

Case Report

Spontaneous Intracranial Hypotension Secondary to Lumbar Disc Herniation

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Spontaneous intracranial hypotension is often idiopathic. We report on a patient presenting with symptomatic intracranial hypotension and pain radiating to the right leg caused by a transdural lumbar disc herniation. Magnetic resonance (MR) imaging of the brain revealed classic signs of intracranial hypotension, and an additional spinal MR confirmed a lumbar transdural herniated disc as the cause. The patient was treated with a partial hemilaminectomy and discectomy. We were able to find the source of cerebrospinal fluid leak, and packed it with epidural glue and gelfoam. Postoperatively, the patient's headache and leg radiating pain resolved and there was no neurological deficit. Thus, in this case, lumbar disc herniation may have been a cause of spontaneous intracranial hypotension.

KEY WORDS : Spontaneous intracranial hypotension · Orthostatic headache · Lumbar disc herniation.

INTRODUCTION

Spontaneous intracranial hypotension (SIH), which was first described by Schaltenbrand in 1938⁸⁾, is a rare condition presented with cardinal postural headache and low cerebrospinal fluid (CSF) pressure²⁾. Orthostatic headaches⁶⁾, low opening pressure on lumbar puncture^{2,8)}, and meningeal enhancement on MR imaging^{2,3)} are typical clinical features of SIH. Iatrogenic causes of intracranial hypotension following spinal surgery, lumbar puncture, and dural tears are relatively common⁶⁾, though spontaneous spinal CSF leaks occur less commonly and should be considered when an anatomical cause cannot be found¹¹⁾. Causes of spinal CSF leakage reported in the literature include cervical bony spurs¹¹⁾, meningeal diverticula¹⁰⁾, nerve root sleeve tears, thoracic disc herniation and Tarlov cysts⁵⁾. However, we have no description of SIH occurring secondary to a lumbar disc herniation. We report on a patient with SIH secondary to a lumbar transdural disc herniation.

CASE REPORT

History and examination

A 31-year-old male presented to the emergency department with one week history of worsening orthostatic headaches, nausea, vomiting, back pain, and left thigh pain. He was subsequently admitted to our neurologic department with a primary differential of either meningitis or subarachnoid hemorrhage. Brain computed tomography (CT) with angiography and lumbar puncture were performed; both the CT and CSF cell count were subsequently found to be normal. However, the lumbar puncture pressure was 1 mmH₂O. An magnetic resonance image (MRI) of the lumbar spine was ordered, which demonstrated sharp disc herniation at L2-3 level (Fig. 1), and the patient was transferred to our department. We performed an MRI of the brain to evaluate orthostatic headache (Fig. 2), which appeared diffusely on meningeal Gd enhancement. SIH due to lumbar disc herniation was suspected, but myelography was not performed because the lumbar disc herniation needed surgery, and we thought it was possible to confirm a CSF leak in the operative field.

Operation and postoperative course

Partial hemilaminectomy and discectomy was performed at L2-3, and we were able to localize both the ruptured

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transdural disc material and CSF leakage at the same level (Fig. 3). We removed the ruptured disc material, and packed the dural tear with gelfoam and glue. The patient's symptoms resolved postoperatively, and he was discharged from hospital 9 days after the operation.

DISCUSSION

Orthostatic headache is one of the most typical symptoms of intracranial hypotension^{2,6}; other common symptoms include nausea, vomiting, dizziness, diplopia, tinnitus, and deafness¹⁰.

There are many causes of SIH, including meningeal diverticula, dural root sleeve tears, and Tarlov cysts^{5,10}. In this case, a transdural lumbar disc herniation was implicated as the cause of SIH. The lower cervical and upper thoracic spines are common sites for a CSF leak in patients with SIH¹. When we reviewed the literature, we were able to find two cases of SIH due to thoracic disc herniation^{7,12}; however, to our knowledge, a case of lumbar disc herniation has not been previously reported.

MRI may demonstrate diffuse cerebral pachymeningeal Gd enhancement, subdural hygromas or hematomas, and brain sagging including caudal herniation of the brainstem and cerebellar tonsils^{3,12}. In addition, the pituitary gland may appear enlarged or unusually enhanced. Mokri and Atkinson⁴ considered the dural enhancement and pituitary enlargement to be a result of the Monroe-Kellie doctrine. In our case, we found diffuse meningeal Gd enhancement on brain MRI (Fig. 2).

Confirmation of SIH involves the demonstration of extrathecal CSF on spinal imaging⁹; however, the cause of SIH is often unclear. Schievink et al.⁹ recommend different diagnostic criteria for SIH : cranial MR findings of intracranial hypotension and at least one of the following; 1) low opening pressure, 2) spinal meningeal diverticulum, and 3) improvement of symptoms after epidural blood patch if extrathecal CSF was not observed. If the diagnosis of SIH is still not certain, the presence of all of the following or at least two of the following and typical orthostatic headaches can also be used as criteria : 1) low opening pressure, 2) spinal meningeal diverticulum, 3) improvement of symptoms after epidural blood patch. In our case, SIH was diagnosed by brain MRI, typical orthostatic headache, and low opening pressure in spinal puncture. In addition, we could confirm a CSF leak in the operative field (Fig. 3).

Main therapeutic modalities of SIH are conservative treatment and epidural blood patching^{1,2,5,6}. In our case, however, definitive surgery was necessary due to the lumbar disc herniation, which was causing the patient's thigh pain.

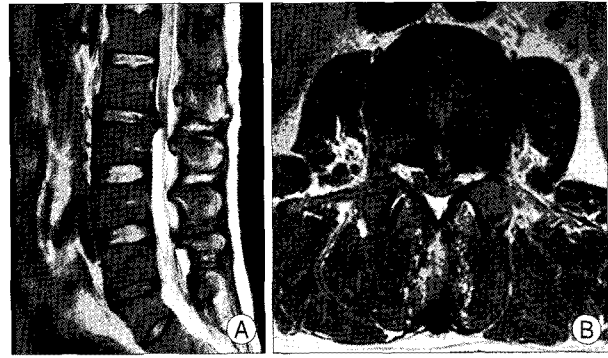


Fig. 1. A : Saggital view of lumbar magnetic resonance image showing a sharp disc herniation at L2-3. B : Axial view showing a transdural disc herniation.

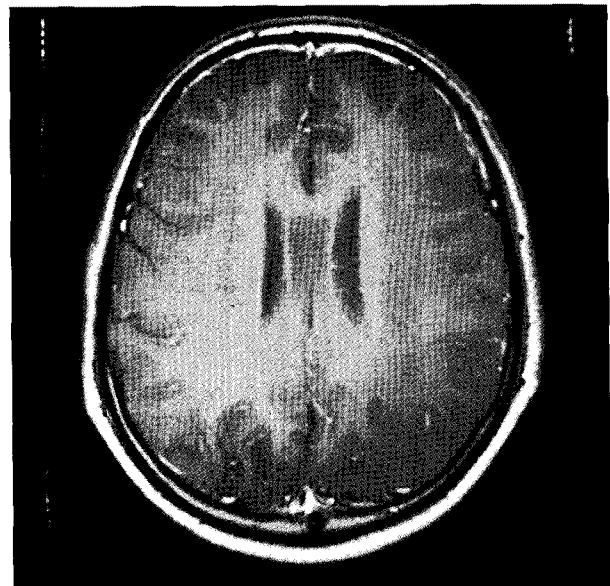


Fig. 2. Brain magnetic resonance image demonstrating diffuse meningeal Gd enhancement.

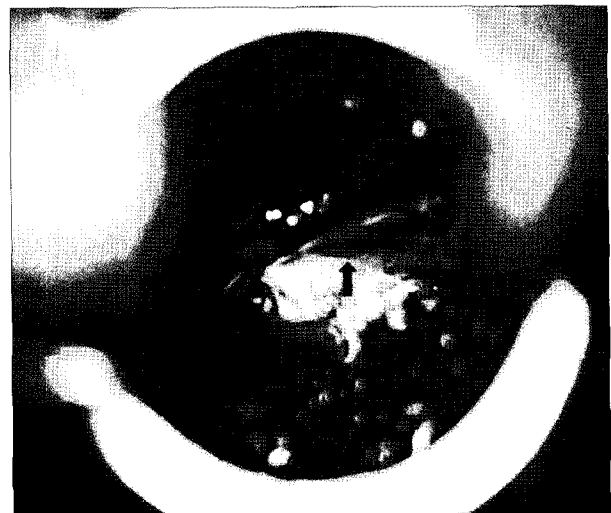


Fig. 3. The ruptured disc material is penetrating the lumbar dura and cerebrospinal fluid (CSF) is leaking in the operative field (Black arrow : transdural disc herniation, White arrow : leaking CSF).

We removed the ruptured disc material, and packed the dural tear with epidural glue and gelfoam to block the CSF leak.

CONCLUSION

To the best of our knowledge, SIH due to lumbar disc herniation has not been previously reported. Transdural lumbar disc herniation can be a cause of SIH, and a surgical procedure is one among the various therapeutic modalities for SIH.

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