



Case Report

Spinal cord injury without radiological abnormality (SCIWORA) manifested as self-limited brown-SEQUARD syndrome

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ABSTRACT

Introduction: Combination between SCIWORA and Brown-Sequard syndrome in a patient is a rare condition. In SCIWORA, there is usually a delay in neurologic deficits which can potentially lead to misdiagnosis. Therefore, the clinician should have a good understanding of the course of the disease to make a good diagnosis and treatment.

Case report: Reporting a case of female 20 years old with chief complaint of severe neck pain and delayed limbs weakness. The mechanism of injury was fall with the head hit the ground in left lateral flexion position. The physical examination showed zero motor power of the right limbs and contralateral pain and temperature deficit 1 h after the injury. We diagnosed the patient with incomplete spinal cord injury at C4 level with associated Brown-Sequard syndrome. We gave soft collar neck for immobilization, medication with NSAID for analgetic and Methylprednisolon. We found dramatic improvement in 10 h after the injury with motor improvement from 0 to 5 and normal sensory function. The patient then was discharged with good functional outcome and with no sequelae.

Conclusion: Incomplete cervical spinal cord injury without radiological abnormality that manifested as Brown-Sequard syndrome is a rare case and potentially confusing condition. Better understanding of the course of the disease may help the clinician to make a right diagnosis and plan for management.

Introduction

Spinal cord injury without radiological abnormality (SCIWORA) is defined as the occurrence of acute traumatic myelopathy despite normal plain radiographs and normal computed tomography (CT) studies. This occurs predominantly among pediatric population with incidence range from 4% to 66% of all spinal cord injuries (10%–20% of all pediatric spinal trauma) [1]. In young children, the pathogenesis of SCIWORA may be related to the mismatch in the elasticity of the tissue of the vertebral column and spinal cord [1–3]. The mechanism of injury could be direct or indirect spinal cord traction or compression and vascular or ischemic injury [1,3]. SCIWORA have a large spectrum of neurologic deficit, ranging from mild, transient until complete spinal cord injuries. The neurologic deficits can happen in delayed form, ranging from hours to days after the injury [1,3,6].

Brown-Sequard syndrome is an anatomic hemisection of the cord, resulting in ipsilateral motor and proprioception loss and contralateral pain and temperature deficit. It is a rare condition, as the trauma or something should damage the nerve fibers on just one half of the spinal cord. Fortunately, the prognosis for significant motor recovery is good and the most important prognostic variable relating to neurologic recovery is completeness of the lesion [5].

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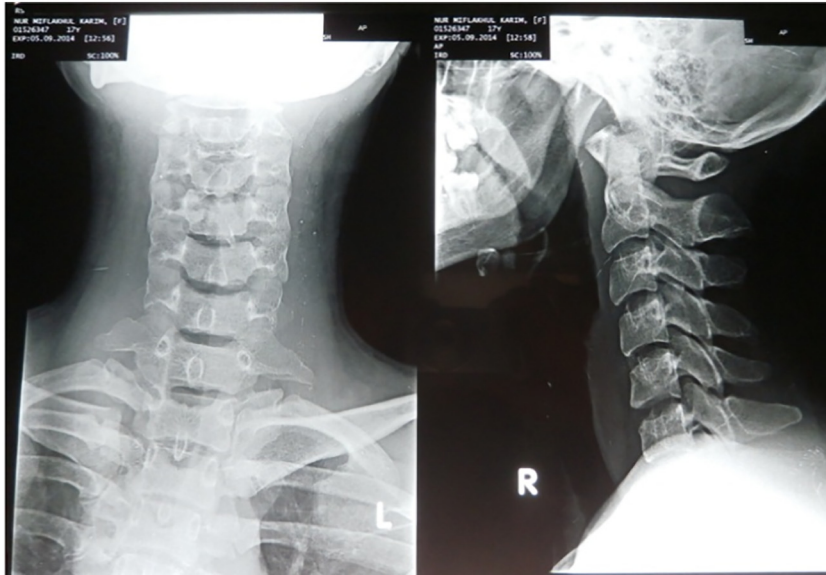


Fig. 1. AP and lateral view of cervical spine X-ray. There is no fracture and dislocation found here. The alignment and pretracheal soft tissue is also looks normal.

Combination between SCIWORA and Brown-Sequard syndrome is a rare condition that can lead to misdiagnosis. Therefore the clinicians should have a good awareness and understanding of the disease to make a right diagnosis and therapy for the patients.

Case report

Incomplete cervical spinal cord injury without radiological abnormality was diagnosed in a victim of sport injury at the authors' hospital. A 20-year-old female presented with chief complaint of severe neck pain and delayed limbs weakness after suffered from sport injury in martial arts competition. The mechanism of injury was fall with the head hit the ground first in left lateral flexion position. No history of loss of consciousness. After the accident, the patient felt neck pain and about 1 h after the accident she could not move her right limbs.

From physical examination, the general condition was good, the vital sign was within normal limit. The motor functions of the right upper and lower extremities from C5 – S1 level were decreased to zero with no muscle tone and the sensory functions of the left side (contralateral side) below the C4 level were decreased with loss of pain and temperature sensation. The ASIA scores were 56 for

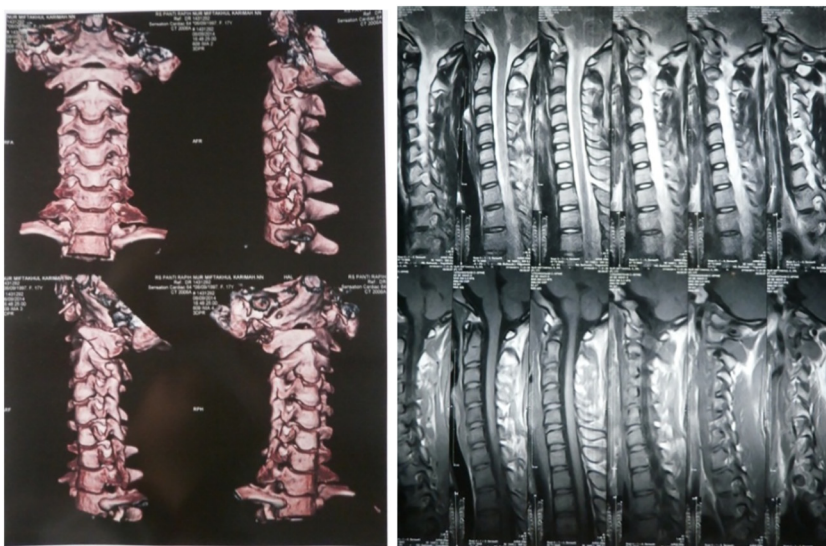


Fig. 2. Cervical CT scan and MRI. There is no fracture and dislocation found in the CT scan. From sagittal view of the cervical MRI the spinal cord looks good.

sensory functions and 50 for motor functions and the functional score was 4 for Nurick scale that means unable to walk without assistance. We performed thorough diagnostic approach including X-ray, CT scan and MRI investigation (Figs. 1 and 2). From plain X-ray and CT scan there was no visible fracture or dislocation and the alignment was good. From MRI there were no signs of abnormality. So we diagnosed the patient with incomplete spinal cord injury at C4 level with associated Brown-Sequard syndrome manifestation. We performed observation and managed the patient with soft collar neck for immobilization, medication with NSAID for analgesia and Methylprednisolon 30 mg/kg in 15 min followed by maintenance with 5,4 mg/kg/h for the next 23 h, and we found dramatic improvement in 10 h after the injury with motor improvement from 0 to 5 in both affected extremity and normal sensory function in the contralateral side. The Nurick scale improved to 1 that means the patient had no difficulty in walking. We observed the patient for the next 24 h and gave rehabilitation program. The patient then was discharged with good functional outcome and with no sequelae.

Discussion

Spinal Cord Injury Without Radiographic Abnormality (SCIWORA) was first introduced by Pang and Wilberger and was first reported by Burke in 1974. It was used to define clinical symptoms of traumatic myelopathy with no radiographic or CT abnormality. The symptoms have a broad spectrum from mild and transient paresthesia in fingers to quadriplegia. The symptoms can be appear at the moment of injury but can also be delay until several days of injury. The main therapeutic treatment is external immobilization of the spine for up to 12 weeks [6]. Incomplete cervical spinal cord injury without radiological abnormality could be potentially confusing and frustrating because there could be a delay in neurologic deficit and the course of the disease is very dramatic. In this case, SCIWORA manifested as Brown-Sequard syndrome which is a rare condition. The neurologic status and the imaging studies of the patient were initially normal but suddenly worsening very quickly placing the patient and families in a big worried. And then, without any surgical intervention, there was surprisingly fast recovery time and excellent functional outcome. The delay in neurologic deficit needs full and thorough observation. We use soft collar neck for immobilization, high dose of intravenous corticosteroid, intravenous NSAID agents, and rehabilitation as the management approach. The prognosis is related to the severity of the spinal cord dysfunction. Outcome after incomplete injuries in older children is excellent [1]. The patient age and the first clinical presentation after the injury are maybe the clinical predictors for this patient to have a very good recovery.

Conclusion

Incomplete cervical spinal cord injury without radiological abnormality that manifested as Brown-Sequard syndrome is a rare case and potentially confusing condition because of the delay in neurologic deficit and the course of the disease that is very dramatic. Better understanding of the course of the disease may help the clinician to make a right diagnosis and plan for management with better explanation and education to the patient and the frustrated families.

Conflict of interest

The authors declare that there is no conflict of interests regarding the publication of this paper.

Author's contributions

All of authors gave contributions to the final manuscript.

References

- [1] C.A. Dickman, J.M. Zabramski, M.N. Hadley, H.L. Rekate, V.K.H. Sonntag, Pediatric spinal cord injury without radiographic abnormalities: report of 26 cases and review of literature, *J. Spinal Disord.* 4 (1991) (296-205).
- [2] D. Pang, K. Sahrarkar, P.P. Sun, Pediatric spinal cord and vertebral column injuries, in: J.R. Youman (Ed.), *Neurological Surgery*, 4th ed., WB Saunders, Philadelphia, 1996, pp. 1991–2037.
- [3] D. Pang, I.F. Pollack, Spinal cord injury without radiographic abnormality in children—the SCIWORA syndrome, *J. Trauma* 29 (1989) 654–664.
- [5] M.E. Pollard, D.F. Apple, Factors associated with improved neurologic outcomes in patients with incomplete tetraplegia, *Spine* 28 (1) (Jan 1 2003) 33–39.
- [6] Traumatic spinal paralysis in children, in: D.C. Burke (Ed.), *Paraplegia*, 11(4) Feb 1974, pp. 268–276.