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Case Report

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Brown Sequard Syndrome Secondary to Intraspinal Cervical Hemorrhage Associated with Cavernous Angioma and Warfarin Therapy

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Abstract

Introduction: *The description of clinical findings associated with lateral hemispinal cord dysfunction or Brown-Sequard syndrome is ascribed to Charles Edouard Brown-Sequard for his study of spinal pathways [1]. In most cases, acute Brown-Sequard syndrome occurs secondary to penetrating trauma involving a lateral half of the spine. On occasion, it arises spontaneously as a complication of spontaneous spinal epidural hematomas and ischemia [2,3].*
Case Report: *In our patient, the intraspinal hemorrhage arose from cavernous angiomas during warfarin therapy for atrial fibrillation. The clinical picture is characterized by left side hemiparesis of boby and micturitional symptoms.*
Conclusion: *Brown-Sequard syndrome can occur as a complication of spontaneous intraspinal hemorrhages in patients with cavernous angiomas and warfarin therapy. Accurate diagnosis and management of spinal damage associated to management of micturitional disturbance may be needed to improve the treatment outcome.*

Keywords: *Brown Sequard Syndrome, cavernous angiomas, warfain therapy, micturitional disturbance.*

Introduction

Brown-Sequard syndrome (BSS) is a rare neurological condition characterized by a lesion in the spinal cord which results in weakness or paralysis (hemiparaplegia) on one side of the body and a loss of sensation (hemianesthesia) on the opposite side. Depending on the position of the lesion in the transverse plane, however, motor or sensory disturbance will predominate [4]. BSS may be caused by injury to the spinal cord resulting from a spinal cord trauma, tumor, ischemia or inflammatory diseases. Cavernous angiomas of the spinal cord are rare vascular malformations, which account for approximately 5 to 12 percent of spinal cord vascular lesions. They usually originate in the vertebrae, with occasional extension into the extradural space, and intramedullary cavernomas, even if reported in the literature, are very rare [5]. Little is known of micturitional function and no urodynamic data is available to our knowledge, although some patients with BSS are troubled with severe voiding difficulty and urinary incontinence.

Case Report

A 82-year-old woman presented to the emergency department with 2 days of mild weakness in his left arm and leg and numbness and tingling in her right leg that rapidly worsened in the preceding few hours. She had been on warfarin for 8 years for atrial fibrillation. This was complicated by spontaneous bleed from cavernous angiomas. On clinical examination, she was alert and oriented with intact cranial nerve function. She had diffuse severe weakness of his left upper and lower extremities (motor grades: deltoid, I; biceps, I; brachioradialis, I; interossei, I; iliopsoas, II; gastrocnemius, I; tibialis anterior, I). The right upper and lower extremities had grade V power across all muscle groups. Sensory examination showed decreased pain and temperature sensation on the right arm and leg. She showed increased reflexes over the left triceps, brachioradialis, and triceps, and at the left knee and ankle. Her right extremities showed grade II reflexes across all tendons. Her plantar reflexes were upgoing bilaterally. Bladder function was impaired: patient was unable to empty her bladder completely causing a significant post void residual volume; self-catheterization, performed four times a day, showed a significant post

voiding residual volumes. Urodynamic studies provide early identification of detrusor underactivity and decreased maximal bladder capacity.

MR imaging of the cervical spine showed intramedullary blood components involving the cervical cord without significant cord swelling or edema (Fig.1). The patient was treated acutely with high-dose intravenous corticosteroids, managed as an inpatient, and later discharged to Spinal Unit for rehabilitation program. A conservative treatment was decided and the assumption of warfarin was suspended.

Motor Evoked Potentials, (MEPs) of the upper and lower limbs showed a pathology of the first motor neuron and / or intrarachide of the second motor neuron. We applied single transcranial magnetic stimulation of the motor cortex (sTCMS) and recorded compound muscle action potentials CMAP from the hypothenar and anterior tibial muscle bilaterally. Motor evoked potentials (MEPs) are neuroelectrical signals produced by the spinal cord or peripheral muscles under transcranial or direct brain stimulation. MEPs provide direct and objective *in vivo* assessment of the function of involved central motor pathways, i.e. pyramidal tracts [6-7]. Compared to sensory pathways, motor pathways are more sensitive to ischemic insults, and therefore MEPs have a better correlation with good motor outcome than somatosensory evoked potentials (SEPs) [8].

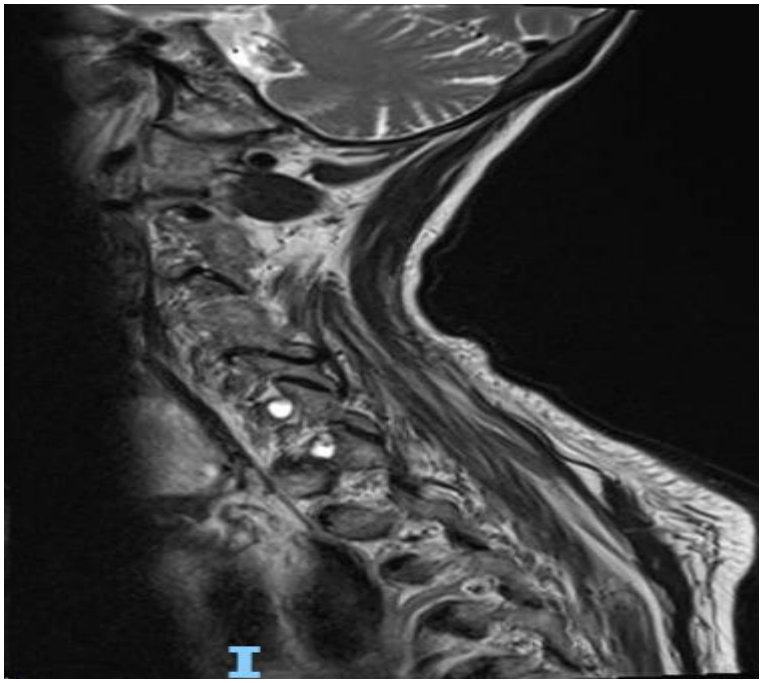

Figure 1: C.T2 Weighted sagittal cut of the cervical spinal cord showing heterogeneous hyper intense signal of the hemorrhage.

Discussion

BSS secondary to a cervical spinal cord cavernous angiomas is extremely rare.

In most cases, acute Brown-Séquard syndrome occurs secondary to penetrating trauma involving a lateral half of the spine. Intraspinal hemorrhages is a rare but dangerous complication of anticoagulant therapy. In our patient, the intraspinal hemorrhage arose from cavernous angiomas associated with warfarin therapy. His clinical manifestation followed a biphasic pattern with mild symptoms for 2 days followed by rapid progression in the preceding hours before presentation.

Spinal intramedullary cavernous angiomas may be asymptomatic, accidentally found at autopsy in with multiple cavernous angiomas, or may have variable patterns of clinical presentation. Progressive neurological deterioration can be confused with demyelinating pathologies, myelitis, intramedullary tumors, and spinal arteriovenous vascular malformation (9). Subarachnoid hemorrhage [10] and hematomyelia [11] have been reported as initial clinical presentation although the most frequent mode of presentation is progressive myelopathy [12].

Little is known of micturitional function in BSS. Our patients wit BSS was troubled with severe voiding difficulty and urinary incontinence. Although the lower urinary tract is bilaterally innervated in the periphery [13] the results of the present study showed that spinal cord hemisection affects micturition function and causes urinary retenction as known in patients with hemisferic brain disease [14,15].

Detrusor hyperreflexia and detrusor areflexia could be considered as sopranuclear type of pelvic nerve dysfunction. Probably reflecting a lesion of the descending

pathway to the sacral intermediolateral cell column [16,17]. Unrelaxing sphincter or detrusor-sphincter dyssynergia could be considered as supranuclear type of pudendal nerve dysfunction, probably reflecting a lesion of the pathway to the sacral Onuf's nucleus [16,17]. This study also showed an increased bladder volume at first sensation, (300cc) indicative of decreased bladder sensation [16,18]. An approach for the treatment of urinary dysfunction in BSS will require a combination of therapies for the underlying disorders with a-adrenergic blocking agents and clean, intermittent selfcatheterization for large residuals.

An MRI scan is the diagnostic tool to reveal the presence of an intramedullary lesion with the neuroradiological features of a cavernoma. Early surgery with total removal of the malformation should be the goal when approaching these spinal lesions A conservative treatment should be considered when neurological function is at risk, since rebleeding of the residual lesion can occur. Multiple follow-up MRI scans showed complete resolution of the intraspinal hemorrhage.

Conclusion

Brown-Séquard syndrome can rarely occur as a complication of spontaneous intraspinal hemorrhages in patients with cavernous angiomas. This cause should be considered in patients with a remote history of warfarin therapy. Accurate diagnosis and management of the patients depends on additional imaging studies as well as a careful history and neuro-urologic examination.

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Declaration of conflicting interests

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Patient consent

Obtained.

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