Case Studies

Syringomyelia due to Lumbar Spinal Fluid Drainage in the Acute Phase of Subarachnoid Hemorrhage: A Case Report

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Lumbar spinal fluid drainage is a common procedure for treating hydrocephalus and alleviating vasospasm by egesting blood in the subarachnoid cavity after subarachnoid hemorrhage. Despite being an effective and safe procedure, cerebrospinal fluid overdrainage might result in serious complications. Here we report the case of a 49-year-old man who suffered from tonsillar herniation with subsequent cervicothoracic syringomyelia in the acute phase of subarachnoid hemorrhage due to vertebral artery dissection. About 2 weeks after lumbar drainage was switched from external ventricular drainage initiated on the day of subarachnoid hemorrhage, the recovery from the disturbance of consciousness revealed tetraplegia, and magnetic resonance imaging demonstrated tonsillar herniation and syringomyelia. Removal of the spinal drain and resumption of external ventricular drainage resulted in the restoration of the herniated tonsils to the normal position and the complete disappearance of syringomyelia 11 days later. We should consider that spinal syringomyelia could develop as a complication of lumbar spinal fluid drainage in the acute phase of thick subarachnoid hemorrhage, particularly in the posterior cranial fossa. **Key Words:** Spinal syringomyelia—subarachnoid hemorrhage—vertebral artery dissection—lumbar spinal fluid drainage—complication.

Introduction

Cerebrospinal fluid (CSF) drainage is a well-established procedure for treating hydrocephalus and alleviating vasospasm, which often occurs after subarachnoid hemorrhage (SAH). Common adverse events observed with lumbar spinal fluid drainage are infections, neurological injury from spinal drain insertion, pneumocephalus, hematomas, and CSF overdrainage.[1] The incidence of complications is estimated to be 2.5%–5.3%.[1,2]

Spinal syringomyelia is an extremely rare complication of SAH and usually occurs long after the onset of SAH because of chronic adhesive arachnoiditis. To our knowledge, syringomyelia resulting from lumbar spinal

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fluid drainage in the acute phase of SAH has not been reported.

Here we report the case of a 49-year-old man who suffered from tonsillar herniation with subsequent cervicothoracic syringomyelia after performing lumbar spinal fluid drainage for SAH treatment due to vertebral artery dissection.

Case Report

A 49-year-old man with mild hypertension was admitted to our hospital because of the sudden onset of severe headache, urinary incontinence, and disturbance of consciousness. A computed tomography (CT) scan of the head showed SAH with acute hydrocephalus (Fig 1A). SAH was classified as Hunt and Hess grade 3, and the CT findings were consistent with Fisher group 3. Three-dimensional CT angiography revealed dissection of the right vertebral artery involving the origin of the right posterior inferior cerebellar artery (PICA; Fig 1B). The patient was lethargic and was intubated under sedation. On day 1 of admission, an Ommaya reservoir with a ventricular catheter was installed for external ventricular drainage (EVD) to relieve acute hydrocephalus. The ruptured dissecting vertebral aneurysm and the right vertebral artery were successfully embolized with detachable coils. Patency of the right PICA was secured by placing an intracranial stent over the proximal parts of the dissection and right PICA. On day 3, a lumbar drain was additionally placed to eliminate the subarachnoid hematoma. EVD was discontinued on day 5 because spinal fluid drainage alone could control the hydrocephalus. The patient was comatose during the clinical course. On day 13, cerebral angiography revealed vasospasm in the bilateral middle cerebral and left vertebral arteries. Because the left vertebral artery is the sole source of posterior circulation, percutaneous transluminal angioplasty was performed in the middle cerebral and vertebral arteries. Following endovascular treatment, the patient's consciousness slightly recovered, but neurologic examinations indicated that the patient had tetraplegia. Magnetic resonance imaging (MRI) revealed tonsillar herniation with concomitant swelling of the spinal cord, although no responsible lesions, including hydrocephalus, hematoma, and ischemic lesions, were observed in the brain. The swelling spread from C1 to Th4 levels, with high signal intensity noted in T2-weighted images (Fig 1C). Spinal fluid showed slightly elevated protein levels (75 mg/dL), pleocytosis (leukocytes, 55/μL), and normal glucose levels (59 mg/dL), which were not suggestive of any significant abnormality. The most probable diagnosis for the spinal cord swelling was syringomyelia caused by tonsillar herniation, attributable to the pressure imbalance between the intracranial and spinal cavities due to overdrainage (daily drainage volume from spinal drain is shown in Fig 2). To resolve the pressure imbalance, the lumbar drain was removed and EVD was resumed on day 16. Because acute transverse myelitis was a possible diagnosis, during the same

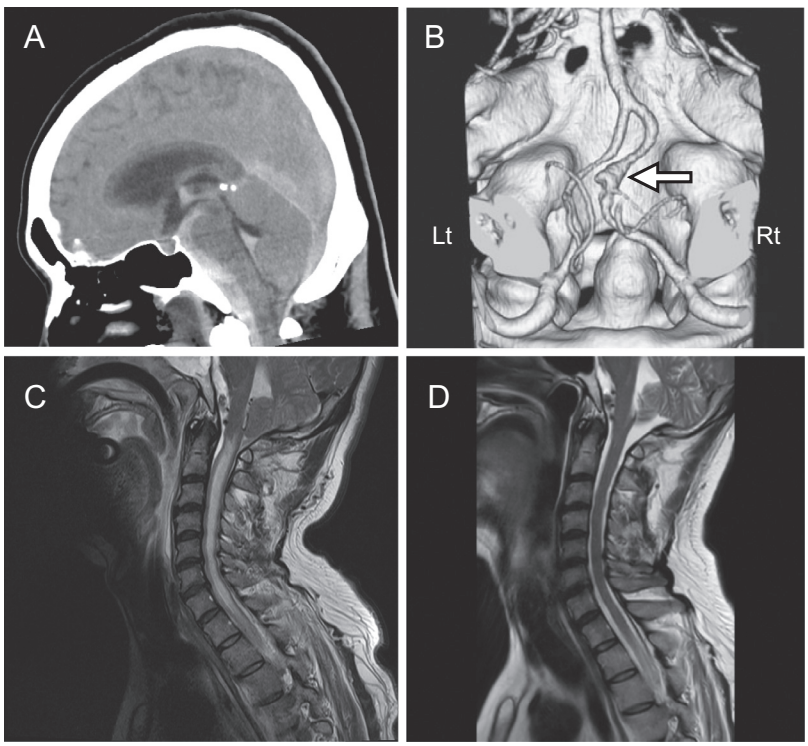

Figure 1. *(A) Sagittal view of head computed tomography (CT) showing subarachnoid hemorrhage (SAH) with hematoma in the third and fourth ventricles and prepontine cistern. In the cerebellum, dorsal SAH seems to push the cerebellum anterior-caudally and reduce the posterior cranial fossa volume. (B) CT angiography showing a dissected aneurysm of the right vertebral artery involving the origin of the right posterior inferior cerebellar artery. (C) Sagittal T2-weighted magnetic resonance imaging (MRI) of the cervical and upper thoracic cord taken at 14 days after the onset of SAH shows syringomyelia from C1 to T4 levels, with tonsillar herniation. (D) Sagittal T2-weighted MRI of the cervical and upper thoracic cord taken at 11 days after the removal of the lumbar drain shows the complete disappearance of the herniation of the cerebellar tonsil and spinal syringomyelia.*