Clinical Outcome for Cases of Segmental Cervical Myelopathy after Surgical Management

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Abstract: Objective: Evaluation of surgical strategies in the management of cervical spondylotic myelopathy. **Patient and Methods:** This study was carried out on 20 adult patients diagnosed as having cervical spondylotic myelopathy (CSM) they were admitted and managed at El Azhar University Hospitals, in the period from May 2016 till January 2017. They were managed by anterior cervical discectomy with fusion (ACDF), anterior cervical corpectomy with fusion (ACCF), and posterior cervical laminectomy and prospectively studied for surgical outcome using neurological examination, radiological examination and Nurick's gait disability scale. **Results:** The age range was 40-75 years, mean age was 56.15 years, male-to-female ratio was 1.9:1. The duration of symptoms ranged from 0.75 to 4 years with mean duration of 2.06. 18 (90%) cases were operated by ACDF, 1 case by ACCF (5%) and 1 case by posterior cervical laminectomy (5%). 55% had excellent outcome, 20% had good outcome, 15% had fair outcome and 10% had poor outcome. **Conclusion:** Choosing the surgical technique depends mainly on the site of the pathology whether anterior or posterior. The prognosis doesn't depend on the type of surgery, but it depends mainly on the age of the patient, severity of myelopathy, duration of symptoms, and cord changes of the MRI.
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1. Introduction:

Cervical spondylotic myelopathy is the most common cause of spinal cord dysfunction worldwide. The disease is caused by the degeneration of various components of the vertebra, including the vertebral body, the inter vertebral disk, the supporting ligaments and the facet joints. Static factors, including the protrusion of osteophytic spurs (spondylosis), disk desiccation, ossification of the posterior longitudinal ligament and hypertrophy of the ligamentumflavum, may lead to the narrowing of the spinal canal and to cord compression. Long standing compression of the spinal cord can result in irreversible damage including demyelination and necrosis of the gray matter **(Tetreault et al., 2015).**

Patients usually present with radicular symptoms, a stiff and/or painful neck, paraesthesia, gait and balance disturbances, loss of manual dexterity, as well as bowel and bladder dysfunction. As a result of significant inter patient variation in terms of disease severity and progression. The individual course of CSM is not predictable. In the majority of cases there is slow step wise deterioration in neurological function. However, in some patients the disease is characterized by a stepwise progression of myelopathic symptoms and approximately 5% of patients present with a dramatic and rapid function decline **(Pumberger et al., 2013).**

An MRI scan and/or a CT with myelogram can show the tight canal and associated spinal cord pinching. MRI especially the T2 weighted signal is the most sensitive to roll out the myelopathic signal of the spinal cord. The condition may be present at one or several levels in the spine. Often, cervical stenosis with myelopathy is associated with some degree of instability, and flexion/extension lateral cervical spine x-rays are useful to rule out abnormal motion and instability **(Nouri et al., 2016).**

2. Patients and Methods

A. Patients:

This study was carried out on 20 adult patients diagnosed as having cervical spondylotic myelopathy (CSM) they were admitted and managed at El Azhar University Hospitals, in the period from May 2016 till January 2017.

They were followed up clinically for 6 months post-operative. Their clinical data were recorded. Each patient included in this study was assessed clinically for 6 months postoperatively.

The patients were categorized according to Odom's criteria for the evaluation of the outcome results as:

Excellent: all preoperative symptoms relieved, abnormal signs unchanged or improved.

Good: minimum persistence of preoperative symptoms, abnormal signs unchanged or improved.

Fair: definite relief of some pre-operative symptoms, others unchanged or slightly improved.

Poor: signs and symptoms unchanged or worse.

B. Methods:

All patients were subjected to the following:

I. History taking:

1. Stressing on patient's age, sex, occupation, and special habits.
2. Presenting symptoms stressing on the onset, course, duration and progression.
3. History of chronic medical problems specially diabetes mellitus.
4. History of previous operations.

II. Symptoms:

Usually, a diversity of complaints and clinical findings present in CSM.

Symptoms include:

• Neck pain during movement and neck stiffness

• Upper extremity pain from shoulders to hands (brachialgia).

• Tingling and numbness of both upper limbs and hands.

• Clumsy hands and inability to perform fine manual works.

• Difficulty during writing and buttoning of shirt

• Heaviness of both lower limbs.

• Instability during walking and rising on stairs.

• Difficulty during micturition (urine retention), frequency of urination, incontinence and impotence.

Specific questions are asked to the patient to exclude associated lumbar canal stenosis e.g. sciatica as it may be associated with cervical myelopathy in 15-30%.

Sings include:

- Weakness of both upper limbs and weakness of the hand grip.
- Decrease superficial sensations to pain and touch that involve upper limbs and lower limbs.
- Hyporeflexia at the level of lesion and hyperreflexia below the level of the lesion.
- Electric sensation of both upper limbs during neck extension (L'hermitte sign).
- Spasticity that may affect upper limbs, lower limbs, or both.
- Signs of upper motor neuron always present that involves +ve Babinski sign, clonus, +ve patellar reflex, and +ve Hoffman sign.

The disability: of the patient is assessed and graded according to Nurick's grading system for gait.

Radiological studies:

1. Plain X-ray:

▪ For every patient AP, lateral views, flexion and extension emphasizing on narrowing of disc space, foraminal narrowing, and stability of the cervical spine.

▪ For this study plain X-ray reveal no instability of the cervical spine appears in any case.

2. MRI:

It was the standard imaging modality for diagnosis of CSM as it gives an excellent anatomic detail to determine the severity of spinal cord compression and canal compromisation. It was done for all cases.

Through the studied MRI imaging sequences:

▪ The level and type of compression were accurately determined.

▪ Other causes of myelopathy (i.e., multiple sclerosis, tumors, infection and syrinx) were excluded.

Table 1: Nurick scale (Lozorio et al., 2012)

Grading	NURICK clinical scale
Grade 0	Signs and symptoms of root involvement but without evidence of spinal cord disease.
Grade 1	Signs of spinal cord diseases but no difficulty walking.
Grade 2	Slight difficulty in walking which does not prevent full-time employment.
Grade 3	Extreme difficulty in walking that requires assistance and prevents full-time employment and occupation.
Grade 4	Able to walk only with someone else's help or with the aid of a walker.
Grade 5	Chairbound or bedridden.

Management:

The studied 20 cases all have cervical myelopathy underwent surgical decompression of the stenosed and affected segment. Surgical approach depended on the type and cause of myelopathy.

Operative approaches:

Anterior cervical discectomy and fusion:

In this study 18 cases underwent anterior cervical discectomy and fusion.

▪ In all cases fixation was done using cervical cages.

▪ Eighteen (18) cases underwent one level anterior cervical discectomy and fusion.

Anterior cervicalcorpectomy with fixation:

This technique was done for one case. one case underwent anterior cervical corpectomy with fixation.

Posterior Approach to one case:

This technique was done for one case. One case underwent laminectomy and decompression for only one level.

Post-operative follow up for all cases:

A rigid cervical collar is worn post-operatively for a varying number of weeks depending on the bone quality, fixation adequacy, and fusion length.

3. Results

This study included 20 cases of cervical spondylotic myelopathy. They were selected to be managed surgically. Patients were followed up clinically for six months after treatment.

Gender distribution, male-to-female:

Table 2. Gender distribution, male-to female.

Gender	Number	Percentage
Male	13	65%
Female	7	35%
Total	20	100%

In the present study, there were 13 males (65%) and 7 females (35%).

Mean age of patients, and age distribution:

Table 3. Mean age of patients, and age distribution.

Age	Number	%	Mean	SD
40-50	3	15%	56.15 years	± 8.27
51-60	12	60%		
61-75	5	25%		
Total	20	100%		

The age of patients ranged from 40 years to 75 years, mean age was 56.15 years old with SD ±8.27 most patients' age was ranging between 51 – 60 years.

Distribution of the mean duration of symptoms:

Table 4. Distribution of the mean duration of symptoms.

Duration of symptoms	Number	Percentage	Mean	SD
> 0 – 1 y	4	20%	2.06	±0.93
> 1 – 2 y	9	45%		
> 2 – 3 y	5	25%		
> 3 – 4 y	2	10%		
Total	20	100%		

The duration of symptoms in this study was 0.75-4 years with mean duration and SD 2.06±0.93.

Clinical presentation:

In the present study patients presented with variety of symptoms concerning myelopathy (spasticity, weakness, hyperreflexia, clonus, positive Babinski sign, Hoffman sign, brachialgia, clumsy hands, gate disturbance, difficult writing, heaviness of both lower limbs, urine problems, and +veL'hermitte sign). All these presentations are analyzed and discussed in addition to comorbidity.

Co-morbidity:

In the present study 13 cases have co-morbidity (65%, 13/20). 9 cases (45%) had single co-morbid disease, and 4 cases (20%) had multiple co-morbid diseases. Co-morbid diseases distributed in the following manner, forty percent of cases had DM (40%, 8/20), thirty five patients had HTN (35%, 7/20), five percent of cases have hepatic disease (5%, 1/20), while ten percent of cases have cardiac disease (10%, 2/20).

Table 5. Type of co-morbidity.

Type of co-morbidity	Number	Percentage
DM	8/20	40%
HTN	7/20	35%
Hepatic	1/20	5%
Cardiac	2/20	10%

The distribution of the clinical presentation pre-operative was as follows:

In the present study, clinical presentation reveals the following:

Eleven patients revealed neck stiffness (55%, 11/20), sixteen patients revealed Clumsy hands (80%, 16/20), eleven patients with Gait disturbance & sensory affection (55%,11/20), nine patients revealed difficulty writing & spasticity (45%, 9/20), fourteen patients revealed heaviness of LLs (70%,14/20), seven patients revealed Urine problems (35%,7/20), seventeen patients revealed Hoffman's sign (85%, 17/20), sixteen patients revealed Babinski sign & clonus (80%,16/20) and eight patients revealed L'hermitte sign (40%,8/20).

Table 6. The distribution of the clinical presentation pre-operative.

Clinical presentation	Number	Percentage
Neck stiffness	11	55%
Clumsy hands	16	80%
Gait disturbance & sensory affection	11	55%
Difficulty writing & Spasticity	9	45%
Heaviness of LLs	14	70%
Urine problems	7	35%
Hoffman's sign	17	85%
Babinski sign & clonus	16	80%
L'hermitte sign	8	40%

Nurick scale:

The distribution of the Nurick scale pre-operative was as follows:

Fifteen percent of cases had Nurickscale Grade I (15%, 3/20), forty five percent of cases had NURICK

scale Grade II (45%, 9/20), ten percent of cases had NURICK scale Grade III (10%, 2/20), twenty percent of cases had NURICK scale Grade IV (20%, 4/20), while ten percent of cases had NURICK scale Grade V (10%, 2/20) with mean ±SD 2.65 ±1.26.

Table 7. The distribution of the Nurick scale of the operated patients.

Nurick scale	Number	Percentage	Mean	SD
I	3	15%	2.65	±1.26
II	9	45%		
III	2	10%		
IV	4	20%		
V	2	10%		
Total	20	100%		

Surgical Outcome:

The clinical outcome was assessed according to the Nurick grading. The following results were the final results of patients after 6 months of follow up.

In the present study, fifty five percent of cases had Excellent outcome (55%, 11/20), twenty percent of cases had Good outcome (20%, 4/20), fifteen percent of cases had Fair outcome (15%, 3/20) and ten percent of cases had poor outcome (10%, 2/20).

Table 8. Distribution of the studied patients regarding their out-come.

Out-come	(n=20)	Percentage
Excellent	11	55%
Good	4	20%
Fair	3	15%
poor	2	10%
Total	20	100%

Correlation between outcome and sex of the patient:

The difference in the outcome with gender distribution is statistically non-significant. The outcome is not associated with gender the p value is 0.604.

Table 9. The outcome in relation to gender distribution.

Gender		Out-come				p value	Significance
Type	No	Excellent	Good	Fair	Poor	0.604	Non-significant
Male	13	5(25%)	4(20%)	3(15%)	1(5%)		
Female	7	6(30%)	0(0%)	0(0%)	1(5%)		
Total	20	11(55%)	4(20%)	3(15%)	2(10%)		

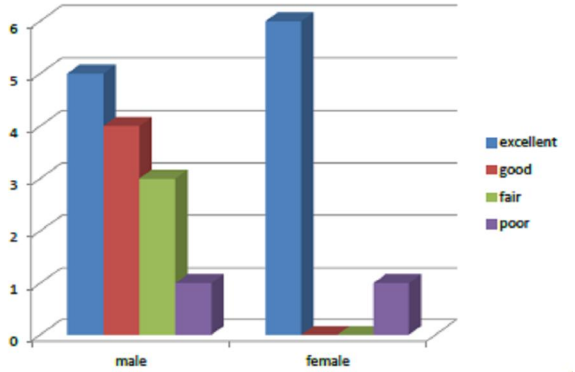

Figure 1. Diagram showing the correlation between outcome and sex of the patient.

Correlation between outcome and age of the patient:

The relation between the outcome and age is statistically significant as the excellent outcome occurs mostly with younger age while the fair and poor outcome occurs with the oldest age group (the p value is 0.002 while the R value is -0.16).

The difference in the outcome in relation to the duration of symptoms is statistically highly significant. The most excellent and good outcome occurs with short duration of symptoms while fair and poor recovery occurs with long duration of symptoms (the P value is 0.001 while the R value is -0.66).

Table 10. The outcome of patients in relation to age distribution.

Age		Out-come				p value	Significance
Value	No	Excellent	Good	Fair	Poor	0.002	Significant
40-50	3	3(15%)	0(0%)	0(0%)	0(0%)		
51-60	12	6(30%)	2(10%)	3(15%)	1(5%)		
61-75	5	2(10%)	2(10%)	0(0%)	1(5%)		
Total	20	11(55%)	4(20%)	3(15%)	2(10%)		

Correlation between the duration of symptoms and the outcome:

Table 11. The outcome in relation to the duration of symptoms.

Symptoms duration	Out come					p value	Significance
Value	No	Excellent	Good	Fair	Poor		
> 0 – 1 y	4	4(20%)	0(0%)	0(0%)	0(0%)	0.001	Significant
> 1 – 2 y	9	6(30%)	2(10%)	1(5%)	0(0%)		
> 2 – 3 y	5	1(5%)	2(10%)	2(10%)	0(0%)		
> 3 – 4 y	2	0(0%)	0(0%)	0(0%)	2(10%)		
Total	20	11(55%)	4(20%)	3(15%)	2(10%)		

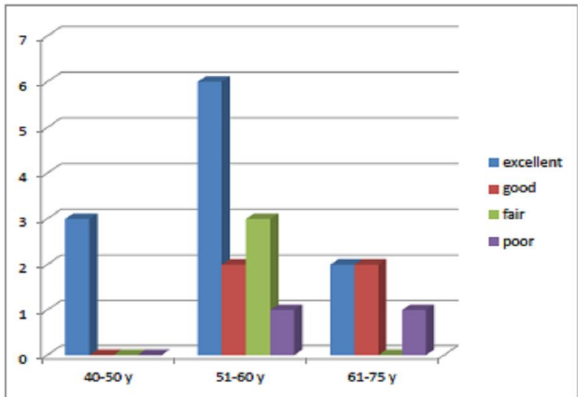

Figure 2. Diagram showing the outcome in relation to age.

Functional out-come:

Clumsy hands, heaviness of LLS and Hoffman sign revealed high significant outcome. Pre-operative presentation revealed (80%, 70%, 85%) cases respectively they became (20%,10%,25%) respectively post-operative. Neck stiffness, gait disturbance, urine problems, clonus, L'hermitte sign revealed significant outcome. Pre-operative presentation revealed (55%, 55%,35%,80% and 40%) cases respectively they became (20%, 10%, 10%, 40%, 10%) respectively post-operative. Difficult writing and Spasticity revealed weak significant outcome. Pre-operative presentation revealed (45%) of cases had Difficult writing and Spasticity. They became (25%) of cases postoperative. Babinski sign revealed non-significant outcome. Pre-operative presentation revealed (80%) of cases had Babinski sign they became (60%) of cases postoperative.

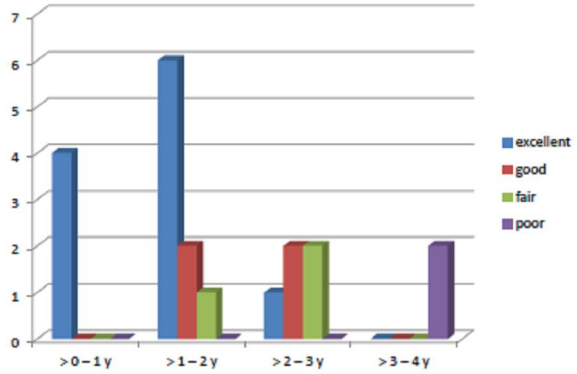

Figure 3. Diagram showing the outcome in relation to duration of symptoms.

Table12. Correlation between outcome and clinical presentation post-operative.

Clinical presentation	Pre-op	Post-op	P value	Significance
Neck stiffness	11 (55%)	4 (20%)	0.016	Significant
Clumsy hands	16 (80%)	4 (20%)	<0.001	Highly significant
Gait disturbance	11 (55%)	2 (10%)	0.004	Significant
Sensory affection	11 (55%)	3 (15%)	0.008	Significant
Difficult writing	9 (45%)	5 (25%)	0.0125	Weak significant
Spasticity	9 (45%)	5 (25%)	0.0125	Weak significant
Heaviness of LLS	14 (70%)	2 (10%)	<0.001	Highly significant
Urine problems	7 (35%)	2 (10%)	0.062	Significant
Hoffman sign	17 (85%)	5 (25%)	<0.001	Highly significant
Babinski sign	16 (80%)	12 (60%)	0. 721	Non-significant
Clonus	16 (80%)	8 (40%)	0.008	Significant
L'hermite sign	8 (40%)	2 (10%)	0.007	Significant

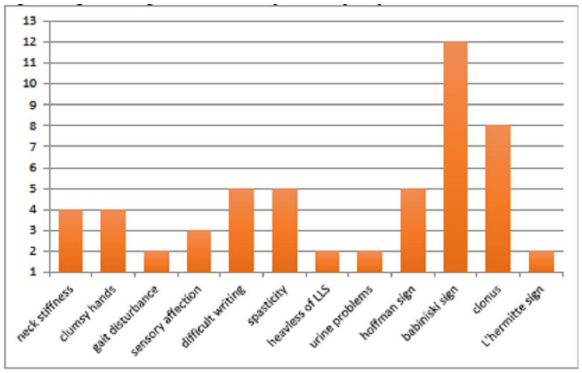

Figure 4. Diagram showing outcome and clinical presentation post-operative.

Correlation between the out-come and Nurick scale:

Nurick scale: post-operative (Mean ±SD 1.90 ±1.33). The outcome is strongly correlated with the pre-operative Nurick scale as the most excellent and good outcome occurs with Nurick scale G I and II while the fair and poor prognosis occur with Nurick scale G IV and V (the p value is<0.001).

Table 13. Correlation between the out-come and Nurick scale.

Category	N=20		Total	p value
	Pre-op	Post-op		
	Mean ±SD	Mean ±SD		
Nurick scale	2.65 ±1.26	1.90 ±1.33	3.63	<0.001

4. Discussion

Cervical spondylotic myelopathy (CSM) has been a challenge for generations of surgeons. Although there have been no epidemiological studies on this disease, some reports indicate that the incidence of CSM could be as high as 23% among western populations and older patients, and would increase as these societies face an aging population. In North America today, CSM is considered as the most common cause of spinal dysfunction in patients over the age of 55 **(Woernle et al., 2015)**.

Despite reports of successful conservative treatment of CSM, it is commonly considered as a surgical disease. The first surgery for spinal decompression was performed by Sir Victor Horsley at the end of the 19th Century. Since then, many attempts to determine the optimal surgical approach have been made. **Matz et al. (2009)** recently reviewed the different surgical techniques for the treatment of CSM, such as dorsal decompression through laminectomy with or without fusion or laminoplasty, ventral decompression with or without fusion, or corpectomy. Which one might be the most favorable remains controversial though? All of these techniques have the common goal of neuronal decompression while maintaining spinal stability in order to prevent further neurological deterioration **(Woernle et al., 2015)**.

This study was carried out on 20 adult patients diagnosed as having cervical spondylotic myelopathy (CSM) they were admitted and managed at Al-Azhar University Hospitals in the period from May 2016 till January 2017. They were followed up clinically and radiologically for 6 months post-operative.

In the present study, 20 patients of CSM were managed surgically, by one of three methods:

1. ACDF: Single level discectomy with fusion by cervical cages.
2. ACCF: Single level corpectomy with fusion by pyrafix.
3. Posterior Cervical laminectomy through posterior approach without fixation.

In the present study, there were 13 males (65%) and 7 females (35%). Male predominance was described in other studies as in **Lin et al. (2014)** there were 88 males and 80 females (52.4%: 47.6%), nearly with the result of **Pumberger et al. (2013)**, there were 71 women and 177men, (male predominant), **Ahn et al. (2010)** series, there were 26 males and 13 females (male predominant) and **Yukawa et al. (2007)** who reported 67 men and 37 women, while **King Jr et al. (2003)** who conduct that predominantly male (91%), but female predominance was described in **Omidi-Kashani et al. (2014)** as 48 females and 20 males and **Saunders et al. (1998)** series there were 22 males and 18 females (the female approaching the number of males) we can explain this with aggressive strain of cervical spine in our community especially manual workers with predominant of males in this jobs.

Male predominance may be attributed to the higher prevalence of cervical disc disease among males, the more latency of males in seaking medical treatment possibly due to fear of losing time or losing their jobs they are totally dependent to cope with their responsibilities. This latency produces gradual decompensation of cervical skeletal and neurological structures and makes them more liable for complications.

In the present study, the age of patients ranged from 40 years to 75 years, mean age was 56.15 years old with SD ±8.27 most patients' age was ranging between 51 – 60 years. This goes with **Papadopoulos et al. (2004)** who reported the mean age of the patients in this series was 57.5 years and **King Jr et al. (2003)** who mentioned that the mean (± standard deviation) patient age was 56.8± 11.2 years, and older than mean age of **Kato et al. (2015)** the mean age was 45 years old and less than mean age of **Ahn et al. (2010)** with

an average age of 62.4years, and **Pumberger et al. (2013)** with a mean age of 59.0 years.

The age of the patient at the time of presentation with cervical spinal cord compression may affect the decision-making process because:

- The effect of age on the spine, its ligaments, and on intrinsic spinal stability;
- The effect of age on the spinal cord and its vasculature
- The effect of age on bone density **(Pumberger et al., 2013)**.

Vascular changes associated with spondylosis may be more severe in the older patient group and may result in ischemia of the nerve roots or spinal cord. This phenomenon can affect the tolerance of the spinal cord to compression. On the other hand, the spinal cord may be atrophic in older patients, thus minimizing the compressive effect of spinal stenosis & bone density can affect surgical strategies **(Pumberger et al., 2013)**

In this study, it demonstrated that the prognosis was well correlated with age. The relation between the outcome and age is statistically significant as the excellent outcome occurs mostly with younger age while the fair and poor outcome occurs with the oldest age group (the p value is 0.002 while the R value is -0.16).

The following study denoted that CSM was earlier in our community against older age in developed countries, may be due to bad handling of our spine especially in farmers and manual workers.

This appeared as in all other previous studies, **Pumberger et al. (2013)** in his series showed severity of myelopathy and age are significant predictors in outcome. In the series of **Born (1999)**, better results were observed in younger patients of CSM. **Tetreault et al. (2015)** demonstrated that age was a predictor and that older patients had decreased odds of a favorable outcome. Although most surgeons will not discriminate on the basis of age, they should be aware that elderly patients are not able to translate neurological recovery to functional improvement as well as a younger population can.

There are several potential explanations for this discrepancy: (1) the elderly experience age-related changes in the spinal cord including a decrease in the number of g-Moto neurons, number of anterior horn cells, and number of myelinated fibers in the corticospinal tracts and posterior funiculus, (2) older patients are more likely to have un associated comorbidities that may affect outcome, or (3) the elderly may not be able to conduct all of the activities on a functional scale as a result of these comorbidities.

The significant association between age and surgical outcome in the present study should help confirm that age does affect surgical results at one year postoperatively. But disagree with **Fessler et al. (1998)** age was not a good predictor factor of clinical outcome of CSM.

In the present study, the duration of symptoms range was 0.75-4 years with mean duration and SD 2.06±0.93. The delayed diagnosis as the symptom may be masked by weakness of old ages.

The difference in the outcome in relation to the duration of symptoms is statistically highly significant (the P value is 0.001while the R value is -0.66) as most excellent and good outcome occurs with duration of symptoms less than 2 years while poor outcome occurs with duration of symptoms for 4 years. This is also mentioned by **Yamazaki et al. (2003)** as well as **Handa et al. (2002);** they demonstrated that a shorter duration of symptoms indicated a better recovery in the elderly population, when compared with younger patients.

The duration of symptoms is an independent prognostic indicator for outcome. Patients with a longer duration of symptoms had a worse prognosis for post-operative improvement compared with patients with a shorter duration of symptoms. However, our findings underline the absence of a relationship between disease severity, as graded according to the Nurick classification, and duration of myelopathic symptoms. This might be based on significant inter-patient variation in terms of both disease severity and progression, resulting in an unpredictable individual course of CSM **(Pumberger et al., 2013)**.

In this study, Nurick scale post-operative was (Mean ±SD1.90 ±1.33). The outcome is strongly correlated with the pre-operative Nurick scale (the P value is<0.001).

This difference in outcome between different Nurick's grades was statistically highly significant and inversely proportional to the degree of post-operative improvement.

This goes with other series results. **Pumberger et al. (2013)** concluded that pre-operative symptom duration and CSM severity, as graded according to the Nurick classification, would correlate with the surgical outcome and that patients with more advanced disease stage and/or with prolonged duration of pre-operative symptoms would have a lower likelihood of improvement following surgery, when compared with patients in an earlier stage and/or with a shorter duration of CSM symptoms, respectively**.**

Gok et al. (2009), **Iencean (2007)** and **Naruse et al. (2009)** more severe preoperative myelopathy is associated with a worse outcome. Baseline severity is significantly related to outcome on the Nurick scale. **Born (1999)** mentioned that the strongest predictive factor for recovery from myelopathy was the severity of the myelopathy before operative intervention, as the

better preoperative neurological function was associated with better neurological outcome.

In this study, we demonstrated improvement in upper limbs, lower limbs and sphincter functions in terms of Nurick's scale after surgical decompression.

In literatures, surgical decompression for cervical spondylotic myelopathy produced neurological recovery in 71% of patients. The neurological recovery in terms of Nurick's scale improved after surgical decompression reached statistical significance at 3 months and reached a plateau at 6 months. The neurological recovery apparently was best in the upper limb function, followed by lower limb function, and was worst in the sphincter function. There was no significant difference in neurological recovery in patients with different genders, age groups and pre-operative duration of symptoms**(Cheung et al., 2008)**.

In the present study, 18 cases (90%, 18/20) were operated by anterior cervical discectomy and fusion (ACDF), and one case was operated by corpectomy (5%, 1/20) while one case was operated by posterior cervical laminectomy (5%, 1/20).

ACDF is the procedure of choice for single-level disc disease and is also commonly performed for two-level disease. Studies have shown that for adjacent two-level disc disease, ACDF is superior to single - level corpectomy in terms of operating time and blood loss, but the two procedures have similar neurological outcomes **(Park et al., 2010)**.

In the present study, in patients treated by ACDF the success rate (Odom I & II, equal to “Excellent” & “Good” respectively) was 50% & 20% respectively.

Hwang, et al. (2007) mentioned that an excellent or good result was found in 92% of patients with radiculopathy, 69% of those with myelopathy.

In the present study, according to the Patient Satisfaction, 66% of patients treated by anterior approach were very satisfied & 34% were unsatisfied.

Posterior approaches may be considered when the pathology is located at the posterior portion of the spinal canal, for example, in cases of hypertrophied ligamentumflavum. Never the less, posterior decompression also addresses anterior compression because it indirectly decompresses the spinal cord by enlarging the spinal canal **(Mattei et al., 2011)**.

The National Library of Medicine and Cochrane Databases were queried using MSH headings (Medical Subject Heading) and keyword regarding anterior and posterior surgery and CSM. An evidentiary table was assembled to summarize the quality of evidence from I to III (lowest). Recommendations were formulated containing degree of strength based on Scottish Intercollegiate Guidelines. Most of the manuscripts were found to be Class III. The results of the paper were that ACDF, ACCF, laminoplasty, laminectomy, and laminectomy with fusion all yielded similar near term functional improvements for CSM. Laminectomy without fusion, however, is associated with late deterioration. Another recent systematic review of retrospective cohort studies showed that ACCF, ACDF, laminoplasty, and laminectomy and fusion yielded similar neurologic recovery. The major differences between the groups were the associated complications. Therefore it appears that, given the available literature, the choice of surgical approach will be more dependent on the individual patient factors described previously than the superiority of any one surgical option**(Cunningham et al., 2010).**

Conclusion

- Any old age patient complaining from difficult gait must be fully examined neurologically to exclude CSM.
- Clinical signs appear before MRI radiological changes.
- Inspection of patients gait is very important in diagnosis as this will direct the attention of the clinician to the diagnosis of CSM.
- A Plain X-ray and MRI are the gold standard for diagnosis of CSM. The corner stone for excellent and good outcome of cervical spondylotic myelopathy is early diagnosis as this will lead to low grade myelopathy absence of cord changes and short duration of symptoms.
- Choosing the surgical technique depends mainly on the site of the pathology whether anterior or posterior. Many surgical modalities co-exists in the management of cervical myelopathy including, ventral and dorsal approaches with and without fusion.
- The prognosis doesn't depend on the type of surgery, but it depends mainly on the age of the patient, severity of myelopathy, duration of symptoms, and cord changes of the MRI.
- In this work, there was progressive improvement in gait and hand function started from the first week postoperative. The radiculopathy and bladder dysfunction were the first symptoms to disappear.

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