

# Second autologous stem cell implantation in patients with chronic spinal cord injuries

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Research Article

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## Abstract

**Introduction:** Since the beginning of the last century, multiple investigations have been carried out in the field of Regenerative Medicine. Stem cells obtained by different routes have been implanted in different injured tissue in order to achieve its regeneration.

**Objective:** To demonstrate the feasibility and safety of the implantation of autologous MO-CMA by subarachnoid puncture.

**Method:** A study is carried out by implanting autologous stem cells by subarachnoid puncture in five patients who had undergone a first open implant due to a neurological lesion of traumatic etiology. January 2016 to December 2018, at the Enrique Cabrera General Teaching Hospital.

**Results:** The second implant was completed in 5 patients and the following advantages were obtained: less surgical time, less possibility of sepsis, no blood loss, less hospital stay and fewer complications.

**Conclusions:** The feasibility and safety of stem cell implantation by subarachnoid puncture without complications is demonstrated in this study.

**Keywords:** Implant / stem cells / regenerative medicine.

## Introduction

In recent years, there has been an extraordinary advance in knowledge related to different biomedical branches, including cell biology. This has given a remarkable boost to a new branch of medicine called regenerative medicine, which has been considered a "New Revolution in Medicine". This medical discipline has been based primarily on new knowledge about stem cells and their ability to become cells of different tissues and whose objective is to stimulate or regenerate cells, tissues or organs in order to restore or establish normal function [1-5].

## Methods

We have carried out a descriptive observational cross-sectional study in thirty patients with a first open implant of autologous adult stem cells obtained from bone marrow (ACM-MO) in patients with chronic spinal cord injury of traumatic etiology with encouraging results.

We have recently practiced a second implant in 5 cases of stem cells by subarachnoid puncture, from January 2016 to 2018 at the Enrique Cabrera General Teaching Hospital.

## Description of the technique

The patient is admitted with the corresponding investigations and approval for anesthesia, two days before the implant, stimulation with leukocin (growth factor of granulocyte colonies) begins at a rate of 5 mg / kg of weights every 12 hours until 4 doses are applied.

Stem cells are obtained from peripheral blood by the centrifugation method in the laboratory.

In the operating room in a sitting position, after washing the area with soap and water, antisepsis is performed with iodinated alcohol, field cloths are placed and the intervertebral space corresponding to the spinal cord injury is located, skin wheal is performed with lidocaine 1 % and then it infiltrates deeper planes.

Following the anterior scar and under radiographic control, a subarachnoid puncture with trocar # 22 is performed above and below the lesion, implanting 5cc stem cells in each intervertebral space, confirming the location of the space with the previ-

ous aspiration of cerebrospinal fluid. trocar and the rest of stem cells are administered by IV route in 100cc of physiological saline for 30 minutes.

## Results

### Patient relationship

Patient Diagnosis 2nd Implant Complications  
E.PR Spinal cord injury T12 6/29/2016 No  
MJ.GC Spinal cord injury T11-T12 10/31/2016 No  
JA.OP Spinal cord injury T10-T11 11/22/2016 No  
Y.GC Spinal cord injury T8-T9 3/28/2018 No  
Y.MC Spinal cord injury C5-C6 11/21/2018 No

### This technique has the following advantages

Less surgical time  
Less chance of sepsis.  
No blood loss.  
Less hospital stay  
Fewer anesthetic complications.  
In all cases, it has been possible to carry out the procedure without great difficulties and there have been no complications.

## Discussion

Regenerative Medicine is based on the potential of stem cells to become cells of different tissues [6-10]. Autologous adult stem cells used to treat spinal cord injury patients have several advantages.

**First:** Problems associated with immune rejection or graft-versus-host reactions can be avoided [11-13].

**Second:** CMA-MO transplantation is considered a safe method since its association with carcinogenesis has not been reported [14-15].

**Third:** There is great experience with the use of transplantation of these cells in hematological diseases [16].

## Conclusions

The feasibility and safety of stem cell implantation by subarachnoid puncture is demonstrated. None of our cases has presented complications that could put this technique at risk.

## Conflicts of interest

The authors do not declare any conflicts of interest.

## Authors' contributions

**Alberto Benítez Herrera:** He reviewed the literature on the subject looking for epidemiological data worldwide, designed the study methodology, classified the research, processed the information and limited the bibliographic references according to Vancouver standards. He wrote the document.

**Pedro Rolando López Rodríguez:** He declared the objectives of the study, selected and triangulated the variables and carried out the translation into English and the final revision of the manuscript. He performed the statistical processing. He contributed to the preparation of the article.

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