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# Assessment of Spinal Cord Compression in Patients with Cervical Spondylosis, A Clinical Prospective Study of 25 Patients

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## Abstract

**Background** Cervical spondylosis myelopathy (CSM) is a common cause of disability in older persons. Because spondylosis is a universal finding as the patients aged.

**Objective** To assess the demographic and management of cervical spondylosis in a sample of Iraqi patients.

**Methods** This is a prospective clinical study, carried out over the period from January 2013 to December 2014, and included 25 patients with cervical spondylosis myeloradiculopathy referred for surgical intervention in Neurosurgical Department in the Al-Imamein Al-Kadhimein Medical City. General examination and full neurological assessment were performed, as well as relevant investigations, particularly; radiological assessments. All of the patients were subjected to surgery, with 17 patients (68%) were treated with laminectomy and foraminotomy, while the remaining 8 patients (32%) were treated with laminectomy only.

**Results** They were 14 males and 11 females, slightly affects males more than females, aged 38 to 82 years it is more common in 5th and 6th decades of life, and in rural than urban areas. Myeloradiculopathic features were the most common presenting ones with C5-C7, which were the most affected levels. General examination and full neurological assessment were performed, as well as relevant investigations, particularly; radiological assessments. All of the patients were subjected to surgery, with 17 patients (68%) were treated with laminectomy and foraminotomy, while the remaining 8 patients (32%) were treated with laminectomy only. More than half of the patients were showed slight improvement in their complaints, while significant improvement occurred in more than 28 % of patients. Despite that, 20% of patients showed no improvement in their symptomatology, however; no reported deterioration was noticed in the study.

**Conclusion** Myeloradiculopathic feature were the most common presenting features with C5-C7 was the most level affected. Laminectomy with foraminotomy was surgery of choice in tow third of patients, with remaining one third underwent laminectomy only.

**Keywords** Cervical spondylosis, spinal cord compression

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**List of abbreviations:** CT scan = Computerized tomography scan, MRI = Magnetic resonance imaging

## Introduction

Cervical spondylosis is a non-specific term describing the morphological manifestations of progressive degeneration of the spine. It is a disorder caused by abnormal wear on the cartilage and bones of the neck (cervical vertebrae) with degeneration and mineral deposits in the cushions between the vertebrae (cervical disks) and there is subsequent impingement of neural elements in a narrow cervical canal [(1)]. It

includes degenerative changes in the facet joints, longitudinal ligaments, and ligamentum flavum. The changes of neural compression resulting in radiculopathy or compression of the spinal cord resulting in myelopathy. Both the neural and spinal cord compression will result in radiculomyelopathy [(1)]. Due to aging intervertebral disc undergoes progressive desiccation, becomes more compressible and less elastic and secondary changes arise [(2)]. The primary event is a progressive decrease in the degree of hydration resulting in loss of disc height, disc fibrosis and annular weakening [(3)].

There are several predisposing factors, which may cause acceleration of these changes including: Occupations, Previous injury with fracture or disc prolapsed, Segmentation defects [(4)].

Common clinical syndromes associated with cervical spondylosis include the following: cervical pain, cervical radiculopathy, cervical myelopathy.

The diagnosis of cervical spondylosis is based on observation of the aforementioned symptoms, physical examination, x-rays, computerized tomography (CT) scan and Magnetic resonance imaging (MRI) [(2)].

Evaluating the efficacy of any particular treatment strategy for Cervical spondylosis myelopathy (CSM) is difficult because reports show that as many as 18 percent of patients with CSM will improve spontaneously, 40 percent will stabilize and approximately 40 percent will deteriorate if no treatment is given [(5)].

The objective of this research was to study the incidence, clinical features and presentations of the cervical spondylotic myelopathy in Iraq.

## Methods

This is a prospective clinical study, carried out during the period from January, 2014 throughout December 2014, and included 25 patients with cervical spondylosis referred for surgical intervention Neurosurgical Department in the Al-Imamein Al-Kadhimein Medical City. Including 25 patients they were14 males and 11 females, 38 to 82 years of age. All patients were admitted to hospital and opened case sheets and detailed history was taken including general and neurological. In addition, general as well as full neurological assessment was performed, relevant investigations, particularly radiological especially MRI to give detail about the pathology which involved the spine and caused spinal cord compression or roots compression, neurophysiological studies to exclude other causes such as peripheral neuropathy, motor neuron disease, and multiple sclerosis were followed up. Patients operated in sitting position cervical collar remained throughout the position and even during intubation, and the collar remained post-operative for long period. Steroid started preoperatively and intra operative then gradually tapered, prophylactic antibiotics also considered. Patients were subjected to surgery, with 17 patients (68%) those with radiculopathic features and Myeloradiculopathic features treated by laminectomy and foraminotomy, while the remaining 8 patients (32%) those of myelopathic features treated by laminectomy only. Midline posterior cervical incision, subcutaneous, ligamentum nuchae and muscles are all opened with good hemostats, cautery, forceps arteries, self-retaining retractors were used, subperiosteal gauze dissection for muscles with spade, spinous processes were removed by shear, laminae were opened by fine manipulation with Roenguers to exposed the dura and thickened ligaments, ligament removed by tenatom knife carefully to avoid dural injury, if we need to open the foramina we must extended more laterally in decompression, good hemostasis and wound closed in layers and dressing cervical collar used immediately postoperative. Posterior decompression was performed in all patients and follow them in during a period of staying in the hospital for 10 days, most of them get slight improvement others remained same, no deterioration in their neurological state were found post-operatively.

## Results

Distribution of cervical spondylosis according to age and sex is shown in table 1; (14 males and 11 females), the commonest age group affected by the disease was 40-59 years. followed by the group 60-70 years), while the percent decline for the age group before 40 years and those above 70 years. It is also found that in all age group, males and females affected equally.

**Table 1. Distribution of patients with cervical spondylosis according to age and sex**

| Age (yr) | Sex | | Total |
|---|---|---|---|
| | Male No. (%) | Female No. (%) | No. (%) |
| <40 | 1 (7.2) | 1 (9.9) | 2 (8.0) |
| 40-49 | 5 (36.0) | 4 (39.6) | 9 (36.0) |
| 50-59 | 4 (28.8) | 5 (49.5) | 9 (36.0) |
| 60-69 | 3 (12.6) | 1 (9.9) | 4 (16.0) |
| ≥70 | 1 (7.2) | 0 (0.0) | 1 (4.0) |
| Total | 14 (100) | 11 (100) | 25 (100) |

Distribution of patients with cervical spondylosis according to the residency is illustrated in table 2; the majority of studied patients come from urban areas comprises 64%, the remaining 9 patients were rural inhabitant.

**Table 2. Distribution of patients with cervical spondylosis according to the residency**

| Residency | No. (%) |
|---|---|
| Urban | 16 (64.0) |
| Rural | 9 (36.0) |
| Total | 25 (100) |

Table 3 displays presentation of patients with cervical spondylosis, 12 patients (48%) complained of myeloradiculopathic symptoms, 8 patients (32%) complained of myelopathic symptoms, while the remaining 5 patients (20%) had mixed features from those with radiculopathic features.

**Table 3. Presentation of patients with cervical spondylosis**

| Presentation | No. (%) |
|---|---|
| Myeloradiculopathy | 12 (48.0) |
| Myelopathy | 8 (32.0) |
| Radiculopathy | 5 (20.0) |
| Total | 25 (100) |

Among patients with myelopathy, it is found that 4 patients (50%) have involvement of upper limbs alone. While, 2 out of total 8 patients (25%) had Paraparesis and 2 patients (25%) had quadriparesis. Neither paraplegic

nor quadriplegic was documented; this is shown clearly in table 4.

Table 5 shows those patients with radiculopathy, 3 out of 5 patients (60%) complaining of pain and paresthesia, while 1 patients (20%) presented with motor and sensory loss, while complete motor paralysis occur in 1 patient (20%).

**Table 4. Deficit among myelopathy**

| Deficit | No. (%) |
|---|---|
| Upper extremities weakness | 4 (50.0) |
| Quadriparesis | 2 (25.0) |
| Paraparesis | 2 (25.0) |
| Quadriplegia or paraplegia | 0 (0.0) |
| Total | 8 (100) |

**Table 5. Deficit among radiculopathy**

| Clinical features | No. (%) |
|---|---|
| Pain and paresthesia | 3 (60.0) |
| Motor and sensory loss | 1 (20.0) |
| Complete motor paralysis | 1 (20.0) |
| Total | 5 (100) |

Myeloradiculopathic were the most presenting features of cervical spondylosis and table 6 shows mixed features.

Levels of cervical spondylosis is shown in table 7, the commonest level affected was C5-C7 15 patients then (60%), followed by C3-C5 5 patients 20% and C3-C7 5 patients 20%. It was found no patient with spondylotic changes in C1-C2 involved in the study.

Table 8 shows the surgical treatment of patients with cervical spondylosis, all the 12 patients with myeloradiculopathy and the 5 patients with radiculopathy were treated by laminectomy and foraminotomy (68 %), while the remaining the 8 patients with myelopathy treated by laminectomy alone (32%).

**Table 6. Deficit among myeloradiculopathy**

| Deficit | No. (%) |
|---|---|
| Upper extremities weakness | 4 (30.8) |
| Quadriparesis | 2 (15.4) |
| Paraparesis | 2 (15.4) |
| Pain and paresthesia | 3 (23.0) |
| Motor weakness and sensory loss | 1 (7.7) |
| Complete motor paralysis of the segmental involvement | 1 (7.7) |
| Total | 13 (100) |

**Table 7. Levels of cervical spondylosis**

| Level | No. (%) |
|---|---|
| C1-C2 | 0 (30.8) |
| C3-C5 | 5 (20.0) |
| C5-C7 | 15 (60.0) |
| C3-C7 | 5 (20.0) |
| Total | 25 (100) |

**Table 8. Treatment of patients with cervical spondylosis**

| Surgical treatment | No. (%) |
|---|---|
| Laminectomy with foraminotomy | 17 (68.0) |
| Laminectomy | 8 (32.0) |
| Total | 25 (100) |

Table 9 presented the outcome of surgical treatment in this study, where 28% of patients showed significant improvement in their symptoms, while 52% showed slight improvement. No improvement was seen in 20% of patients, whereas no deterioration in symptoms noted in any of patients in our study. the figures with regard to type of pathological deficit (myelopathy, radiculopathy or mixed) were somewhat comparable to the overall figures. The parameter for degree of improvement is the British Medical Research Council Classification the motor power M0-M5, and the sensory function S0-S4.

**Table 9. Outcome of surgical treatment**

| Outcome | Myelopathy No. (%) | Radiculopathy No. (%) | Mixed No. (%) | Total No. (%) |
|---|---|---|---|---|
| Significant improvement | 2 (25.0) | 2 (40.0) | 3 (25.0) | 7 (28.0) |
| Slight improvement | 4 (50.0) | 2 (40.0) | 7 (58.3) | 13 (52.0) |
| No improvement | 2 (25.0) | 1 (20.0) | 2 (16.7) | 5 (20.0) |
| Deterioration | 0 (0.0) | 0 (0.0) | 0 (0.0) | 0 (0.0) |
| Total | 8 (100) | 5 (100) | 12 (100) | 25 (100) |

## Discussion

CSM is the most common spinal cord disorder in the person more than 50 years of age. As the numbers of older persons and the advance investigations, myelopathy will most likely increase. The lesion is progressive, but when early diagnosis and surgical treatment applied progression can be prevented.

Regarding age and sex in the current study, it was found that CSM nearly affected males and females, but more commonly between 40-60 years (60%), the result agrees with that of Benzel [3].

CSM more common among the rural areas, as compared with Epstein et al. result [6].

In the current study, myeloradiculopathy was the most common presenting feature in 50% of patients which goes with Stringer et al. study [4].

Among myelopathic patients, upper extremities involvement more than lower extremities in this study, and this goes with Nakajima et al study [6].

Pain and paresthesia were the most common presenting features among radiculopathic patients (60%), followed by motor weakness

and complete motor (20%) which is similar to the finding of Morgan et al. study [7] who said compression of cervical nerve roots lead to ischemic changes that cause sensory dysfunction (e.g. radicular pain) and/or motor dysfunction (e.g. weakness) and C6 root is most commonly affected because the predominant degeneration at the C5-C6 interspaces.

Posterior decompression (laminectomy) was performed in all our patients. Most patients presented with delayed diagnosis and presented with severe deficit. The treatment in those to arrest the progression of the lesion. Those with severe deficit attributed to a fact that those patients diagnosed early and refused operation and later on accept the surgery. Laminectomy with foraminotomy was used in the current study because most patients present with myeloradiculopathy, posterior decompression without foraminotomy for those with myelopathy only, Benzel principle of spinal surgery: posterior approach [8] said once frank myelopathy occurs surgical intervention is necessary, the primary goal to decompress the cord. Stoops and King [9] mentioned a variety of factors determine success of surgery include severe preoperative neurological signal changes within spinal cord seen on radiographic study. LaRocca and Macnab [10] said whatever the surgical approach used; improvement can be expected if symptoms have been present for less than 2 years.

The complications associated with dorsal approaches are predictable and preventable and although ventral operations for CSM have recently been reported to be superior to dorsal approaches a ventral approach has been limited to three levels.

Significant neurological and non-neurological complications associated with ventral approaches, in addition to long-term complications related to fusion, such as increased spinal laxity, hypermobility, and degeneration of the adjacent vertebral segments, affect outcome. Therefore, they must be taken into account when using any ventral decompressive approach [9]. In addition to long-term complications related to fusion, such as increased spinal laxity, hypermobility, and degeneration of the adjacent vertebral segments, affect outcome. Therefore, they must be taken into account when using any ventral decompressive approach [9], ventral approach has been limited to three level

The level of cervical spondylosis in this study was C5-C7 as the most commonly affected (60%) which is similar to results of Epstein et al. study [5] and Morgan et al study [7].

In the present study, the outcome of surgery where 28% of patients showed significant improvement in their symptoms, while 52% showed slight improvement. No improvement was seen in 20% of patients, whereas no deterioration in symptoms noted in any of patients in this study compared with the Kawakita et al. and Benzel studies [12,13]. The course of the lesion may be slow and prolonged, and the patients may either remain asymptomatic or have mild cervical pain, long periods of non-progressive disability are typical, and in a few cases, the patient's condition progressively deteriorated.

This study concluded that:

1) CSM slightly affects males more than females, it is more common in 5$^{th}$ and 6$^{th}$ decades of life and is more common in rural compared to urban people.
2) Myeloradiculopathic features were the most common presenting features with C5-C7 was the most level affected.
3) Laminectomy with foraminotomy was surgery of choice in tow third of patients, with remaining one third underwent laminectomy only.
4) More than half of patients showed slight improvement in their complaints, while significant improvement occurred in more than 28% of patients. Despite that 20% of patients showed no improvement in their symptomatology, however no reported deterioration occurred in any patient in this study.

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## Authors contribution

Dr. Jaizany: provide 9 cases, Dr. Hassan: 8 case, Dr. Nema 8 cases and analysis of the result.

## Conflict of interest

The authors declare no conflict of interest.

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## References

1. LaRocca H. Cervical spondylotic myelopathy: natural history. Spine (Phila Pa 1976). 1988; 13(7): 854-5.
2. Hirabayashi H, Satomi K. Expansive open-door laminoplasty. In: Denaro V (ed). Stenosis of the cervical spine. Causes, diagnosis and treatment. Berlin: Springer-Verlag; 1991. P. 264-78.
3. Benzel EC. Biomechanics of spine stabilization. Principles and Clinical Practice. New York: McGraw-Hill, 1995.
4. Stringer WL, Kelly DL Jr, Johnston FR, et al. Hyperextension injury of the cervical spine with esophageal perforation. Case report. J Neurosurg. 1980; 53(4): 541-3. doi 10.3171/jns.1980.53.4.0541.
5. Epstein JA, Carras R, Hyman RA, et al. Cervical myelopathy caused by developmental stenosis of the spinal canal. J Neurosurg. 1979; 51(3): 362-7. doi: 10.3171/jns.1979.51.3.0362.
6. Nakajima K, Miyaoka M, Sumie H, et al. Cervical radiculomyelopathy due to calcification of the ligamenta flava. Surg Neurol. 1984; 21(5): 479-88.
7. Morgan TH, Wharton GW, Austin GN. The results of laminectomy in patients with incomplete spinal cord injuries. Paraplegia. 1971; 9(1): 14-23. doi: 10.1038/sc.1971.2
8. Benzel EC. Cervical spondylitic myelopathy: posterior approaches. In: Cooper PR (ed). Degenerative disease of the cervical spine. Park Ridge, Ill: American Association of Neurological Surgeons; 1993. p. 91-104.
9. Stoops WL, King RB. Neural complications of cervical spondylosis: their response to laminectomy and foramenotomy. J Neurosurg. 1962; 19: 986-99. doi: 10.3171/jns.1962.19.11.0986.
10. LaRocca H, Macnab I. The laminectomy membrane. Studies in its evolution, characteristics, effects and prophylaxis in dogs. J Bone Joint Surg Br. 1974; 56B(3): 545-50.
11. Stoops WL, King RB: Chronic myelopathy associated with cervical spondylosis: its response to laminectomy and foramenotomy. JAMA. 1965; 192: 281-4.
12. Kawakita E, Kasai Y, Uchida A. Low back pain and cervical spondylotic myelopathy. J Orthop Surg (Hong Kong). 2009; 17(2): 187-9. doi: 10.1177/230949900901700213.
13. Benzel EC. Cervical spondylitic myelopathy: posterior surgical approaches. In: Menezes AH, Sonntag VKH (eds). Principles of spinal surgery. Vol 1. New York: McGraw-Hill; 1996. p. 571-80.

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