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## **POSSIBILITIES OF SEQUELAE SPINAL CORD INJURY TREATMENT SYCH N.**

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A number of patients with severe spinal cord injuries, most often due to industrial, agricultural, sports injuries and traffic accidents is increasing every year. Spinal damage, according to some authors, come up to 7% of the total number of different types of injuries. The frequency of spinal cord injury with open spinal injury equals 86%, underscoring the severity of the problem. The contingent suffered from spinal injuries as much as 75% consists of mostly men of working age (from 20 to 50 years). Fractures of the cervical spine are seen in the 8-9% of the cases, breast-40-46%, lumbar-48-51% [Injury of the spine and Spinal Cord. Ed. N. E. Polishchuk, etc.].

It is estimated that the annual incidence of spinal cord injury (SCI), not including those who die at the scene of the accident, is approximately 40 cases per million population in the U. S. or approximately 12,000 new cases each year. Since there have not been any incidence studies of SCI in the U.S. since the 1990's it is not known if incidence has changed in recent years. The number of people in the United States who are alive in 2013 who have SCI has been estimated to be approximately 273,000 persons, with a range of 238,000 to 332,000 persons.

According to the Kiev Neurosurgery Institute of Ukrainian Academy of medical sciences, there are approximately 2000 patients with spinal-brain

trauma in our country every year, which indicates that the problem is not only medical but also social.

**Goal:** study clinical efficacy in patients with sequel of spinal cord injury (SSCI) treatment under the influence of fetal stem cells (FSC) treatment.

**Material and methods:** The article contains the results analysis of 23 patients with consequences of SSCI, 15 man, 8 women, with the age range between 25 to 60 years old. Duration of injury to an average of  $4,2 \pm 0,34$  years. The 9 patients had an injury of the cervical spine and 14 patients - the thoracic spine. All patients had a spinal injury which was confirmed by magnetic resonance imaging. All patients underwent clinical, neurological research, assessment of the scale, the assessment of quality of life on a scale of SF-36.

The Spinal Cord Independence Measure (SCIM) is a new disability scale developed specifically for patients with spinal cord lesions in order to make the functional assessments of patients with paraplegia or tetraplegia more sensitive to changes. The SCIM includes the following areas of function: self-care (subscore (0-20), respiration and sphincter management (0-40) and mobility (0-40). Each area is scored according to its proportional weight in these patients' general activity. The final score ranges from 0 to 100. Patients with SSCI were timely monitored at 0, 1, 3 months after the stem cell transplantations.

We used suspensions containing stem cells harvested from 6-9 weeks old human fetuses. One suspension was made of hematopoietic stem cell (HSCs) from fetal liver, while the other - from fetal brain nervous stem cells.

On Day 1, we used hematopoietic stem cell (HSCs) from fetal liver harvested from tissues of 5-9 weeks old human fetuses. Suspension containing cryopreserved hematopoietic stem cells was administered via drip-feed IV in the amount of  $2,15 \pm 0,31$  ml with nucleated cell count  $> 58,74 \times 10^6/\text{ml}$  per transplantation.

On day 2, we administered ectodermal homogenate containing nervous cell precursors subcutaneously, in the amount of  $2,12 \pm 0,49$  ml with nucleated cell count  $> 7,9 \times 10^6/\text{ml}$  per transplantation.

**Results:** According to the scale independence spinal 34.78% of patients showed improvement in the area of "control sphincter" at 1 month after treatment with FSC and 52.17% of patients after 3 months after treatment with FSC. Marked improvement in gait and 26.08% of patients at 1 month after treatment with FSC and 47.82% of patients after 3 months. In 17 patients with trauma were identified pressure ulcers in the sacral region. 1 month after treatment, six patients had a decrease in diameter and pressure ulcers in 11 patients at 3 months after treatment, we observed FSC also reduce pressure ulcers in diameter, two patients healed pressure ulcers.

Analysis of the results according to the scale of the SF-36 showed that in patients with SSCI with improvements in the following subtests 1 month after treatment FSC: of physical functioning, mental health, and emotional role functioning, vitality and social role functioning, but the degree of reliability achieved no,  $p > 0.05$ . 3 months after FSC therapy, significant improvement was reported in the emotional role functioning, social role functioning,  $p < 0.05$  (fig.1).

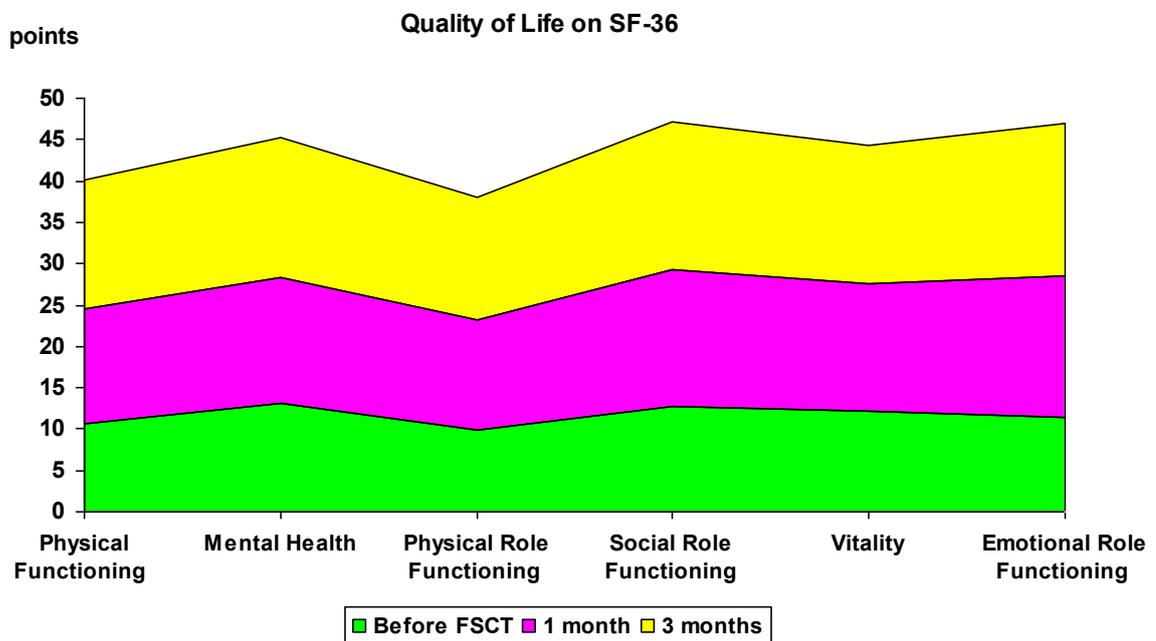


Fig. 1 Dynamics of patient's life quality with spinal injury after the FSC treatment

**Conclusions:** The results indicate a significant clinical efficacy of this variant cell therapy in patients with a history of SSCI. The use of cellular technology in

the treatment of patients with SSCI demonstrated its significance and perspective. Statistically as a result of treatment of patients with spinal injury with fetal stem cells, the patient's life quality, such as: mental health, social and emotional role functioning has significantly improved after 3 months. Also noted the improvement of Spinal Cord Independence Measure on such subtestam as: "control sphincter" gait and reduced bedsores. Our proposed method is by far the most effective way to restore the axons (the long processes of neurons) of the spinal cord with stem cells. Entered stem cells are likely to stimulate angiogenesis, promote germination of axons and formation of myelinated membranes. However, this issue requires further additional clinical studies.