

Nontraumatic Disc Herniation as a Cause of Unusual Cervical Spondylotic Myelopathy

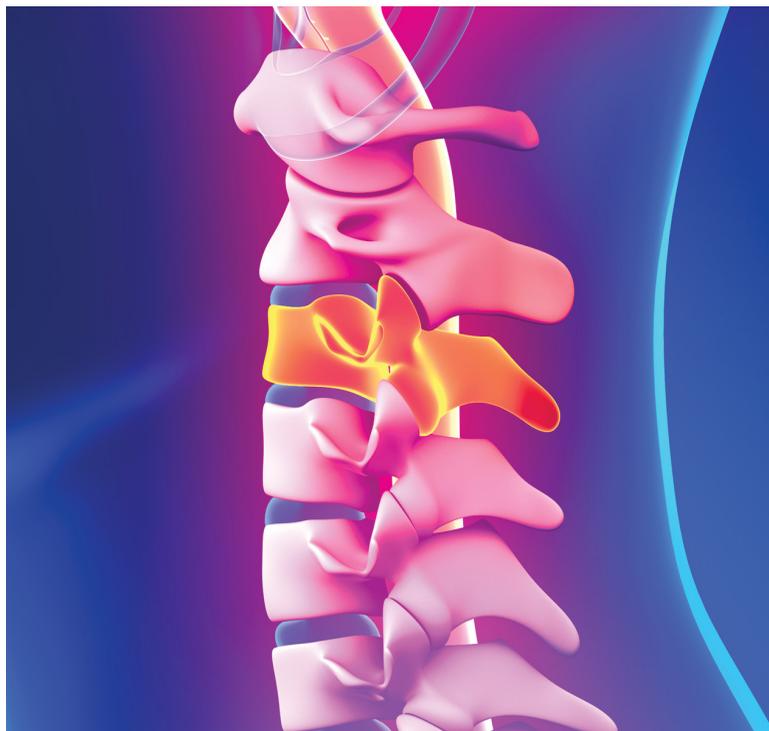
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A 55-year-old previously healthy woman presented for evaluation of worsening right-sided numbness and thermoanesthesia.

Case

A 55-year-old previously healthy woman with an insignificant medical history presented to the ED for evaluation of right-sided numbness, tingling, and inability to sense temperature. The patient stated the numbness and tingling first began in her right leg and thigh 2 months earlier, and had progressively worsened to her entire right-side. She said she first experienced the thermoanesthesia while taking a shower the morning of presentation. While showering, the patient noted that she could not feel any hot or cold sensation on the right side of her body, including her right leg and arm. She also reported decreased sensation to her extremities on the right side.

She denied any new weakness, headache, chest pain, shortness of breath, fever, chills, nausea, vomiting, back pain, neck pain, or any other symptoms. In addition, she denied any difficulty swallowing,



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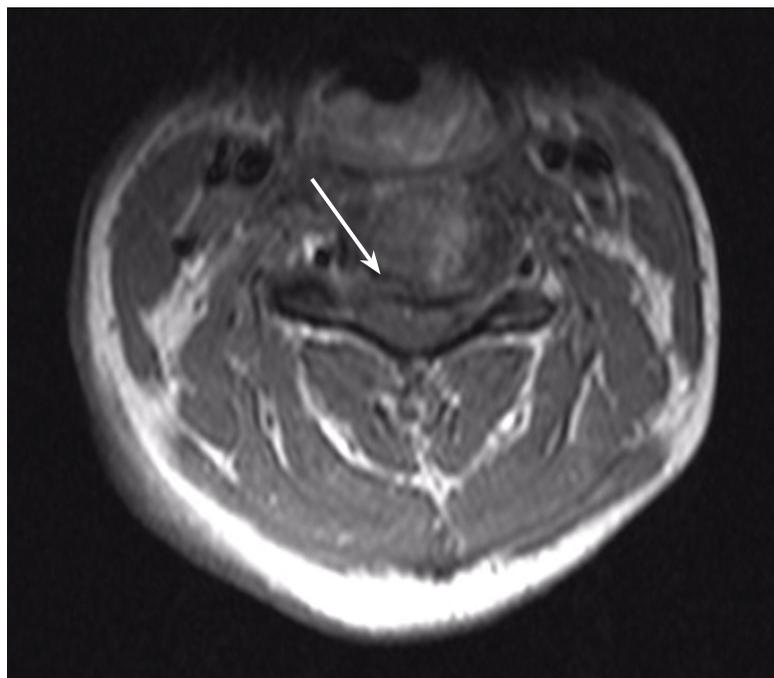


Figure 1. Magnetic resonance image of the patient's cervical spine in the axial plane demonstrates a large left paracentral disc protrusion with associated canal stenosis and ventral thecal sac effacement (**white arrow**).

speaking, blurry vision, or double vision. Regarding her social history, the patient denied a history of sexually transmitted diseases, including syphilis; or any tobacco, alcohol, or illicit drug use. The patient confirmed that she had never experienced any of the presenting symptoms prior to 2 months ago. There was no history of trauma or falls. A review of systems was otherwise negative.

Vital signs at presentation were: blood pressure, 129/88 mm Hg; heart rate, 99 beats/min; respiratory rate, 18 breaths/min; and temperature, 98.5°F. Oxygen saturation was 98% on room air. Physical examination revealed a middle-aged woman who was awake, alert, and oriented. Her head was normocephalic and atraumatic, and her pupils were 5 mm, equal, round, and reactive to light bilaterally. Her cranial nerves II through XII were intact. She had normal 5/5 strength in both her upper and lower extremities bilaterally, and had 2+ and equal bilateral patella and Achilles

deep tendon reflexes. The patient had no truncal ataxia, and she had a normal gait on ambulation. She was unable to sense temperature (assessed by touching a cold metal tray with her right hand). There was no neck or back midline tenderness to palpation of her spine.

Initial laboratory studies included a complete blood count (CBC); basic metabolic panel (BMP), including blood urea nitrogen; and urine drug screen (UDS). The CBC and BMP were within normal limits, except for an elevated creatine kinase of 249 U/L. The UDS was positive for cocaine. A head computed tomography (CT) scan without contrast was unremarkable.

The patient was admitted to the hospital for further evaluation. Additional laboratory workup during the inpatient stay included nonreactive treponemal immunoglobulin G/immunoglobulin M; nonreactive HIV antigen antibody assay; normal thyroid stimulating hormone; normal free thyroxine, folate, and vitamin B₁₂ levels; normal erythrocyte sedimentation rate, and C-reactive protein levels. The patient's hemoglobin A_{1c} was also within normal range.

A magnetic resonance imaging (MRI) study of the cervical spine with and without gadolinium contrast demonstrated a large left paracentral disc protrusion at the C3-C4 level with associated severe acquired canal stenosis and ventral thecal sac effacement (**Figure 1**). The anteroposterior (AP) diameter of the canal was approximately 3 mm at this level, and there was flattening of the ventral aspect of the cervical cord at the C3-C4 level (**Figure 2**). There was no other evidence of cord edema, myelomalacia, or enhancing lesion.

Other imaging studies, which included MR angiography (MRA) of the head and neck, and MRI of the thoracic and lumbar spine, were unremarkable, with the exception of some chronic spondylitic changes.

Due to the significant C3-C4 stenosis, orthopedic surgery services were consulted for a spinal surgery workup. The ortho-

pedic examination identified a few beats of clonus, intact proprioception, and no dysmetria. The patient had decreased sensation to fine touch in the distribution of C7 at the level of the triceps, midphalangeal joints to distal fingertips on the right, fourth, and fifth fingers on the left and right lateral lower extremity. A Hoffmann sign was positive bilaterally. A CT scan of the cervical spine showed severe canal stenosis at the C3-C4 level secondary to a large C3-C4 left paracentral disc protrusion with AP dimensions of the canal measured at 4 to 5 mm. There was no evidence of acute cervical spine fracture or subluxation.

The patient was offered operative and nonoperative management options, including anterior cervical discectomy and fusion vs conservative management with corticosteroid therapy. She agreed to conservative management and received intravenous (IV) dexamethasone with subjective improvement in her symptoms. The patient was discharged home on hospital day 3, with instructions to follow-up with a spine surgeon in 2 weeks. She was also counseled on abstaining from further cocaine or other illicit drug use.

The patient eventually returned for an elective anterior cervical discectomy and fusion 2 months later, after several outpatient visits and progression of symptoms. She was discharged home on postoperative day 1 with pain well-controlled and was able to ambulate without assistance. On follow-up, she reported 15% improvement in her symptoms.

Discussion

Cervical spondylotic myelopathy (CSM) is the most common myelopathy in patients aged 55 years and older. Immediate neuroimaging studies followed by spinal surgery consultation are recommended for patients presenting with acute symptoms suggestive of cord compression.^{1,2}

Diagnosis and Differential Diagnosis

Diagnosis of CSM can be made with a thor-



Figure 2. T₂-weighted magnetic resonance image of the patient's cervical spine in the sagittal plane demonstrates severe canal stenosis from the associated paracentral disc protrusion at the C3-C4 level (white arrow).

ough patient history, neurological examination, and MRI/MRA. However, because cases of cervical disc herniation (CDH) are often atraumatic, the patient history may not always be contributory to the diagnosis and severity of the offending cause.

During our patient's hospital course, there was initially a concern for Brown-Séquard syndrome (BSS) due to the lateralizing symptoms and radiographic findings. This is a rare condition that can occur in the setting of spinal trauma, unilateral disc herniation, tumors, epidural hematomas, and spinal cord ischemia.^{3,4} In one retrospective case review by Sayer et al,⁴ the incidence of CDH causing BSS was only 0.21% (5 per 2,350 patients), and 67% of the cases involved C5-C6 or C6-C7.

Although disc herniation usually presents with symptoms on the ipsilateral side in patients with BSS, there are rare case reports of patients with contralateral symptoms in the

form of complete or incomplete BSS manifesting as ipsilateral motor deficit and/or loss of contralateral pain and temperature due to an incomplete spinal cord compression.⁵⁻⁷ We were able to rule-out BSS in our patient due to the absence of motor symptoms.

Treatment

Corticosteroid Therapy. High-dose IV corticosteroids should be given to all patients with CSM prior to surgery to reduce cord edema caused by spinal cord injury. In one randomized control trial by Bracken et al.,⁸ patients given methylprednisolone within 8 hours of spinal cord injury had improvement in motor function, sensation to pinprick, and touch at 6 months when compared to placebo. When the aforementioned steps are taken in the emergent care setting, they may significantly improve patient outcomes.

Surgical Intervention. All cases of CSM in the review literature were treated surgically with laminectomy or hemilaminectomy, anterior discectomy with or without fusion, or corpectomy followed by interbody fusion, with the goal of achieving cord decompression. A large majority of patients underwent anterior discectomy with interbody fusion, and all of the cases recommend early surgical intervention in severe CSM to prevent rapidly worsening symptoms, including permanent hemiparesis.

Early surgical intervention is positively correlated with better outcomes, most often resulting in significant improvement of symptoms to full recovery.^{3,4,6,7,9-12} In one case report, surgical intervention did not result in a significant improvement, and the patient had been suffering from progressive symptoms for 7 years prior to diagnosis and treatment.¹¹

Conservative Management. Conservative management of CSM includes immobilization, activity modification, pain management, and/or corticosteroids therapy.¹³ However, for patients undergoing surgical decompression, 50% to 80% reported symptom improvement.^{14,15} This evidence

strongly supports management of CSM with early diagnosis and surgical intervention. Despite delays in diagnosis and treatment, surgical intervention can still offer significant relief of weakness and sensory deficits associated with severe CSM.¹¹

Conclusion

Cervical spondylotic myelopathy is the most common myelopathy in patients aged 55 years and older. Common symptoms involve upper extremity sensation, gait disturbances, and deterioration of hand use¹⁶; however, there is a large differential for patients presenting to the ED with these symptoms, including mass effect, infection, vascular conditions, metabolic disorders, inflammatory conditions, and trauma.

Our patient with CSM presented with signs of an incomplete cord syndrome with lateralizing features caused by asymmetric disc herniation. This case is unique in that though our patient had some symptom resolution with corticosteroids therapy alone, she ultimately returned for definitive surgical decompression after symptom progression.

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