Traumatic Acute Spinal Subarachnoid Hematoma
- A Case Report -

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This case report describes a 66-year-old male who presented with progressive paraparesis after falling down. Magnetic resonance (MR) imaging showed an acute spinal hematoma at the T11-T12 level with spinal cord compression. The patient underwent an emergency left T11-T12 hemilaminectomy. The location of hematoma was subarachnoidal and the source of bleeding was the injured radicular vein. To the best of our knowledge, this is the first case of traumatic spinal subarachnoid hematoma. We discuss the possible mechanism and our case illustrates an injured radicular vein can be a source of traumatic spinal subarachnoid hematoma.

Key Words: Spinal Hematoma · Trauma · Subarachnoid

INTRODUCTION

Spinal subdural hematoma (SSH) is a rare occurrence and can cause serious neurologic symptoms. SSH is usually associated with hemorrhagic disorder, anticoagulant therapy, lumbar puncture, spinal surgery, tumor, vascular malformation, and trauma. It is generally agreed that prompt evacuation should be performed before irreversible damage to the spinal cord occurs. Trauma is considered to be a rare cause of SSH. Even following trauma serious enough to cause vertebral fractures, SSH is rare except when associated with bleeding tendencies. Only 11 cases have been reported in the literature. In our review of the previous traumatic SSH treated surgically, subdural bleeding was extraarachnoidal or the spinal cord appeared to be normal in 7 cases. The authors report a case of a traumatic spinal subarachnoid hematoma in a 66-year-old male.

CASE REPORT

A 66-year-old man accidentally fell down from a height 3 m and subsequently presented with back pain, abdominal pain and dyspnea, followed by progressive paraparesis. Physical examination revealed confused consciousness and irritability. Three hours after the injury, the paraparesis of 3/5 had deteriorated to a flaccid paraplegia. The patient's sensory deficits were distal to the T12 segment. Plain radiographs and a computed tomographic (CT) scan of the chest demonstrated hemopneumothorax in both pleural cavities with multiple rib fractures including the 12th rib on the left side (Fig. 1). Brain CT showed traumatic intraventricular hemorrhage and subarachnoid hemorrhage. Emergency magnetic resonance (MR) imaging disclosed an acute spinal hematoma at the T11-T12 level with spinal cord compression. The hematoma was isointense on the T1-weighted images and hyperintense on the T2-weighted images, consistent with a hyperacute hematoma (Fig. 2). The good visualization of the epidural fat and the features of the hematoma surrounding the spinal cord led us to suspect subdural hematoma. His coagulation profiles, including platelet count, prothrombin time and partial thromboplastin time were within the normal range.

The patient underwent an emergency operation via left T11-T12 hemilaminectomy. The epidural space appeared to be normal, but the dura was tense and bluish in color. After making an incision of the dura, a dark bluish-discolored arachnoid membrane was revealed, which tended to bulge (Fig. 3). After opening the arachnoid membrane, an organized hematoma and bloody...
Fig. 1. Computed tomography demonstrating an almost circumferential homogenous hyperdensity within the spinal canal and left 12th rib fracture. The epidural fat was well visualized, suggesting the subdural location of the hematoma.

Fig. 2. Preoperative T2-weighted sagittal (A) and axial (B) MR images of the thoracic spine revealing an acute subdural hematoma extending from T11 to T12 and a soft tissue hematoma on the left side. The spinal hematoma was located left ventrally and crossed the midline, and the posterior epidural fat was well preserved.

cerebrospinal fluid (CSF) were extruded under pressure. Following the complete removal of the remaining hematoma by aspiration and irrigation, active bleeding was noted from the injured radicular vein that was thought to be the source of bleeding. Postoperatively, the patient failed to regain any significant improvement and required ventilatory assistance. Three days after surgery, he developed multi-organ failure and died.

DISCUSSION

Spinal subdural hematoma (SSH) is a rare disease entity, which is usually associated with blood dyscrasia, anticoagulation, lumbar puncture, vascular malformations, tumor bleeding and trauma. Traumatic SSH is quite rare even following trauma serious enough to cause vertebral fractures, and only 11 cases have been reported in the literature. Surgical treatment, consisting of laminectomy and evacuation of the hematoma, was performed in 8 cases, while conservative treatment was provided in the remaining 3 cases. In our review of the previous reports on traumatic SSH, we found that subdural bleeding was extraarachnoidal and that the hematoma was separated from the subarachnoid space with an intact arachnoid membrane or the spinal cord appeared to be normal in 7 cases, while no information was given in 1 case. To the best of our knowledge, this is the first case of traumatic spinal subarachnoid hematoma.

Because SSH can compromise the spinal cord, resulting in paralysis, early diagnosis and identification of the extent of the hematoma are necessary. MRI is superior to CT for the diagnosis and follow-up of SSH, and provides information on the longi-
Traumatic Spinal Hematoma

tudinal extent of the hematoma and the degree of spinal cord compression. According to a large-scale analysis of nontraumatic acute SSH, the prognosis is worse in patients with subarachnoid hemorrhage. In our case, the initial progressive motor deficit of the lower limbs deteriorated in a brief period of time. Once the hematoma had been evacuated, it was observed that the spinal cord appeared to be bruised, as in the case of cerebral subarachnoid hemorrhage. It can therefore be concluded that the mass effect of the subarachnoid hematoma is able to affect the spinal cord directly, reducing the likelihood of recovery notwithstanding prompt evacuation of the hematoma.

The mechanism of hematoma formation in the subdural space remains unknown. An indirect force on the intraspinal vessels was proposed by Rader. A sudden increase in abdominal and thoracic pressures elevates the intravascular pressure, resulting in the rupture of a spinal vessel. Masdeu et al., reported two cases of spinal subarachnoid hematoma following lumbar puncture, in which the radicular vessels were found to be the source of the bleeding at postmortem examination. In our case, active bleeding from the injured radicular vein was noticed, which prompts the question, Since bleeding can originate from the radicular vein, why subarachnoid hematomas are so seldom encountered clinically? The answer may be that they are probably not found when the amount of bleeding from the radicular vein is small, because the blood-tinged CSF does not clot and it can be cleared faster than in the case of subdural hematoma. Most cases of spinal subarachnoid hemorrhage probably follow a benign course or pass unnoticed. However, when the blood collection is large, it has a chance to organize and can cause neurologic deficit, in which case prompt evacuation is mandatory. The present case suggests that acute spinal subarachnoid hematoma can result from an injured radicular vein caused by trauma.

REFERENCES