

Assessment of psychoemotional conditions in patients with consequences of spinal cord injury

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Introduction Assessment of patients' psychoemotional condition (PEC) is a standard aspect of clinical care within traumatic spinal cord injury (SCI) rehabilitation. **Materials and methods** The evaluation was performed for 40 patients with SCI aged more than one year and ASIA grades B, C, D. HAM (Health, Activity, Mood) tests, the Beck Depression Inventory (BDI) and the Spielberger-Khanin Anxiety Scale were used to assess psychoemotional conditions in the patients. **Results** Patients with traumatic SCI did not reveal high level of state anxiety and depression at a long-term follow-up with evidently limited motor function (ASIA grades B, C). Even the presence of baseline trait anxiety did not result in severe psychoemotional disorders like depression. This can be described as a regulating effect of the autonomic nervous system through both recovery and compensation of autonomic dysfunctions employing reparative and adjustment mechanisms including coping efforts. **Conclusions** The majority of the patients could successfully cope with consequences of SCI at mid- and long-term follow-up. Most of them were able to adapt to the circumstances, learn to live with a new status, and successfully overcome SCI related physical, psychological and social difficulties.

Keywords: spine and spinal cord injury, long-term condition, psychoemotional disorders, depression, anxiety, autonomic nervous system

INTRODUCTION

Spinal cord injury (SCI) constitutes up to 15 % of all injuries and is characterised by severe disruptions in the physical, social and psychological domains [1]. Disability due to spinal cord injury ranges from 57.5 % to 96 and even 100 %, that amounts to 0.7 % among general injuries [2]. Psychoemotional and psychophysical impairments are seen in 82.5 % of the cases [3, 4].

Spinal injury related immobility or limited ambulation entail severe psychic stress that causes a variety of personal maladaptations including psychotic and non-psychotic conditions [5]. Various factors influence upon the risk of the disorders, their patterns, frequency, severity and the dynamics. A type of injury, personal characteristics and social conditions are among most important ones.

Depression as a typical reaction from patients with spinal injury remains one of the most urgent topics for discussion [6]. Depression was considered as a universal response to injury, and several clinicians view depression as a stage of normal adaptation to injury [7, 8].

Evaluation of psychoemotional status of patients with spinal cord injury is reported as a part of a complex rehabilitation system at different periods by many authors [3, 4, 6, 7].

Objective Assess patterns and extent of psychoemotional impairments in patients with traumatic spinal cord injury (SCI) at mid- and long-term follow-up depending on severity of neurological disorders.

MATERIAL AND METHODS

Clinical trial was conducted at neurosurgery department of the Russian Ilizarov Scientific Center for Restorative Traumatology and Orthopaedics. The study included 40 patients with traumatic spinal cord injury at mid- and long-term follow-up.

Mean age of patients was 32.4 ± 2.2 years that

indicated to the cases injured at a young working age. There were 23 males and 17 females.

Injury mechanisms included road traffic accidents in 57.5 % of the cases, diving mishaps in 20 % and falls in 22.5 %.

The patients were in mid-term (25 %) and late (75 %) follow-up of traumatic SCI [9].

Most common levels of injury were cervical (45 %) and thoracic (35 %) spine. Spinal cord injury at the lumbar level was identified in 20 % of the cases.

American Spine Injury Association impairment scale/International Standards for Neurological and Functional Classification of Spinal Cord Injury (ASIA/ISCS) were used for motor and sensitivity assessment depending on conduction of sensory and motor signals across the site of lesion [10]. The majority of patients had groups B and C incomplete severe SCI (**Fig. 1**).

Symptoms of autonomous dysfunction of SCI were diagnosed in 38 cases including 20 with cardiovascular disorders (tachycardia, bradycardia, orthostatic hypotension, unstable blood pressure), 3 with respiratory insufficiency (respiratory arrhythmia) and 15 patients with skin conditions.

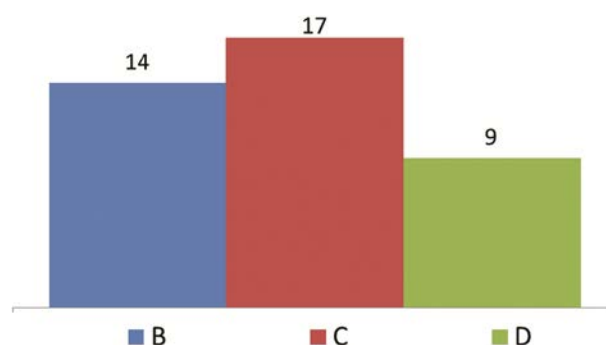


Fig. 1 Diagram showing severity of SCI injury according to ASIA scale

The Spielberger-Khanin Anxiety Scale [11], HAM (Health, Activity, Mood) test [12] and the Beck Depression Inventory (BDI) [13] were used to assess psychoemotional conditions and adjustments in the patients.

Statistical methods of arithmetic mean (M) and the errors ($\pm m$) were applied.

RESULTS AND DISCUSSION

The Beck Depression Inventory (1961) mean scores measured 10.9 ± 1.4 that indicated to low total depressions in the patients. Most of the cases developed no depression (57.5 %), sub-depression was revealed in 27.5 % of the cases, moderate depression in 10 %, and evident depression diagnosed in 5 % of the patients (**Fig. 2**). No cases of severe depression were observed.

Correlation between severity of depression and type of SCI is presented in **Fig. 3**.

Patients with incomplete spinal cord injury and limited motor function of the limbs (type C) developed moderate ($n = 3$) and severe ($n = 1$) depression at mid-term and late follow-up of traumatic SCI. Moderate and pronounced depression was observed in 2 patients with more severe motor and sensitivity disorders (type B).

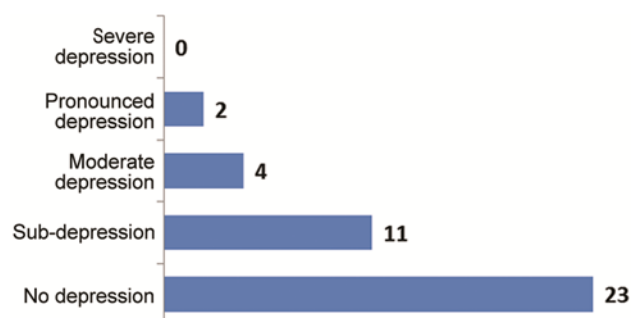


Fig. 2 Diagram showing distribution of depressive syndrome

Evaluating anxiety level the majority of patients (92.6 %) showed trait anxiety (i.e. anxiety as a regular constitutional dominant of an individual) that was equally distributed between high and moderate levels. State anxiety as subjectively experienced stress related emotions was observed in 22.5 % of the cases with high ($n = 2$) and moderate ($n = 7$) levels.

High level of trait anxiety was observed in 19 cases whereas state anxiety was diagnosed in 2 patients only (**Table 1**).

Moderate and high state anxiety was diagnosed in 9 patients with type C partially disturbed function of the spinal cord ($n = 6$) and type B severe impairment (**Table 2**). So, the patients could adapt to posttraumatic condition, a new physical condition and SCI related difficulties.

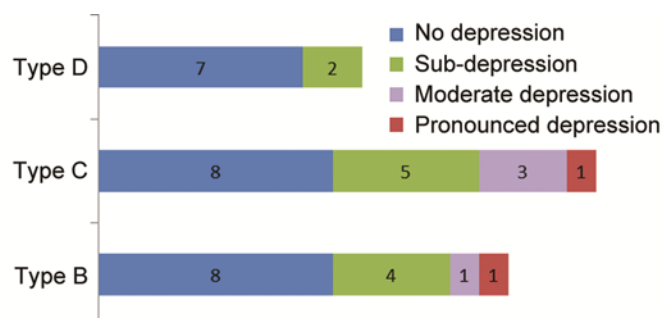


Fig. 3 Diagram showing distribution of depression with regard to ASIA scoring of SCI

Table 1

Anxiety distributed by severity

Anxiety level	Trait anxiety		State anxiety	
	Number of cases	%	Number of cases	%
High	19	47.5	2	5
Moderate	18	45	7	17.5
Absent	3	7.5	31	77.5

Table 2

State anxiety level and ASIA severity of SCI

ASIA severity of SCI	State anxiety level					
	absent		moderate		high	
	number	%	number	%	number	%
B	11	78.5	3	21.4	–	–
C	11	64.7	4	23.5	2	11.7
D	9	100	–	–	–	–

Correlation between anxiety and depression showed depression developed in patients with high and moderate (5:1) levels of trait anxiety with moderate and lower (3:2) state anxiety. High state anxiety was recorded in one case.

Health, Activity and Mood test demonstrated high levels in each of the categories that indicated

to overall positive environment. High positive values were recorded in 33 (82.5 %) from 40 patients who developed positive emotional activity, positive attitude towards the environment and high activity level. Mean scores was recorded in 7 (17.5 %) cases.

DISCUSSION

The level and extent of spinal cord injury determine clinical manifestations and essential life-sustaining activities.

Pronounced conduction disorders were diagnosed in the cohort of patients with 77.5 % graded ASIA B and C with severe incomplete SCI. Cervical and thoracic levels were most common and resulted in expressed neurological disorders and disability.

The number of patients who develop high levels of trait and state anxiety and severe depression was reported to decrease with increase in traumatic SCI timing and rehabilitation. The incidence and extent of depression and trait and state anxiety were shown to increase with greater severity of injury [14]. Various depression syndromes, psychic disorders, psychogenic conditions are most common at a late follow-up of SCI [7].

High level of trait anxiety was observed at mid-term and late follow-up of traumatic SCI in 47.5 % of the cases, whereas state anxiety was diagnosed only in 5 % of the patients. Pronounced depression was revealed in 5 % of the cases. Neither the level

of state anxiety nor the extent of depression were dependent on severity of neurologic disorders. No statement can be made of patients developing high level of state anxiety and severe depression at a late follow-up with pronounced motor limitations and high incidence of disability (ASIA types B, C).

Our findings are in line with other studies showing a greater risk of suicide found with individuals with incomplete spinal cord injury and relatively good physical condition that is contradictory with a common opinion about correlation between severity of SCI and severity of psychological disorders [8, 15]. Different authors report different incidence and extent of depression in SCI [6, 7]. The controversy can be explained by many factors having an impact on adaptation to the injury including the patient's emotional state [8].

Autonomic nervous system is involved in human psychoemotional state [16]. Changes in autonomic regulation of visceral organs, vessels, metabolism due to primary or secondary morphofunctional alterations are found to occur with dysfunctions of autonomic nervous system [17]. All SCI

injuries entail dysfunctions of autonomic nervous system both as direct mechanical at the time of injury and subsequently indirect (scarify atrophic changes in the surrounding tissues, yatrogenic factors) traumas resulting in suprasegmental and segmental impairments [17, 18]. Traumatic disease as a whole and traumatic spinal cord injury, in partic-

ular, are characterised by a group of autonomic responses including stress mechanisms at acute period and compensatory, reparative and adaptive mechanisms at mid-term and late follow-up [18]. There is a well-established correlation between recovery of autonomic nervous system and stabilization of psychoemotional status.

CONCLUSIONS

The review of psychoemotional status in patients with traumatic SCI showed the absence of expressed state anxiety and depression at the mid-term and late follow-up with severely impaired motor and sensitivity functions of the limbs pronounced limitations in daily living activities. Even the presence of baseline trait anxiety did not result in severe psychoemotional disorders like depression. This can be described as a regulating effect of the autonomic nervous system through both recovery and compensation

of autonomic dysfunctions employing reparative and adjustment mechanisms including coping efforts primarily aimed at relieving and regulating the emotional impact of the stressful situation.

The majority of the patients could successfully cope with consequences of SCI at mid- and long-term follow-up. Most of them were able to adapt to the circumstances, learn to live with a new status, and successfully overcome SCI related physical, psychological and social difficulties.

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