Concomitant Traumatic Spinal Subdural Hematoma and Hemorrhage from Intracranial Arachnoid Cyst Following Minor Injury

HUI-YI CHEN 1  YING-SHYUAN LI 1  CHUNG-HO CHEN 1  WU-CHUNG SHEN 1  KUNG-SHIH YING 2

Department of Radiology  1, China Medical University Hospital
Department of Radiology  2, Cheng-Ching General Hospital

Traumatic spinal subdural hematoma is a rare entity. Hemorrhage of intracranial arachnoid cyst is also uncommon. One 20 year-old man suffered from subacute intraspinal subdural hematoma in the sacral level after minor sports injury. He received spinal surgery for decompression and the symptoms recovered well after operation. Unfortunately, he suffered from sudden onset of aphasia one week later. Intracystic hemorrhage of pre-existing arachnoid cyst with adjacent subdural hematoma was found on CT and MRI of brain. The relation between these two events was discussed.

Key words: Arachnoid, cyst; Arachnoid, MR; Spine, subdural hematoma

Spinal subdural hematoma (SDH) is a rare entity. The etiologies of spinal SDH include hemorrhagic disorders, iatrogenic procedures, tumors, and trauma [1]. Traumatic spinal SDH is even rare. It is important to immediately recognize this disorder to avoid the serious consequences.

Arachnoid cysts account for 1% of intracranial tumors. They are often an incidental finding on imaging studies. Patients are usually asymptomatic even that the cysts are quite large. Previous reports [2-4] had described arachnoid cysts with subdural hematoma or intracystic hemorrhage. These cysts may bleed spontaneously or following a minor head trauma, but the exact mechanism is still unclear.

We reported a case of spinal SDH after minor sports injury. Intracranial subacute SDH and intracystic hemorrhage of an intracranial arachnoid cyst 6 days later were noted. After admission, no repeated injury was told. The subacute stage of intracranial SDH may indicate concomitant intracranial and spinal hemorrhage of the previous sports injury. We discussed the association between these two events.

CASE REPORT

One 20-year-old man suffered from severe lower back pain with radiation to bilateral thighs. Ten days prior to that episodes, minor injury during playing basketball was told. Numbness and difficulty of walking were also found during physical examination, but no significant central neurological abnormality was found at that time. His coagulation profiles were within normal limits.

MRI at admission revealed a long semilunar-shaped lesion in the posterior part of subdural space at sacral levels (Fig. 1). The lesion showed homogeneously hyperintense on T1-weighted images (T1WI) and mildly hyperintense on fast spin echo T2-weighted...
images (FSE T2WI). It does not enhanced after IV injection of Gadolinium. The findings were indicative of a subacute spinal SDH, and therefore surgical evacuation was performed 2 days later and SDH was confirmed by the surgeons. His symptoms completely disappeared after the operation. Unfortunately, sudden onset of aphasia 6 days after operation was found. Brain CT (Fig. 2) showed a relatively hyperdense hematoma in the left fronto-parietal area (arrows). One hypodense band-like structure within this hematoma (white arrow) was supposed to be the medial wall of pre-existing arachnoid cyst which separated the intracystic hematoma from the adjacent SDH. CT image of brain in bone window setting showed erosion at calvarium (arrow). The SDH was likely due to rupture of the adjacent arachnoid cyst.

**DISCUSSION**

Spinal hematoma most commonly occurred after lumbar puncture and spinal anesthesia; other etiologies include coagulopathy, vascular malformations, tumoral hemorrhage, spontaneous, and trauma, which
may be trivial trauma and even minor exertion of urination, defecation, vomiting, or exercise [5]. Post-traumatic spinal SDH is relatively rare [5]. Rader [6] proposed that spinal SDH resulted from an indirect force on the intraspinal vessels. Furthermore, the spinal subdural space does not contain major blood vessels and bridging veins [7]. These reasons explain why spinal SDH is less common than epidural hematoma (EDH).

In our case, calvarial erosion adjacent to the

---

**Figure 3.** MRI of the brain performed one day after CT. 

- **a.** Axial T1WI (TR/TE: 466/14 msec) showed hyperintensity of the hematoma (arrow).
- **b.** Axial and **c.** coronal T2WI (4500/75 msec) showed the high signal intensity of the hematoma, which indicated a subacute hematoma. The findings were consistent with hyperdensity of the hematoma on CT. The medial wall of the arachnoid cyst was also observed (double arrows, a and b).
- **d.** Axial post-contrast T1WI showed no abnormal enhancement adjacent to the hematoma.

**Figure 4.** Follow-up CT of brain

- **a.** 1.5 months after discharged
- **b.** 3 months later
- **c.** and 1 year later. The hematoma was totally absorbed and the cyst became smaller. The pictures were indicated intracystic hemorrhage with rupture and adjacent subdural hematoma.
hematoma and mild hypoplasia of adjacent brain were suggestive of congenital arachnoid cyst. The intracranial hematoma had band-like septation, and was totally absorbed on the follow-up CT images. The pictures were consistent with rupture of arachnoid cyst with adjacent SDH.

Intracranial SDH and hemorrhage of arachnoid cyst can occurred after dural tear during spinal surgery [8, 9]. While bulging wound at lower back with CSF-like fluid accumulation developed 10 days after spinal surgery, the patient’s CNS symptoms occurred earlier and intracranial subacute SDH was found on MRI with hyperintensity on T1WI and T2WI. Thus intracystic hemorrhage with rupture and adjacent SDH in our patient seemed happened at the same time as spinal SDH following sports injury.

Arachnoid cysts are usually asymptomatic and they frequently cause erosion of adjacent calvarium. However, they can become symptomatic suddenly because of intracystic hemorrhage with enlargement of their size. Occasionally, arachnoid cysts are complicated by subdural hemorrhage [3-5]. Hemorrhage of arachnoid cysts can be spontaneous or follow minor trauma with rupture of intracystic or bridging vessels [3].

It was interesting that concomitant spinal SDH and hemorrhage of intracranial arachnoid cyst occurred in a young man without major trauma. According to serial images of CT and MRI, hemorrhage of intracranial arachnoid cyst and spinal SDH seemed occur at the similar time following minor sports injury. Delayed neurological abnormality may be due to persistent or repeated intracystic hemorrhage with subsequent rupture.

We postulated that intracranial SDH can be caused by intracystic hemorrhage and by rupture of arachnoid cyst after minor injury. Recognition of these mechanisms is of help in the differential diagnosis.

REFERENCES
輕微外傷後伴隨外傷性脊髓硬腦膜下腔血腫與顱內蜘蛛網膜囊腫出血

陳志誼¹ 李英玄¹ 陳中和¹ 沈政忠¹ 英恭史²

中國醫藥大學附設醫院 放射線部¹
澄清醫院 放射線部²

外傷性脊髓硬腦膜下腔血腫是一種少見的疾病。顱內蜘蛛網膜囊腫出血伴隨硬腦膜下腔血腫也並不常見。一個二十歲年輕男性在輕微的運動傷害後，於腫瘤處發現顱急性硬腦膜下腔血腫。他接受腫瘤減壓手術，術後恢復良好。不幸的是，術後一星期突然出現失語症。腦部電腦斷層和磁振造影發現原本的顱內蜘蛛網膜囊腫出現囊內出血伴隨硬腦膜下腔血腫。我們討論兩者之間的關係。

關鍵詞：蜘蛛網膜囊腫；蜘蛛網膜；磁振造影；脊髓：硬腦膜下腔血腫