

Case presentation of a patient with an onset of psychotic disorder, polytraumatized by defenestration from 10th floor, with thoraco-lumbar SCI and multiple somatic fractures, with favorable neuro-motor and psychiatric evolution after rehabilitation

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Abstract

Introduction: Traumatic fractures of the spine are most common at the thoracolumbar junction and can be a source of great disability. Most of them occur due to motor vehicle injuries and falls from a height. Since these are high-velocity injuries, thoracolumbar fractures are commonly associated with other injuries like rib fractures, pneumo-hemothorax, and rarely great vessel injuries, hemopericardium and diaphragmatic rupture.

Materials and Methods: In this article - having the patient and the THEBA Bioethics Committee approval (no. 3159/30.01.2020) – it is presented the case of a 26-year-old patient who suffered a polytrauma due to defenestration from the 10th floor - about 30 m high - resulted in thoraco-lumbar SCI associated with other severe injuries, hospitalized in Neuromuscular Clinical Division by transfer from the Neurosurgery Clinic of our hospital, for neuromotor recovery, presenting a L1 AIS/ Frankel C quadriplegia and neurogenic bladder. During the hospitalization, the patient presented psychomotor agitation, food and medication rejection, which is why repeated psychiatric evaluations were requested and performed.

Following the recovery program, the patient's evolution was favorable: recovered the weight deficit, improved the motor control and sensitivity, the urethral indwelling catheter was suppressed and the intermittent catheterization program was started with later regaining of the micturition control.

The patient was assessed functionally using the following scales: AIS/Frankel, modified Ashworth, Functional Independence Assessment (FIM), Life Quality Assessment (QOL), FAC International Scale, Independence Assessment Scale in Daily Activities (ADL/IADL).

Results: The patient benefited from a complex program of neuromuscular rehabilitation, with a favorable evolution, with the increasing scores from the evaluated scales and, thus, with a final performance of walking with support on short distances, as well as a sphincter reeducation with the neurogenic bladder remission.

Conclusions: Associating interdisciplinary approach with a customized rehabilitation program in a patient with an onset of psychotic disorder, polytraumatized by defenestration from the 10th floor, with thoraco-lumbar SCI and other severe injuries led to neuromotor and psychiatric improvements, and sphincter function reeducation with an important improvement in patient's quality of life.

Keywords: *neuromuscular rehabilitation, traumatic spinal cord injury, psychiatric disorder, polytrauma,*

Introduction

Spinal cord injuries (SCI) cause osteo-articular lesions of the spine and its contents (bone marrow, nerve roots, meninges and vessels) in a varied anatomical lesion association, with multiple clinical manifestations and therapeutic indications (1).

Every year, between 250.000-500.000 cases of spinal cord injuries are reported. The most common causes are: car accident, falls from heights, assaults, sports accident, work accidents (2).

Spinal cord injuries occur in approximately 1.3% of all spinal fractures, most commonly in cervical spine injuries (55%), followed by the thoracic spine (30%) and lumbar spine (15%). Approximately 40% of all spinal cord injuries present as complete injuries, and the mortality rate associated with spinal cord injuries is approximately 16 times higher than other types of injuries (3).

Traumatic fractures of the spine are also common at the thoracolumbar junction and can be a source of great disability. Since these are high-velocity injuries,

thoracolumbar fractures are commonly associated with other injuries like rib fractures, pneumo-hemothorax, and rarely great vessel injuries, hemopericardium and diaphragmatic rupture.

SCI results in 15% of cases with the death of the victim before being transported to the hospital. Also, a mortality of approx. 5% are registered at the level of specialized assistance centers, able to provide qualified, multidisciplinary assistance, while in non-specialized centers, mortality can be between 25-40%. Patient death is correlated with the severity of spinal cord injuries.4

The average age of injured people is 20–50 years (33.4 years in the EU), most SCI occurring in young, fit for duty men (4,5)

In the case of survivors, the neurological sequelae are often dramatic, ranging from quadriplegia and situations in which assisted ventilation/ ventilatory prosthesis is reached to complete neurological deficits. The presence of these sequelae has a strong negative effect on the

patient's autonomy and mental state, as well as on his work capacity and entourage. There is also a strong economic impact on the patient and his family, imposed by the high costs of maintaining these patients (3,6)

Method: case presentation

The informed consent of the family and the approval of the Ethics Commission of „Bagdasar-Arseni Hospital” Bucharest were obtained for this communication.

We present the case of a 26 years young man, student, IT smoker = 150, occasional alcohol consumer (2L beer), who denies consumption of other psychotropic substances, in good health before the traumatic event, without comorbidities and without medication at home, who suffered on 28.07.2019 a polytrauma by defenestration from the 10th floor of the house (~ 30m) - suicide attempt resulting in SCI TLS- compression fractures T8, T9, T10, fractures L1, L2, complex fracture S1 and sacral fins with anterior dislocation with spondyloptosis L5, S1, S2, bilateral calcaneus comminuted fracture, left ischiopubic ram fracture, costal fractures VI, VII on the right side, bilateral pneumothorax and left superior lobe pulmonary hematoma.

He was hospitalized in the general surgery department – intensive care - between 28.07.2019 - 08.08.2019, where the drainage of bilateral pneumothorax was performed. Blood transfusions were given to compensate for post hemorrhagic anemia and he was cardio-respiratory balanced.

On 21.08.2019 he was admitted in the neurosurgery department where he benefited from a intervention on the spine for the upper partial comminuted fracture L1 and L2, T12 vertebral arch fracture.

L1 transpedicular posterolateral approach was performed, with quasi-complete laminectomy T12, laminectomy L1, arthrectomy T12-L1 and L1-L2 on the right side, anterior decompression and bilateral metal fixation T12, L2, L3 on the left side and T12-L3 on the right side.

He was transferred to the Neuromuscular Clinic Division on August 26, 2019, presenting spastic paraplegia – incomplete AIS / Frankel C lesion with neurological level L1 after polytrauma, post-thoracic trauma status with rib fractures VI-VII on the right~ side; bilateral calcaneal fractures; left symphysis ram fracture; neurogenic bladder (fixed catheterization), secondary ITU-Escherichia Coli, severe depressive episode.

He presented episodes of psychomotor agitation and depressive syndrome for which he was transferred to Clinical Hospital of Psychiatry “Prof. Dr. Al. Obregia” between 30.10-26.11.2019. He is readmitted to our Clinic Division to continue the rehabilitation program between 11/26/2019 and 12/23/2019.

At the time of admission, he was in altered general state, with 38,2 Celsius degrees fever, underweight with a BMI=17, longilin-asthenic thorax, Oxigen saturation

=96% spontaneous, bilateral basal subcrepitant rales. At the neurological exam the patient was conscious, TSO, with incomplete paraplegia AIS/Frankel C, osteotendinous hyperreflexia for Achilles and patellar reflex and inverted plantar reflex.

Functionally, it keeps the supine position in the bed, being able to participate in making the transfers at the bed level.

Paraclinical examinations were necessary to assess the biological reserve and availability in supporting the recovery program. Thus, both laboratory investigations and imaging were used.

The radiography of the lumbar spine (Fig. No. 1 and Fig. No. 2) shows dextroconvex lumbar scoliosis, metal osteosynthesis T12, L1, L2 and L3 and lumbar layered vertebral presses.

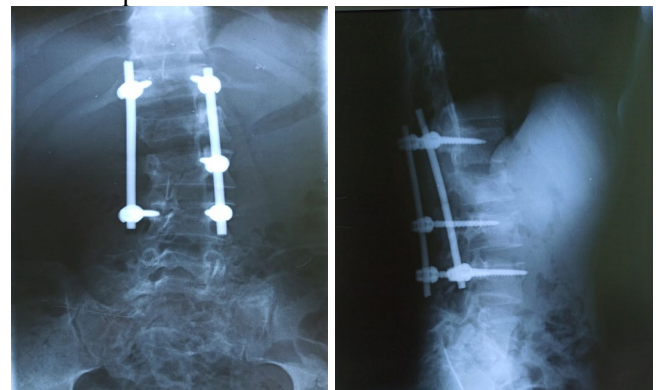


Fig. No.1-Radiography of the lumbar spine (frontal view)

Fig. No.2-Radiography of the lumbar spine (lateral view) (from NeuroRehabilitation Clinic Division of TEHBA)

The radiography of the leg, ankle, foot on the right side (Fig. No. 3) shows comminuted fracture of the calcaneus with a trajectory extending at the level of the posterior thalo-calcaneal articular surface.



Fig. No. 3--Radiography of the right, leg, ankle, foot (from NeuroRehabilitation Clinic Division of TEHBA)

The main general objectives of the neurorehabilitation program were: maintaining mobility and increasing joint stability, increasing cardio-pulmonary capacity, improving global motor control, coordination and balance, increasing independence in daily activities (ADL) - making transfers, maintaining the orthostatic position, re-learning to walk, regaining micturition

control – prevention of the urinary tract infections, learning self-catheterization technique, maintaining a mental balance and increasing self-esteem and quality of life.

Evolution:

As a postoperative medication the patient received: prophylactic subcutaneous anticoagulant, pain relievers, urinary antiseptics. The medication was continued during hospitalization, supplemented with: antibiotic - treatment of urinary tract infection, at the recommendation of the psychiatrist - antipsychotic and antidepressant; neurotrophic and vitamins. In order to carry out a complex recovery program, a multidisciplinary team was needed, consisting of: doctors, physiotherapists, occupational therapists, psychologists, nurses in the center of which the patient and his family are located. Also, the recovery team collaborated with other specialists to provide the patient with a complete, individualized recovery plan, based on the particularities of the case. For managing the psycho-cognitive and mental status, the patient was consulted repeatedly by specialists in the field and specific medication was administered. During his hospitalization, he presented numerous episodes of psycho-motor agitation, with food negativity and medication administration, which is why repeated psychiatric consultations were performed. Following these and the recommended psychiatric medication, he became inserted in reality and adequately situational, cooperating, he manifests his desire to benefit from further psychological counseling. The mobilization was made gradually, starting with kinesiotherapy at the patient's bedside. Gradually he learns how to make transfers to / from the wheelchair and mobilizes with it. Subsequently, he benefited from a complex rehabilitation program at the gym for improving motor control and sensitivity disorders with good evolution and at discharge the patient could perform walking with support in the fixed frame. The patient also benefited from the sphincters reeducation program, regaining partial urinary control. The fixed urinary catheter was suppressed and the intermittent urinary catheterization begins at discharge.

Results:

The patient benefited from a complex program of neuromuscular rehabilitation, with a favorable evolution, with the increasing scores from the evaluated scales and, thus, with a final performance of walking with support on short distances, as well as a sphincter reeducation with the neurogenic bladder remission. During the 1st admission, the patient presented a stationary evolution from a functional point of view, presenting numerous episodes of psychomotor agitation, with food and medication negativity. Upon re-admission to our clinic, after the transfer period to the psychiatric clinic and following the specific

treatment, it had a favorable evolution with the improvement of the functional and mental status; this can also be observed by improving the scores of the evaluation scales.

SCALE	Admission	Discharge
AIS (American Spinal Injury Association Impairment Scale) Frankel	59/100 C	80/100 D
QOL (Quality of Life)	54/112	78/112
FIM (Functional Independence Measure)	44/126	60/126
FAC (Functional Ambulation Category)	0/5	3/5

Table No.1 Evaluation scales at admission and discharge
Prognosis:

The patient prognosis is favorable: Vital (ad vitam) - favorable by preventing complications, giving up ethanol consumption, continuing psychiatric treatment and psychological counseling, functional (ad functionem) - favorable through improved locomotor status, regaining independence in performing daily activities (ADL), of work capacity (ad laborem) -favorable through family support and further studies in the future.

Conclusions:

In order to obtain favorable results and improve the patient's quality of life, an interdisciplinary approach was needed from an early stage to control negativism in the context of severe depression with improved collaboration and increasing patient's interest in healing and regaining independence.

Associating interdisciplinary approach with a customized rehabilitation program in a patient with an onset of psychotic disorder, polytraumatized by defenestration from the 10th floor, with thoraco-lumbar SCI and other severe injuries led to neuromotor and psychiatric improvements, and sphincter function reeducation with an important improvement in patient's quality of life.

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