

CERVICAL MYELOPATHY ASSOCIATED WITH SPINAL CANAL STENOSIS

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Abstract

Cervical myelopathy associated with spinal canal stenosis is a common and potentially progressive neurological disorder caused by compression of the spinal cord within the cervical spine. The condition most frequently develops as a consequence of age-related degenerative changes, including intervertebral disc degeneration, osteophyte formation, ligamentum flavum hypertrophy, and ossification of the posterior longitudinal ligament. Because the cervical spinal cord controls motor and sensory functions of the upper and lower extremities, as well as coordination and gait, chronic compression may result in significant neurological impairment. Clinical manifestations range from neck pain and hand numbness to weakness, impaired fine motor skills, gait disturbances, and, in advanced cases, bladder or bowel dysfunction. Early recognition and appropriate management are essential because neurological deterioration may become irreversible. Magnetic resonance imaging (MRI) is considered the principal imaging modality for evaluating spinal cord compression and identifying associated changes. Treatment depends on symptom severity, neurological status, radiological findings, and the underlying cause. Conservative management may be appropriate for selected patients with mild symptoms, whereas surgical decompression is generally considered for patients with moderate or severe myelopathy or progressive neurological deterioration. This review examines the main causes, clinical characteristics, diagnostic approaches, and treatment strategies associated with cervical myelopathy caused by spinal canal stenosis.

Keywords: cervical myelopathy, cervical spinal stenosis, spinal cord compression, cervical spondylosis, MRI, neurological impairment, spinal decompression.

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Introduction

Cervical myelopathy is a neurological condition resulting from dysfunction of the spinal cord in the cervical region. One of its most important causes is cervical spinal canal stenosis, in which narrowing of the spinal canal reduces the available space for the spinal cord and may lead to chronic mechanical compression. Cervical myelopathy is particularly important in older adults because degenerative changes of the cervical spine become increasingly common with age.

The cervical spine consists of seven vertebrae that provide structural support for the head and protect the spinal cord. Between the vertebrae are intervertebral discs that absorb mechanical stress and facilitate movement. With aging, these structures may undergo degenerative changes. Disc height can decrease, osteophytes can develop, and spinal ligaments may become thickened or ossified. These changes can progressively reduce the diameter of the spinal canal.

Degenerative cervical myelopathy (DCM) is currently recognized as one of the most common causes of spinal cord dysfunction in adults. Its clinical importance lies in its progressive nature and the possibility of permanent neurological disability if significant spinal cord compression remains untreated. Patients may initially experience subtle symptoms, such as hand clumsiness or difficulty performing fine motor activities, which can easily be overlooked.

The purpose of this review is to examine the relationship between cervical spinal canal stenosis and myelopathy, focusing on its causes, clinical

manifestations, diagnosis, and contemporary treatment approaches.

Literature Review

Etiology and Pathophysiology

Cervical spinal stenosis can result from congenital anatomical characteristics or acquired degenerative processes. Degenerative disease is the predominant cause in adults. Intervertebral disc degeneration may cause loss of disc height and changes in spinal biomechanics. As a result, osteophytes may form around the vertebral bodies and facet joints, contributing to narrowing of the spinal canal and neural foramina.

Other important pathological factors include hypertrophy or folding of the ligamentum flavum and ossification of the posterior longitudinal ligament (OPLL). These structural changes may produce both static and dynamic compression of the spinal cord. During cervical extension, the spinal canal may become functionally narrower, increasing the degree of cord compression.

Spinal cord dysfunction is not caused exclusively by mechanical pressure. Chronic compression may interfere with spinal cord blood supply and produce ischemic changes, inflammation, demyelination, and neuronal loss. Repeated mechanical stress may therefore result in progressive neurological deterioration.

Clinical Manifestations

The symptoms of cervical myelopathy can vary considerably between individuals. Early symptoms commonly include numbness or tingling in the hands, loss of hand dexterity, and weakness.

Patients may report difficulty buttoning clothes, writing, using utensils, or manipulating small objects. As the disease progresses, lower-extremity symptoms may develop. Patients can experience gait instability, leg stiffness, weakness, and difficulty maintaining balance. Some patients report frequent falls or a feeling that their legs are unusually heavy.

Neurological examination may demonstrate hyperreflexia, pathological reflexes, clonus, or a positive Hoffmann or Babinski sign. Neck pain and radicular symptoms may coexist, although cervical myelopathy can also occur without significant neck pain.

In advanced cases, patients may develop significant impairment of mobility and, less commonly, bladder or bowel dysfunction. The variability of clinical presentation makes early diagnosis challenging, particularly when symptoms are mild.

Diagnostic Evaluation

Diagnosis requires a combination of clinical assessment and imaging. A detailed neurological examination is essential for identifying signs of spinal cord dysfunction. The patient's history should include the onset and progression of symptoms, changes in hand function, gait abnormalities, sensory disturbances, and previous cervical spine disease.

MRI is the preferred imaging method for evaluating cervical myelopathy because it provides detailed visualization of the spinal cord, intervertebral discs, ligaments, and surrounding soft tissues. MRI can demonstrate the degree and level of spinal canal stenosis and may identify spinal cord signal changes associated with chronic compression.

Computed tomography (CT) provides excellent visualization of bony structures and is particularly useful when evaluating osteophytes, OPLL, and complex anatomical abnormalities. Radiographs may demonstrate degenerative changes and cervical alignment but provide less information about the spinal cord itself.

An important challenge in diagnosis is that radiological stenosis does not always correspond to clinical myelopathy. Some individuals may have substantial canal narrowing without neurological symptoms, whereas others may develop significant neurological impairment with comparatively modest radiological abnormalities. Therefore, imaging findings must always be interpreted together with the clinical examination.

Treatment Approaches

Management depends on the severity of symptoms, neurological findings, disease progression, and radiological characteristics. Patients with mild symptoms may sometimes be managed initially with careful observation, physical therapy, activity modification, and treatment of associated pain. However, conservative treatment does not eliminate the underlying mechanical compression of the spinal cord.

Surgical decompression is the principal treatment for patients with moderate or severe degenerative cervical myelopathy and is generally

recommended when neurological deterioration is evident. The primary objective of surgery is to relieve spinal cord compression and prevent further neurological decline. Depending on the anatomical characteristics of stenosis, procedures may include anterior cervical discectomy and fusion, cervical laminoplasty, laminectomy, or laminectomy with fusion.

The choice of surgical technique depends on several factors, including the number of affected spinal levels, cervical alignment, location of compression, presence of instability, and individual patient characteristics. Early surgical intervention is particularly important in progressive disease because prolonged spinal cord compression may result in irreversible neurological damage.

Clinical guidelines and contemporary reviews emphasize the importance of recognizing degenerative cervical myelopathy promptly. Delayed diagnosis may allow neurological impairment to progress, potentially reducing the degree of recovery achievable after treatment.

Prognosis and Prevention

The prognosis depends on the severity and duration of spinal cord compression, the patient's age and general health, and the presence of preoperative neurological deficits. Patients treated before severe neurological deterioration generally have better functional outcomes.

Because age-related degeneration cannot be completely prevented, early recognition of symptoms is particularly important. Individuals with progressive hand dysfunction, unexplained gait disturbances, limb weakness, or sensory changes should undergo appropriate neurological evaluation. Maintaining general physical activity and addressing modifiable risk factors may support overall spinal health, although these measures cannot reliably prevent degenerative cervical stenosis.

Conclusion

Cervical myelopathy associated with spinal canal stenosis is a significant neurological disorder that can lead to progressive disability if not recognized and treated appropriately. Degenerative changes such as disc degeneration, osteophyte formation, ligamentous hypertrophy, and OPLL are major contributors to cervical canal narrowing and spinal cord compression.

Clinical manifestations commonly include hand numbness, loss of dexterity, weakness, gait disturbance, and hyperreflexia. MRI plays a central role in diagnosis, but imaging findings should be interpreted alongside clinical and neurological assessment. Conservative management may be appropriate for carefully selected patients with mild and stable symptoms, whereas surgical decompression remains the main treatment for moderate, severe, or progressive myelopathy.

Early diagnosis is therefore essential. Greater awareness among healthcare professionals of the early clinical signs of cervical myelopathy can facilitate timely referral, appropriate imaging, and intervention before irreversible spinal cord damage develops.

References

1. Davies BM, Mowforth OD, Smith EK, Kotter MR. Degenerative cervical myelopathy. **BMJ**. 2018;360:k186.
2. Nouri A, Tetreault L, Singh A, Karadimas SK, Fehlings MG. Degenerative cervical myelopathy: epidemiology, genetics, and pathogenesis. **Spine**. 2015;40(12):E675-E693.
3. Fehlings MG, Tetreault LA, Riew KD, Middleton JW, eds. **Degenerative Cervical Myelopathy and Its Management**. New York: Springer; 2020.
4. Karadimas SK, Erwin WM, Ely CG, Dettori JR, Fehlings MG. Pathophysiology and natural history of cervical spondylotic myelopathy. **Spine**. 2013;38(22 Suppl 1):S21-S36.
5. Tracy JA, Bartleson JD. Cervical spondylotic myelopathy. **Neurologist**. 2010;16(3):176-187.
6. Tetreault L, Wilson JR, Kotter MR. Predictors of outcome after surgery for degenerative cervical myelopathy. **Spine**. 2017;42(12):E708-E716.
7. Fehlings MG, Wilson JR, Kopjar B, et al. Efficacy and safety of surgical treatment for degenerative cervical myelopathy. **Journal of Neurosurgery: Spine**. 2018;28(1):1-15.
8. Davies BM, Khan DZ, Barzangi K, et al. We choose to call it “degenerative cervical myelopathy”: understanding the terminology. **Global Spine Journal**. 2022;12(1 Suppl):7S-10S.
9. Lebl DR, Hughes A, Cammisa FP Jr, O'Leary PF. Cervical spondylotic myelopathy: pathophysiology, clinical presentation, and treatment. **HSS Journal**. 2011;7(2):170-178.
10. Badhiwala JH, Wilson JR, Fehlings MG. Degenerative cervical myelopathy—update and future directions. **Nature Reviews Neurology**. 2020;16:108-124.