



Acute Cervical and Thoracic Ventral Side Spontaneous Spinal Epidural Hematoma Causing High Paraplegia: A Case Report

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Abstract

Introduction: Spontaneous spinal epidural hematoma (SSEH) is a rare condition that can potentially cause paraplegia. SSEH has an increasing incidence rate and its cause remains unclear. Magnetic resonance imaging (MRI) results shows that SSEH presents a spinal epidural space-occupying lesion; therefore, emergency surgical treatment is required in some cases. MRI results of most SSEH cases showed that hematoma occurs in the dorsal or lateral side. By contrast, hematoma in the ventral side is very rarely shown.

Case Presentation: A 42-year-old healthy woman developed a sudden onset of severe neck pain with mild limb weakness, gradual breathing difficulty, and high paraplegia. MRI results revealed that an SSEH was compressing her spinal cord in the ventral epidural space from C2 to T3. Upon admission, she received emergency decompressive laminectomy in a posterior approach from C3 to T1, and the epidural hematoma was evacuated through full incision of the dorsal side dural, release of cerebrospinal fluid, and intermittent incision of the ventral side dural. The symptoms of limb paralysis and breathing distress gradually improved after recover rehabilitation, and the patient was discharged with life self-care after 2 months.

Conclusions: Performing early decompressive laminectomy and evacuation of hematoma on severe SSEH patients improves neurological outcomes. For patients with ventral side SSEH, the cerebrospinal fluid should be released after the incision on the dorsal side dural, and the ventral side dural should be gradually as well as intermittently clipped to evacuate the hematoma. The patient would also receive a good prognosis after the total release of the spinal cord compression.

Keywords: Cervical, Thoracic, Spinal Epidural Hematoma, Magnetic Resonance Imaging, Decompressive laminectomy

1. Introduction

Spontaneous spinal epidural hematoma (SSEH) is a rare spinal epidural space-occupying hematoma that is a potentially devastating problem (1). The onset presentation of SSEH widely varies from only axial neck pain to severe neurological compromise (2). This condition may lead to rapid and irreversible neurological impairment if not recognized on time (3). Therefore, early diagnosis and treatment are essential (2, 3). In most cases previously reported, SSEH is positioned on the dorsal or lateral side (4, 5). Decompressive laminectomy and removal of the epidural hematoma are comparatively easy to perform in these positions. This report is a case study of the ventral side SSEH. The patient presents serious preoperative clinical symptoms, and the occupying was evident. In this case, total decompression of the spinal cord is difficult to achieve through decompressive laminectomy. Thus, we performed dorsal dural incision, released the cerebrospinal fluid, and intermittently clipped the ventral dural to evacuate the ventral side hematoma. The follow-up complete neuro-

logical resolution for the patient was conducted within 2 months.

2. Case Presentation

A 42-year-old healthy woman was admitted to the emergency room of the No.101 Hospital of PLA (Wuxi, Jiangsu, China). She complained of a sudden onset of severe neck pain with mild limb weakness and paraparesis for 4 h, followed by numbness from the sternal handle without respiratory distress. Her conscious was clear upon admission. During neurological examination and diagnostic evaluation, 3 hours later, she was found to be completely paralyzed in both legs and both arms. She also had sensory loss below the level of C3. Respiratory distress manifested after 7 hours later. Turn out muscle tendon reflexes and sphincter dysfunction (McCormic scale IV, Frankel scale A).

Laboratory analyses of blood, including prothrombin time: 11.8 s (10.4 – 14.3 s), thrombin time: 19.7 s (14 – 21 s)

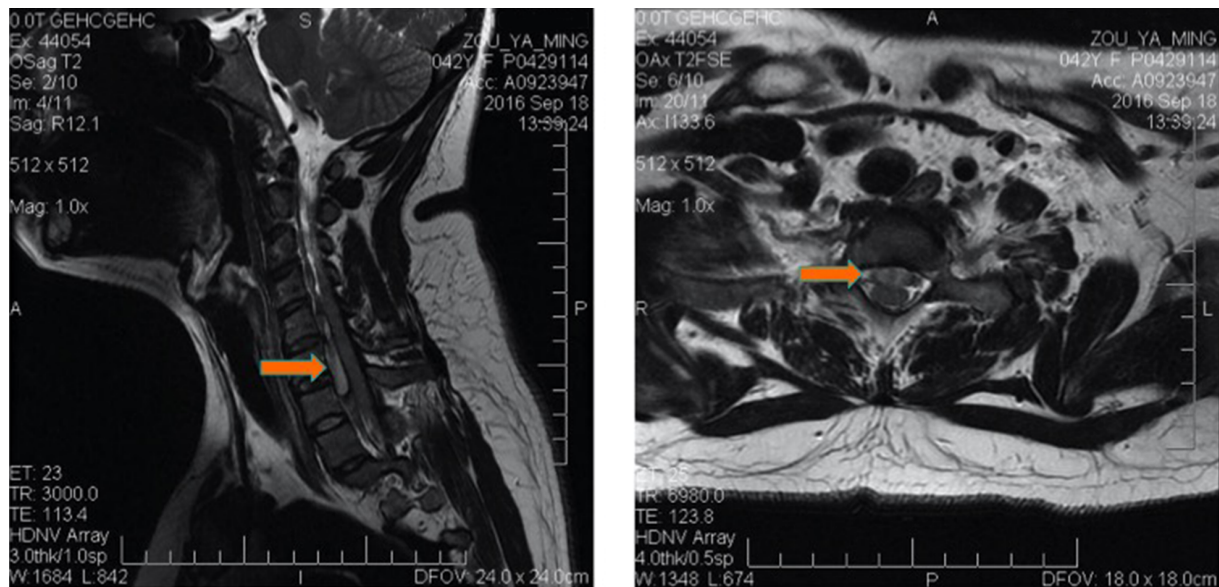


Figure 1. Initial T2-Weighted Sagittal (A) and Axial (B) Magnetic Resonance Images Showing a Hyperintense Acute Hematoma That Compressed the Spinal Cord in the Ventral Epidural Space at the C2-T3 Level

and platelet count: $178 \times 10^9/L$ ($100\text{--}300 \times 10^9/L$), were immediately conducted upon admission to the hospital. Magnetic resonance imaging (MRI) was performed without administering gadolinium enhancement of the cervical and thoracic cord. An SSEH compressing her spinal cord in the ventral epidural space from C2 to T3 was revealed through T1 and T2 weighted imaging (Siemens Magnetom Avanto 3.0-T, Erlangen, Germany). On the day of hospital admission, surgical decompression with total laminectomy from C3 to T1 was performed, followed by the release of cerebrospinal fluid after the incision on the dorsal side dural. The spinal cord was undrawn to gradually and intermittently clip the ventral side dural and evacuate the ventral side hematoma. The dorsal side dural was tightly stitched, and an external drainage tube was connected after evacuating the SSEH. The patient had no history of hypertension, diabetes, trauma, and bleeding dyscrasia and did not undergo anticoagulant therapy. A follow-up MRI obtained 2 days after the operation revealed that the hematoma was completely evacuated. The limb paralysis symptoms of the patient gradually improved, and she was discharged with life self-care after 2 months of recover rehabilitation.

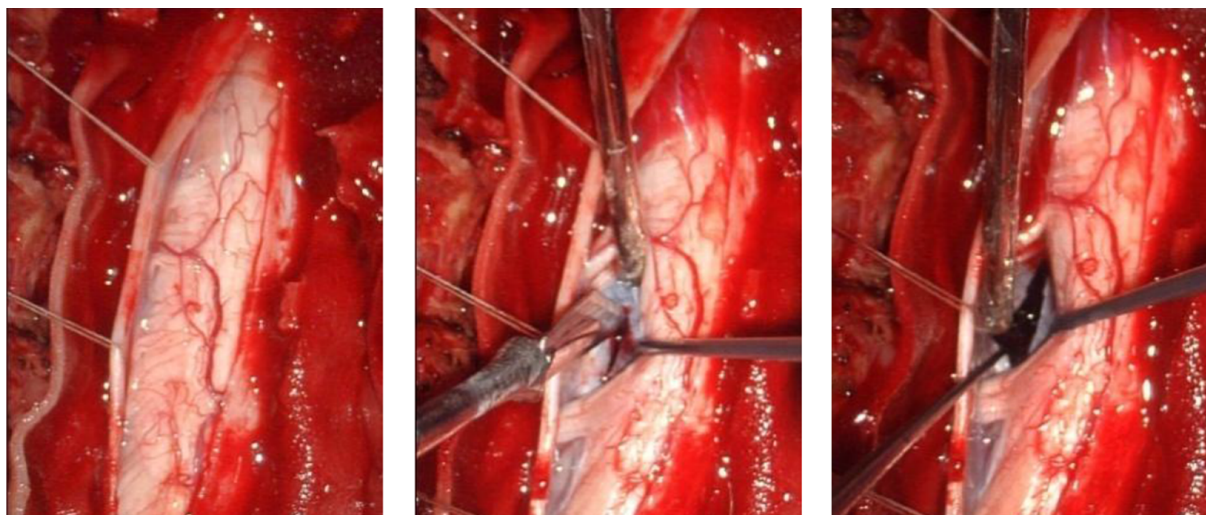
3. Discussion

SSEH was first described by Jackson in 1969 (6). Since then, more spontaneous spinal epidural hematoma cases

have been reported. In the last 2 decades, the annual incidence of SSEH has been estimated to be 0.1 per 100,000 patients (7, 8). The increasing prevalence of SSEH is due to the increasing number of patients that currently take single or various combinations of anticoagulant or antiplatelet medications due to the frequent incidences of heart or cerebrovascular disease. In addition, MRI is now easy to use in medical practices even for patients with minimal limb paralysis or neurological abnormalities (9, 10). It also facilitates SSEH diagnosis and thus allows the detection of more cases with an onset, exact, and natural change course. Other secondary causes, such as increased bleeding tendency for various medications (11), blood dyscrasia (12), hypertension (13), indirect spinal trauma (14), and pregnancy (15), were also discussed in literature.

The initial symptoms of SSEH usually presents with acute neck or back pain, radiating pain, progressive weakness, limb weakness or even paralyzed, and acute pain and paralyzed syndrome due to compression of the spinal cord or nerve roots (2). Due to the fact that these symptoms can mimic a disc herniation, epidural tumor, acute ischemic cerebrovascular disease, or an infection, differential diagnosis is important. MRI has been currently recognized as the most accurate diagnostic method for its definitive position diagnosis and to rule out the presence of SSEH. Within 24 hours of onset, the hematoma was isointense with the cord on T1-weighted images and heterogeneous on T2-weighted images (16). Within 48 h, the hematoma

Figure 2. Intraoperative Aspect of the Incision on the Dorsal Side Dural (A); Intermittent Clipping of the Ventral Side Dural (B); and Evacuation of the Ventral Side Hematoma (C)



(Department of Neurospinal and Neurotrauma, Craniocerebral Injury Cure Center of PLA, No.101 Hospital of PLA, Wuxi, Jiangsu, China, 2016).

produced an increased signal on the T1-weighted images, however, remained hyperintense on the T2-weighted sequences due to the accumulation of methemoglobin (17). SSEH diagnosis was certainly doubted and an immediate spinal MRI must be ordered if the patient presents definite neurological deficits in the early phase of disease progression.

There are little cases received conservative treatment according the symptom and the space-occupying lesion (18). Standard therapy for severe occupying SSEH includes the prompt evacuation of hematoma and decompressive laminectomy (19), usually with good neurological recovery. The outcomes for these patients depend on the time interval between the onset of symptoms and surgical treatment. Early decompression surgeries are associated with improved neurological recovery (20). Spinal cord ischemia tends to be reversible when decompressive laminectomy is performed within 8 h after the onset of neurological dysfunctions (21). In our case study, successful decompressive laminectomy was performed during the first 24 h of the onset of symptoms and thus allowed full recovery of the sensorimotor and sphincteric functions. In general, early operative evacuation results in improved neurological outcomes (22, 23).

The region of spinal hematoma is often at the cervical and thoracic vertebrae levels and spreads throughout the thoracolumbar spine (1, 24). Most spinal hematomas are found at the dorsal dural or lateral side area due to the fact that the hematoma adheres to the posterior longitudinal

ligament located at the front of the spinal canal (1). However, in the preset case, the SSEH was in the ventral side of the spinal cord and across the multiple segment space. As the spinal nerve root in the intervertebral foramen position and abundant venous blood supply of paravertebral, ventral side hematoma is difficult to remove from the dorsal lateral side. For this, patients with severe clinical and acute onset symptoms, anterior surgery approach could be used to directly remove the hematoma. However, multi-segment evacuation is not appropriate. Sufficient decompression is difficult to achieve by performing only single or bilateral decompression. Decompressive laminectomy in a posterior approach is also insufficient without removal of the hematoma. When the dorsal side dural is not clipped, reaching the ventral side to evacuate the hematoma is difficult due to the spinal nerve root that blocks the bilateral intervertebral foramen position, and during the operation, we found that the cervical spinal was very swelling and not pulsating after the laminectomy. Finally, we selected the full incision on the dorsal dural to release the cerebrospinal fluid and relieve the pressure. The spinal cord was undrawn. The ventral side dural was intermittently clipped to gradually evacuate the ventral side hematoma. The dorsal dural was tightly stitched and the external drainage tube was connected after evacuating the SSEH. Finally, we repeated the MRI after 2 days and found that the ventral side SSEH was totally removed and the spinal cord was fully decompressed.

Compared with the previous report, a simple ventral

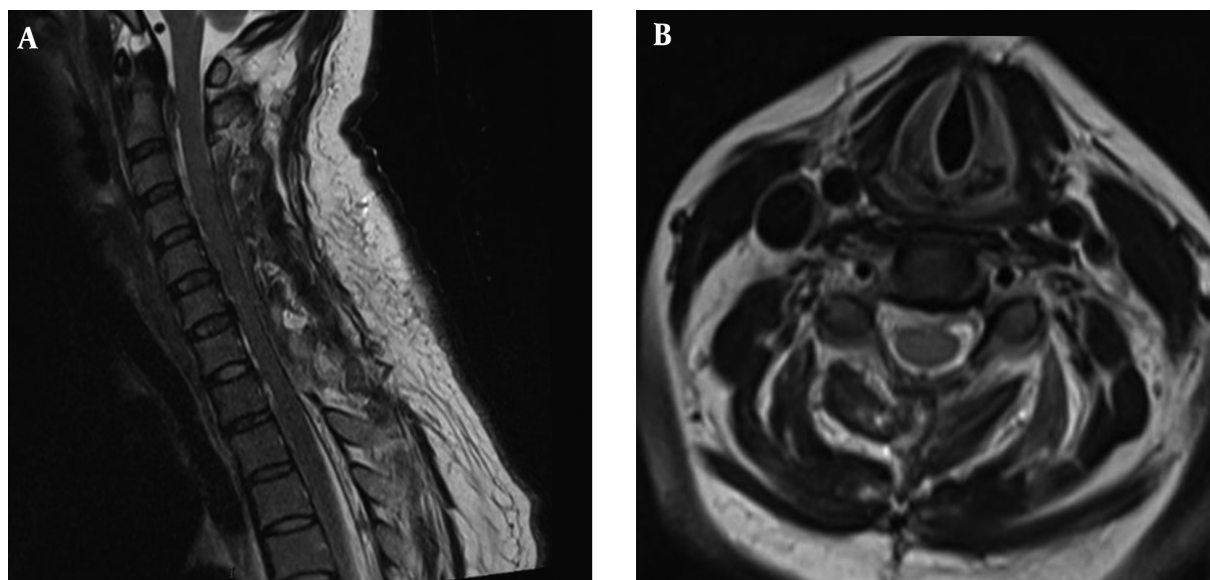


Figure 3. T2-Weighted Sagittal (A) and Axial (B) Magnetic Resonance Images, Which Were Obtained 2 Days After Onset and Revealed the Evacuation of the Hematoma

drainage tube connected to the ventral side hematoma lesion induces hemorrhage (25). In this case, we first clipped the dorsal side dural to release the cerebrospinal fluid. The cervical dorsal was notably enlarged during the intraoperative phase. The incision of the dorsal dural alleviated the symptoms of spinal cord compression, which was rarely reported in the previous cases. Thus, we suggested that in case the spinal cord remains swelled after the evacuation of the SSEH in the dorsal or lateral side, the dorsal side dural should be clipped to release the cerebrospinal fluid for further decompression.

In conclusion, SSEH is a rare, disabling, or even fatal entity that requires early diagnosis and prompt surgical treatment to improve the neurological and functional outcomes. SSEH causing high paraplegia is rarely located in the ventral multisegment. In the present study, we reported a case of ventral side SSEH. The patient received incision on the dorsal side dural and decompression of the intermittently clipped ventral side dural. After successfully evacuating the hematoma, the patient showed good recovery and less neurological deficits. This study serves a basis for the treatment of ventral side EESH.

Footnote

Authors' Contributions: Sang Cai, Wei Zhao, Long-Fei Shu and Feng Zhang Study concept and design, Wei Zhao Critical Revision of the manuscript.

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