Case report

Rehabilitation of a patient with Wedge Compression with Paraplegia: A Case Report

Abstract

Background: Despite the most significant efforts of many experts to provide natural therapeutic therapies, spinal cord injury (SCI) is a traumatic event with limited functional recovery. After a spinal cord injury, paraplegia can develop. Damage to the ligaments, vertebrae, or discs of the spinal column causes this. Paraplegia is the loss of muscle function in the lower half of the body, including both legs. Leg paralysis, in this case in which affects all parts of the pelvic organs, legs, and torso. This is partly owing to the complex character of SCI, which involves a great deal of disarray and malfunction as a result of the initial injury. Secondary degeneration is caused by neurotoxicity, vascular malfunction, neuroinflammation, apoptosis, and demyelination.

Presentation of case: 34year old male patient with wedge compression was diagnosed on x-ray after a fall from the tree.

Discussion: The requirements for regeneration, rehabilitation, and neuroprotection appear to necessitate a diverse set of therapeutic approaches that can be used at different stages of the post-injury response.

Conclusion: We'll focus on one strategy, in particular, physical training/exercise, which looks to have a wide range of applications and benefits for those with a chronic or acute SCI.

Keyword: Spinal cord injury, wedge compression, paraplegia, case report

Introduction

A traumatic incident is a spinal cord injury (SCI). This is a severe condition that results in long-term motor and sensory dysfunction. SCI affects between 250,000 and 500,000 persons worldwide each year (WHO,2013). Injuries can be caused by trauma, infections, and malignancies, in addition to the more common motor vehicle accidents, sports injuries, falls, and weaponry (Devivo, 2012). Because the cell and tissue response to injury is extensive and progressive, a precise sequence of therapies to repair damage and produce new neural connections may be required to find a cure for SCI.

SCI is divided into two phases: the first, which involves mechanical trauma to two neurons, glial cells, and their surrounding vasculature, and the second, which involves invasive degeneration of the surrounding spinal cord tissue. Axon retraction, glial scarring, and inflammatory cell recruitment are all instances of cellular events, as are demyelination and subsequent exposure to Myelin-related inhibitory chemicals and abnormal sprouting/plasticity of a spared nerve fiber pathway(1). For example, excitotoxicity is a metabolic change. Even without modern therapeutic approaches, both humans and animals with partial SCI have shown some degree of recovery.

Spontaneous recovery is a phenomenon that occurs less frequently in patients than in mild-moderate damage animal models—neuronal properties changes (2). The injury is rostral and caudal collateral sprouts (3) and alterations to cortical maps (4). This takes place without the need for invasive therapy, pharmaceutical medications, or rehabilitative training. Because several studies have demonstrated that animals self-train in their home cages after being injured, assessing the degree of spontaneous healing in animal models may be difficult (5). Even if automatic recovery occurs, it will not result in significant functional recovery; hence, additional interventions are required.

In this case, the patient had a fall from the tree and suffered from a wedge compression fracture, leading to paraparesis for which he was operated(6). Physiotherapy in wedge compression fracture plays an important role to bring back the patient to normal activities of daily living.

Patient Information

A 34 years male patient with low back pain came to an orthopedic department with chief complaints of pain and swelling in the lower back, fever, weakness in the lower limb, difficulty in walking, and no sensation in the lower half of the body, including both legs and patient had a history of present illness that he had a fall from tree sustaining an injury to the lower back. The patient visited AVBRH hospital on 5/10/21 at the Orthopedic department and was suggested for an x-ray. His reports diagnosed wedge compression fracture with paraplegia, for which he got operated on date 11/10/21. He was shifted to the general ward on 12/10/21; since then, he was referred to the physiotherapy department for rehabilitation. Postoperatively the patient was treated with

antibiotics, drugs, Iv fluids, and other medications were given. He was under regular physiotherapy after that.

Clinical Findings

Patient mesomorphic by build presents with the following attitude: limbs ankle in plantar flexion, hip external rotated. Reflex examination revealed hyporeflexia in the bilateral lower limb and normal reflexes in the bilateral upper limb. The abdominal reflex was also diminished. ASIA impairment scale showed the patient in Level C, i.e., motor incomplete. Sensory examination revealed the absence of sensations in bilateral lower limbs. (Light touch and pinprick). Feelings were intact in the bilateral upper limb. Motor examination revealed grade 0 power (According to MMT) in the bilateral lower limb and grade 4 in the bilateral upper limb.

There was bowel and bladder involvement; hence the patient was catheterized with intermittent catheterization.

Date of Incidence	5/10/2021
Date of Admission	6/10/2021
Date of Operation	11/10/2021

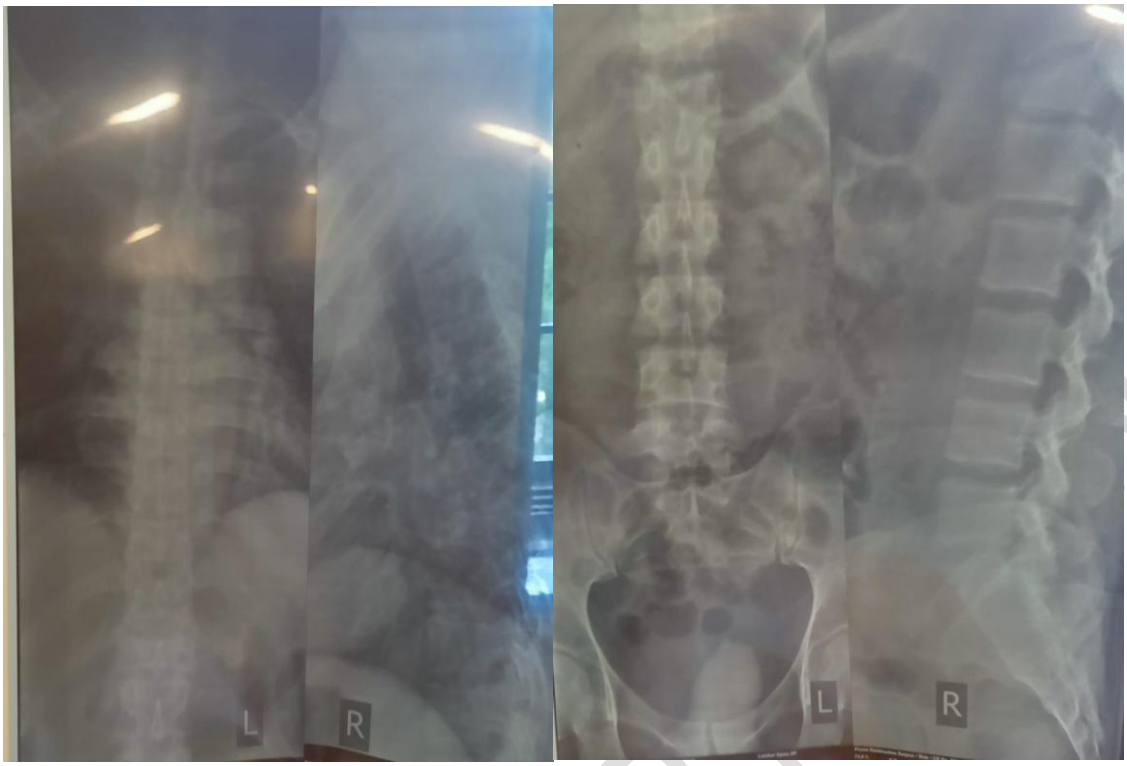

Fig 1: X-ray of the lumbar spine

Fig 2: MRI of the lumbar spine

Physiotherapy Interventions:

Physiotherapy was primarily focused on the prevention of secondary complications and management of primary problems. Vigorous strengthening program for the upper limb to improve the use intact upper limb, with the help of weight cuffs that increased in weight progressively. Breathing exercises were provided to improve lung compliance. For lower limbs, stretching was provided to prevent tightness and contractures developing due to increased immobility. Bed mobility exercises were taught to prevent bedsores and other complications. Positioning every hour was introduced to the patient and the relatives as well. Proper bowel and bladder training was provided to the patient for easy defecation and prevention of infection. Trunk stability exercises were incorporated to improve both static and dynamic sitting balance. Scooting movements and pelvic shifts were also taught to help in future for wheelchair transfers.

Discussion:

High-energy or compound-energy trauma is the most common cause of spinal cord injury. Patients frequently suffer from high-energy or compound-energy trauma, as well as many injuries, making diagnosis and therapy difficult(7). Phantom limb discomfort, neuropathic pain, and low back pain are among the patient's complications. The loss of motor and sensory function as a result of a spinal cord injury and the loss of body image following amputation will impede recovery(8,9). Locomotor training is a simple and effective technique for spinal cord injury patients to increase their motor recovery and

walking capacity(10,11). Locomotor training along with body weight support gait training was provided to the patient. It helped to improve not only the gait, but also improved the dynamic balance in the patient. In patients with spinal cord injuries, rehabilitation and training are more complex leading to delayed recovery, but a multididciplinary approach is very effective in early recovery(12).

Conclusion:

In our present study, we conclude that early physiotherapy intervention for this patient helped in avoiding major secondary complications like pressure sores, joint contractures, also helped in maintaining proper chest compliance and improved trunk control also. Hence, early physiotherapy intervention has to be started following the spinal cord as it plays a significant role in different prognosis and outcomes.

Reference:-

1. Bareyre FM, Kerschensteiner M, Raineteau O, Mettenleiter TC, Weinmann O, Schwab ME. The injured spinal cord spontaneously forms a new intraspinal circuit in adult rats. Nat Neurosci. 2004 Mar;7(3):269–77.

2. Boucher TJ, McMahon SB. Neurotrophic factors and neuropathic pain. Curr Opin Pharmacol. 2001 Feb 1;1(1):66–72.

3. Thompson FJ, Reier PJ, Parmer R, Lucas CC. Inhibitory control of reflex excitability following contusion injury and neural tissue transplantation. Adv Neurol. 1993 Jan 1;59:175–84.

4. Bruehlmeier M, Dietz [No Value], Leenders K, Roelcke U, Missimer J, Curt A. How does the human brain deal with a spinal cord injury? Eur J Neurosci. 1998 Dec;10(12):3918–22.

5. Côté M-P, Azzam GA, Lemay MA, Zhukareva V, Houlé JD. Activity-dependent increase in neurotrophic factors is associated with an enhanced modulation of spinal reflexes after spinal cord injury. J Neurotrauma. 2011 Feb;28(2):299–309.

6. Iii CJD, DiPompeo CM, Varacallo M. Vertebral Compression Fractures [Internet]. StatPearls [Internet]. StatPearls Publishing; 2021 [cited 2021 Dec 6]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK448171/

7. Phansopkar P, Athawale V, Birelliwar A, Naqvi W, Kamble S. Post-operative rehabilitation in a traumatic rare radial nerve palsy managed with tendon transfers: a case report. Pan Afr Med J [Internet]. 2020 Jun 30 [cited 2021 Oct 22];36(141). Available from: https://www.panafrican-med-journal.com/content/article/36/141/full

8. Saifee SS, Yadav* V, Jain M, Kulkarni CA, Naqvi WM. A COMPREHENSIVE PULMONARY REHABILITATION PROGRAM FOR THE MANAGEMENT OF POST-TUBERCULOSIS PNEUMOTHORAX: A CASE STUDY. J Med Pharm [Internet]. [cited 2021 Oct 25];MAY-JUNE 2021(VOLUME-10 ISSUE-3 MAY-JUNE 2021). Available from: https://jmpas.com/abstract/551

9. Patel L, Yadav V, Jain M, Wadhokar O. Positive Outcomes of Comprehensive Exercise Program on Restoration of Functional Level and Quality of Life in a Patient with Rheumatic Heart Disease Undergone Mitral Valve Replacement: A Case Report. J Pharm Res Int. 2021 Oct 15;379–84.

10. Harjpal P, Qureshi MI. Efficacy of bilateral lower limb training over unilateral to re-educate balance and walking in post stroke survivors: a protocol for randomized clinical trial [Internet]. Protocol Exchange; 2021 May [cited 2021 Aug 2]. Available from: https://protocolexchange.researchsquare.com/article/pex-1497/v1

11. Jain M, Vardhan V, Yadav V. Efficacy of Buteyko breathing technique on Anxiety, Depression and Self-efficacy in Coronary Artery Bypass Graft Surgery patients: A Randomized Clinical Trial [Internet]. Protocol Exchange; 2021 May [cited 2021 Aug 4]. Available from: https://protocolexchange.researchsquare.com/article/pex-1496/v1

12. Nas K, Yazmalar L, Şah V, Aydın A, Öneş K. Rehabilitation of spinal cord injuries. World J Orthop. 2015 Jan 18;6(1):8–16.