J Med Sci 2007;27(6):291-294
http://jms.ndmctsgh.edu.tw/2706291.pdf

Spontaneous Spinal Epidural Hematoma Mimicking Lymphoma or Tumor Metastasis

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Spontaneous spinal epidural hematoma (SSEH) is an uncommon condition causing spinal cord compression and neurologic deficits. Clinical history with MR imaging has been authorized as the most reliable method for diagnosis of SSEH. Aggressive surgical decompression within 36 hours is the golden standard management for patients of SSEH, especially for patients with complete sensorimotor loss. Early rehabilitation following operation plays an important role in neurological recovery in SSEH. We present a paraplegic man with sudden onset of severe upper back pain when sitting calmly, followed by abruptly neurologic deteriorations including sensory loss below T-6 dermatome and paralysis. He was initially diagnosed as spinal lymphoma or metastasis by MR imaging of thoracic spine. Emergency surgical decompression was preformed within 24 hours. The pathology of the tumor turned out to be spinal hemangioma. After surgical intervention, our patient underwent a series of rehabilitation treatment. The lower extremity function gradually recovered and he was independently ambulating with a walker at ten month follow-up. Voluntary bowel function also returned but thrice daily intermittent catheterization remained necessary for neurogenic bladder.

Key words: spontaneous spinal epidural hematoma, paraplegia, thoracic spine

INTRODUCTION

Spontaneous spinal epidural hematoma (SSEH) is an uncommon medical condition associating with spinal cord injury and neurologic deficit. SSEH was first reported as "spinal apoplexy" in 1869 by Jackson[1]. There are multiple etiologies of SSEH, such as coagulopathies resulting from blood dyscrasias, vascular malformations, neoplasms, infections, iatrogenic procedures, or even minor vertebral traumas due to activities of daily living. However, etiologies in 50% of cases with SSEH remained unknown[2-4]. Although some reported SSEH resulted from spinal arterial bleeding, evidence from postmortem findings has proved that the rupture of the vertebral valveless venous plexus is the major bleeding source of SSEH in relation to the elevation of intrathoracic and/or abdominal pressure[2,3]. Clinically, patients with SSEH usually present with sudden back pain and sensorimotor impairment related to the injuried level[3]. The magnetic resonance (MR) imaging is standard method in diagnosis of SSEH[4]. The appropriate and acceptable management of SSEH is early decompressive laminectomy[5]. After early surgical intervention for SSEH, complete sensory motor recovery is noted in about one-third patients and incomplete recovery is measured in another one-third patients[6]. Although there is no study about the long-term follow-up after rehabilitation for SSEH, aggressive intervention of rehabilitation after surgery still plays an important role in the neurologic recovery of patients with spinal cord lesion[7].

Received: March 21, 2007; Revised: June 15, 2007; Accepted: July 2, 2007
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CASE REPORT

A 41-year-old officer was transferred to our emergency room with complaint of numbness and weakness in his lower limbs. He was relatively healthy in the past. Sudden onset of upper back pain developed on May 22, 2006. He described the sensation of his back pain as tingling and burning, which aggravated by a knock on inter-scapular space and while bending forward.

Nine hours prior to this admission, he experienced severe sudden pain at inter-scapular region followed by progressive numbness below costal margin and lower limbs weakness when sitting quietly. He was brought to a local hospital and transferred to our medical center for

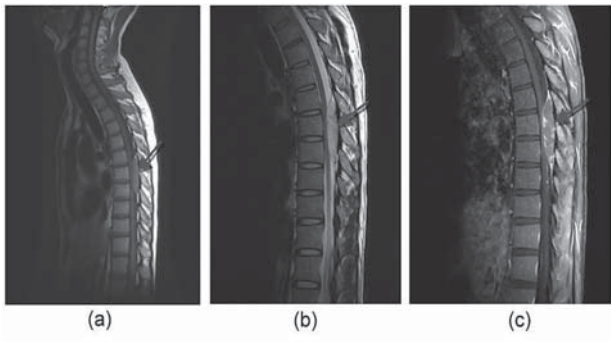
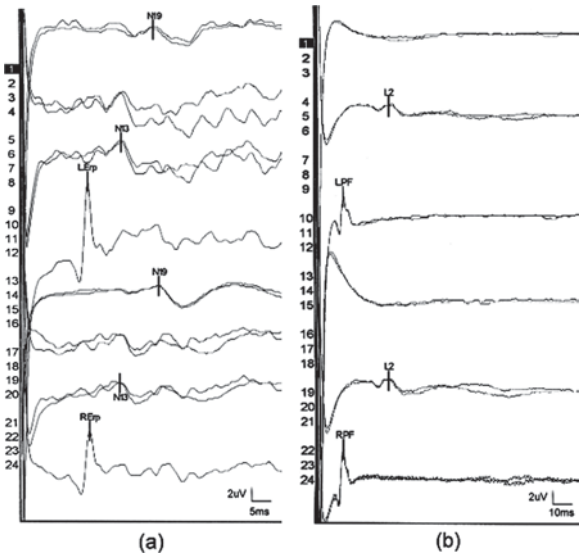


Fig. 1 MR imaging of thoracic spine 9 hours after onset of symptoms showed an extradural fusiform mass, 1.6 ×1.3×5.9 cm, causing spinal cord compression. (a) The mass is isotense with spinal cord in sagittal T1-weighted image, (b) the hyperintense mass with inner focal hypointense signal as spinal cord in sagittal T2-weighted image, and (c) Sagittal T1-weighted image after injection of gadolinium contrast revealing a mass in hypointense signal and peripheral enhancement.

further investigation. On arrival, his consciousness was clear and the blood pressure was 140/90 mmHg. He had paraplegia (muscle power score as 1/5 in lower limbs) and hypoesthesia with sensory alteration below approximately T-6 dermatome. Patellar tendon reflex and Achilles tendon reflex were absent, but Barbinski's sign was present bilaterally. Impairment of a sensation level was detected below T6 level. There was absent in his rectal sphincter tone and sensation with inevitable urine incontinence.

Laboratory routine studies were all within normal limits. The MR imaging of the thoracolumbar spine showed an extradural fusiform mass about 1.6×5.9×1.3 cm located in the epidural dorsal space between T6 and T8 vertebral body levels with obvious compression and displacement of the spinal cord. After the injection of gadolinium contrast, the mass showed homogeneous iso-intensity with the spinal cord on T1-weighted image (T1WI), hyper-intensity on T2-weighted image (T2WI) and surrounding enhancement of mass lesion on T1 fast scan (Fig. 1). Radiologist reported a tumor mass and lymphoma or tumor metastasis is highly impressed. High dose methylprednisolone was prescribed as a bolus of 30 mg per kilogram of body weight followed by infusion at 5.4 mg per kilogram per hour. Then, an emergency T6-T8 decompressive laminectomy surgery was preformed 17 hours after onset of his symptoms. During operation, an epidural venous bled with hematoma was found and then was evacuated completely. Pathology report revealed hemangioma without evidence of malignancy.



	Recording site	Latency, ms	
		Left side	Right side
Median SEPs			
	C3	**Nil**	**20.9**
	C4	**20.2**	**Nil**
	C7	**15.3**	**15.1**
	Erp	**10.3**	**10.6**
Tibial SEP			
	Cz	**No response**	**No response**
	L2	**22.0**	**21.6**
	PF	**8.6**	**8.2**

C3, C4, C7, and L2, electrode placement over the corresponding cervical or lumbar vertebra; Erp, Erp's point; PF, popliteal fossa

(c)

Fig. 2 Somatosensory evoked potential (SSEP) of the patient with spontaneous spinal epidural hematoma. (a) Normal SSEP study obtained from the median nerves in upper limbs showing normal. (b) SSEP study of tibial nerves showing that the initial potential was recorded over the lumbar spine without response recognized over the scalp. A thoracic myelopathy should be considered. (c) SSEP measured in our patient.

The American Spinal Injury Association (ASIA) function scale was evaluated one week after operation. The ASIA motor score was 54, pin prink score was 76, and light touch score was 71 without anal sensation and voluntary contraction. ASIA impairment scale improved from A to B. The somatosensory evoked potential (SSEP) was recorded normal from median nerve. Simultaneously, the tibial SSEP showed that the initial potential was recorded over the lumbar spine, but no response can be identified over the scalp. A thoracic myelopahty should be considered (Fig. 2).

Table1 The variable values of SSEP measured in our patient

Text	Left, ms	Right, ms
C3	Nil	20.9
C4	20.2	Nil
C7	15.3	15.1
Erp	10.3	10.6
L2	22	21.6
PF	8.60	8.20

Lat Diff	Left, ms	Right, ms
Ep-N13	5.00	4.50
N13N19	4.90	5.80
Ep-N19	9.90	10.3
LPF-L2	13.4	13.4
L2-P37	faint	faint
PFP37	faint	faint

Two weeks later after operation, he complained of progressive numbness of bilateral lower extremities and severe tingling and stabbing pain over his left big toe, which would be exaggerated by knocking and be relieved hardly by medication. The visual analogue scale (VAS) score was 5. Nevertheless, we rechecked MR imaging of thoracolumbar spine, which showed no further abnormal finding. Five weeks later after operation, intractable neuropathic pain progressed. After partial improvement of his neuropathic pain (VAS score from 8 to 4), our patient kept on his rehabilitation therapy. Ten months later after operation, we reevaluated the condition of our patient that ASIA motor score was 80, pin prink score was 96, and light touch score was 91 with anal sensation and voluntary contraction with improvement of ASIA impairment scale from B to D in our clinic. The VAS score with improvement from 4 to 3. Intermittent catheterization remained twice per day because of his neurogenic bladder. The muscle power score in his lower limbs improved from 2/5 to 4/5 but he ambulated with a walker due to his poor gait influenced by neuropathic pain and neurogenic bladder dysfunction.

DISCUSSION

There are many predisposing factors, such as clotting disorders for SSEH, either acquired (anticoagulant treatment, hematology, malignancy, or congenital (hemophilia), vertebral microtrauma, vascular malformation. Even a tumor invading the epidural space has been reported[2,3]. The causes of the bleeding remain idiopathic in 50% of the cases[2,3,8]. We present a patient with SSEH due to a thoracic spinal hemangioma and presenting mimic MR features with epidural lymphoma or metastasis.

The final diagnosis of the spinal epidural hematoma in our case is based on the pathology mainly. Although the clinical picture is relatively characteristic, its exact diagnosis is still difficult to make. Differential diagnosis includes spinal abscess, tumor, ischemia, transverse myelitis or acute vertebral disc disease[9]. Computed tomography with myelography was used for the diagnosis of SSEH in the past. In the present time, however, the best image modality for diagnosis of the epidural hematoma has been replaced by MR image, which localizes and characterizes the hematomas rapidly and more accurately[10].

The SSEH in our case has been misdiagnosed as lymphoma or metastasis, possible due to three reasons. First, the signal characters of spinal epidural lymphoma would be a hypo- or isointense relative to the cord on T1WI and a hyperintense signal also on T2WI[11]. Second, metastasis in MR study usually reveals hypointense or mixed hypo- and isointense signal when compared with bone marrow[12]. Third, MR imaging of epidural hematoma is usually located in posterior or posteriolateral part inside the spinal canal at cervicothoracic or thoracolumbar region[4], rather than at middle part of thoracic spine. During the acute phase of hemorrhage, the lesion is isointense on T1WI and hyperintense with/without focal hypointensity on T2WI, and is usually biconvex shape[10], rather than fusiform shape. Therefore, the location and shape did not match those of the hematoma presented in our case. Taken the clinical experience of our case, a sudden and unexplained neck and back pain together with spinal reticular pain followed by rapid progression of neurological sensory and motor impairment should be considered as SSEH. Pain in the interscapular region was usually perceived in the thoracic region of SSEH[13].

Although conservative management in some patients of SSEH with mild neurologic impairment might be effective[14], early surgical intervention such as decompressive laminectomy with evacuation of hematoma is regarded as the best treatment of choice for most patients with symptomatic SSEH[6,15]. Previous review of the state-of-the-art in operative treatment of SSEH in 333 cases, Groen and van Alphen reported that decompressive laminectomy with evacuation of hematoma within 36 hours of symptomatic onset in cases with complete sensorimotor loss and 48 hours of symptomatic onset in cases involving incomplete neurologic impairment associated with better prognosis[6]. Thus, the golden time of surgical decompression for patients with SSEH, particularly with a complete spinal cord compression is within 36 hours, or even better within 12 hours after the onset of symptoms if possible[6,15,16]. In short, the neurological outcome is closely related to the preoperative status of the neurological deficit, and the time period between onset of symptoms and surgical decompression[14,17]. In addition, the rehabilitation therapy also improved the neurologic impairment outcome[7]. In our case, laminectomy and surgical decompression were preformed within 24 hours and his neurological outcome improved much

after early surgical intervention and rehabilitation therapy, as anticipated.

In conclusion, the keys to the diagnosis of spinal epidural hematoma are clinical history and early MR imaging study. The MRI patterns of SSEH in our case resembles a tumor mass rather than a hematoma and this case can provide more insight and workout for radiologists, physiatrists and neurosurgeons. Early diagnosis, early surgical intervention and rehabilitation programs play important roles in enhancing a better neurologic outcome.

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