

Case Report

Intraventricular and Subarachnoid Fat after Spinal Injury

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The authors report an extremely rare case with intraventricular and subarachnoid fat developed after trauma to spine and soft tissue in a 54-year-old male. The initial computed tomography (CT) showed multiple low attenuation lesions, which were thought to be pneumocephalus. Cerebral magnetic resonance imaging (MRI) showed lesions with high signal intensity on T1-weighted magnetic resonance images and high signal intensity on T2-weighted images, indicating fat globules within the CSF. In this report, the clinical presentation, radiological findings, and a review of the literature are presented.

KEY WORDS : Intraventricular · Subarachnoid · Fat · Spine · Injury.

INTRODUCTION

Intraventricular and subarachnoid fat is a rare case and usually associated with spontaneous rupture or as a part of postsurgical course after surgical removal of dermoid and epidermoid tumors^{4,5}. But, intraventricular and subarachnoid fat after trauma, in absence of intracranial or intraspinal tumor², have never been reported. We present a case of intraventricular and subarachnoid fat dissemination following an injury to the spine and soft tissue.

CASE REPORT

A 54-year-old male presented to the emergency department reporting with impaired consciousness, motor weakness, and sensory loss of the both lower extremities after an injury caused by falling.

A neurological examination demonstrated disoriented words but obey command. His pupils were of equal size and reactive to light, and he showed no cranial nerve deficits, but only a mild weakness in both lower extremities.

The initial CT scan of the head revealed a multiple low attenuation lesions in the lateral ventricles as well as supras-

ellar, sylvian and prepontine cisterns without hemorrhage or brain injury (Fig. 1). These lesions were initially thought to indicate pneumocephalus.

The CT scan of the lumbosacral junction showed fracture and dislocation of the sacrum between the first and second sacrum (Fig. 2). Sacropelvic fixation was performed to obtain a rigid fusion at the fracture and dislocation between the first and second sacrum.

MRI of the brain, taken 14 days after the trauma, showed areas of high signal intensity on T1 and T2-weighted images in the subarachnoid and intraventricular space, indicating fat, without brain injury or hemorrhage (Fig. 3).



Fig. 1. Axial computed tomography scan showing low signal intensity, initially thought to be pneumocephalus, at the prepontine and right sylvian cistern.

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Fig. 2. Initial sagittal (A) and axial (B) computed tomography scans and sagittal (C) T2-weighted magnetic resonance image of the lumbosacral spine confirmed soft tissue injury and bilateral longitudinal fractures through the sacral foraminae and forward displacement of the first sacral vertebra into the pelvic cavity, just in front of the second sacral vertebra.

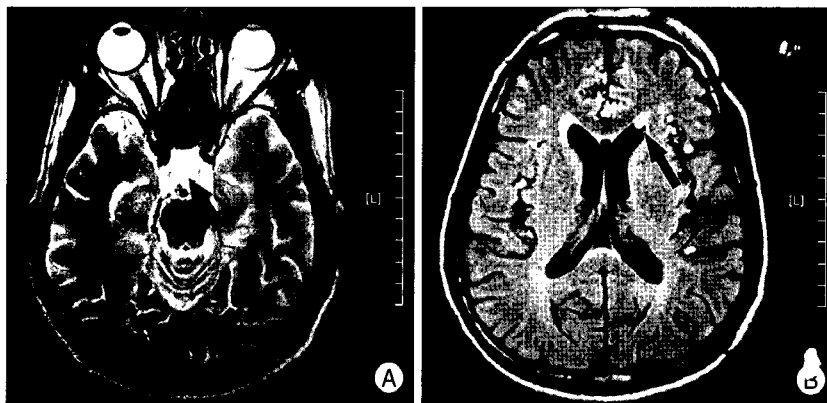


Fig. 3. T2-weighted magnetic resonance image (A) showing the widespread subarachnoid dissemination of the fat within the cerebrospinal fluid, mainly at the right sylvian fissure and suprasellar cistern (arrow). T1-weighted magnetic resonance image (B) showing multiple hyperintense lesions of the widespread fat drops at the subarachnoid space, along with a fat drop at the frontal horn of the left lateral ventricle (arrow).

No mass suggesting a tumor was found in the brain or spine. Repeated MRI showed intraventricular and subarachnoid fat particles moving within the cerebrospinal fluid. Neither hydrocephalus nor meningitis was found.

By the postoperative fifth week the patient was able to walk with a cane. The intraventricular fat was managed conservatively, and the patient was discharged with no cerebral sequelae.

DISCUSSION

Generally, intracranial fat dissemination occurs spontaneously or during the postoperative course after surgical removal of dermoid and epidermoid tumors.

Typical CT findings include free fat globules in the subarachnoid spaces and intraventricular fat-fluid levels. Subarachnoid fat may be difficult to differentiate from pneumocephalus on standard CT imaging optimized for brain parenchyma, but imaging for bone detail will easily differentiate fat from air³. Moreover, the fat within the

ventricles and the subarachnoid space is mobile, as can be shown by changing the position of patient's head, which accounts for redistribution of the fatty material on follow-up scans^{6,8}. MRI study has several advantages including its sensitivity in detection of fat, the ease of multiplanar imaging, and the lack of bone artifacts³. Fat drops in the subarachnoid and intraventricular space appear hypertense on T1 and T2-weighted images^{1,8}. Intraventricular and subarachnoid fat from the spine or soft tissue likely develop when fat content gains access to the ventricular system by way of retrograde migration through the fourth ventricular outlet foramina as a result of head position and CSF pulsation from the spine or subcutaneous tissue after trauma^{3,6}.

The presence of fat in the subarachnoid space may induce different types of complications, including aseptic meningitis, hydrocephalus, ischemia, calcification due to meningeal inflammatory reaction, obstruction of CSF flow, or irritation of vascular and neural structures, which are caused mainly by the inflammatory effects of break-

own products from cholesterol^{1,2,3,6}. For patients with subarachnoid aseptic meningitis, high doses of corticosteroid were the most effective treatment^{1,7}.

The long-term clinical and radiological findings of intracranial subarachnoid fat dissemination remain uncertain⁸. Several authors reported that repeated MRI studies revealed no movement of the subarachnoid fat particles demonstrating their adherent nature of these globules⁹. Furthermore, there were no complications, such as hydrocephalus, transient cerebral ischemia, seizures, or neurological deterioration of the patient, during the 8-year follow-up period⁶.

CONCLUSION

The authors report an extremely rare case of intraventricular and subarachnoid fat, initially thought to be pneumocephalus, after spinal injury. It is important to consider the possibility of intraventricular or subarachnoid fat in a patient who has pneumocephalus.

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