

Cervical Disc Herniation Producing Acute Brown-Sequard Syndrome: A Case Report

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Abstract

Background: Brown-Sequard Syndrome (BSS) is a kind of rare neurological condition characterized by incomplete spinal cord lesion which results in ipsilateral loss of motor function due to corticospinal tract compression on one side of the body, and contralateral loss of pain and temperature sensitivity as a result of spinothalamic tract dysfunction on the opposite side. The possible causes of Brown-Sequard Syndrome have been frequently observed in patients with spinal traumatic injuries and extramedullary spinal tumors. However, cervical disc herniation is an exceptional cause of this syndrome.

Case presentation: A 42-year-old man presented with a one-day history of neck pain and activity limitation of right arm and leg after neck massage. The Computed Tomography (CT) scan of head indicated no abnormal sign. The cervical Magnetic Resonance imaging (MRI) showed a large right-side C4/5 disc herniation which caused right-side compression of spinal cord. The patient received subtotal vertebrectomy of C5 and reconstruction with titanium mesh cage through anterior approach. The muscle strength of patient was improved the contralateral sensory disorder of pain and temperature was alleviated after the surgery.

Conclusion: The case demonstrated that a prompt diagnose followed by decompression of cervical spinal cord is essential for the prognosis of the patients who diagnosed as BSS.

Keywords: Brown-Sequard syndrome; Cervical disc herniation

Abbreviation: BSS: Brown-Sequard Syndrome; MRC: Medical Research Council; CT: Computed Tomography; MRI: Magnetic Resonance Imaging

Introduction

Brown-Sequard syndrome (BSS) is a rare condition of incomplete spinal cord injury characterized by ipsilateral loss of motor function and contralateral loss of pain and temperature sensitivity. It is usually thought to be caused by spinal cord injury, intraspinal tumors and intraspinal hematoma [1,2]. Since the first case of BSS caused by cervical disc herniation was reported by Stookey [3], few English literatures have been reported [4-11]. Herein, we reported a case of BSS produced by C4/5 disc herniation and received anterior approach decompression operation. The case revealed that it was advised to perform decompression operation as soon as possible once the patient was diagnosed as BSS.

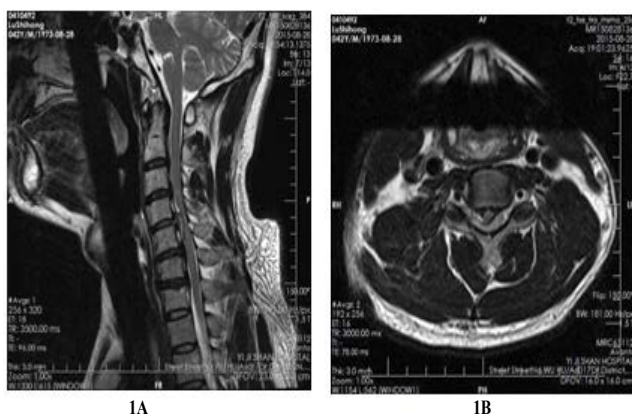


Figure 1: Preoperative T2-weighted sagittal (A) and axial (B) MRI revealed a larger right paramedian C4/5 disc herniation and severe compression of the ipsilateral spinal cord.

Case Report

The 42-year-old male patient with history of headache and right arm and leg movement limitation for one day without trauma. The patient arrived at emergency room one hour after the symptoms



Figure 2: X-ray after the operation. Anteroposterior (A) and lateral (B) radiograph showing C5 corpectomy and titanium mesh cage reconstruction and C4-C6 locking plate implantation. The cage was packed with autogenous spongy bone from C5 vertebra.

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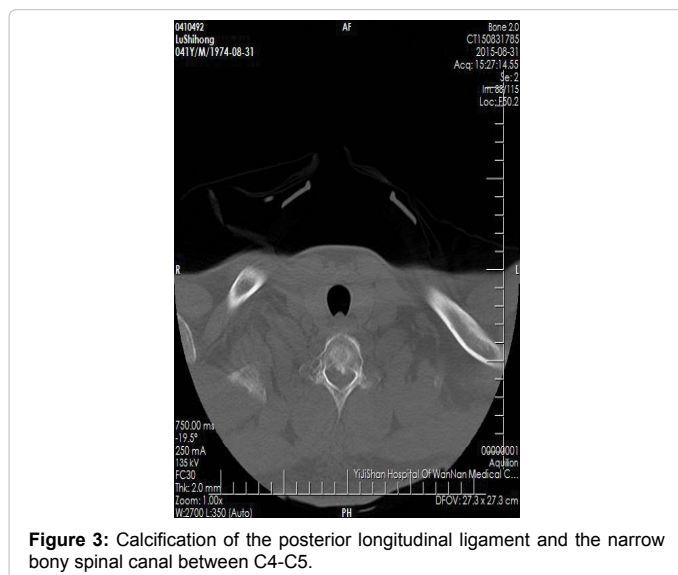


Figure 3: Calcification of the posterior longitudinal ligament and the narrow bony spinal canal between C4-C5.

started. Upon physical examination, he presented weakness in the right upper and lower extremities (MRC Grade 3/5), along with the reduced left sensation of pain and temperature. Besides, the Hoffman sign of both sides were positive. The emergency doctor thought it was cerebral infarction at first and took the emergency head CT scan for the patient. Then the patient was adopted in neurology department. The CT scan indicated no abnormal sign in head. However, the cervical Magnetic Resonance imaging (MRI) showed a large right-side C4/5 disc herniation, causing right-side compression of spinal cord (Figure 1). Then the patient was transferred to our department taking BSS into consideration and was received subtotal vertebrectomy of C5 and reconstruction with titanium mesh cage filled with autogenous bone from the removed C5 vertebral through anterior approach (Figure 2). About a month after the surgery, the muscle strength of the patient was improved to MRC Grade 4/5 and the contralateral sensory disorder of pain and temperature was alleviated to about 80%.

Discussion

Brown-Sequard syndrome was first described by Brown-Sequard in 1849 and was usually caused by traumatic events such as stab wounds, followed by extramedullary spinal tumors. Since the first BSS case induced by cervical disc herniation in year 1928, only 51 cases have been reported in English language literature until now. It was reported that the prevalence ranges from 0.21% to 2.6% [12,13].

The clinical features of BSS caused by cervical disc herniation are weakened or lost ipsilateral limb motor function due to corticospinal tract compression, accompanied by contralateral limb pain and the decreased or disappeared temperature sensation caused by Tractus spinothalamicus dysfunction. According to the previous reports, the incidence age of BSS caused by spinal disc herniation ranges from 25 to 73 years, and the mean age was 48 years [7]. There were no typical nerve root symptoms because the compression site was in the spinal cord rather than the nerve root. In this case, the patient had sudden onset after neck massage. We speculated that the patient has suffered original cervical degeneration according to the cervical CT scan (Figure 3) and the nucleus pulposus break through the posterior longitudinal ligament and stay in the corresponding epidural space after the repeated action of the cervical spine stress. It is easy to show clinical symptoms for patients with cervical spinal stenosis because the spinal cord cannot tolerate the oppression of the herniated nucleus pulposus.

It is essential to take cervical MRI examination for the diagnosis of BSS in addition to relying on clinical physical examination. MRI examination can not only exclude the spinal canal neoplasms and hematoma but also can clearly show the herniation type and segment. Based on the relevant studies, the most common involvement was C5/6, followed by C3/4, C4/5. What's more, it was estimated that 85.7% of the patients were nearby central type [14].

It is widely accepted that early surgical decompression is necessary for the treatment of BSS. Surgical procedures included posterior half laminectomy or total laminectomy, anterior cervical discectomy or cervical vertebral subtotal resection and interbody fusion [15,16]. However, most scholars believed that curative effect of posterior decompression is limited due to indirect decompression therapy. On the contrary, the anterior surgery can not only completely decompress the front oppression but also avoid the shortcomings of incomplete decompression harassment of spinal cord caused by posterior surgery. The patient in this case received subtotal vertebrectomy of C5 and reconstruction using titanium mesh cages filled with autogenous bone. Taking the huge prominent nucleus pulposus into consideration by preoperative MRI, it is difficult to remove the free nucleus pulposus directly with limited vision brought by anterior intermittent single interphalangeal distraction. While it is easy to perform posterior longitudinal ligament resection and remove the entirely free nucleus pulposus in subtotal vertebrectomy. The operator should guarantee that the spinal cord can be completely decompressed and use pituitary rongeur to clamp nucleus pulposus when the decompression near to the posterior longitudinal ligament during the surgical procedures.

Conclusion

The prognosis of patients is related to the severity of spinal cord compression, the timing of surgery and the choice of surgical methods. According to previous study, it was suggested that the spinal cord injury was severe if there were round or quasi-circular high-signal appearance in T2-weighted MRI image and the postoperative recovery was poor as well. In this case, the myodynamia and mental image were restored after operation due to the short history of the patient.

Although there are few reports about the clinical effect of BBS caused by cervical disc herniation, it should be paid more attention by clinicians. Some cases may be misdiagnosed as cerebral infarction. It could make a clear diagnosis through clinical physical examination and cervical MRI examination and prompt surgical decompression may lead to a satisfactory prognosis.

Declarations

The patient was informed that data from the case would be submitted for publication and gave his consent. All the data and materials were real and credible. The authors report no declarations of interest. The first author was responsible for collecting data and writing the manuscript. The responding author oversaw verifying the accuracy of the data and making the appropriate modifications to the article. The article was supported by a grant from Natural Science Foundation of Anhui Province (Project number: 1708085QH205).

References

1. Aryan HE, Farin A, Nakaji P, Imbesi SG, Abshire BB (2004) Intramedullary spinal cord metastasis of lung adenocarcinoma presenting as Brown-Sequard syndrome. *Surg Neurol* 61: 72-76.
2. Lee HM, Kim NH, Park CI (1990) Spinal cord injury caused by a stab wound: A case report. *Yonsei Med J* 31: 280.
3. Stookey B (1928) Compression of the spinal cord due to ventral extradural

- cervical chondromas: Diagnosis and surgical treatment. *Arch Neurol Psych* 20: 275-291.
4. Borm W, Bohnstedt T (2000) Intradural cervical disc herniation: Case report and review of the literature. *J Neurosurg* 92: 221-224.
 5. Iwamura Y, Onari K, Kondo S, Inasaka R, Horii H (2001) Cervical intradural disc herniation. *Spine* 26: 698-702.
 6. Mastronardi L, Ruggeri A (2004) Cervical disc herniation producing Brown-Sequard syndrome: Case report. *Spine* 29: 28-31.
 7. Sayer FT, Vitali AM, Low HL, Paquette S, Honey CR (2008) Brown-Sequard syndrome produced by C3-C4 cervical disc herniation: A case report and review of the literature. *Spine* 33: 279-282.
 8. Laghmari M, Blondel B, Metellus P, Bartoli M, Fuentes S, et al. (2009) Brown-Sequard-type myelopathy due to cervical disc herniation associated with severe carotid stenosis prompting rapid combined corpectomy and carotid endarterectomy under deep anticoagulant therapy. *Spine J* 9: 15-19.
 9. Malhotra NR, Shaffrey CI (2010) Intraoperative electrophysiological monitoring in spine surgery. *Spine* 35: 2167-2179.
 10. Urrutia J, Fadic R (2012) Cervical disc herniation producing acute Brown-Sequard syndrome: Dynamic changes documented by intraoperative neuromonitoring. *Eur Spine J* 21: 418-421.
 11. Guan D, Wang G, Clare M, Kuang Z (2015) Brown-Sequard syndrome produced by calcified herniated cervical disc and posterior vertebral osteophyte: Case report. *J Orthopaed* 12: 260-263.
 12. Choi KB, Lee CD, Chung DJ, Lee SH (2009) Cervical disc herniation as a cause of Brown-Sequard syndrome. *J Kor Neurosurg Soc* 46: 505-510.
 13. Jomin M, Lesoin F, Lozes G, Thomas CE, Rousseaux M, et al. (1986) Herniated cervical discs. *Acta Neurochirurgica* 79: 107-113.
 14. Kobayashi N, Asamoto S, Doi H, Sugiyama H (2003) Brown-Sequard syndrome produced by cervical disc herniation: Report of two cases and review of the literature. *Spine J* 3: 530-533.
 15. Clatterbuck RE, Belzberg AJ, Ducker TB (2000) Intradural cervical disc herniation and Brown-Sequard's syndrome: Report of three cases and review of the literature. *J Neurosurg Spine* 92: 236-240.
 16. Suri A, Chhabra RP, Mehta VS (2003) Effect of intramedullary signal changes on the surgical outcome of patients with cervical spondylotic myelopathy. *Spine J* 3: 33-45.