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DATA ANALYSIS OF THE EFFECTS OF SPINAL CORD STIMULATION IN POST-LAMINECTOMY SYNDROME: A SYSTEMATIC REVIEW

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INTRODUCTION

Low back pain has become a public health problem, evidenced by the high number of lumbar surgeries. Pain is not only an obstacle to leading a full life, but when it becomes chronic, as in patients with post-laminectomy syndrome, symptoms such as insomnia, anxiety and social isolation are noticeable in these patients. Post-laminectomy syndrome (PLS) has a varied incidence, ranging from 10% to 40% after lumbar laminectomy and 19% after lumbar microdiscectomy. Conventional clinical therapy for SPL is multidisciplinary, associated with the use of antidepressants, anticonvulsants, psychological treatments and physiotherapy devices, in order to not only reduce pain, but also improve the patient's quality of life. Spinal Cord Stimulation (SME) was introduced as a complementary treatment for these chronic patients when components of neuropathic pain are present. There is evidence that EME is an effective treatment for post-laminectomy syndrome, since the stimulation of large diameter afferent nerve fibers, with subsequent changes in the levels of adenosine, serotonin and substance P, can produce an inhibitory effect on the sensation of pain, improving patients' quality of life. Therefore, given the complexity and impact of post-laminectomy syndrome, it is crucial to invest in more comprehensive and targeted therapeutic approaches, such as spinal cord stimulation, in order to provide effective relief and improve the well-being of these patients with chronic pain.

GOAL

To analyze the effects of spinal cord stimulation on the pathophysiology and symptoms of post-laminectomy syndrome, based on data collected in the systematic review.

METHODS

This article is a systematic review, in which the PubMed database was used to find the observational studies reviewed. The descriptors used were found from the DeCS (Health Sciences Descriptors) and were: "Failed Back Surgery", "Spinal Cord Stimulation", "Effectiveness" combined with the Boolean operator "AND". Articles published between 2019 and 2023, with the free full text, studies carried out on humans, in addition to the presence of the methodology of observational studies. The studies reviewed analyzed patients over 18 years of age, in regions of Western Europe, over an observation period of 24 months to 3 years (between implantation of the stimulating device and effects), in addition, conventional stimulation, high frequency stimulation and the Burst method were used.

RESULTS AND DISCUSSION

In the present review, carried out with 3 studies, involving a partial sample of 85 people in the study by Pérez et al., 50 in the study by Masopust et al and 80 in the study by Zucco et al, totaling 215 patients, promising results were found regarding to the effectiveness of spinal cord stimulation in post-laminectomy syndrome.

In the study by Pérez et al, patients with PFS achieved greater pain relief and improvements in health-related quality of life (HRQoL) than patients who received Conventional Medical Treatment (CMT) alone. The utility of Spinal Cord Stimulation (SCS) patients was 2.86 times higher compared to their baseline status according to the EQ 5D-3L scale. Patients with SCS stopped reporting clear components of neuropathic pain (PD-Q reduction of 10.9 points).

The study by Masopust et al. demonstrated

the effectiveness of spinal cord stimulation, significant increase in leg pain relief and quality of life and functional capacity. In it, 75% of patients with refractory PFS, treated by EME, were satisfied with the results of treatment after 8.3 years. The most important changes were found within the first six months of EME treatment and then maintained or slightly improved during the following period. Paresthesia-free 10 kHz stimulation was statistically and clinically superior to conventional SCS at 12- and 24-month follow-up, with response rates for back and leg pain of 77% and 73% at 2 years respectively.

In the study by Zucco et al, EME treatment was also proven to be effective in relieving pain, improving HRQOL and disability in patient's refractory to CMM.

CHANGE IN THE USE OF DRUGS AND COMPLEMENTARY THERAPIES

The proportion reporting pain relief or bearable pain without analgesics in the patients described by Pérez et al fell to 13.04% in TMC (18% at baseline) and rose to 21.43% in EME (0% at baseline). study). Furthermore, there was a 42.67% drop in the proportion of patients with EME who reported "no/little" relief when taking analgesics, indicating that many patients with previously refractory PFS were seeing effects from treatment. Both facts show that the EME approach decreased pharmacological consumption, compared to TMC. The authors also suggested that EME must be considered before subjecting a patient with PFS to a long-term systemic approach with opioids, and repeated spinal surgeries in certain patients may result in more cases of PFS.

COMPLICATIONS RELATED TO SPINAL CORD STIMULATION

Regarding patients' symptoms over time, the sample submitted to TMT reported varied symptoms, while the portion that underwent EME exhibited constant improvements in all scales of outcome measures reported by patients, Pérez et al. Safety results revealed that lead migration (15.1% incidence) and infection (3.4% incidence) were the two most frequently reported complications of EME Masopust et al.

CONCLUSION OR FINAL CONSIDERATIONS

In this article, several references were explored, describing spinal cord stimulation as a promising and innovative approach in the treatment of post-laminectomy syndrome, presenting lower risks in its administration compared to previously used methods (conventional medical treatment). Neurostimulation leads to greater symptom relief, improving patients' quality of life and, mainly, functional capacity, enabling them to once again perform instrumental activities of daily living, demonstrated by patient satisfaction when using this treatment to relieve chronic pain, reducing (or eliminating) the number of analgesic drugs in therapy.

REFERENCES

PÉREZ, C; ROJO, E; MARGARIT, C; SANCHEZ, N; BLANCO, T; MUÑOZ, M; CRESPO, C; OCHOA, D. 24-month Real-World Stury of Spinal Cord Stimulation in Failed Back Surgery Patients with Refractory Pain. **Pain Physician**, 24, 479-488, 2021.

MASOPUST, Vaclav et al. Neuromodulation in the treatment of postoperative epidural fibrosis: comparison of the extent of epidural fibrosis and the effect of stimulation. **Physiological Research**, v. 70, n. 3, p. 461, 2021.

ZUCCO, Furio et al. Cost-effectiveness and cost-utility analysis of spinal cord stimulation in patients with failed back surgery syndrome: results from the PRECISE study. **Neuromodulation: Technology at the Neural Interface**, v. 18, n. 4, p. 266-276, 2015.

HAMM-FABER, T. *et al.* High-Dose Spinal Cord Stimulation for Treatment of Chronic Low Back Pain and Leg Pain in Patients With FBSS, 12-Month Results: A Prospective Pilot Study. **Neuromodulation: Technology at the Neural Interface,** v. 23, n. 1, p. 118-125, 2020

KINFE, T. *et al*. High Frequency (10 kHz) or Burst Spinal Cord Stimulation in Failed Back Surgery Syndrome Patients With Predominant Back Pain: Preliminary Data From a Prospective Observational Study. ***Neuromodulation : journal of the International Neuromodulation Society***, vol. 19, n. 3, p. 268-275, 2016.