

SPINAL CORD STIMULATION IN FAILED BACK SURGERY

STIMULAREA COLOANEI VERTEBRALE ÎN INTERVENȚIILE
CHIRURGICALE EȘUATE

*Ali Yilmaz¹, Zahir Kizilay², Filiz Altug³,
Doriana Ciobanu⁴, Göksemin Acar⁵, Feridun Acar⁶*

Key words: unsuccessful lower back surgery, neuropathic pain, spinal cord stimulation

Cuvinte cheie: intervenție chirurgicală nereușită, coloana lombară, durere neuropatică, stimulare medulară

Abstract

Objective: Spinal cord stimulation is used for treating failed back surgery syndrome, chronic arachnoiditis, peripheral neuropathies, postamputation phantom pain, complex regional pain syndrome and pain secondary to spinal cord injury. In this study we present 7 cases with intractable neuropathic radicular pain which developed following spine surgery.

Material and Methods: Spinal cord stimulation was applied to 7 (3male/4 female) patients who had failed back surgery syndrome and pain resistant to medical and invasive methods, with the council decision, which included neurosurgery, neurology, and psychiatry. One week stimulation trial was applied to all cases.

Results: The mean age of the patients was 54.85 ± 7.64 years. The mean of pain intensity in Visual Analog Scale was 8.71 ± 0.74 at preoperative status and post operative pain intensity was 2.27 ± 0.67 at 6 months. Pain intensity significantly decreases after spinal cord stimulation ($p=0.000$). One of the three cases who had unsuccessful trial period received morphine pump implantation, and percutaneous lumbar sympathectomy was applied to another one. One case who received permanent implantation was replaced to another location due to skin erosion. There was no morbidity.

Conclusion: Spinal cord stimulation is an effective tool in reducing pain, in patients who have unsuccessful lower back surgery with the correct indications.

Rezumat:

Introducere: Stimularea medulară este folosită pentru tratarea intervențiilor chirurgicale nereușite la nivelul coloanei lombare, a arahnoiditei cornice, a neuropatiilor periferice, durerii postamputație, sindromul durerii regionale și a durerii consecutive unui traumatism vertebro-medular.

Scop: În acest studiu prezentăm 7 cazuri de durere intractabilă radiculară neuropatică, consecutivă intervenției chirurgicale pe coloană.

Material și Metode: Stimularea medulară s-a aplicat la 7 pacienți (3 bărbați/4 femei), cu sindrom dureros consecutiv unor intervenții chirurgicale nereușite la nivelul coloanei, rezistent la tratament medicamentos și invaziv și care include neurochirurgie, tratament neurologic și psihiatric. În toate cazurile s-a aplicat o săptămână de stimulare medulară.

Rezultate: Media de vârstă a pacienților este de 54.85 ± 7.64 ani. Media intensității durerii pe Scala Analogă Vizuală a fost de 8.71 ± 0.74 preoperator iar postoperator aceasta a fost de 2.27 ± 0.67 , la 6 luni. Intensitatea durerii se reduce semnificativ după stimularea medulară ($p=0.000$). Unul dintre trei cazuri de intervenție nereușită au beneficiat de implantarea unei pompe cu morfină, iar altui pacient i s-a efectuat simpatectomie lombară laparoscopică. Într-un caz la care s-a efectuat implantare permanentă s-a schimbat locația datorită eroziunilor cutanate. Nu a existat mortalitate.

Concluzii: Stimularea medulară este un instrument util în lupta pentru reducerea durerii, la pacienții cu intervenție chirurgicală nereușită la nivelul coloanei lombare, cu indicații corecte.

¹ MD, Pamukkale University, Department of Neurosurgery, Denizli, Turkey

² MD, Pamukkale University, Department of Neurosurgery, Denizli, Turkey

³ Assist. Prof., Pamukkale University, School of Physical Therapy and Rehabilitation, Denizli, Turkey.

Corresponding author: Filiz ALTUĞ

Address: Pamukkale Üniversitesi Fizik Tedavi ve Rehabilitasyon Yüksek Okulu Rektörlük Binası B Katı Denizli, Turkey; Email: fkural@pau.edu.tr; Phone: 05355625146

⁴ Assist. Prof., Oradea University, Department of Physical Therapy, Oradea, Romania

⁵ Assoc. Prof., Pamukkale University, Medical School, Department of Neurology, Denizli, Turkey

⁶ Assoc. Prof., MD, Pamukkale University, Department of Neurosurgery, Denizli, Turkey

Introduction

Failed back surgery syndrome (FBSS, post laminectomy syndrome) is described as continuance or occurrence of pain due to various reasons after surgical treatment. [1]

Whatever the surgical procedure is, a small percentage of patients are experiencing chronic back-leg pain. For most of the postoperative complications, it is possible to find an organic reason (foraminal stenosis, spinal stenosis, false level surgery, recurrent disc, painful disc disease, neuropathic pain, etc.). Even though the causes are different for these conditions, they are classified under failed back surgery syndrome. [2,3,4]

Treatment of chronic back pain is difficult on a patient who did not benefit from surgery. This patient population must be assessed in a multidisciplinary fashion that will decrease the complications. Various diagnostic and therapeutic minimally invasive procedures are performed on several steps in failed back surgery syndrome. [4,5]

Spinal cord stimulation is an acceptable method of treatment in medically intractable neuropathic pain [6, 7]. Its main effect is via Melzack and Wall's door control mechanism. In addition to this property, suppression of tactile allodynia, prevention from peripheral ischemia, inhibition of dorsal horn by GABA is also present with this approach [8, 9]. General indications include failed back surgery, periphery ischemia, complex regional pain syndrome, phantom pain, resistant and non-operative radiculopathy, postherpetic neuralgia and resistant symptomatic ischemic heart diseases [9, 10].

This study aims to evaluate effectiveness of spinal cord stimulation on failed back surgery syndrome patients who have intractable pain.

Materials and method

This study was performed according to the Declaration of Helsinki. All patients were extensively informed and provided written consent before the following treatment.

Spinal cord stimulation was applied to 7 (3 male/4 female) patients who had failed back surgery syndrome and pain resistant to medical and invasive methods with the council decision which included neurosurgeon, neurologist, and psychiatrist. Pain was evaluated with Visual Analog Scale (VAS). 1 week stimulation trial was applied to all cases using Medtronic percutaneous oktade lead. 4 patients who had pain relief over 50% received permanent implantations. Stimulation began on an appropriate dermatome region and adequate voltage adjustments were done after sufficient pain control was achieved.

Results

The mean age of the patients was 54.85 ± 7.64 years. The mean of pain intensity in VAS (Visual Analog Scale) was 8.71 ± 0.74 preoperatively and postoperative pain intensity was 2.27 ± 0.67 at 6 months. Pain intensity has decreased significantly after spinal cord stimulation ($p=0.000$).

For 3 ineffective cases, one had morphine pump implantation and one had percutaneous lumbar sympathectomy. Generator was removed to another location due to skin erosions on the case that had permanent implantation. None of the cases experienced permanent morbidity.

Discussion

Spinal cord stimulation has become a popular neuromodulator procedure for failed back surgery cases in order to achieve pain management. Beside from being reversible and minimally invasive, it also decreases the pain killer applications, pain intensity and frequency and increases physical activity and life quality [11,12,13,14].

As a result of this study, 4 cases that had permanent implantation after trial period experienced significantly less pain after 6 months ($p=0.000$).

Turner et al. evaluated spinal cord stimulation for pain intensity, medication dosage, functional state and working capacity on 51 failed back syndrome cases. Within the first 6 months after the application, they observed decrease in leg pain and morphine use and increase

functional capacity. They also reported that opioid usage has decreased significantly in postoperatively 12 months [15]. Another study divided FBSS cases into 3 groups and applied spinal cord stimulation to 51, medical treatment to 39 and no treatment to 68 cases. Cases were compared for pain intensity, disability status and opioid usage. As a result, spinal cord stimulation was found to be more expensive but more effective in decreased pain intensity and disability [16]. One study observed 35 patients (complex regional pain syndrome and FBSS) for 4.4 years and evaluated pain intensity and life quality. More than half of the cases in complex regional pain syndrome expressed a decrease of 50% in pain intensity after 4.4 years; furthermore, FBSS cases expressed a decrease of 50% in pain intensity after 3.8 years [17].

We present early period results on our study. VAS scores for pain intensity have decreased from 8.71 ± 0.74 to 2.27 ± 0.67 6 months postoperatively.

Spinal cord stimulation for failed back surgery syndrome also shows promising results in the long term [17,18]. Abeloos et al. observed 55 FBSS patients for 8.3 for treatment satisfaction and life quality and reported 50% decrease of pain intensity in 75% of the patients. In addition, sitting, getting up from bed and going up from stairs have improved 75% and walking has improved 82%. Medication usage has decreased 66% in 50% of the patients [19].

There are plenty of studies in the literature explaining effectiveness of spinal cord stimulation [18, 19, 20, 21]. On our study we presented or preliminary experiences. Limitations of our study include evaluating only pain, limited patient number and short follow-up period.

Conflict of Interest Disclosure: There is no any conflict of interest

References

- [1] Schofferman J, Reynolds J, Herzog R, Covington E, Dreyfus P, O'Neill C. (2003), Failed back surgery: etiology and diagnostic evaluation. *The Spine Journal*; 3: 400-403.
- [2] Hazard RG. (2006), Failed back surgery syndrome: surgical and nonsurgical approaches, *Clinical Orthopaedics & Related Research.*; 443:228-236.
- [3] Onesti S. (2004), Failed back syndrome. *The Neurologist*; Vol 10: No.5.
- [4] Buyten JP. (2006), Neurostimulation for chronic neuropathic pain in failed back surgery syndrome. *J of Pain S Manag.*; Vol 31: No: 45.
- [5] Ross JS. (2006), Non-mechanical inflammatory causes of back pain: current concepts. *Skeletal Radiol*; May 4.
- [6] Stojanovic MP, Abdi S. (2002), Spinal cord stimulation. *Pain Physician.*; 5(2): 156-166.
- [7] Van Buyten JP. (2006), Neurostimulation for chronic neuropathic back pain in failed back surgery syndrome. *J Pain Symptom Manag*; 31(4): 25-29.
- [8] Bagnall D. (2010), The use of spinal cord stimulation and intrathecal drug delivery in the treatment of low back-related pain. *Phys Med RehabilClin N Am*; 21:851-8.
- [9] Hegarty D. (2012), Spinal cord stimulation: The clinical application of new technology. *Anesthesiol Res Pract*; Article ID: 375691, 5 pages doi:10.1155/2012/375691.
- [10] Skaf G, Bouclaous C, Alaraj A et al., (2005), Clinic outcome of surgical treatment of failed back surgery syndrome. *Surg Neurol.*; 64(6): 483-489.
- [11] Yeğin A, Akbaş M, Salman C., (2009) Postlaminektomi sendrom luikihastadaoktadelektrotile spinalkordstimülasyonuuygulaması. *TürkiyeKlinikleri, J AnestReanim.*;7(1):49-54.
- [12] Klimek M, Ubben JF, Ammann J, Borner U, Klein J, Verbrugge SJ. (2006), Pain in neurosurgically treated patients: a prospective observational study. *J Neurosurg.*; 104(3):350-9.
- [13] Shipton E. Post-surgical neuropathic pain. *ANZ J Surg.* 2008;78(7):548-55.
- [14] Stojanovic M, Abdi S. Spinal cord stimulation. *Pain Physician.* 2002; 5(2): 156-166.
- [15] Turner JA, Hollingworth W, Comstock BA, Deyo RA. (2010), Spinal cord stimulation for failed back surgery syndrome: outcomes in a workers' compensation setting. *Pain.*; Jan; 148(1):14-25.
- [16] Hollingworth W, Turner JA, Welton NJ, Comstock BA, Deyo RA. (2011), Costs and cost-effectiveness of spinal cord stimulation (SCS) for failed back surgery syndrome: an observational study in a workers' compensation population. *Spine.*; Nov 15;36(24):2076-83.
- [17] Sears NC, Machado AG, Nagel SJ, Deogaonkar M, Stanton-Hicks M, Rezai AR et al. (2011) Long-term outcomes of spinal cord stimulation with paddle leads in the treatment of complex regional pain syndrome and failed back surgery syndrome. *Neuromodulation.* Jul-Aug; 14(4):312-8.

- [18] Frey ME, Manchikanti L, Benyamin RM, Schultz DM, Smith HS, Cohen SP. (2009), Spinal cord stimulation for patients with failed back surgery syndrome: a systematic review. *Pain Physician*; Mar-Apr; 12(2):379-97.
- [19] Abeloos L, De Witte O, Riquet R, Tuna T, Mathieu N. (2011), Long-term outcome of patients treated with spinal cord stimulation for therapeutically refractory failed back surgery syndrome: a retrospective study. *Neurochirurgie*. Jul; 57(3):114-9.
- [20] Bala MM, Riemsma RP, Nixon J, Kleijnen J. (2008), Systematic review of the (cost-) effectiveness of spinal cord stimulation for people with failed back surgery syndrome. *Clin J Pain.*; Nov-Dec; 24 (9): 741-756.
- [21] Kumar K, Taylor RS, Jacques L, Eldabe S, Meglio M, Molet J, et al. (2008), The effects of spinal cord stimulation in neuropathic pain are sustained: A 24-month follow-up of the prospective randomized controlled multicenter trial of the effectiveness of spinal cord stimulation. *Neurosurgery*; oct; 63(4): 762-770.

REVISTA ROMÂNĂ DE

KINETOTERAPIE

ROMANIAN JOURNAL OF PHYSICAL THERAPY

VOL.19 / NR.32

Decembrie/ December, 2013

Revistă semestrială de studii, cercetări și recenzii
Half-early journal of studies, research and reviews

Revistă indexată/ Journal indexed

IndexCopernicus

SOCOLAR

EBSCO Publishing

DOAJ

SCIPRO

DRJI

EDITATĂ CU SPRIJINUL

FEDERAȚIEI ROMÂNE

A ASOCIAȚIILOR DE FIZIOTERAPIE

și a

ASOCIAȚIEI PROFESIONALE

A KINETOTERAPEUȚILOR DIN TRANSILVANIA

ISSN 1224-6220