

TREATMENT OF IDIOPATHIC CHRONIC ORCHIALGIA WITH TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION (TENS): A PRELIMINARY RESULT

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ABSTRACT

Purpose: Unilateral or bilateral testicular pain lasting more than three months is called as chronic orchialgia. Approximately 25-50% of chronic orchialgia is the idiopathic origin. This study aimed the effectiveness of Transcutaneous Electrical Nerve Stimulation (TENS) therapy due to Idiopathic Chronic Orchialgia (ICO). **Methods:** Five patients were included in this study with ICO that diagnosed with physical examination, urine analysis, urinary system x-ray film, and scrotal Doppler ultrasound. Medical history revealed that multiple conservative therapy attempts failed to alleviate the pain. Two of the patients had right sided ICO. Traditional TENS device is placed to the most painful points. TENS applied three times in a week with duration 30 minutes for four weeks. Before and after TENS application, patients were evaluated by using Visual Analog Scale (VAS) at first and third months. **Results:** Median age of patients was 26.20 ± 2.38 (22-30) years. Mean VAS value was 6.52 ± 0.89 before the procedure. After 1 month VAS value was 3.82 ± 0.83 ($p < 0.05$). VAS value was 5.67 ± 0.44 at the end of the third month ($p > 0.05$). None of the patients needed any analgesics after during the one month. No complications, hyperemia or hypoesthesia of the scrotal or penile skin, occurred after the procedure. **Conclusion:** TENS reduces pain by increasing endorphin release in the spinal cord dorsal horn. TENS is very effective method for first one month in patients with ICO, but its effect reduces the time. There is no standard therapeutic protocol for ICO. Therefore, TENS may be an alternative for patients who do not benefit from medical therapy and do not want invasive procedures. Short-term use of TENS and low number of the patients are the limitations of this study. Randomized, placebo-controlled, and longer follow-up period studies are needed to assess better the efficacy of TENS for ICO.

KEYWORDS: Analgesia, Chronic Orchialgia, Transcutaneous Electrical Nerve Stimulation

Introduction

Transcutaneous Electrical Nerve Stimulation (TENS) today is a very popular non-pharmacological and non-invasive pain treatment method [1]. It is widely used in acute and chronic pain treatment [2]. Low voltage electricity is applied via electrodes that have been placed on the skin thus pain control in the body is obtained by this effective, simple, low-cost, noninvasive and portable method [3]. TENS activates cutaneous nerves with low voltage electricity, thus inhibits nociceptive data transfer along the central nervous system and causes hypoalgesia [4].

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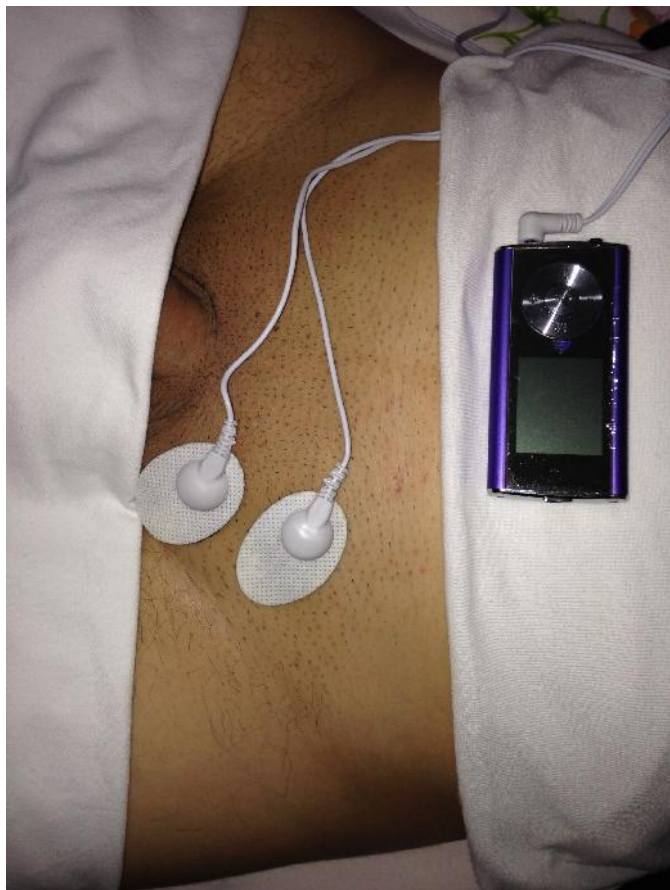


Fig.1:TENS (Transcutaneous Electrical Nerve Stimulation) points.

Plus TENS causes opioid secretion after neural stimulation and reduces pain [5]. TENS frequencies and intensities can be applied in different combinations [6]. Even though exact settlement points of electrodes for pain treatment are not clearly defined, TENS is an effective method of pain treatment [7]. Any pain in testis that lasts longer than three months, either unilateral or bilateral, intermittent or permanent in nature is called chronic orchialgia [8]. Chronic Orchialgia can be due to infection, torsion, tumor obstruction, spermatocele, hydrocele, ureter stones, trauma and iatrogenic (vasectomy, inguinal hernia surgery, and others) [9]. However, in 25-50% of patients, there is not any specific etiology, and this group is called idiopathic chronic orchialgia (ICO) [10,11]. The cause of infection is uncertain, is commonly seen by urologists, since there is not a simple treatment algorithm continuous unsolvable pain is a problem both for the patient and attending physician [9]. ICO diagnosis is made by medical history, physical examination and ruling out other possible conditions [10]. There are numerous alternatives in the treatment and these can be classified as nonsurgical therapies (scrotal elevation, antibiotics, analgesics, tricyclic antidepressants, gabapentin, alpha adrenergic agents, allopurinol, TENS, radiofrequency) minimally invasive procedures (spermatic cord blockage with local anaesthetics), ultrasound guided pelvic plexus blockage, laparoscopic spermatic cord blockage) and open surgical procedures (microsurgical spermatic cord denervation, testicular denervation, orchiectomy) [11].

TENS is a noninvasive procedure, and it can be successfully used in conditions where surgical procedures are not appropriate

and in patients that did not benefit from pharmacological treatments [11]. In this prospective study, we aimed to evaluate the results of TENS in ICO treatment.

Patients and Methods

Following the necessary obtaining of ethical committee approval for this study, to ICO patients that did not benefit from pharmacological treatment TENS treatment is advised according to Helsinki Declaration. A written consent is taken from all patients those who accepted TENS treatment.

Patients

Five patients (mean age 26.20 ± 2.38 years) with ICO of more than one year in duration were included in the present study. Two of the patients had right sided ICO. Patients were included in this study with ICO that diagnosed with physical examination, urine analyses, urinary system x-ray film, and scrotal Doppler ultrasound. Medical history revealed that multiple conservative therapy attempts failed to alleviate the pain. Demographic, clinical, radiologic characteristics and pain intensity over Visual Analog Scales (VAS) were recorded.

TENS protocol

Traditional TENS device (Pinook®, Pinook USA LLC, Orlando, USA) is placed to the most painful points. Two carbon electrodes 4x5 cm in size were stuck to the skin via carboxy vinyl polymer gel (Figure 1). TENS was applied double way portable device for four weeks, three times a week, 30 minutes and with pulses 40-70 ms pulses with high frequency (50-100Hz). Following the procedure pain intensities were recorded in first and third months via VAS and were evaluated. No complications were observed during the treatment period.

Evaluation of response

The participant's pain was subjectively assessed using a VAS. The VAS was a 10-cm line with the anchor words "no pain" (0 cm) and "agonizing pain (10 cm)" at the opposite ends (Figure 2). Each participant was asked to place a vertical mark on the VAS to indicate the intensity of his or her level of sensitivity after receiving stimuli.

Statistics

The Statistical Package for Social Sciences 15 (SPSS 15.0, Chicago, IL, USA) software was used for statistical analysis. For data analysis, Kruskal-Wallis variance analysis was used. For comparison between 2 groups, Mann-Whitney U test was used. All values were shown as mean \pm standard deviation (Mean \pm SD). P value <0.05 was accepted as statistically significant.

Findings

The mean age of the patients was 26.20 ± 2.38 (22-30) years. Mean body mass index (BMI) was 23.89 ± 2.08 . Three of the patients had left sided pain. Patients had orchialgia at least 12 months. All of the patients denied any preceding factors are causing ICO, and none of them had any history of genital surgeries. All patients had failed conservative treatment with antibiotic therapy and other analgesics, anti-inflammatory agents, or antidepressant drugs. Mean VAS before the treatment was 6.52 ± 0.89 . In the first month after the procedure means, VAS was 3.82 ± 0.83 ($p < 0.05$), three months after the procedure mean

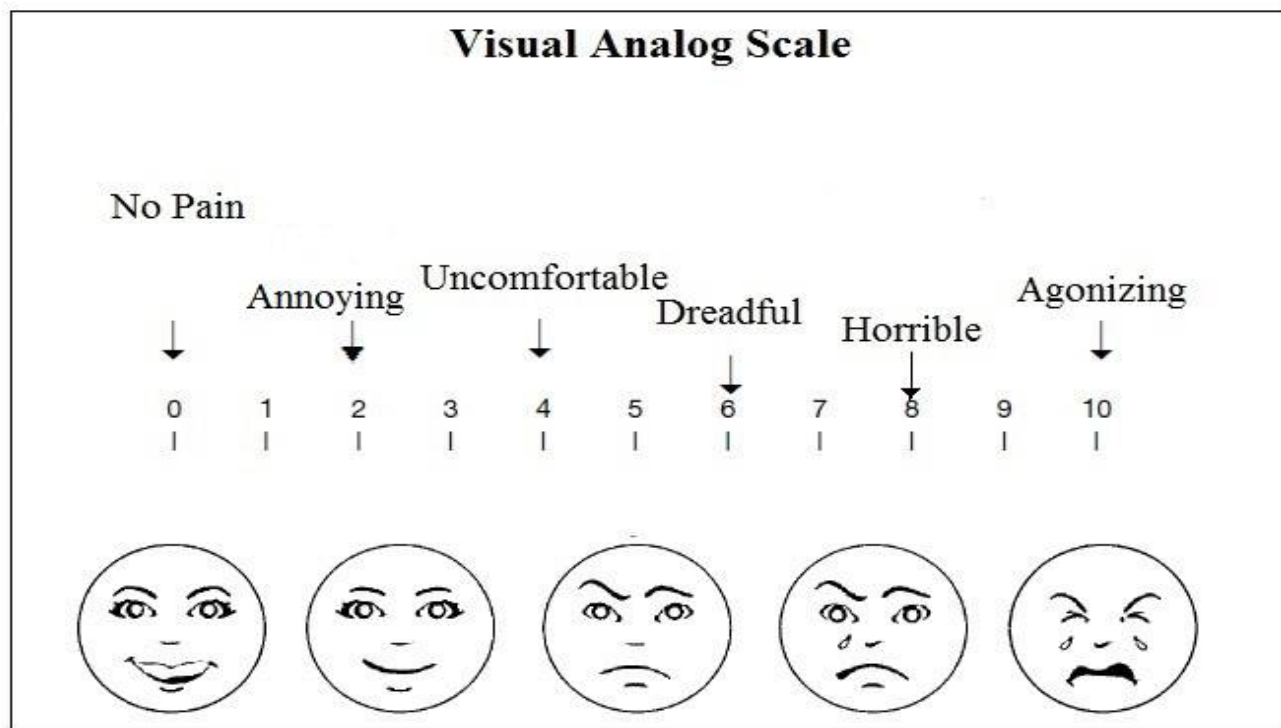


Fig.2: Visual Analog Scale.

VAS value was 5.67 ± 0.44 ($p > 0.05$). None of the patients needed any analgesics after during the one month. No complications, hyperemia or hypoesthesia of the scrotal or penile skin, occurred after the procedure.

Discussion

TENS is a nonpharmacological treatment method that acts by inhibiting nociceptive data transformation along the central nervous system [2]. In this study five patients that were diagnosed with ICO were treated with TENS.

Patients with chronic orchialgia were diagnosed with ICO after ruling out intrascrotal lesions on all other pathologies that can cause pain. All of the patients received conservative treatment. It is consisted of scrotal support, hot pack application, nonsteroids and antibiotics. TENS was recommended to those that did not benefit from conservative treatment and refuse the surgical procedures.

Placement of electrodes is critical while receiving TENS. Exact placement points for TENS electrodes are not yet clearly defined [7]. In this study, electrodes are placed on the most painful areas that patients indicated. Mean VAS value for the patients before TENS was 6.52 ± 0.89 , however in the first month after treatment it dropped to 3.82 ± 0.83 ($p < 0.05$). At the end of the 1st month, it was concluded that TENS was a very effective method for pain treatment. On the contrary, at the end of the third month mean VAS value was 5.67 ± 0.44 . Values before TENS and three months after TENS were not different from one another. Costabile et

al. reported that TENS application was effective between 1-3 months [12]. In concordance with their report, patients in this study benefited from TENS in the early period, unfortunately in the follow-up this advantage was seen to disappear.

In this study, patients were given high frequency (50-100 Hz) TENS over four weeks, three times a week, 30 minutes in each session with 40-75 ms pulses. TENS frequencies and intensities can be given in various combinations for pain treatment, and there is no standard data relating neither the duration of the treatment nor treatment episode [6]. Perhaps the biggest disadvantage of TENS is that treatment is long and takes much time. However, in these days new design small and portable TENS devices, practical and easy application any time of the day at everywhere are featured characteristics of the procedure. There is no common consensus about how long the treatment can be continued, but after a certain period a tolerance develops against TENS [5].

Basal et al., have defined a new method in the treatment of patients with ICO, and they performed a spermatic cord denervation by needle assisted pulsed radio frequency. It is a very minimally invasive nonpharmacological procedure that is very close to TENS. Basal et al., have followed their patients 20 weeks average, and they did not report any pain in their patients [13]. However, their study contains only five patients, and patient number is limited.

The selective neuronal blockage is an alternative treatment in ICO patients. Davis et al. did spermatic cord blockage with

six mL 1% lidocaine and one mL methylprednisolone, without adrenaline. They reported a longer pain relief than the subcutaneous blockage, and they also reported that this procedure is easily repeatable [8]. Also Zorn et al. performed transrectal ultrasound guided pelvic plexus blockade with local anesthetics and they obtained short-term pain relief in 6 of 8 patients [14].

Surgical alternatives can be recommended to patients that did not benefit from medical treatments. Spermatic cord denervation with microsurgery, testicular denervation with microsurgery, vasovasostomy, epididymectomy and orchiectomy are surgical choices in the treatment of chronic orchialgia. Davis et al. performed 15 inguinal and nine scrotal orchiectomies in their 24 patient with ICO series. The success of these procedures are reported to be 73% and 55%, respectively [8]. Chooa and Swami performed testes denervation with microsurgery to 4 patients. In this way, they succeeded full pain relief by dividing terminal branches of genitofemoral nerve [15]. Microsurgery assisted spermatic cord denervation has a success rate of 71-100%. It is the candidate for being the standard surgical treatment for ICO, and its success rate is superior to traditional surgical approach like orchiectomy and epididymectomy [16].

In this study, a noninvasive technique that relieves pain via opioid secretion called TENS is used for patients with ICO. It is demonstrated that this method is very effective in the first month after it is used. However, its efficacy is diminished at the end of the third month after it is used. Nevertheless, being a noninvasive technique, application at everywhere and ever hour and a portable TENS device make this procedure worth keeping in mind for the recommendation. It should not be forgotten that surgery is an irreversible process, and even microsurgery assisted spermatic cord denervation that is a candidate for the future surgical treatment of ICO, has a limited success. In this situation, at least, to lengthen the time to surgery, TENS treatment can be recommended to ICO patients.

Conclusion

In ICO pain treatment, TENS is very effective in short term. The main reason for pain in ICO is unknown and in this instance pain management is becomes difficult. TENS stands a useful choice in the hands of clinicians against such vastly different and controversially successful fan of treatments. However, in TENS treatment, answers should be fund to the questions of the area of electrode application, some application in a week, duration of treatment in weeks, the number of applications in each session, appropriate frequency, and complications. Bigger studies with longer follow-up periods and wider scopes are needed to evaluate the efficacy of this short-termed but effective pain reliever procedure in the treatment of ICO.

Authors' Statements

Competing Interests

The authors declare no conflict of interest.

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