Lumbar Spinal Subdural Hematoma Following Craniotomy
—Case Report—

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Abstract
A 52-year-old female complained of lumbago and weakness in the lower extremities 6 days after craniotomy for clipping an aneurysm. Neurological examination revealed symptoms consistent with lumbosacral cauda equina compression. The symptoms affecting the lower extremities spontaneously disappeared within 3 days. Magnetic resonance (MR) imaging 10 days after the operation demonstrated a lumbar spinal subdural hematoma (SSH). She had no risk factor for bleeding at this site, the symptoms appeared after she began to walk, and MR imaging suggested the SSH was subacute. Therefore, the SSH was probably due to downward movement of blood from the cranial subdural space under the influence of gravity. SSH as a complication of cranial surgery is rare, but should be considered if a patient develops symptoms consistent with a lumbar SSH after craniotomy.

Key words: complication, craniotomy, magnetic resonance imaging, spinal subdural hematoma

Introduction
Spinal subdural hematoma (SSH) is a rare condition which can be caused by several factors, but only very rarely occurs as a complication of cranial surgery. We here report our experience of a patient with a lumbar SSH that occurred after craniotomy for clipping an aneurysm.

Case Report
A 52-year-old female was referred to our service with a left parietal convexity meningoima. On admission, physical examination revealed no abnormalities, but neurological examination demonstrated slight weakness in the right upper extremity. Laboratory data, including coagulability, were normal. Preoperative cerebral angiography revealed an aneurysm at the left internal carotid artery bifurcation.

The aneurysm was clipped prior to removal of the tumor by the pterional approach, and she began to walk 6 days after the operation. At this time she complained of lumbago and felt weakness in the lower extremities. The bilateral Achilles reflexes were absent. The straight leg raising test was positive on the right side at 30 degrees. Sensory and sphincteric functions were normal. Fortunately, the symptoms affecting the lower extremities spontaneously disappeared within 3 days. However, lumbar magnetic resonance (MR) imaging 10 days after the operation demonstrated a clear lumbar SSH (Figs. 1 and 2). Sagittal T1-weighted images showed increased signal intensity lesions anterior and posterior to the cauda equina, below the L-4 level. Sagittal T2-weighted images showed the lesion as an isointense signal. These findings were interpreted as indicating a subacute hematoma. Again, coagulability was normal. To determine the origin of bleeding, selective spinal angiography was performed, but provided no evidence of spinal vascular malformation. Retrospective examination of the computed tomography scans just after the operation indicated a suspected slight hyperdensity area at the tentorium (Fig. 3). The presence of this lesion suggested migration of the blood from the subdural space at the initial supratentorial operative site into the lumbar spinal canal via the subtentorial region, under the influence of gravity.

Total removal of the tumor was performed and she was discharged without deficit.
Fig. 1 left: Sagittal T₁-weighted magnetic resonance (MR) image showing increased signal intensity lesions anterior and posterior to the cauda equina in the spinal canal below the L-4 level. right: Sagittal T₂-weighted MR image showing an isointense signal at the same site as the T₁-weighted image.

Fig. 2 Axial T₂-weighted magnetic resonance image at the L-5 level showing compression of the cauda equina anteriorly and posterolaterally by the isointense subdural hematoma.

Fig. 3 Brain computed tomography scan obtained just after the craniotomy showing a slight hyperdensity area that may be interpreted as a subdural hematoma at the tentorium.

Discussion

Only one case of SSH following cranial surgery has been reported, in which the intracranial subdural hematoma was a complication of ventriculoperitoneal shunting, extending into the spinal subdural space because of gravity. Our case was similar due to migration of old blood from the cranial subdural space, associated with craniotomy, into the lumbar subdural space under the influence of gravity, for the following reasons. Our patient had none of the risk factors for SSH, such as coagulopathy, administration of anticoagulants, a spinal vascular malformation, or a lumbar puncture prior to episode. The onset of the symptoms in the lower extremities only occurred after she began to walk. The continuity between the cranial subdural space and the spinal subdural space has been proven by pneumoencephalography. MR imaging suggested that the SSH was in the subacute phase. Subdural hematomas in the subacute phase, from 7 days to one month old, demonstrate T₁ shortening and T₂ prolongation. Our case showed hyperintensity on T₁-weighted images and isointensity on T₂-weighted images. Probably, these signals were the result of T₂ prolongation following T₁ shortening and thus the diagnosis of subacute hematoma is reasonable.

Although the prevalence of this type of SSH is uncertain, some cases may remain silent following common cranial surgery. If patients demonstrate...
symptoms consistent with lumbosacral cauda equina compression after cranial surgery, this rare condition should be considered as the cause. Migration of the blood into the intracranial subdural space must be avoided at cranial surgery.

References

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