# Cervical Myelopathy

#### Patrick Graham



# Introduction

With a typically insidious onset and stepwise progression, the presentation of cervical myelopathy can vary greatly depending on the chronicity, degree of compression, and affected spinal levels. The primary etiology of myelopathy is stenosis secondary to spondylosis, with ischemia and dynamic factors, specifically hypermobility, also playing a role. Upper extremity symptoms include lacking proprioception, hand weakness and incoordination, arm and hand numbness, and/or generalized pain. Lower extremity symptoms include progressive weakness, gait instability, and clumsiness. The subtle, relatively vague presentation of early symptoms commonly causes delays in seeking care. Without appropriate diagnoses and treatment, the eventuality is that of significant functional decline and potential paralysis (Donnally, Hanna, et al., 2022; Donnally, Patel, et al., 2022; Iver et al., 2016; Kalantar & Yoon, 2012).

## **Case Presentation**

A 57-year-old man presented for evaluation of chronic neck pain, as well as progressive hand and arm weakness, with gait unsteadiness requiring use of a walker. Nine months prior, he was working on an out-of-state construction project, became extremely ill, was admitted to the local hospital, and eventually diagnosed with cervical discitis/osteomyelitis. He was hospitalized for approximately 3 weeks, including 10 days in the intensive care unit, and received intravenous antibiotics at a rehabilitation center for a total of 9 weeks. He was primarily bedbound during his hospitalization and was only ambulatory with staff assist and a walker in the rehabilitation center. He was subsequently placed on an oral antibiotic, with plan for continued use for an additional year. He did report chronic neck and back pain for years preceding this incident, noting that symptoms had progressively worsened in the weeks leading up to his hospitalization. Having recently relocated to be closer to family, he presented to establish care.

He noted continued moderate daily neck pain with associated stiffness. He went for the occasional massage, which provided minimal short-lived relief. He did daily stretches and utilized a number of topicals, including CBD (cannabidiol) products. Tramadol and cyclobenzaprine prescribed by primary care were also utilized for pain management. Of more concern to him were generalized deconditioning, weakness and incoordination of the hands, weakness of both arms, and difficulty ambulating. He discussed with the provider that he had expected a time of recovery



**FIGURE 1.** Computed tomography, sagittal view: Note significant erosions with collapse of C3–4 with focal kyphosis. Degenerative disc disease of C4–5, C5–6, and C6–7.

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from the hospital stay and rehabilitation, but the symptoms seemed to be getting worse instead of getting better. He was dependent on a walker for mobilizing and even with that could only tolerate about 10–15 minutes of activity at a time. He had trialed a course of physical therapy but unfortunately made no meaningful progress with activity tolerance and continued to note progressive hand symptoms of incoordination and fine motor.

On presentation was an alert, oriented, affect-appropriate, morbidly obese man in no apparent distress. He ambulated with a forward-posturing, broad-based, shuffling-type gait over a four-wheeled walker. He was unable to heel or toe walk and lost balance with an attempt at tandem gait. His neck was shortened, without abrasions or discoloration. He had pain-limited range of motion of the cervical and lumbar spine. He noted diffuse tenderness of the cervical, thoracic, and lumbar spine. He also noted tenderness over the posterior left shoulder and bilateral elbow lateral epicondyles. Grip and wrist flexion/extension were 3+/5 bilateral. Remaining motor testing of bilateral upper and lower extremities was 4/5. Noted difficulty was seen in coordination with opposition testing, and he displayed positive Hoffman, grip release, and Lhermitte's signs.

### Management

The patient had provided the prior computed tomographic (CT) scan of cervical spine from an outside facility, and radiographs were obtained in the clinic at time of evaluation for comparison (see Figures 1 and 2, respectively). These studies were notable for advanced cervical degenerative disease and secondary changes of C3–4 in keeping with the patient's reported diagnosis of cervical discitis/osteomyelitis.



FIGURE 2. Lateral cervical radiograph: Advanced degenerative change with acute kyphosis of C3–4 as compared with the prior computed tomographic scan.

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FIGURE 3. (A) MRI, sagittal T2: Arrow denotes level of cord signal change in the cervical cord. Note the advanced degenerative changes and collapse of C3–4 secondary to prior known discitis/osteomyelitis; (B) MRI, sagittal STIR; and (C) MRI, axial STIR. MRI = magnetic resonance imaging.

Given the constellation of progressive symptoms and significance of imaging findings, consistent with cervical myelopathy, the patient was urgently referred for magnetic resonance imaging (MRI). MRI is considered the gold standard in assessing for cord compression, intramedullary cord signal changes, specific areas of stenosis, and related structures, as is necessary in confirming the diagnosis of cervical myelopathy. Finding of T1-weighted hypointensity indicates irreversible damage to the cord and is a poor prognostic indicator for return of function. For those patients unable to obtain MRI, CT myelography is the next best study of choice. This patient's MRI was revealing for advanced degenerative changes with associated stenosis and intramedullary cord signal changes, including T1 hypointensity of multiple levels, as seen in Figure 3. With these findings, the patient was referred to an orthopaedic spine surgeon for consultation and further treatment (Donnally, Hanna, et al., 2022; Donnally, Patel, et al., 2022; Iver et al., 2016; Kalantar & Yoon, 2012).

## Discussion

Owing to the typically mild nature of early symptoms, the diagnosis of cervical myelopathy is often delayed. A careful history will reveal a stepwise progression in declining dexterity, which can be assessed with a patient's ability to manage buttons, zippers, lids, and silverware. A common report is "dropping items." In the absence of significant cord signal changes, gait instability and balance should return to normal following successful decompression, although expectations should be set for at least 6 months for this to recover, with balance being overall slower. Unfortunately, the recovery of motor weakness is unpredictable. Chronicity of greater than 18 months, significant weakness, and cord signal changes, including the pathognomonic finding of a "snake-eyed" appearance, are poor prognostic indicators. Conservative measures are acceptable for an asymptomatic patient with identified cervical stenosis or those patients whose symptoms are mild and stable. Those with progressive decline, daily functional limitations, or severe symptoms such as weakness should be referred for operative management. The specific surgical technique is dependent on involved cervical levels, alignment, and identified anatomic pathology needing to be addressed (Donnally, Hanna, et al., 2022; Donnally, Patel, et al., 2022; Haddas et al., 2018, 2019; Iyer et al., 2016; Kalantar & Yoon, 2012).

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