



## Musculoskeletal CASE No. 13, January 2004

This is a PASSOR Recognized case

### **Presenting Symptom(s): Bilateral lower extremity weakness**

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**Appropriate Audience:** Residents and practicing physicians

**Learning Objectives:** After completing this educational activity, participant will be able to: (1) describe the appropriate diagnostic imaging and identify pertinent findings, (2) formulate a proper course of treatment, and (3) predict outcome and prognosis based upon the presenting symptoms and diagnosis.

**This case is no longer available for CME credit.**

### **History**

A 62 year old male presents with a chief complaint of bilateral lower extremity weakness, low back and bilateral lower extremity pain and numbness. His complaints of lower extremity numbness started about 17 months ago, and weakness and pain started 6 months ago.

- Prior to continuing, please develop a differential diagnosis and list each possible diagnosis in order of likelihood.
- Is there any other additional information from the clinical history that may change the priority of your differential list?

### **Commentary I**

Differential diagnosis should include spinal stenosis and lumbosacral radiculopathy, although radiculopathies typically present with unilateral symptoms. Other considerations include tumor, neurovascular disorders and idiopathic or metabolic polyradiculopathies. Additional information should include further details of symptoms including location of symptoms in legs, exacerbating or relieving factors, quantification and quality of pain, the time line of symptom development, presence or absence of key associated symptoms, and any prior history of back or leg symptoms.

### **History, continued**

The patient states that he noted some numbness in both lower extremities gradually developing about 17 months ago. Six months ago he had the onset of constant burning pain in both lower extremities that radiated along the medial aspect of his legs into his feet. He quantifies his lower extremity pain at 6 / 10 on a pain scale. Also at that time he noted some mild weakness of the lower extremities, but he could ambulate independently. He has not had any problems with his back or legs prior to the onset of these symptoms.

He was initially evaluated by his primary care provider and an open MRI was ordered. This demonstrated lumbar spinal stenosis at the L3-L4 level and some degenerative disc disease



at L5-S1. For this problem he was referred to a spine surgeon, and subsequently underwent a decompressive lumbar laminectomy two months prior to this evaluation. Surgery relieved some of his back pain, but his lower extremity symptoms persisted, and his weakness progressed. In the last month he had lost the ability to ambulate independently. He also had experienced several episodes of nocturnal urinary incontinence. He had no bowel complaints. He had no complaints of fevers, night sweats, or chills.

- If necessary, revise your differential diagnosis based on the additional clinical history.
- On which details of the physical examination should you focus at this point?

## Commentary II

The patient has not improved following his surgery. He now has worsening weakness, difficulty with ambulation and bladder symptoms. Progression of symptoms points away from the diagnoses of radiculopathy or spinal stenosis. Initial MRI should have been able to rule out infection and most tumors. Differential should now also include post-operative complications.

## Physical Examination

He presents to the office in a wheelchair and required the assistance of two people to transfer to the examination table. He has diffuse weakness in his lower extremities in all myotomes tested graded at 3 to 4 /5 and decreased sensation to pinprick diffusely throughout his lower extremities. Reflexes at his patella were symmetrical and 1+ and absent at the Achilles. Plantar reflexes were down going bilaterally. There was no ankle clonus. Neurological examination of the upper extremities was normal.

- At this point, review your differential diagnosis and revise as appropriate.
- Are there additional observations on physical examination that might be helpful in narrowing your differential list?

## Commentary III

The patient's symptoms are bilateral and diffuse. The underlying process cannot be attributed to a single neurological level. Progressive decline of neurologic function is always very concerning. In this case, ambulation became more difficult and urinary incontinence developed. These findings are suggestive of involvement of the cauda equina or the distal spinal cord.

## Clinical Impression

Myelopathy or cauda equina compression status post surgical decompression for spinal stenosis.

Possible etiologies would include:

Post operative hematoma compressing the cauda equina

Post-operative spinal infection and epidural abscess compressing the cauda equina

Transverse myelitis involving the distal cord



Spinal cord vascular injury – cord infarction  
Spinal dural arteriovenous fistula  
Multiple sclerosis

- What diagnostic tests would you order at this time?

### **Commentary IV**

A closed MRI with gadolinium enhancement of the lumbar spine was ordered.

### **Test Results**

There is diffuse T2 hyperintense signal within the visualized cord (Figures 1 and 2) that enhanced with gadolinium. The lumbar spinal canal and decompression site at L3-4 did not show any evidence of infection or ongoing cauda equina compression.

### **Final Diagnostic Impression**

Spinal dural arteriovenous fistula causing myelopathy

### **Commentary V**

MRI with gadolinium enhancement is typically used to evaluate the post-operative spine. See Figures 1 and 2. In this case, the post-gadolinium enhancement within the visualized cord is consistent with a spinal dural arteriovenous fistula.

Spinal dural AV fistulas are the most common type of vascular malformation to involve the spinal cord. They are defined as being supplied by a dural artery and draining into spinal veins via an AV shunt in the intervertebral foramen. They are more common in males with an average age greater than 50 years. Initial symptoms are most commonly lower extremity weakness, sensory changes, occasional pain, and eventual bladder dysfunction. The course for a majority of patients is progressive neurologic deterioration. The diagnosis is often considerably delayed with symptoms lasting at least 15 months. MRI findings of increased T2 signal in the cord are highly suggestive and are the most sensitive imaging finding. Most fistulas are located between T2 and L2.

After careful review of the original MRI with a neuroradiologist, there was an area of increased T2 signal in the cord. The MRI was done in an open facility and was of poor quality.

- What treatment would you now initiate?

**Figure 1.** T2 sagittal image of lumbar spine of normal individual. Notice the low signal intensity (dark) of the spinal cord.

**Figure 2.** Demonstrates relative hyperintensity of the cord leading to its gray instead of black appearance.



## Commentary VI

The patient was referred for a spinal angiogram. The arteriovenous shunt was not found on the first 4 hour spinal angiogram. Two weeks later, the patient underwent a second angiogram. After localization of the arteriovenous shunt, it was closed via embolization. If embolization is unsuccessful, surgical ligation can be attempted. Our patient did achieve some improvements in his strength but he still could not ambulate without the use of an assistive device. His urinary incontinence did not resolve.

## Final Discussion

The earlier the diagnosis of a spinal DAVF is made, the better the prognosis. Because there is usually a long delay between symptom onset and successful treatment, some symptoms are irreversible, i.e. bladder dysfunction. Physicians should be more aware of the presenting symptoms and radiographic findings. The presenting symptoms and the MRI findings are the most important clues to the diagnosis. Unfortunately, even though the original MRI was open and of poor quality, the abnormal signal was evident to a neuroradiologist. The second MRI was of much better quality and hence the abnormal signal was easier to see.



## Bibliography

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