A possible neuroregeneration on ASIA-A scale using a Neurostimulator and combinatorial biologics: Bioquantine® and Wharton's Jelly Mesenchymal Stem Cells as standardized therapy for No Option patients

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A *c*omplete spinal cord injury (SCI) is the complete sensory and motor loss below the site of spinal cord injury following acute or chronic destruction, compression, or ischemia of the spinal cord. It constitutes an inestimable public health issue. The most crucial phase in the pathophysiological process of SCI concerns the well-known secondary injury, which is the uncontrolled and destructive cascade occurring later with aberrant molecular signaling, inflammation, vascular changes, and secondary cellular dysfunctions. The use of our combinatorial biologics based in the combination of a unique polypeptide (Bioquantine®) and Wharton's Jelly or Umbilical Cord Mesenchymal Stem Cells (UCMSCs) specifically Wharton's Jelly derivate ones represents one of the most important and promising and now safe and tested strategy to stimulate the neuroregeneration. This combinatorial method attract, among the other sources and types of stem cells, increased because of their ease of isolation/preservation and their properties. In this review, the therapeutic role of MSCs is discussed, together with their properties, application, limitations, and future perspectives. However, despite our deeper understanding of the molecular changes occurring after initial insult to the spinal cord, the cure for paralysis remains elusive. The current treatment of SCI is limited to early administration of high dose steroids to mitigate the harmful effect of cord edema that occurs after SCI and to reduce the cascade of secondary delayed SCI. An array of mesenchymal stem cells (MSCs) from various sources with novel and promising strategies are being developed to improve function after SCI. In this review, we briefly discuss the pathophysiology of spinal cord injuries and characteristics and the potential sources of MSCs that can be used in the treatment of SCI. Our evidence and science based method (as we previously demonstrated with a patient 2 years ago) is showing a promising alternative on the ASIA-A classification SCI. Added to it, we utilized an improved delivery method (making it ambulatory) for the in situ application of subdural Whaton's Jelly MSCs and a unique polypeptide (Bioquantine®). Thereafter we proceeded with the intrathecal application of an advanced neurostimulator biomedical system obtaining improved results and faster clinical recovery after only 5 weeks of the started translational protocol.

Keywords: mesenchymal stem cells, umbilical cord derived mesenchymal stem cells, Wharton's jelly mesenchymal cells, polypeptide, Bioquantine®, spinal cord injury, neurostimulator system, regenerative medicine, translational medicine.

Learning Objectives:

- Demonstrate new medical pathways for a possible neuroregeneration.
- Demonstrate the safe use of our combinatorial biologics.
- Demonstrate the use and efficacy of Wharton's Jelly mesenchymal stem cells.
- Demonstrate the safe and efficacy of and advanced neurostimulator biomedical system.
- Demonstrate the efficacy of therapies of regenerative medicine and interventionist pain and palliative care management.

Topic description:

Spinal cord injury (SCI) constitutes an inestimable public health issue, with an incidence of 40–80 per million people per year and continues to be a devastating injury to affected individuals and their families and exacts an enormous financial, psychological and emotional cost to them and to society. Our innovative translational medical protocol is based in science and regenerative medicine and can bring another option to those known as "No Option" patients

The differentiation and regeneration potential of stem cells has been well studied in both preclinical and clinical investigations. A traumatic spinal cord injury triggers a complex local inflammatory reaction capable of enhancing repair and exacerbating pathology [Fig. 1]. Spinal cord injury (SCI) constitutes an inestimable public health issue, with an incidence of 40–80 per million people per year. Wharton's jelly mesenchymal stem cells (MSCs) and showed hopeful promise in preclinical research.

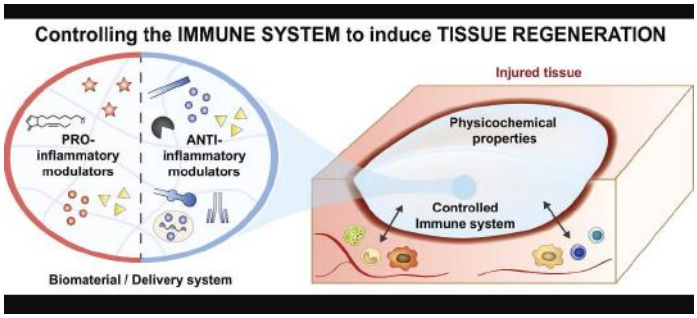


Fig. 1. Local inflammatory reaction and immune response: tissue regeneration.

The composition and effector potential of the post-injury cellular and molecular immune cascade changes as a function of time and distance from the lesion. The current clinical report is meant to demonstrate the beneficial changes with the use of Bioquantine® and its administration in a patient with a complete spinal cord injury [Fig. 2] offering a possible optional translational therapy and potential neuroregeneration in his clinical condition.

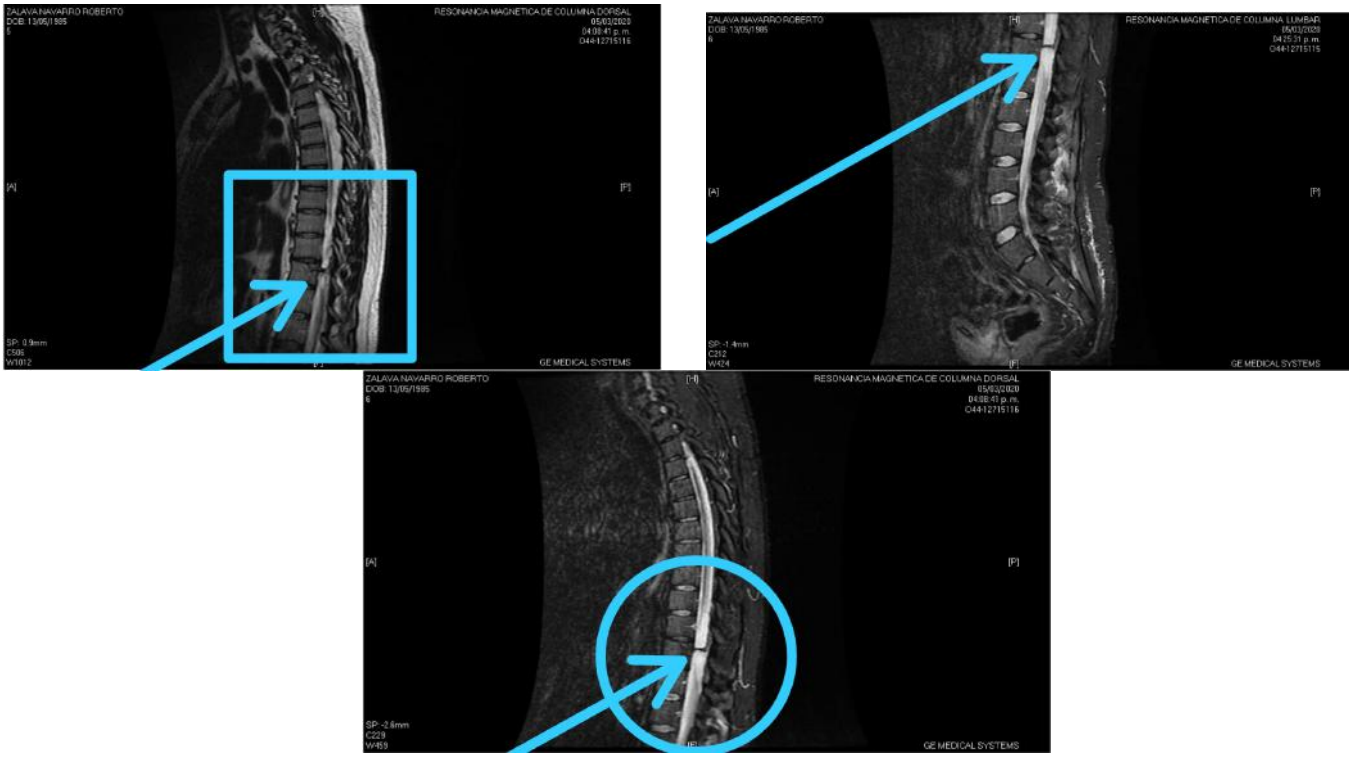


Fig. 2. Patient's MRI before the treatment 03/ 05/2020.

In this case review we are reporting the improvement of our 35 years old male patient who suffered an injury from a gunshot wound that sectioned the spinal cord at T12-L1 level and the safe use of our combinatorial biologics translational protocol. This diagnosis of SCI is known as an ASIA-A classification according to the American Spinal Injury Association establishing the International Standards for Neurological Classification of Spinal Cord Injury (ISNCSCI) since 1973.

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Biography

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