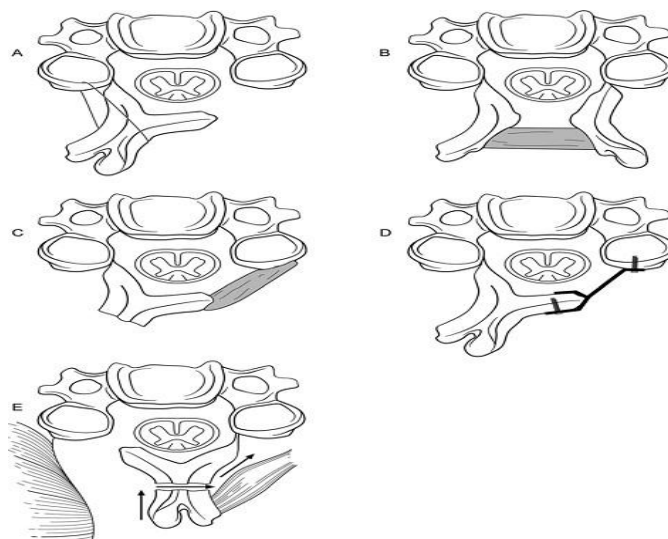


### **2) Laminoplasty:**

Advantage: less chance of post operative neck pain, instability or kyphosis.

Disadvantage: complicated procedure, technically demanding.

There are two types of Laminoplasty



Illustrations depicting common techniques used for cervical laminoplasty. A, Single-door laminoplasty. B, Double-door laminoplasty. C, Single-door laminoplasty with use of bone graft or spacer to prop the door open. D, Single-door laminoplasty with use of a laminoplasty plate. E, Unilateral muscle-stripping approach to maintain the integrity of soft tissues on the contralateral side.

- I. **Single Door Laminoplasty**[7,8]
- II. **Double Door Laminoplasty**[9,10]

#### Complications:

- 1) Post operative neck pain
- 2) Post operative stiffness, both usually occurs after posterior surgery.
- 3) C5 radiculopathy after posterior procedure due to stretching of C5 root after post operative posterior cord shift.
- 4) Cervical spine Instability occurs if facet joints are violated during surgery.
- 5) Adjacent segment degeneration is not uncommon after anterior surgery, it usually affect upper segment.
- 6) Neurological complication and worsening neurology can occur but it is very rare.
- 7) Dysphagia due to post operative edema or injury to esophagus after anterior surgery.
- 8) Kyphosis after laminectomy if facets are damaged and soft tissue repair is not done properly
- 9) Vertebral artery injury.

#### IV. Materials and Methods

This is a prospective study of 42 patients with cervical spondylotic myelopathy carried out from 2013 to 2014 in Orthopaedics Department, Civil Hospital Ahmedabad. A complete clinical examination of patients is carried out through a standard Performa.

Out of 42 patient, 10 patients were excluded either due to loss of follow up or inadequate follow up, so 32 patients included for study.

**Aim of study:** To evaluate the results of different approaches and modalities of treatment in cervical spondylotic myelopathy.

**Study level II -Prospective study with 76% follow up.**

#### Study design:

All patients with cervical spondylotic myelopathy were admitted in hospital and treated by different surgeons.

Thorough local and neurological examination done as per Performa.

Patient is assessed pre-operatively and post-operatively by using Nurick's grading and JOA score.[11]

X-rays cervical spine with lateral flexion extension view was taken.

M.R.I was taken in all patients.

Plan was decided according to clinical and radiological features to give conservative treatment or operative treatment.

Types of operations are decided by site of pathology, level of pathology & curvature of spine. Conservative patients were discharged earlier and operative patient were discharged on 5<sup>th</sup> or 6<sup>th</sup> post operative days after confirming dressing status.

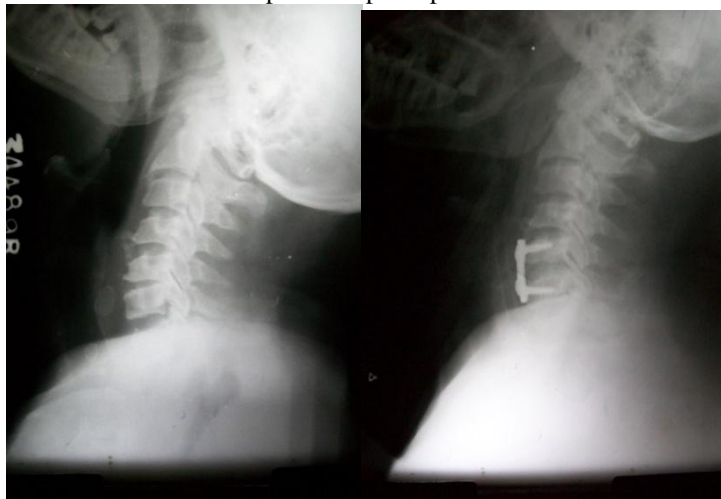
All patients were given Philadelphia cervical collar for 6 weeks with isometric neck muscle exercise.

Patient was called in follow up on 1 ½ month, 3 month, 6 month and 1 year.  
Minimum follow up duration is 9 months and average followup is 1 year.  
Final outcome is assessed using Odom's Criteria and Percentage Recovery rate of JOA score.

### V. Few Cases

#### Anterior Surgery

- 1) Excellent to Good Outcome – Dolatkhan 57 year/Male  
Pre-operative: post operative:

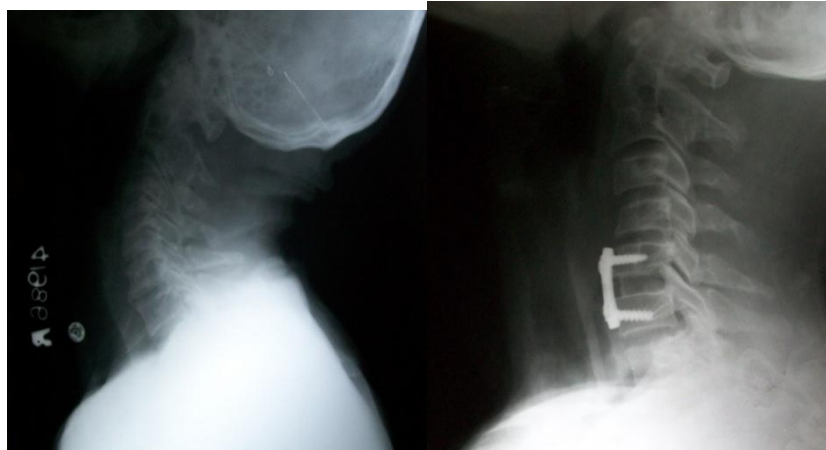


MRI – Anterior Pathology with 2 segmenvar involved



- 2) Fair outcome – Nagjibhai 52 year/male  
Pre-operative:post operative:

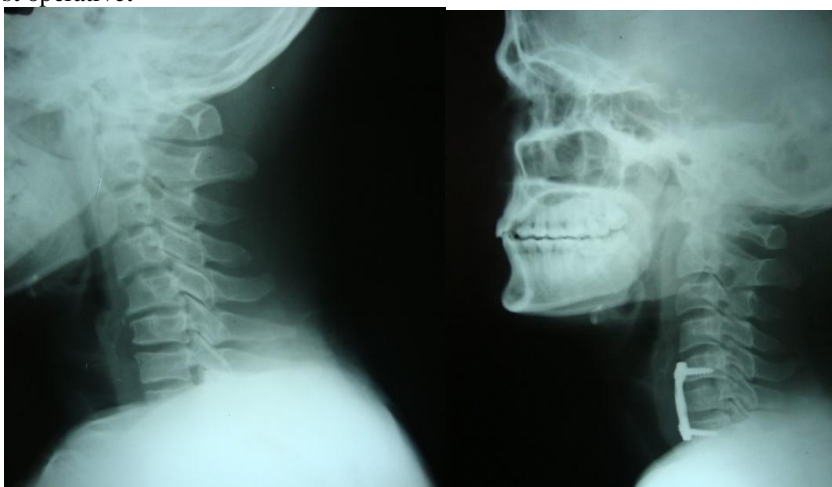




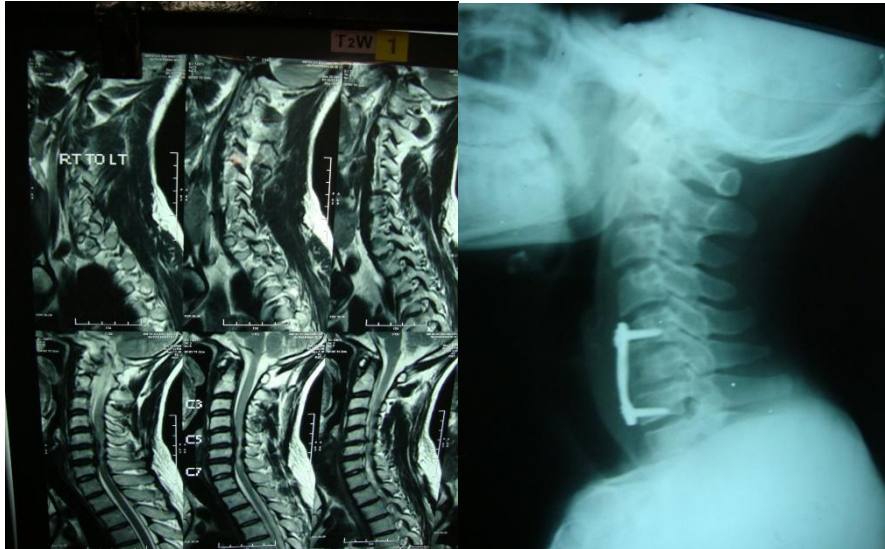
MRI – Anterior Pathology with Focal Myelomalacia :



3) Good outcome but Adjacent Segment Degeneration– Natvarbhai 35 year/M  
Pre-operative: post operative:



MRI – 2 segment Anterior Pathology adjacent upper segment degeneration



**Posterior Surgery**

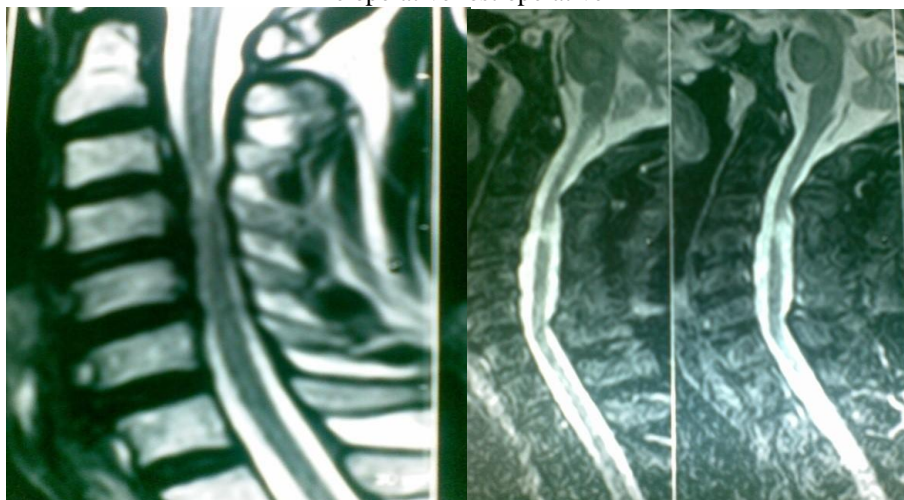
1) Excellent to Good outcome – Rahimbhai Arab 60 year male

Pre-operative xray: post operative xray:



MRI showing Anterior Pathology and Decompressed spinal cord

Pre operative Post operative



## VI. Observation

Following are the observations of followedup patient.

Maximum no of patients were found between 41- 60 years of age with mean age of 52.3 years with 90% being male.

As the data suggest majority of patients having normal lordotic alignment of cervical spine and kyphotic alignment is seen in only 1 patient. About 18 patients (56.25%) are in nurick's grade III and 7 patients (21.88%) are in grade IV. Majority of patients 24 (65%) are having JAO score between 8-12 with mean score being 9.66 .

MRI finding, majority patients (20) are having Anterior pathology and having two segment involvement leading to Myelopathic changes with 6 having posterior pathology and other 6 having both. Majority patients 20 are operated by posterior surgery

### 1. Complications:

Complication	Anterior (n=12)	Procedure	Posterior (n=20)	procedure	Total (n=32)
Post operative neck pain	3 (25%)		7 (35%)		10 (31%)
Neck Stiffness	3 (25%)		4 (20%)		7 (22%)
C5 radiculopathy	-		2 (10%)		2 (6%)
Instability	-		2 (10%)		2 (6%)
Adjacent segment degeneration	2 (17%)		-		2 (6%)
Worsening Neurology	-		-		-
Dysphagia	-		-		-
Kyphosis	-		-		-
Vertebral Artery Injury	-		-		-

### Results as per Odom's criteria:

#### 1. Result according to Procedure:

Results	Anterior Procedure	Posterior Procedure	Total	Statistics
Excellent	4 (33%)	3 (15%)	7 (22%)	Z value= 1.2 p >0.05
Good	7 (58%)	16 (80%)	23 (72%)	Z value= 1.3 p >0.05
Fair	1 (9%)	1 (5%)	2 (6%)	Z value= 0.41 p >0.05
Poor	-	-	-	-
Total	12	20	32	p >0.05

Data suggest that all the three procedures having good to excellent outcome. n=32

Nurick's grade I pts having Excellent outcome, Grade II & III having good to excellent outcome and Grade IV & V having fair to good outcome after surgery.

According to data, patients with JOA Score >10 having Excellent outcome and <10 is having good to excellent outcome after surgery.

#### 2. Results of surgery in patients having Anterior Pathology.

Results ( Odom's criteria)	Anterior procedure (n=12)	Posterior Procedure (n=8)	Z value and p value	Total
Excellent	4 (33%)	1 (12.5%)	Z=1.12, p>0.05	5 (25%)
Good	7 (59%)	6 (75%)	Z=0.65, p>0.05	13 (65%)
Fair	1 (8%)	1 (12.5%)	Z=0.28, p>0.05	2 (10%)
Total	12	8	p>0.05	20

Data suggest that 8 patients with more than 2 segments involvement with anterior pathology are operated by posterior procedure.

#### 3. Comparative Results according to Improvement in Nurick's grade

	Civil hospital, Ahmedabad (n=32)		Edward CC (2002) (n=26)	
	Anterior Procedure	Posterior Procedure	Anterior Procedure	Posterior Procedure
Number of Patients	12	20	13	13
Average Improvement in Nurick's grade	2	2	0.9	1.6

Comparison with this study suggest that average improvement is Nurick's grade is similar in both procedures in our study, while Posterior procedure is having better improvement in Edward CC's study(June2002 [Spine Journal] for multiple level cervical spondylotic myelopathy).

**4. Comparative Results according to Odom's criteria.**

	Civil hospital, Ahmedabad (n=32)		J. Vaquaro et al. (1982) (n=34)	
	Anterior Procedure	Posterior Procedure	Anterior Procedure	Posterior Procedure
Number of Patients	12	20	20	14
Improvement Good to Excellent (Odom's criteria)	91%	95%	40%	71%

Similar results were found in both the procedures in our study, compared to only 40% in Anterior procedure by J. Vaquaro (1982 published in Journal of Acta Neurochirurgica).

**5. Comparative results.**

	Anterior Procedure		Posterior Procedure	
Result	Civil hospital, Ahmedabad	PGIMER (2009)	Civil hospital, Ahmedabad	AIIMS (2002)
Excellent to Good	91%	80%	95%	70%

This comparison again suggests that majority of patients having Good to Excellent results after anterior procedure and posterior procedure also have Good to excellent outcome in multiple level Nurick' grade III or IV Cervical Spondylotic Myelopathy.

**6. Final Result according to Odom's criteria:**

Odom's Criteria	Number Of Patient(n=32)	Percentage
Excellent	7	22%
Good	23	72%
Fair	2	6%
Poor	-	-
Total	32	100%

Data suggest that majority of patients having good to excellent results after operative procedure for CSM.

**VII. Discussion**

Cervical spondylotic myelopathy is a disease associated with degenerative changes in cervical spine leading to myelopathic changes in spinal cord and subsequent specific clinical features. Various modalities of treatments are described since last 60 years but still decision of surgical treatment has controversies between anterior and posterior procedures. This is the study of operative results of cervical spondylotic myelopathy in which patients were treated by either anterior procedure (discectomy/ corpectomy with fusion) or posterior procedure (laminectomy).

In this study, 32 randomly selected patients were operated by either anterior or posterior surgical procedure, data analysis is done after average 1 year follow up and results were analysed and discussed.

Majority of patients were between the age of 40 to 60 years at the time of presentation, similar to patients in other studies. It is due to starting of degenerative changes, disc protrusion and osteophytes formation and ossification of posterior longitudinal ligament in this age patients with mobile cervical spine region compared to dorsolumbar region.

Most of the patients at the time of primary presentation are having average 6 to 8 months duration of illness with Nurick's grade III or IV and JOA Score between 8 – 10. Due to lack of early diagnosis at primary centres and patient unawareness, we always get patients late in their presentation with average Nurick's grade of III or IV and associated multiple segment involvement.

In all the studies MRI was considered must for detailed evaluation of pathological diagnosis and decision for surgery. Normal Lordotic cervical spine alignment with degenerative changes at disk and facets provides inherent stability to cervical spine.

Anterior pathology (OPLL, Osteophytes, Calcified protruded disc etc.) is a causative factor in majority of cases with cervical spondylotic myelopathy suggests greater incidence of OPLL and disc diseases compared to ligamentum flavum thickening. Anterior discogenic pathology usually affects up to 2 segments but Posterior pathology (ligamentum flavum ossification) usually produces multiple level compressions. In case of OPLL, it produces multiple level anterior pathology but amount of compression is different at each segment.

Number of segments involvement is important for decision making regarding anterior and posterior procedure. Anterior Procedure (Discectomy/Corpectomy with fusion) is performed in patients with anterior pathology and up to 2 segment involvement. In multiple segment involvement and posterior pathology we have

preferred posterior procedure. Though majority of patients are having anterior pathology, only 38% patients were operated by anterior procedure. The other patients with anterior pathology had multiple segment involvement and lordotic cervical spinal alignment are operated by posterior procedure because lordosis of cervical spine allows drift of spinal cord after laminectomy and decompresses the cord.

Two patients with 2 segments involvement and with anterior pathology only were operated by posterior procedure. It is because of Klippel-Feil anomaly with congenital short and deformed neck in one patient and congenitally fused C5-C6 vertebral body in another patient. Rest of the patients with posterior pathology or anterior pathology with multiple segment involvement were operated by posterior procedure (Laminectomy). In a multiple segment pathology anterior surgery is morbid compared to posterior surgery, so it is better to perform posterior surgery in stable lordotic cervical spine.

Post operative neck pain, stiffness and instability is more commonly associated with posterior procedure due to soft tissue injury, facet arthrosis and multiple segment dissection in this procedure. C5 radiculopathy is also common with posterior procedure because post operative posterior shifting of spinal cord stretches short C5 nerve roots. Post operative kyphosis is not seen in any patient even up to 3 yrs follow up in some patients, this could be due to proper dissection, repair of muscles (C2 muscle attachment) and ligaments and preserving lateral mass structures during surgery and isometric exercise of neck muscle post operatively. Adjacent segment degeneration is seen more with anterior procedure with non-lordotic curve and fusion at 2 or 3 levels leads to stress load over adjacent upper segment.

Up to 2 level pathology, anterior surgery gives better result compared to posterior surgery because of direct decompression of the cord is achieved, whereas in cases of multiple segment pathology less morbid posterior surgery is considered in aged patients to get indirect decompression of the cord. Anterior procedure though performed in less number of patients has 91% excellent to good outcome in most of the patients. While posterior procedure is also having 95% excellent to good outcome in patients. P value is  $>0.05$  in comparing both the procedure. It establishes that both the procedures have similar good to excellent outcome.

Two patients with anterior pathology had fair results; the reason is long duration of symptoms, Nurick's grade IV and focal myelomalacia changes in cervical spinal cord in MRI. Compared to focal myelomalacia changes, diffuse myelomalacia changes have good prognosis.

Early diagnosis and treatment within stage of Nurick's grade I or II and JOA score  $>10$  have excellent outcome. But patient presenting with Nurick's grade III or IV and JOA score  $<10$  have less rewarding outcome after surgery. It suggests that permanent degenerative and myelopathic changes in cord in late presentation have poor outcome. Anterior surgery in patients having up to 2 level pathology gives excellent result compared to multiple level anterior pathology. Posterior surgery results are equivocal in multiple segment disease irrespective of site of pathology.

As per Edward CC (2002) and J. Vaquero (1982) study posterior surgery gives better results in multiple segment pathology. In our study out of 13 patients having more than 2 segments involvement, 11 (85%) patients have good results by posterior surgery compared to 2 (15%) patients by anterior surgery. This data again suggest that posterior procedure is better in patients with multiple segment involvement.

Study of Anterior procedure done in PGIMER-2009 (n=25) have 80% excellent to good results in patients with up to 2 segment involvement with anterior pathology. In our study also 75% excellent to good results by anterior surgery in patients with up to 2 segment involvement. Similar results are observed in comparing with study of posterior procedure done in AIIMS-2002 (n=34)

In multiple segment pathology posterior surgery is less morbid and gives better results than anterior surgery but up to 2 segments anterior pathology, anterior surgery also gives comparable results.

### **VIII. Conclusion**

Cervical Spondylotic Myelopathy is common between 40 to 60 years of age and majority of the patients are presenting with numbness, weakness and clumsiness in hands with difficulty in walking and frequent fall.

Majority of patients are having Nurick's grade III or IV and JOA Score of 8-10 at the time of presentation.

Spasticity, exaggerated reflexes and pathological reflexes, kinetic elements of hand and finger escape sign are present in majority of patients and are useful diagnostic tools.

Operative treatment is always having better outcome in all the cases of Cervical Spondylotic Myelopathy patients.

Patients with Nurick's grade III or less with JOA score  $>10$  at the time of presentation have better prognosis while Nurick's grade IV or V and JOA score  $<8$  usually have poor prognosis. Focal myelomalacia have a bad prognosis irrespective of type of surgery

Anterior surgery shows excellent result with anterior pathology up to 2 segment involvement. While posterior surgery gives better results in multiple segment involvement irrespective of site of pathology in a normal lordotic cervical spine.

Anterior procedure and posterior procedure both are having good outcome if done in properly indicated patients considering the site of pathology, alignment of cervical spine and number of segments involvement.

### **Bibliography & Referances**

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