

## Acute Subdural Hematoma after Accidental Dural Puncture During Epidural Anesthesia

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Acute subdural hematoma is an exceptionally rare, but life-threatening complication of spinal anesthesia. The authors report here on a case of acute subdural hematoma in a 52-year-old male who underwent an arthroscopic knee joint operation under spinal epidural anesthesia due to tearing of the medial meniscus. He complained of headache after surgery. Computed tomography(CT) revealed acute subdural hematoma in the right fronto-tempo-parietal area. The headache progressed in spite of analgesics and bed rest; two weeks later, the CT showed subacute subdural hematoma with a mass effect. The patient improved after surgical decompression. The pathogenesis of subdural hematoma formation after dural puncture is discussed and we briefly review the relevant literature. Prolonged and severe postdural puncture headache(PDPH) should be viewed with suspicion and investigated promptly to rule out any intracranial complications. Immediate treatment of the PDPH with an epidural blood patch to prevent further CSF leakage should be considered.

**KEY WORDS :** Subdural hematoma · Epidural anesthesia · Complication.

### Introduction

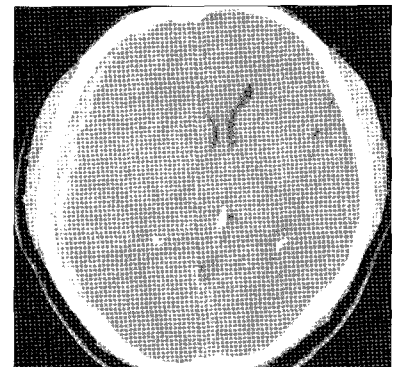
Intracranial subdural hematoma is an exceptionally rare complication of spinal anesthesia. This complication can occur in patients with no previous pathology and also after atraumatic use of a small-bore needle. This report describes the occurrence of acute subdural hemorrhage in a 52-year-old male who underwent a knee joint arthroscopic operation under spinal epidural anesthesia due to tearing of the medial meniscus.

### Case Report

A 52-year-old male underwent knee joint arthroscopic operation under spinal epidural anesthesia due to tearing of medial meniscus. After surgery, he complained of a positional headache that was not controlled by analgesics and hydration. A week later, he presented with severe headache that was especially aggravated in the sitting position, and also vomiting was present; these symptoms didn't respond to bed rest and analgesia. All laboratory data were within the normal limits. Computed tomography(CT) showed acute subdural hema-

toma in the right fronto-tempo-parietal area (Fig. 1). Cerebral angiography showed no definite aneurysmal dilatation, except for the junctional dilated posterior communicating artery (Fig. 2). The persisting headache did not decrease by day 14, so follow-up brain CT was performed. The follow-up brain CT showed that the previously noted acute subdural hematoma had changed into low density, but it had increased in size and the mass effect was revealed (Fig. 3).

Through the pterional craniotomy, we removed a subacute staged subdural hematoma; there was no subarachnoid hematoma and no aneurysmal dilatation noticed at the posterior communicating artery. The patient recovered fully and w-



**Fig. 1.** Initial preoperative brain CT showing acute subdural hematoma in the right fronto-tempo-parietal area.

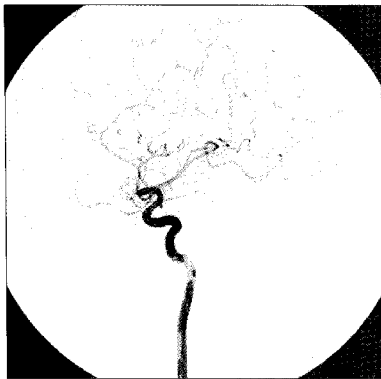
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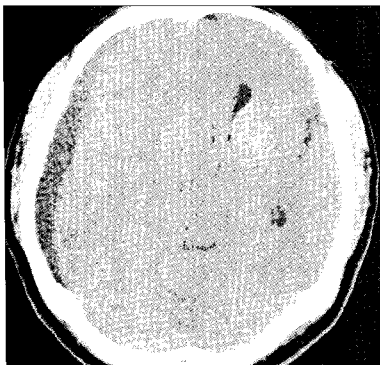
as discharged on the fourteenth day after operation. He had no headache, and the subdural hematoma had subsided by the time of discharge (Fig. 4).

## Discussion

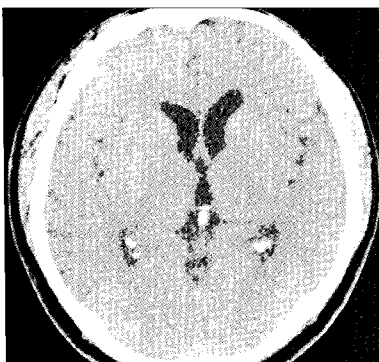
PDPH is the most frequent major complication after spinal anesthesia. Such headaches are thought to be caused by excessive leakage of cerebrospinal fluid (CSF) through the dural puncture that cause caudal displacement of the intracranial structures<sup>6</sup>. This displacement then stretches the intracranial pain-sensitive dura, the sinuses and the blood vessels, which causes pain. In the majority of cases, the symptoms subside within a few days when the patients are treated with analgesics and bed rest. The persistent headache in the days after the puncture was often initially mistaken for a simple PDPH.



**Fig. 2.** Preoperative cerebral angiography showing the junctional dilated posterior communicating aneurysm.



**Fig. 3.** Follow-up brain CT showing the previously noted acute subdural hematoma had changed to low density. However, the size is increased and mass effect is shown.



**Fig. 4.** Postoperative CT shows the subdural hematoma has been totally removed.

This displacement then stretches the intracranial pain-sensitive dura, the sinuses and the blood vessels, which causes pain. In the majority of cases, the symptoms subside within a few days when the patients are treated with analgesics and bed rest. The persistent headache in the days after the puncture was often initially mistaken for a simple PDPH.

A subdural hematoma following dural puncture is a very rare complication of epidural anesthesia, and the bleeding may be either cranial or spinal in location<sup>11,14</sup>. According to Tryba, the risk of spinal hematoma caused by central blockade is 1 : 150,000–220,000<sup>13</sup>. Scott and Hibbard reported an incidence rate of intracranial hematoma caused by central blockade is 1 : 500,000<sup>10</sup>. Subdural hematomas have occurred after lumbar puncture in associa-

tion with cerebral aneurysm, a brain tumor, a recent cerebrovascular accident and meningovascular syphilis<sup>12</sup>. The pathophysiology of subdural hematoma is similar to that of PDPH. Reduced CSF volume and pressure allow the brain to move caudally, and this stretches the dural veins. These veins can then tear, leading to bleeding<sup>1</sup>. Bjarnhall et al have reported that rupture of ascending dural veins in the brain can occur while moving the patient<sup>2</sup>. We propose that traction on the brain created by a loss of CSF volume, and this led to the subdural hematoma in our patient.

For the patients presenting with a postural headache, it is important to obtain a complete history and to consider the possible contributing risk factors such as use of large-bore needles<sup>1,2</sup>, multiple injection attempts<sup>2,3</sup>, patients with preexisting neurologic disease<sup>15</sup>, patients with cortical atrophy<sup>3</sup>, patients with alcohol abuse<sup>7</sup>, and patients taking anticoagulants preoperatively and/or postoperatively<sup>4,15</sup>. A subdural hematoma after lumbar spinal anesthesia can occur even in the absence of known contributing factors, as was the case for our patient.

PDPH is common in comparison with subdural hematoma which is a rare, but potentially fatal complication. Most patients with headache are probably treated without investigation. Subdural hematomas are known to resolve spontaneously, but they may be catastrophic as evident from the deaths that have been reported as complications of lumbar punctures<sup>3,9,12</sup>. Suess reported and reviewed 17 previously reported cases of intracranial hemorrhage following lumbar myelography, and fourteen of the 17 patients recovered completely after treatment, while three died<sup>12</sup>. A review of the literature found 48 patients with subdural hematomas following lumbar puncture. Nine deaths (19%) were reported, 5 of which were of patients who had been treated with burr holes. Of the 39 surviving patients, 36 required burr holes<sup>7</sup>. Failure to recognize these rare cases of subdural hematoma may have permanent and fatal consequences.

## Conclusion

In conclusion, we present a case of a patient who had none of the known risk factors for incurring acute subdural hematoma which occurred after a PDPH. Immediate treatment of the PDPH with an epidural blood patch to prevent further CSF leakage should be considered.

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