

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

HUI-YI CHEN<sup>1</sup> YING-SHYUAN LI<sup>1</sup> CHUNG-HO CHEN<sup>1</sup> WU-CHUNG SHEN<sup>1</sup> KUNG-SHIH YING<sup>2</sup>

*Department of Radiology<sup>1</sup>, China Medical University Hospital  
Department of Radiology<sup>2</sup>, 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.

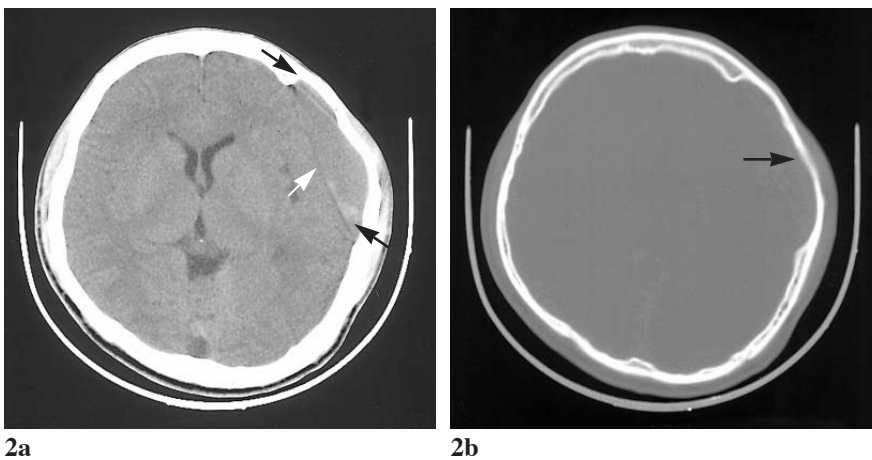
MRI at admission revealed a long semilunar-shaped lesion in the posterior part of subdural space at sacral levels (Fig. 1). The lesion showed homogeneously hyperintense on T1-weighted images (T1WI) and mildly hyperintense on fast spin echo T2-weighted

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Reprint requests to: Dr. Ying-Shyuan Li  
Department of Radiology, China Medical University Hospital,  
No. 2, Yuh Der Road, Taichung 404, Taiwan, R.O.C.



**Figure 1.** MRI of lumbosacral spine performed after admission. **a.** Sagittal T1-weighted image (T1WI, TR/TE: 350/14 msec) showed semilunar-shaped lesion (arrows) of high signal intensity at the posterior part of subdural space at sacral levels. **b.** Sagittal fast spin-echo T2WI (4000/99 msec) showed mildly hyperintense of the lesion (arrow). **c.** Axial post-contrast T1WI showed no significant enhancement of the lesion (arrows). The pictures were suggestive of subacute subdural hematoma.



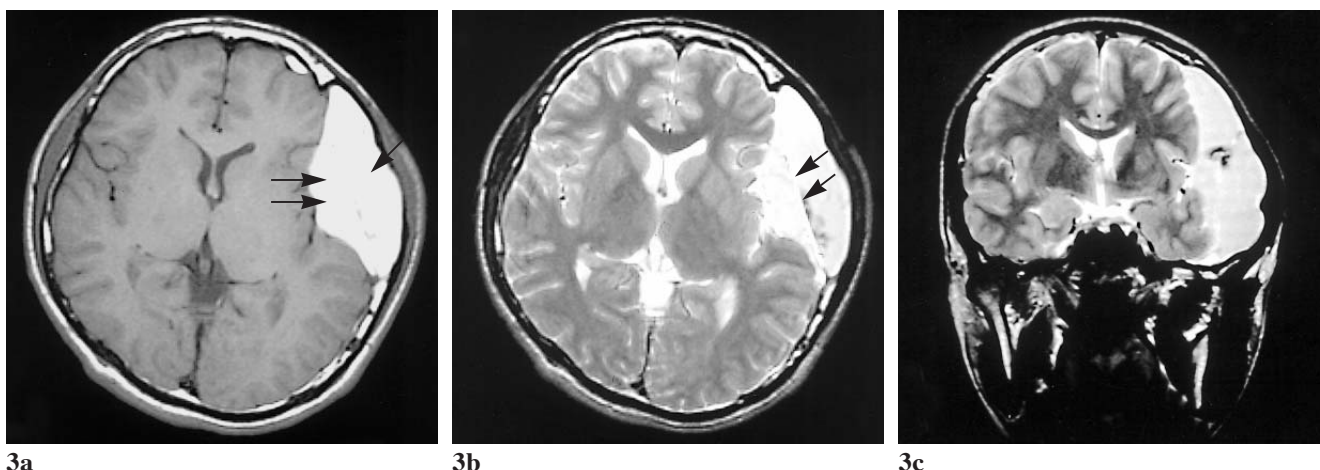
**Figure 2. a.** Non-contrast enhanced CT scan of brain taken 6 days after spinal surgery showed relatively hyperdense hematoma in the left fronto-parietal area (arrows). One hypodense band-like structure within this hematoma (white arrow) was supposed to be the medial wall of pre-existing arachnoid cyst which separated the intracystic hematoma from the adjacent SDH. **b.** 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.

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 (Fig. 2a) with erosion of overlying calvarium (Fig. 2b). The hematoma was hyperintense on T1WI and T2WI (Fig. 3), which was performed on the next day of CT. The findings were suggestive of hemorrhage of a pre-existing arachnoid cyst. Surgical decompression had been suggested, but it was refused by his family. Ten days after spinal surgery, local bulging of the wound in lower back with CSF-like fluid accumulation at sacral area was noted, but no specific treatment was

used. Because his CNS neurological symptoms were stable, the patient refused operation for the intracranial hematoma. The patient visited another hospital after he was discharged, and received CT scans at 1.5 month, 3 months and 12 months during regular OPD follow-up. On serial follow-up CT scans (Fig. 4), total absorption of the intracranial hematoma with decreased size of the cyst was observed, the findings supported the diagnosis of intracystic hemorrhage from arachnoid cyst and subsequent rupture with adjacent SDH.

## DISCUSSION

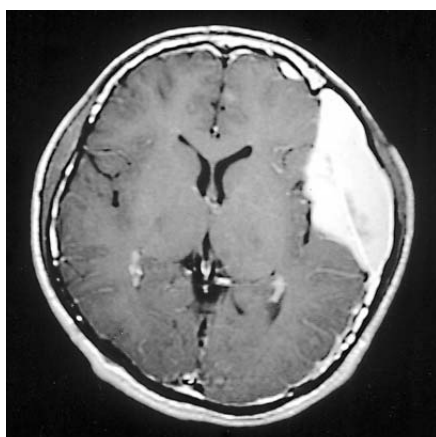
Spinal hematoma most commonly occurred after lumbar puncture and spinal anesthesia; other etiologies include coagulopathy, vascular malformations, tumoral hemorrhage, spontaneous, and trauma, which



3a

3b

3c



3d

**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.



4a

4b

4c

**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.

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

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 occur 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 to have 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 to 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.



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## 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

陳惠誼<sup>1</sup> 李英玄<sup>1</sup> 陳中和<sup>1</sup> 沈戊忠<sup>1</sup> 英恭史<sup>2</sup>

中國醫藥大學附設醫院 放射線部<sup>1</sup>  
澄清醫院 放射線部<sup>2</sup>

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，於薦椎處發現亞急性硬腦膜下腔血腫。他接受脊髓減壓手術，術後恢復良好。不幸的是，術後一星期突然出現失語症。腦部電腦斷層和磁共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，磁共振造影；脊髓；硬腦膜下腔血腫