Spontaneous intracranial hypotension due to thoracic disc herniation

Case report


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Spontaneous intracranial hypotension was first described by Schaltenbrand in 1938. It is now characterized by orthostatic headaches, a low opening pressure on lumbar puncture, and meningeal enhancement on MR imaging. Iatrogenic causes of low-pressure headaches following lumbar puncture, spinal surgery, and dural tears are relatively common. Less common are spontaneous spinal CSF leaks when an anatomical cause often cannot be found. The causes of CSF leakage reported in the literature are a cervical bone spur, meningeal diverticula, tears in nerve root sleeves, or Tarlov cysts. These lesions are found predominantly in the cervicothoracic region, followed by the thoracic spine and, rarely, the lumbar spine. We report on a patient with spontaneous intracranial hypotension secondary to a calcified thoracic intradural disc herniation.

Case Report

History. This 42-year-old woman presented with a 3-month history of worsening orthostatic headaches, nausea, dizziness, and tinnitus. She had been working as an aid worker in Bhutan for 4 years, where the altitude is 4000 m, when the symptoms started. She was treated with local herbal remedies for altitude sickness, descended to 1000 m, and the headaches improved. After a few days, however, the headaches increased in intensity, with relief being experienced only by drinking increasing amounts of coffee. She returned to the United Kingdom for further investigation.

Presentation and Examination. An MR imaging study obtained at another hospital demonstrated bilateral subdural collections. She was initially observed, but while on weekend leave in Oxford her headaches intensified further and she became confused. She was then admitted to The Radcliffe Infirmary. There was no history of back pain. On neurological examination the patient was found to be mildly confused but no focal symptoms were observed. Repeated MR imaging confirmed the presence of bilateral subdural collections with meningeal enhancement (Fig. 1). The clinical features and radiological findings indicated a diagnosis of intracranial hypotension.

A spinal MR imaging study was therefore performed to identify a cause. A calcified T7–8 disc was observed to be indenting the spinal cord (Fig. 2), and an extradural CSF collection was noted at the same level (Fig. 3). Lumbar myelography confirmed the presence of a calcified disc and demonstrated extravasation of contrast (Fig. 4). We observed features of a calcified thoracic disc that had eroded through the dura mater and arachnoid, causing CSF to leak into the extradural plane. At lumbar puncture, the opening pressure was 4 cm H2O, with normal CSF constituents and no abnormal cytological and culture findings.

Operation and Postoperative Course. Primary surgical repair of the CSF fistula and removal of the herniated disc were considered. In view of the potential risks to the cord

Abbreviations used in this paper: CSF = cerebrospinal fluid; MR = magnetic resonance.
in a patient without neurological dysfunction and in whom there was no certainty of repairing the fistula, however, a blood patch was offered as a conservative first-line treatment. An epidural autologous blood patch was therefore injected at the T7–8 level. Although clinical improvement was evident, a repeated MR image, obtained 3 days later, demonstrated that the right subdural collection had increased in size. Burr hole drainage was therefore undertaken. Symptomatically, the patient continued to improve; however, 1 week later her headaches recurred and a follow-up CT scan demonstrated a recurrent right-sided subdural collection. Proposed primary repair of the fistula and discectomy were declined by the patient. Repeated burr hole surgery was undertaken, and the results were successful. She experienced a rapid clinical recovery and was

Fig. 1. Coronal T₁-weighted gadolinium-enhanced MR image revealing bilateral subdural collections. In addition to normal vascular enhancement, there is intense meningeal enhancement affecting the falk, tentorium, and meningeal convexity.

Fig. 2. Sagittal T₂-weighted MR image demonstrating a normal spinal canal and thoracic cord. The only abnormality is seen at T7–8 where there is a small calcified disc causing some mild distortion of the thecal sac.

Fig. 3. Axial T₂-weighted MR image demonstrating an extradural calcified disc impinging on the cord. The membrane visible posteriorly is the dura (arrow) outlined by CSF. The arachnoid is not visible.

Fig. 4. Anteroposterior and lateral myelograms confirming the calcified disc (large arrows), and demonstrating early extravization of contrast medium on the left (thin arrow).
Hernia-induced intracranial hypotension
discharged from hospital 5 days later. She declined to undergo further neuroimaging, and she remains asymptomatic at 18-month follow up.

Discussion

Intracranial hypotension is typically characterized by orthostatic headaches.7,12 Patients may also present with nausea, dizziness, tinnitus, diplopia, and deafness.9 The cause of spontaneous intracranial hypotension is often not identified.13 Abnormalities associated with spontaneous spinal CSF leaks include meningeal diverticula, dural root sleeve tears, and Tarlov cysts, which are rarely linked with a connective tissue disorder.6,10 In this case a transdural herniation of a calcified thoracic disc is implicated as a cause of spontaneous intracranial hypotension. To our knowledge, this has not been previously reported.

In investigations of such cases a low opening pressure is typically found on lumbar puncture.8,11 Frequently with pleocytosis and an elevated protein level.3 Magnetic resonance imaging may demonstrate meningeal enhancement, subdural hygromas, or hematomas and caudal displacement of the brainstem and cerebellar tonsils.5,13 Although the pathophysiology of meningeal enhancement is unknown, it is probably related to dural venous dilation associated with reduced CSF volume.4 Histologically, fibrocollagenous proliferation of the leptomeninges may be present in the absence of inflammation.3 Myelography demonstrates epidural enhancement and may reveal passage of contrast medium extradurally.2

Conservative treatment, with bed rest and high fluid intake, often suffices.7 Symptoms, however, can take several months to resolve. The intake of caffeine is recognized as a cause of spontaneous intracranial hypotension.1 In our case definitive surgery was not undertaken because the thoracic disc herniation was otherwise asymptomatic, and formal dural repair involved major surgery with unacceptable risk.

In summary, transdural thoracic disc herniation can be a cause of CSF fistula and spontaneous intracranial hypotension, even in the absence of back pain.

References


Manuscript received October 2, 2000. Accepted in final form December 13, 2001.

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