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CASE REPORT

Traumatic Cervical Disc Herniation Manifesting as Brown-Sequard Syndrome: A Case Report

Ahmed Mohamed Hazeem[1*], Faheem Nawaz[2], Mohammed Saleh Al-Blooshi[3]

[1]BSc, MD, Junior Resident, Neurosurgery Department, BDF-RMS Hospital, Kingdom of Bahrain

[2]M.D, FCPS (Fellow of Physicians and Surgeons of Pakistan) Neurosurgery, MRCPSG (Member of Royal College of Physicians and Surgeons Glasgow) Senior Resident in Neurosurgery Department, BDF-RMS Hospital, Kingdom of Bahrain

[3]MD, MRCSI (Fellow of Royal College of Surgeons Ireland), SBNS (Saudi Board of Neurosurgery) Consultant Neurosurgeon and Spine Surgeon, BDF-RMS Hospital, Kingdom of Bahrain

***Corresponding author:**

Dr. Ahmed Mohamed Hazeem, BSc, MD, Junior Resident, Neurosurgery Department, BDF-RMS Hospital, Kingdom of Bahrain; Email: Dramh@outlook.com; Tel. No. +973-38897980

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Abstract

Brown-Sequard syndrome (BSS) is an uncommon condition caused by a localized injury to one side of the spinal cord. It is rarely reported to present because of cervical disc herniation (CDH), especially as a result of 2 consecutive discs prolapse, with only 8 cases reported worldwide, 4 of which have the cervical disc levels of C5-C6, C6-C7 being affected just like the case we are presenting. A 45 years male had complained of left-sided body pain and numbness following a fall, his symptoms progressing over two weeks to left side hemiparesis and impaired sensation; MRI of C spine revealed C5-C6, C6-C7 disc prolapse with cord compression resulting in BSS. The patient was treated surgically by anterior cervical discectomy and fusion (ACDF) followed by physiotherapy. The patient showed complete recovery in terms of sensory and motor deficits in both the right and left upper and lower limbs. We are stressing the role of detailed history, comprehensive neurological examination, and proper imaging in the early diagnosis of BSS. Treatment with anterior surgical intervention is the recommended approach in most reported cases and is associated with an excellent prognosis.

Keyword: Brown-Sequard syndrome, Cervical disc herniation, Cervical discectomy, Cervical fusion and decompression, Cervical spine injuries, Spinal cord syndromes

Introduction

Brown- Squared syndrome is a rare condition described for the first time in 1849. Patients usually present with symptoms related to the affected hemisection of the spinal cord that could involve different neurological tracts, namely: 1) corticospinal tract which affection manifests as limbs weakness or paralysis, 2) dorsal column, which when affection manifests as loss of proprioception, fine touch, and vibration, 3) sympathetic tract if the lesion is above first thoracic vertebra and it is injury manifests with Horner syndrome, all of which occur at the ipsilateral side of the injury. On the other hand, the spinothalamic tract's involvement will

cause pain loss and temperature sensation on the contralateral side.[2,11] Although it is a rare condition, it is commonly caused by trauma and, to a less extent, due to non-traumatic causes such as a tumor, cyst, ischemia, and multiple sclerosis.[9,11] However, cervical disc prolapse was rarely reported to be the cause, with the first case reported after around 80 years since the disease was discovered.[12] A total of 75 cases were reported in English up to date as per our review, including our case.[1,4,6-8] Most cases are due to a single-level cervical disc prolapse, with less than 11% being due to 2 consecutive disc prolapses.[5] We are presenting a case of a 45 years male who presented with BSS due two-level disc bulge at C5-C6 and C6-C7; he was treated surgically with complete recovery.

Case report

Patient 45 years, male, smoker, obese, with a known case of hypertension, diabetes mellitus, and dyslipidemia. The patient presented to the accident and emergency department with a history of left-side body pain and numbness after a history of slipping in the toilet and falling on his left body side. The patient denied a history of head trauma, loss of consciousness, or vomiting. There was no facial palsy, no convulsion, n consciousness level decrease, and no speech slurring. On examination, there was no motor or sensory deficit with standard brain computerized tomography (CT) scan and brain magnetic resonance imaging (MRI). The patient was initially managed by Neurologist as a case of a transient cerebrovascular event (CVS) and was discharged on aspirin. Three weeks later, he presented to the Emergency with worsening numbness and left-sided hemiparesis associated with neck pain. There was no history of deterioration in the speech or consciousness level. Examination according to Medical Research Council (MRC) scale for motor functions revealed a scale of 4/5 in C6 and C7 Myotome and 3/5 in L3, L4, L5, and S1 Myotomes on the Left side. Proprioception and vibration sensations were intact on the left side. However, the patient showed impaired pain and temperature sensation below the level of T1 on the Right side. Knee and ankle jerks showed hyperreflexia. All other neurological examinations were normal. Again, the patient was managed as a case of an acute cerebrovascular event and was admitted to the medical ward for investigations. Brain CT and MRI were normal. MRI of the whole spine showed C5-C6 posterior central disc protrusion and a large, migrated disc on C6-C7, compressing the spinal cord and causing significant stenosis (figure 1).

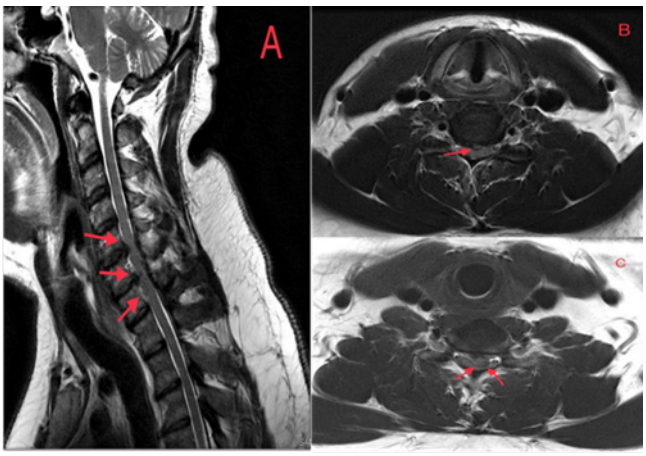

Figure 1: Figure A: T2-weighted sagittal magnetic resonance image. A C5-6 herniated dise is seen indenting the cord. C6-C7 large migratory disc reaching upperhalf of C7 vertebra and causing marked spinal cord stenosis; Figure B: T2-weighted axial magnetic resonance image, A C5-C6 hemiated disc is seen indenting the spinal cord slightly to the Left side; Figure C; T2-weighted axial magnetic resonance image, A C6-C7 large disc hemiation causing marked spinal cord compression

The patient was treated surgically by the Neurosurgery team using an anterior approach. On the C5-C6 disc level, central osteophytes were identified and drilled. At the C6-C7 level, a discectomy was done. Thickening of the posterior longitudinal ligament was noted, dissected, and small fragments compressing on the cord were removed. At the end of the surgery, the spinal cord was decompressed entirely on both levels, and the foramina was free. Interbody fusion was established with a Cervios cage 5 mm on both levels; the plate was kept and secured with five screws (figure 2).

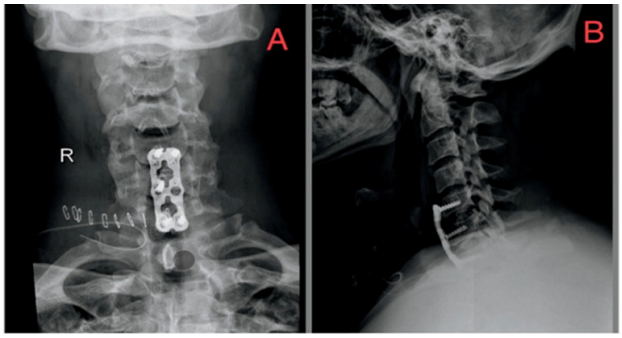

Figure 2: X-ray was taken on the 2nd Post-Operative day; Figure A: A-P view of cervical spine x-ray showed a satisfactory position of the hardware plate on the midline; Figure B: lateral X-ray of the Cervical Spine showed a satisfactory position of the plate, ion of the inter space with intervertebral cages.

Post-operatively, the patient showed marked improvement regarding his pain and numbness. The patient started an intensive physiotherapy program. After eight months, during the Neurosurgery clinic follow-up patient showed full recovery, where muscle power in all myotomes was 5/5 and sensation was intact on both sides. Post-operative MRI screening confirmed the complete elimination of cervical disc herniation. (figure 3).

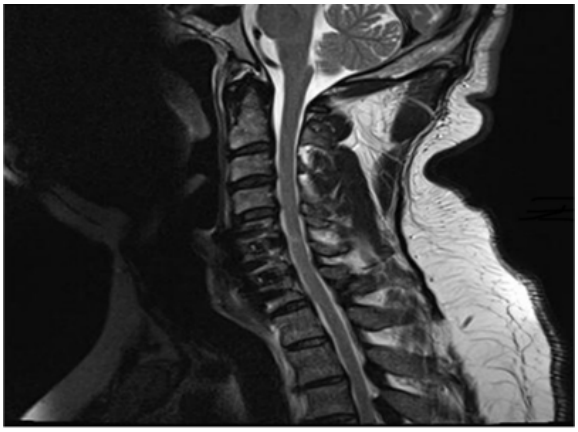

Figure 3: Post operative.T2-weighted sagittal done after8 months. showed complete climination of previously noted disc on C5-C6, C6-C7 With a small area of high signal intensity opposite to C5-C6 disc level

Discussion

Brown-Squared syndrome accounts for less than 5% of all cervical spine injuries, rarely caused by cervical disc disease.[13] A total of 74 cases were reported in English literature. The age range varies between 23 and 86 years, with a mean of 47.2. Males constitute most of the cases, and the majority of them were caused by single-level CDH, mainly at the level of C5-C6.[1,2,3] Less than 10 cases were reported as a result of 2 consecutive levels of CDH, including our case.[5] Symptoms-wise, it is reported that patients usually start complaining of mild symptoms such as numbness that is usually preceded by mild trauma.[9] As a result, many cases are misdiagnosed and treated as CVS events.[1,13] However, the absence of aphasia and fascial numbness or weakness could lower the expectation of it. Despite starting as mild symptoms, it will rapidly progress to unilateral limb weakness; Safwat *et al*. reported that the degree of involvement differs between the upper and lower limbs in most reported cases.[9] Most cases usually present as an incomplete form of BSS due to the sparing of the dorsal column.[2,9] As the disc usually causes anterior compression, as described by Zeng *et al*.,[1] this can explain normal vibration and proprioception in our patient. Most reported cases were diagnosed by physical examination and confirmed by the spine and brain MRI .[14] BSS management can fall under two categories, either conservative or surgical intervention. The former can be the treatment of choice in traumatic injuries. While all CDH cases are treated with the latter.[1,15] Different approaches of surgical techniques were adopted, including anterior cervical discectomy with or without fusion, posterior lamina-foraminotomy, or just laminectomy.[1] Size, location of herniated discs, numbers of involved vertebral levels, the dimensions of the spinal canal, and presence of ossification of posterior longitudinal ligament or Ligamenta Flava are factors that the surgical approaches decision is based on.[1] The favorable intervention used an anterior approach to discectomy and fusion (ACDF).[1] It has been noticed that 57 % of whom underwent ACDF showed complete recovery, our case included.[1] The second most common intervention reported was ACDF with corpectomy followed by a posterior approach with bilateral or unilateral laminectomy. The last intervention was done using dual anterior and posterior approaches.[1] Acute surgical treatment of BSS has shown a good prognosis. Almost 50% of all surgically approached reported cases showed complete recovery.[9] Furthermore, no relation has been proven between the duration of symptoms, the amount of compression on MRI, the number of

affected levels, and the outcome or prognosis.[5] The same applies to our case; despite being a result of 2 consecutive levels of disc prolapse, considered a rare condition, there was no difference in the outcome compared to reported cases with single-level disc prolapse.

Conclusion

Brown-Sequard syndrome is a rare condition caused by a localized injury to one side of the spinal cord. This can rarely happen because of cervical disc prolapse; such a cause needs to be better documented and can be easily misdiagnosed or missed. While early diagnosis can be achieved by adding MRI Cervical Spine in cases with Neurological symptoms affecting the body if the MRI brain is reported normal. Proper treatment of such etiology can lead to full recovery of neurological function with a complete symptomatic resolution; awareness about this rare presentation and further research are needed to ensure effective treatment outcomes. Therefore, we are stressing the need for proper clinical examination and magnetic resonance imaging to diagnose such cases and extend their differential diagnosis.

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