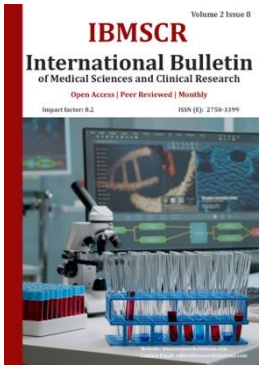

«MODERN TREATMENT AND REHABILITATION OF SPINAL FRACTURES»

Botirov Nozimjon Turakhonovich
Senior teacher of the Department of Traumatology, Orthopedics and Neurosurgery, Andijan State Medical Institute
https://doi.org/10.5281/zenodo.20182119

Abstract: Spinal cord injury (SCI) is defined as impairment in the brainstem/cortex and spinal neurons between the ascending and descending neural pathways, leading to a loss in sensory-motor functions.

Key words: Combination therapy, Neural tissue engineering, Neuron, SCI, Spinal cord injury.

The vertebral column (spine or backbone) is a curved structure composed of bony vertebrae that are interconnected by cartilaginous intervertebral discs. It is part of the axial skeleton and extends from the base of the skull to the tip of the coccyx. The spinal cord runs through its center. The vertebral column is divided into five regions and consists of 33 vertebrae interlaced by strong joints and ligaments. Although the spine can be a pain in the back, it's function is very important. Thanks to the spine, you can twist, bend and sway your trunk in almost any direction. Your vertebral column also protects your fragile spinal cord and helps support the weight of the upper body. Therefore, it's important to take good care of it and maintain a good posture at all times!

The spine, vertebral column, or backbone is defined as the bony structure that runs from the inferior aspect of the occipital bone of the skull to the tip of the coccyx. However, the spinal cord is the tubular nervous tissue that travels through the vertebral canal of the vertebral column. How many vertebrae do we have? The vertebral column consists of 33 vertebrae in total, divided as follows:

- Cervical vertebrae (7)
- Thoracic vertebrae (12)
- Lumbar vertebrae (5)
- Sacrum (5 fused)
- Coccyx (3-4 fused)

Aramedics and first responders ascribe to the basic tenet of "do no harm." Their routine protocol is to use spinal immobilization for patients with major traumatic injuries, patients whose mechanism of injury is not clear, and patients who may have experienced some trauma. Of course, the initial focus is on cervical spine injuries, and they routinely apply a cervical spine immobilization device, typically a rigid plastic cervical collar. They use a logroll technique when transferring the patient onto a long spine board or rescue board, which avoids unnecessary movement. Once on a spine board, the patient is secured and prepared for transport. Even patients with no spinal tenderness or neurologic deficits are transported in this fashion. The goal of routine spinal immobilization protocols is to avoid injuries during transport and during the prehospital phase.

Once in the hospital, remove the patient from the board as soon as practical. Prolonged use may be uncomfortable and even counterproductive, because uncomfortable patients may start moving on the board. Some patients develop skin breakdown and decubitus ulcers, even after 1 hour of use. Controlled transfer, use of a sliding board or scoop system, and the logroll technique can prevent further injury. Adequate personnel are needed to facilitate these transfers.

Focus the initial assessment and stabilization of patients with spine injuries on the ABCs and patient immobilization. As part of the initial assessment and stabilization, the airway may need to be secured using rapid-sequence intubation and spinal stabilization. Once the ABCs algorithm is satisfied, focus attention on the secondary survey. Quite often, these patients are victims of multiple traumas. Associated injuries, such as brain, thoracic, or abdominal injuries, take precedence. The neurologic examination helps determine the presence of deficits. In the presence of neurologic deficits, hypotension and bradycardia may indicate neurogenic shock. he treatment goal for patients in neurogenic shock is to maintain hemodynamic stability. Maintain the systolic blood pressure at a value of at least 90 mm Hg with a heart rate of 60-100 beats per minute. Initial treatment of hypotension is fluid resuscitation; typical adults may require up to 2 liters of crystalloids. Bradycardia may be titrated by the use of 634 atropine. Attempt to maintain urine output at a minimum of 30 mL/hr. If all of the above parameters are difficult to maintain, consider support with inotropic agents. These patients are also at risk for hypothermia and should be warmed to maintain a core temperature of at least 96°F. Place a Foley catheter to help with voiding. A nasogastric tube can help with ileus, which is common in the setting of spinal injury. Priapism is not usually treated.

Paramedics and rescue personnel often transport patients on a spinal board with complete spinal immobilization. The objective is to minimize the possibility of injury during transport. Traditionally, patients have been kept on the spinal board until all radiographic studies were completed and no fractures were identified. A more practical approach is to logroll patients off the board, even prior to obtaining radiographs. A cervical collar can be kept in place until the cervical spine is cleared. The objective is to provide maximal patient comfort while minimizing iatrogenic injury. Early clearance from the spinal board can prevent formation of pressure sores and necrosis. Ensure that patients are turned every 1-2 hours to prevent decubitus ulcer formation. Administer pain medication to maintain patient comfort.

For patients with blunt trauma injuries and neurologic deficits, consider the administration of high-dose intravenous steroids to help minimize deficits. Begin steroid therapy within 8 hours of the injury. The initial dose of methylprednisolone is 30 mg/kg administered over 15 minutes. Start an infusion for the maintenance dose of 5.4 mg/kg/hr at the beginning of the first hour and continue it through the 23rd hour. Studies have shown that steroid use may result in complications and inconsistent results. Fractures may be managed operatively or nonoperatively depending on the extent of spinal cord injury and the overall health of the patient. Minor fractures or those with column stability are managed nonoperatively. Major fractures or those with significant instability can be managed operatively. Operative management is used for stabilization of the spinal column and prevention of spinal deformity, although major factors in nonsurgical candidates can be treated conservatively with nonoperative treatment.

Nonoperative management of unstable spinal fractures involves the use of a spinal orthotic vest or brace. The objective of the brace is to prevent rotational movement and bending. Give consideration to the stabilization of patients with spinal cord injuries and paraplegia. These patients need to be stabilized sufficiently so that their upper body and axial skeleton are appropriately supported, which allows for effective rehabilitation. Stabilization allows patients to use their upper body strength to help with mobility and rehabilitation.

Spinal orthoses are somewhat uncomfortable and only partially effective in providing full stabilization of the thoracic and lumbar spine. The thoracolumbar junction is especially difficult to immobilize externally. As with cervical collar immobilization of the neck, the patient can exhibit an almost complete range of motion with minimal effort. External braces and orthoses primarily serve as a reminder to the patient to minimize movement. A more effective means of immobilization is the body cast, although the body cast is very uncomfortable and may not be well tolerated.

Depending on the location of the fracture and the degree of instability of the spine, the treatment of spinal fractures is determined. Fracture treatment starts with stabilizing the person to prevent further spinal damage. For this purpose, a back support or cervical collar is used to stabilize the spine.

The treatment plan depends on the severity of the fracture. Spinal fracture surgery may not always be necessary. In some spinal fractures, non-surgical methods such as the use of a corset can be useful. Many fractures, including vertebral collapse fractures due to osteoporosis, can be treated with the use of a brace for 6-12 weeks. Physical therapy and exercises are then applied to gradually increase the person's physical activity. If there is a fracture of the cervical vertebrae (neck vertebrae), a neck brace may be recommended.

Vertebroplasty or kyphoplasty are surgical procedures for collapse fractures caused by osteoporosis or spinal tumors. A needle called a trocar is inserted into the broken bone in the spine. A balloon is inflated to expand the collapsed vertebrae and return the vertebra to its normal height.

Bone cement is then injected into the fractured vertebral body. The procedure is called vertebroplasty only if bone cement is used and kyphoplasty only if a balloon is used. When this method is applied at an early stage in spinal fractures caused by osteoporosis, the pain is rapidly controlled and hump formation is prevented.

All of the discussed treatments in this article possess inherent limitations. Prescriptions, surgeries, and other mentioned management are based on previous experiences with patient or animal samples that only represent a division of the current capabilities for SCI treatment as an intricate disease. Future research aims to develop new and prospective treatments that build upon these current interventions, taking into account the specific conditions and severity of spinal cord lesions in individual patients..

References:

1. Khadour FA, Khadour YA, Meng L, Lixin C, Xu T. Epidemiological features of traumatic spinal cord injury in Wuhan, China. J Orthop Surg Res. 2023;18(1):72.
2. Ebrahimzadeh MH, Golhasani-Keshtan F, Shojaee BS. Correlation between health-related quality of life in veterans with chronic spinal cord injury and their caregiving spouses. Arch Trauma Res. 2014;3(4).

3. Abdelrahman S, Ireland A, Winter EM, Purcell M, Coupaud S. Osteoporosis after spinal cord injury: aetiology, effects and therapeutic approaches. J Musculoskelet Neuronal Interact. 2021;21(1):26–50.
4. Lv B, Zhang X, Yuan J, et al. Biomaterial-supported MSC transplantation enhances cell-cell communication for spinal cord injury. Stem Cell Res Ther. 2021;12(1):36..