



Modern Clinical Analysis of Injuries of the Thoracolumbar Spine

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Annotation: The number of injuries of the thoracic and lumbar spine remains at a high level with an upward trend. As a rule, this type of injury affects the most active in social and labor terms, persons aged 15 to 34 years. Modern views on the treatment of spinal cord injury (SCI) are based on decompressive and stabilizing operations. However, the tactics of surgical interventions require clarification for decompressive and stabilizing operations, their volume and sequence. Therefore, work to improve the surgical treatment of SCI is relevant.

Keywords: spinal cord injury, decompressive and stabilizing operations.

Introduction. Over the past decades, there has been an increase in the number of spinal injuries due to intensive urbanization and mechanization, an increase in high-speed vehicles, an acceleration in the pace and rhythm of life [1].

Mortality in PSCI, depending on the severity and localization, according to various authors, ranges from 18% to 99% [6, 7]. The number of injuries of the spine, spinal cord and roots of the cauda equina in peacetime is from 0.7% to 4% of all injuries, and 6.3% of injuries of the bones of the skeleton, of which in 40-45% of cases the thoracic region is damaged and in 45 52% lumbar. More often, VTh12 (15-17%) and VL1 (25-28%) are damaged [4]. 30-70% of patients with injuries of the thoracolumbar spine have neurological disorders, which indicates damage to the spinal cord and roots. Livshits A.V. considers that in 60-70% of patients the compression nature of fractures of the vertebral bodies is determined, in 20-28% of fracture-dislocations, and in 5-10% of dislocations. In these statistics, the defeat of one vertebra prevails - in 60%; fractures of two vertebrae - in 30%; three vertebrae - in 5-6% of the victims. Thoracic vertebrae are damaged according to various authors, from 33.7% to 40-45%, mortality in these fractures is 8.3%, fractures of the lumbar spine are 41.7% [3, 4].

In the last decade, the overall mortality rate for spinal cord compression has decreased to 10.5%, for thoracic spine injury it has become 18-20%, and at the lumbar level it is below 10% [11]. Of course, it is very difficult to draw unambiguous conclusions when analyzing various statistics. It depends on the fact that patients with spinal injuries were examined and treated in clinics and departments of various profiles. Undoubtedly, the specifics of the selection of patients in accordance with the profile of the department and clinic leave their mark on the static indicators of the frequency and outcomes in this pathology.

Damage to one vertebra is most typical in 80.5% of cases, and damage to two or more vertebrae is 19.5%. In the literature, total damage to the spinal cord along the diameter is determined in 35%, anterior compression in 46%, posterior in 1%, lateral in 14% of the victims [13,17]. Complete violation of the conduction of the spinal cord was observed in 45% of patients, partial violation in 55%. Complicated fractures account for 25% of the total number of patients with spinal injuries [10, 12].

An analysis of the data reflecting the dynamics of treatment outcomes shows their significant differences, which is explained by the different contingent of patients considered by the authors. The

results of the treatment of closed spinal injuries were extremely different from other statistics. They believed that 99% of cases had a favorable outcome, and only 1% had an unfavorable outcome. It is quite clear that these authors observed patients with mild and uncomplicated spinal fractures. Most other researchers considered that adverse outcomes were noted from 17%, 44%, and 50.8% and up to 57.2% [9, 16]. The data of researchers studying this problem in those patients with spinal cord injuries most realistically reflect the outcomes of treatment [15, 16]. Considering all of the above, it should be recognized that, in general, the global increase in neurotraumatism also reflects the dynamics of spinal cord injuries, which have increased significantly over the past decades [9, 10].

In the course of a traumatic disease of the spine and spinal cord, 5 periods are distinguished [5, 12].

1. The acute period lasts from the moment of injury to 3 days. In the area of injury, tissue edema, primary necrosis, and circulatory disorders are noted.
2. The early period is determined by the duration of 2-3 weeks. Livshits A.V. considers that this period lasts 2-4 weeks. At this time, primary complications occur - myelitis, meningitis, pneumonia, urosepsis, and bedsores.
3. The interim period lasts from 2 to 3 months. In the first 5-6 weeks after the injury, the obvious symptoms of spinal shock disappear. In the area of damage, cicatricial fibrous processes develop, a callus is formed, and the healing of bedsores begins.
4. Late period lasting from 3-4 months to 1 year. With an unfavorable course, bedsores, trophic disorders, sepsis, pyelonephritis occurs.
5. Residual period from terms of more than 1 year.

A lot of work has been devoted to creating a classification of SCI. The most common, in our opinion, is the classification of closed injuries of the spine and spinal cord, approved by the All-Union Commission on Neurosurgery under the Ministry of Health of the USSR in 1979. This classification distinguishes between uncomplicated injuries that are not accompanied by trauma to the spinal cord and its roots, and complicated injuries, in which neurological disorders associated with damage to the spinal cord and its roots come to the fore [16].

According to the nature of damage to the structures of the spine, there are:

1. Damage to the ligamentous apparatus, without changes in the bones (stretching, rupture).
2. Fractures of the vertebral bodies (compression-wedge-shaped, compression-comminuted, comminuted, "explosive", horizontal - such as Shants).
3. Fractures in the region of the posterior half-ring of the vertebrae (fractures of the arches, spinous, transverse and articular processes).
4. Fracture-dislocations and dislocations of the vertebrae.
5. Multiple injuries of the ligamentous apparatus, bodies, arches, processes of the vertebrae, intervertebral discs.

All closed spinal injuries can be stable or unstable. Instability [7,8] should be understood as a pathological condition characterized by the occurrence and progression of non-physiological displacements and deformities in pathologically altered vertebrae and (or) vertebral segments within the spinal column. According to Khvisyuk, there are 3 degrees of instability:

1 degree - loss of body height up to 15%.

Grade 2 - loss of body height up to 35%.

Grade 3 - loss of body height of more than 35%.

To understand the spinal instability syndrome, it is necessary to have an idea of the 2 and 3 support (column, post) concepts of maintaining spinal stability. The two-column concept was proposed by F. Holdsworth (1963). The author divided the bone-ligamentous apparatus of the spine into two fixing supports, or support structures. Of these, the anterior consists of the vertebral bodies and

intervertebral discs, as well as the anterior and posterior longitudinal ligaments. The posterior supporting structure is formed by the vertebral arches, facet joints, transverse and spinous processes, yellow, interspinous, supraspinous and intertransverse ligaments.

More recent studies undertaken by F.Denis (1983) have made it possible to propose a tricycle concept for maintaining spinal stability. According to this concept, the structure of the rear support (column) is fully consistent with that of the Holdsworth concept, while the front was divided into 2 supports - front and middle. The anterior support included the anterior 2/3 of the vertebral bodies, the anterior 2/3 of the 4 intervertebral discs and the anterior longitudinal ligament, the middle-posterior vertebral bodies, the posterior sections of the fibrous ring of the intervertebral discs and the posterior longitudinal ligament. F.Denis considered a spinal injury stable if the structures were damaged within only one supporting column, relatively unstable if damage occurred within 2 supporting columns, and absolutely unstable if the structures of all three supporting columns were damaged.

A more detailed classification of spinal injuries at the thoracic and lumbar levels was developed by Magerl (1989). It is called OA spinal fracture classification and is based on the fact that three forces are involved in the formation of various types of spinal injuries: compression, distraction and rotation. Depending on what mechanism of injury occurs, the authors divide all injuries at the thoracic and lumbar levels into three types: A, B and C.

Type A injuries (subdivided into three types A1; A2; A3) occur during compression, while the anterior sections of the spine are damaged and compression or explosive fractures of the bodies occur.

Type B injuries (also divided into B1; B2; B3) form, in addition to compression, distraction forces (anterior and posterior), while the anterior and posterior columns are damaged. There are flexion-extensor fractures, "explosive" fractures with a rupture of the posterior ligamentous apparatus.

Type C injuries (C1; C2; C3) occur with injuries that are caused by forces of compression, distraction and rotation, all three supporting structures of the spine are damaged; these are the most severe injuries of bones and ligaments, in which, as a rule, there are gross neurological disorders.

According to the mechanism of damage to the spine and spinal cord, six main mechanisms of action of the damaging factor should be distinguished: flexion, flexion-rotation (rotational, rotational), extensor, compression, flexion-distraction (distraction), and shear mechanism.

According to the nature of damage to neurovascular formations, the following types are distinguished: 1. Concussion of the spinal cord; 2. Contusion of the spinal cord; 3. Compression of the spinal cord; 4. Hematomyelia; 5. Hematorachis; 6. Radicular syndrome [16].

Spinal cord concussion is a functionally reversible form without signs of morphological disorders in the spinal cord. Clinically, concussion of the spinal cord can manifest itself as segmental disorders, in the form of weakness of any muscle groups, decreased reflexes and sensitivity disorders in the area of the injured segments of the spinal cord. Recovery occurs with conservative treatment within 5-7 days.

A spinal cord contusion is an injury accompanied by morphological damage to the substance of the brain, cells of the segmental apparatus and pathways. Dysfunction of the spinal cord manifests itself immediately after injury, and depends on the degree and level of its damage. At the time of injury, dysfunction is caused by the phenomena of spinal shock, which lasts up to several months, and only after its completion, the neurological can establish the true size of the damage [13, 14, 15].

The pathomorphological and pathophysiological mechanisms of the phenomenon, which received the clinical name "spinal shock", have not been fully elucidated. Spinal shock is characterized by the reversibility of neurological disorders that occurred in the acute and early periods with spinal cord injury. The depth and duration of spinal shock depend on the severity of the injury, it is more pronounced in areas adjacent to the area of injury, although in the proximal parts of the spinal cord in relation to the injury, spinal shock is always less pronounced than in the distal parts.

These clinical observations led to the idea that spinal shock is a consequence of traumatic overstimulation. According to Ch.Sherrington (1947), spinal shock is a condition of the spinal cord devoid of supraspinal influences from the middle and a violation of interneuronal connections [16, 17].

Causes of spinal cord compression:

1. Bone structures in fractures and dislocations of the vertebrae;
2. Fragments of a destroyed disk;
3. Epidural hematoma;
4. Traumatic hydroma;
5. With traumatic edema of the spinal cord;
6. With the combined action of the above factors

According to the time of development, compression of the spinal cord is divided into:

1. Acute compression that occurs at the time of injury, and is very difficult to clinically differentiate from spinal cord contusion;
2. Early compression that develops hours and days after the injury;
3. Late compression, which manifests itself months and years after the injury, and is associated with the formation of excess callus, cicatricial adhesions [13,16].

Spinal cord injury is also manifested by a syndrome of partial and complete conduction disturbances in the spinal cord [2,11]. Syndrome of partial violation of the conduction of the spinal cord is manifested by neurological disorders of varying severity - from mild anisoreflexia to gross muscle paralysis, with dysfunction of the pelvic organs.

The syndrome of complete violation of the conduction of the spinal cord is characterized by the presence of muscle paralysis, areflexia, atony, loss of sensitivity below the affected segment according to the conduction type, gross disorders of pelvic functions.

It is necessary to distinguish the syndrome of complete violation of the conduction of the spinal cord, caused by its contusion and spinal shock, from the syndrome with a complete anatomical break. An MRI study helps in early diagnosis [4, 5, 6, and 7].

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