Case Report
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Experience in the treatment of chronic pain with transcranial stimulation in ISSSTE patients

Abstract

The objective of this study is to know the experience in the treatment of chronic pain with transcranial stimulation in patients of the High Specialty Hospital centennial of the Mexican Revolution, a descriptive design was applied (observational) which involved 40 patients with chronic pain that came to the rehabilitation of ISSSTE centennial of the revolution, who started a treatment of 10 therapy sessions. It was used as material interviews and clinical records for translating the results, same results that show that there is a favorable experience, good and with a great result of improvement. It is therefore concluded that this study will provide data relevant to the experience and the effectiveness of the transcranial stimulation with direct current in chronic pain. Of the sample studied, all patients had a satisfactory experience, taking an improvement above 50% in decrease of pain. Transcranial stimulation is being investigated a lot in the last few years but here in our midst is still unknown.

Keywords: chronic pain, transcranial stimulation, direct current

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Abbreviations: ADLs, activities of daily living; VAS, visual analog scale; IASP, international association for the study of pain

Introduction

According to the International Association for the Study of Pain (IASP), pain is "an unpleasant emotional sensory experience associated with actual or potential tissue damage, or described in terms of such damage". Likewise, the same association classifies pain into acute and chronic, the latter being related to different diseases or clinical conditions.[1]

The World Health Organization recognizes pain as a major global public health problem. In 2017 it identified the need for improved and standardized treament. Its diagnosis poses a challenge and its treatment is complicated when it has a multifactorial cause. The prevalence of chronic pain varies from 16 to70%, is more frequent in women than in men, and is associated with degenerative diseases and age over 65 years.[2]

Transcranial direct current stimulation is a form of electrical stimulation that consists of the application of two surface electrodes (anode and cathode) placed above the scalp, which deliver a low-amplitude (0.5-2 mA) direct electrical current capable of passing through the cerebral bone and modulating the selected brain area. This current induces changes in the resting potential of the neuronal membrane.

Chronic pain has been recognized as pain that persists beyond the normal healing time[3] and therefore lacks the acute warning function of physiological nociception.[4] Chronic pain is considered when it persists or recurs for more than 3 to 6 months.[5] It is a common condition that affects approximately 20% of people in the world and generates 15-20% of medical consultations.[6] Therefore, this condition should receive greater attention as a priority in global healthservices, since pain relief is considered a human right.[7]

Chronic pain is a multifactorial problem that includes both physical and psychological components, such as anxiety, reduced mobility, sleep and appetite disturbances and depression.[8] These symptoms are associated with a demonstrable reduction in patients' quality of life and a limitation of their work performance and social function[9] and require frequent use of health care resources, all of which can lead to a significant reduction in their quality of life which contributes to generating a significant socioeconomic burden.[10]

In addition to its high frequency and its relevant individual and social impact, chronic pain has been shown to be a major contributor to increased health care utilization, reduced work productivity and, consequently, large direct and indirect costs.

Pathophysiology of pain

Pain is the most frequent, annoying and disturbing symptom in medicine. There are few diseases that donot have a painful phase and in almost all of them pain is a characteristic without which the diagnosis is not confirmed. Because of the enormous frequency with which pain arises, its structural and physiological characteristics assume special importance.

Pain receptors and peripheral afferent pathways

Pain receptors are distributed throughout the body, in its integumentary and deep structures including the viscera. Two types of afferent fibers have been identified: very fine myelinated C-fibers (0.4 to 1.1 m in diameter) and fine myelinated A- fibers (1 to 5 µm in diameter).

It is important to recognize that not all pain is thesame, so that we should clearly distinguish the pain syndrome of each patient. Somatic pain syndrome is usually referred to as oppressive or stabbing, is well localized and is related to damage to somatic structures, such as bone, muscle and tendon. It is transmitted primarily by A-delta fibers. Visceral pain syndrome is usually more of a colicky or dull type, poorly defined in its localization and transmitted by C[11]type amyelinic fibers.

Physiotherapy

Transcranial direct current

Transcranial direct current (TDCS or TDCS) is a technique with few adverse effects and consists of the administration of a very low intensity electric current on the scalp through two electrodes. Both electrodes interact to create an electric field that alters the potential

of scalp membrane at rest and the spontaneous discharge rate of the cells,[12] being able to influence the corticalactivity of the brain.[13,14]

The efficacy of TDC has already been demonstrated in certain pathologies, such as depression, fibromyalgia and anxiety. It has also shown beneficial effects in the treatment of chronic painof neuropathic origin in spinal cord injury[15] or in the treatment of the affected upper extremity after a stroke.[16]

TDC is capable of producing fluctuations in the neuronal activity of the brain that are important for perception[17,18] and cognition[19,20] and, ultimately, of influencing motor learning. A new current of research is currently emerging whose focus of study is the combination of TDC with other techniques to enhance its effect, as in the case of virtual reality.[21] Although it isa technique that has been used for many years, itsapplication in physical therapy is relatively new and requires more research to support its effect and, in addition, to cover aspects such as the recording and consensus of the application parameters.

Non-invasive stimulation technique

The CDT

It uses electrodes (the anode excites and the cathode inhibits neuronal excitability).

Applies a galvanic electric current. Moreeconomical.

More portability and, therefore, more possibility of simultaneous combination.

Simpler

The TDC applies a galvanic electric current to create an electric field that alters the resting membrane potentials and the spontaneous discharge rate of thecells.

Justification

Through this study, the experience of patients withchronic pain who have been treated with transcranial electrical stimulation with direct currentat the Hospital de Alta Especiali dad Centenario dela Revolución Mexicana of the ISSSTE, during theperiod from August 2017 to July 2018, will be reported through the review of clinical records and interview in which the visual analog scale (VAS), or numerical scale, of pain will be applied.

The treatment of chronic pain with CDT is little known and used in our environment, being a very useful resource for the improvement of this conditionaccording to multiple investigations on this therapeutic modality. “Pain is an unpleasant sensory or emotional experience associated with actual or potential tissuedamage, or described in terms of such damage”. However, sometimes pain can also be experienced in the absence of tissue damage, and its intensity may not even be proportional to the original damage.

The VAS, introduced by Downie in 1978, is one of the most commonly used. The patient must assigna numerical value to the pain between two extreme points (0 to 10). With this type of scale, painis considered a simple unidimensional concept and is measured only according to its intensity. Itis useful as a measuring instrument to assess the response to a selected treatment. Both prevalence and intensity are higher in womenthan in men, increasing with age. The relationship of pain with work shows generally higher values inmen who perform non-manual work and in womenwith manual work.

Objectives

General: To know the experience of patients withchronic pain who received treatment with transcranial direct current stimulation at the Hospital de Alta Especialidad Centenario de laRevolución Mexicana of the ISSSTE.

Specific: To assess the decrease in chronic pain using the VAS scale. To know the ability in activities of daily living (ADLs) with decreased pain.

Methodology

Subjects, material and methods

Subjects: patients with chronic pain who receivedtranscranial direct current stimulation treatment.

Material: interview (sheets, pen, clinical file).

Method

Requesting clinical records that received transcranial direct current stimulationtreatment during the period from August 2017 to July 2018.

Apply the interview to patients who meet theselection criteria.

To quantify the perception of pain reduction using the VAS scale.

The study was conducted at the Hospital de Alta Es- pecialidad Centenario de la Revolución Mexicana of the ISSSTE, in the rehabilitation area, during the period: August 2017 - July 2018.

It was decided to conduct this study to assess the experience with transcranial stimulation therapy, since recent studies report that it may be a promising alternative in the reduction of chronic pain.

Design

It is a descriptive (observational), retrospective, cross-sectional, observational, prolective, cross- sectional and descriptive study.

Study groups

Patients with chronic pain who attended the ISSSTE Centenario rehabilitation service and who received transcranial direct current stimulation treatment were studied.

Selection criteria

Patients with a diagnosis of chronic pain.

Patients with chronic pain of both sexes.

Patients with chronic pain older than 18 years who received transcranial direct current stimulation.

Hemodynamically stable chronic pain patients.

Exclusion criteria

Patients with chronic pain secondary to a specificdisease.

Severe radiculopathies.

Cancer.

Psychiatric diseases.

Elimination criteria

Patients with chronic pain who did not complete the block of 10 treatment sessions.

Non-probabilistic sample, patients who met all the inclusion criteria were included.

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Results

The sample studied consisted of 40 patients who received transcranial direct current stimulation with chronic pain, of whom 30 were women (90%) and 10 men (10%). Among the patients, 25 patients were found to be older than 50 years and 15 younger than 49 years, with a mode of 45 years. According to the VAS scale, 21 patients were found with an improvement of 10, 14 patients with an improvement of 9, 4 patients with an improvement of 8 and 1 patient with an improvement of 7. From the population studied, it was determined that all our patients had a satisfactory treatment experience, all had an improvement of over 70%. Finally, each patient's file was reviewed to determine the therapeutic exercise prescription for each patient, and a prescription for therapeutic exercise (resistance, strength and stretching) was found in 100% of the cases (Figures 1-4).

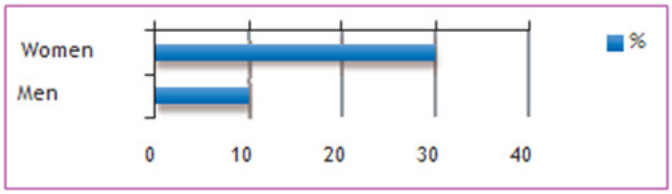

Figure 1 Distribution by sex.

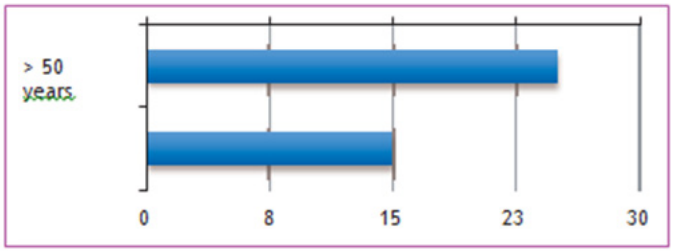

Figure 2 Distribution by age.

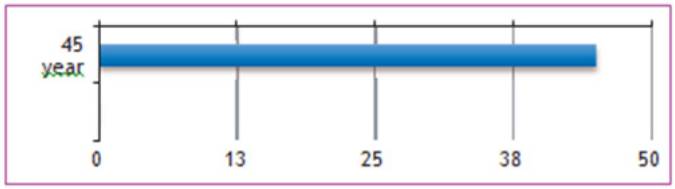

Figure 3 Age mode (45 years).

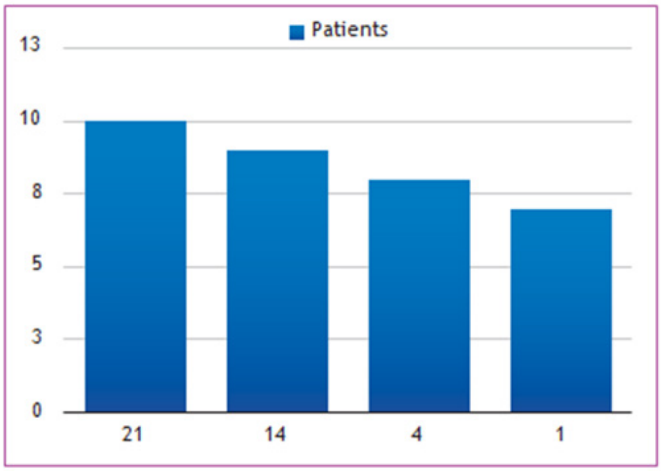

Figure 4 Improvement according to the Visual Analogical Scale

Discussion

According to the results obtained in this work, it was demonstrated that the main objective of this study was fulfilled by learning about the experience of patients with chronic pain who received treatment with transcranial direct current stimulation at the Hospital de Alta Especialidad Centenario de la Revolución Mexicana of the ISSSTE.

It is clear what 10 sessions of transcranial stimulation in the treatment of chronic pain implies in terms of the efficacy of this treatment. It should be noted that the 10 therapy sessions have to be fulfilled, as they are necessary in order to produce clinically significant results. So far, there have been no studies that have concluded the above, as background research has been done on physical agents for chronic pain and drugs.

Despite being a little-known and little-used technique, it proved to be effective and improved the relief of chronic pain, helping patients to return to their previously limited activities of daily living. All our patients had an improvement of more than 50%, which can be seen in the figures. Chronic pain is nowadays a major health problem and generates a high rate of work incapacity and

The transcranial stimulation with direct current helped patients to reduce chronic pain, however, it is already being investigated in recent years. Although today it is little known and little used, it has become known for its great usefulness and efficacy. The results enrich the understanding and give us an insight into the efficacy of this treatment.

Conclusions

This article concludes that patients who received transcranial direct current stimulation in the treatment of chronic pain had a good experience and improved health.

As the research demonstrates, chronic pain is an important factor for disability in work and activities of daily living, and as soon as the patients started treatment they were able to reintegrate into their activities of daily living without any difficulties.

Transcranial direct current stimulation is a non- invasive, low-cost and very useful technique for the treatment of chronic pain.

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None.

Conflicts of interest

The authors declare that they have no conflicts of interest.

Ethical responsibilities

Protection of humans and animals: The authors declare that no experiments on humans or animals have been performed for this research.

Confidentiality of data: The authors declare that they have followed the protocols of their research center work on the publication of patient data.

Right to privacy and informed consent: The authors have obtained the informed consent of the patients and/or subjects referred to in the article.

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References

1. IASP terminology. International Association for the Study of Pain; 2018.
2. Bautista Sánchez SG, Jímenez Santiago A. Epidemiology of chronic pain. *Arch Med Fam*. 2014;16(4):69–72.
3. Bonica JJ. The management of pain. Philadelphia: Lea & Febiger; 1953.
4. Treede RD. Entstehung der Schmerzchronifizierung. In: Baron R, Ko-ppert W, Strumpf M, et al. editors. Praktische Schmer- ztherapie. Heidelberg: Springer; 2011. pp. 3–13.
5. Merskey H, Bogduk N. Classification of chronic pain. 2nd ed. Seattle: IASP Press; 1994. p. 1.
6. Mäntyselkä P, Kumpusalo E, Ahonen R, et al. Pain as a reason to visit the doctor: a study in Finnish primary health care. *Pain.* 2001;89(2-3):175–180.
7. Goldberg DS, McGee SJ. Pain as a global public health priority. *BMC Public Health*. 2011;11:770.
8. Becker N, Thomsen AB, Olsen AK, et al. Pain epideliology and health related quality of life in chronic non- malignant pain patients referred to a Danish multidisciplinary pain center. *Pain.* 1997;73(3):393–400.
9. McDermott AM, Toelle TR, Rowbotham DJ, et al. The burden of neuropathic pain: results from a cross-sectional survey. *Eur J Pain.* 2006;10:127–135
10. Dunn KM, Croft PR. Epidemiology and natural history of low back pain. *Eur Medicophys*. 2004;40(1):9–13.
11. Baron R. Mechanisms of disease: neuropathic pain-a clinical perspective. *Nat Clin Pract Neurol.* 2006;2(2):95–106.
12. Priori A. Brain polarization in humans: a reappraisal of an old tool for prolonged noninvasive modulation of brain excitability. *Clin Neurophysiol*. 2003;114:589–595.
13. Nitsche MA, Paulus W. Sustained excitability elevations induced by transcranial DC motor cortex stimulation in humans. *Neurology.* 2001;57(1):1899–1901.
14. Chhatbar PY, Kautz SA, Takacs I, et al. Evidence of transcranial direct current stimulation generated electric fields at sub thalamic level in human brain *in vivo*. *Brain Stimul.* 2018;11(4):727–733.
15. Lefaucheur JP, Antal A, Ayache SS, et al. Evidence-based guidelines on the therapeutic use of transcranial direct current stimulation (tDCS). *Clin Neurophysiol.* 2017;128(1):56–92.
16. Lüdemann-Podubecká J, Bösl K, Rothhardt S, et al. Transcranial direct current stimulation for motor recovery of upper limb function after stroke. *Neurosci Biobehav Rev*. 2014;47:245–259.
17. Neuling T, Rach S, Wagner S, et al. Good vibrations: oscillatory phase shapes perception. *Neuroimage.* 2012;63(2):771–778.
18. Strüber D, Rach S, Trautmann-Lengsfeld SA, et al. Antiphasic 40 Hz oscillatory current stimulation affects bistable motion perception. *Brain Topogr.* 2014;27:158–171.
19. Marshall L, Helgadóttir H, Mölle M, et al. Boosting slow oscillations during sleep potentiates memory. *Nature*. 2006;444(7119):610–613.
20. Antonenko D, Diekelmann S, Olsen C, et al. Napping to re- new learning capacity: enhanced encoding after stimulation of sleep slow oscillations. *Eur J Neurosci.* 2013;37:1142–1151.
21. Massetti T, Crocetta TB, Silva TDD, et al. Application and outcomes of therapy combining transcranial direct current stimulation and virtual reality: a systematic review. *Disabil Reha- bil Assist Technol.* 2017;12(6):551–559.

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