The Efficacy of Transcutaneous Electrical Nerve Stimulation (TENS) for The Treatment of Chronic Pelvic Pain

TRANSKUTAN ELEKTRİKSEL SİNİR UYARIMININ KRONİK PELVİK AĞRI TEDAVİSİNDEKİ ETKİNLİĞİ

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Summary

Purpose: The aim of this prospective study was to research the effectiveness of transcutaneous electrical nerve stimulation (TENS) in the treatment of chronic pelvic pain.

Materials and Methods: This randomized trial was enrolling 50 cases, with the complaint of pain in the pelvic region persisted for longer than six months, referred to Gynecology policlinic of Yüzüncü Yıl University Medical Faculty, between February 1998 and March 1999. Subjected women were aged between 16-47 years and all of them was married, except one. The treatment program was composed of subsequent 3 phase with one month interval period. At the first phase, placebo TENS was given to all patients. One month later, TENS setting with 200usec pulse width and 5Hz frequency for 30 minutes was given to all patients, too. Following that, nonsteroid anti-inflammatory drugs (NSAID's) were administered only to patients who had no pain rescue. Pain intensity of the patients were measured by oral analog scale (OAS) and visual analog scale (VAS). The psychological situation of patients at the beginning and end of the treatment were measured by applying Beck depression inventory (BDI). Student's t test was used for statistical analysis, and significance was defined as $p<0.05$.

Results: According to VAS, 30% or more improvement in pain intensity was provided in 36% of patients with TENS and

Received: March 31, 2000

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29 Ekim-1 Kasım 1999 tarihleri arasında Ankara'da düzenlenen TİV Kongresinde poster olarak sunulmuştur.

Özet

Amaç: Bu çalışmada, transkutan elektriksel sinir uyarımının (TENS) kronik pelvik ağrı (KPA) tedavisindeki etkinliği araştırıldı.

Çalışmanın Yapıldığı Yer: Yüzüncü Yıl Üniversitesi, Tıp Fakültesi Kadın Hast. Ve Doğum AD, Van.

Materyal ve Metod: Şubat 1998-Mart 1999 tarihleri arasında 6 ay veya daha uzun sure pelvik bölgede sebat eden ağrı şikayeti ile Yüzüncü Yıl Üniversitesi Tıp Fakültesi kadın hastalıkları ve doğum polikliniğine başvuran 16-47 yaşları arasındaki 49'u evli, 1'i bekar 50 hasta prospektif randomize çalışmaya dahil edildi. Tedavi, birer ay arayla birbirini takip eden 3 basamaktan oluşturuldu. Birinci basamakta, bütün hastalara 30 dakika süreyle plasebo TENS verildi. Tedavinin ikinci basamağında, yine bütün hastalara 200usn pulse genişliği ve 5Hz frekansta ayarlanmış olan TENS 30 dakika süreyle verildi. Üçüncü basamakta ise, önceki tedavi basamaklarında iyileşme sağlanamayan hastalara NSAID verildi. Hastaların ağrı şiddetleri, görsel (VAS) ve sözel (OAS) ağrı skalaları kullanılarak ölçüldü. Hastaların tedavi başlangıcı ve sonundaki psikolojik durumları, Beck depression inventory (BDI) testi uygulanarak ölçüldü. İstatistiksel değerlendirme t-test ile yapıldı. İstatistiksel anlamlılık sınırı $p<0.05$ olarak kabul edildi.

Bulgular: VAS'a göre ağrı şiddetinde %30 ve üzerindeki bir azalma TENS verilen hastaların %36'sında saptanırken, bu oran plasebo TENS için %12 bulunmuştur. Hastaların %52'si NSAID tedavisine ihtiyaç göstermiş olup, bunların %19'u tedaviden fayda görmüştür. %42 hastada her üç tedavi basamağında da iyileşme sağlanamamıştır. BDI %31 hastada aynı kalırken, %19 hastada iyileşme tespit edilmiştir.

in 12% of patients with placebo TENS. NSAID was administered to 52% of patients who had no pain relief after placebo TENS and TENS, and only 19% of these patients had pain rescue with this medication. BDI was found the same in 31 patients both at the beginning and at the end of the study and improvement was observed in 19 patients.

Conclusion: We suggest that, TENS is a safe and an effective method for the treatment of chronic pelvic pain.

Key Words: Chronic pelvic pain,
Transcutaneous electrical nerve stimulation

TKlin J Med Res 2000, 18:90-94

Sonuç: TENS'in kronik pelvik ağrı tedavisinde kullanılabilir güvenli ve etkin bir metot olduğunu düşünmekteyiz.

Anahtar Kelimeler: Kronik pelvik ağrı,
Transkutan elektriksel sinir uyarımı

T Klin Araştırma 2000, 18:90-94

Chronic pelvic pain (CPP) may be defined as the pain in the area of the pelvis which has been persist for longer than six months. It is one of the most common gynecological complaint, estimated to comprise 2 to 10% of outpatient referrals (1).

Etiology of CPP depends on gynecologic or non-gynecologic causes. Mainly, gynecologic causes include chronic pelvic inflammatory disease (PID), endometriosis, pelvic pain syndrome, neoplasia (benign or malignant), residue ovary syndrome and uterovaginal prolapsus. Defined non-gynecological causes for CPP are originated from gastrointestinal (irritable bowel syndrome, diverticulitis), renal (chronic interstitial cystitis, calculi, malignancy) or musculoskelatal (osteoarthritis, intervertebral disc prolapsus) systems (2).

Failure to identify any organic cause in many women with CPP has lead to a consideration of pscyhological factors in this area. From a traditional dualistic perspective, in the absence of clear pathology, this type of pain has been viewed as psychogenic (3).

The primary goals of treatment of CPP are to relieve suffering by treating identifiable symptoms and concurrent psychological morbidity to restore normal function and to improve the quality of life by managing symptoms and minimizing disability, and to prevent the recurrence of chronic symptoms and disability (4).

Electricity harnessed in to pulsed, controlled electrical waves now known as transcutaneous electrical nerve stimulation (TENS). Equipment was first found to be effective for chronic pain. The first reference to the use of electricity for pain relief dates back to about 2500 BC when Egyptians were believed to have stood on an 'electric' fish in order to numb a painful leg. More recently, in the 19th century, a Frenchman reported using static electricity for pain relief, while at about the same time, in America, electric current was applied for analgesia to the site of a surgical procedure (5).

Such experiments were then abandoned until the development of the gate-control theory of pain by Melzack and Wall in 1965. Melzack and Wall's explanation of pain is that pain impulses are mediated in the gelatinous substance of the spinal cord. The dorsal horns of the spinal cord act as 'gates' controlling the entry of pain signals into the central pain pathways. This is known as the gate-control theory. When electrical waves are applied it seems to impair the transmission of painful stimuli from the periphery to the central nervous system (5). Melzack and Wall believe that those procedures produce sensory inputs that inhibit pain signals by closing the 'gate' in the spinal cord (6). This research was paralleled by the discovery of endorphins (morphin-like substances occurring naturally in the body) and enkephalins (opioid substances found in the brain), both of which have an analgesic effect. TENS is thought to activate the release of endorphins (5).

The purpose of this study was to find out the effectiveness of transcutenous electrical nerve stimulation (TENS) for the treatment of chronic pelvic pain.

Materials and Methods

Study was enrolling 49 married and 1 single women referred to gynecology policlinic of Yüzüncü Yıl University of Medical Faculty Hospital with the complaint of pain in the pelvic region, which persist for longer than six months between February 1998 and March 1999. The sociodemographic characteristics including age, marital and socio-economic status; obstetric history, medical history, duration of CPP, laboratory findings including complete blood count, urine examination and culture, Ca-125, CRP, and pap smear of all patients were evaluated and, pelvic and physical examination was performed. Results were recorded on the previously prepared forms for each patient. Before starting to the study, all the patients were informed and their permission was taken.

The treatment program was based on 3 subsequent phases with one month interval. At the first phase, placebo TENS in which two electrodes of TENS equipment were placed on the pain trigger points of patients without giving electrical current was given to all patients for 30 minutes. One month later, two electrodes of TENS equipment was placed on the pain trigger points and TENS setting with 200 usee pulse width and 5Hz frequency was given to all patients for 30minutes. Following that, one month later, NSAID' s was administered only to patients with no pain rescue by placebo TENS and TENS.

At the beginning and at the end of one month after each treatment phase, the subject's pain level was assessed using the OAS and VAS. The OAS gives the subject a choice of words describing her pain, "no pain" through "pain as bad as it could be". The VAS is composed of a 10cm line with the pain level of 0% on the left and 100% on the right. The subject was instructed to make a mark on the line at a point that represents her pain level.

All the patients completed BDI (Beck Depression Inventory) as a psychological measure at the beginning and at the end of the study.

For the statistical analysis, Student's t test was used in SPSS statistical program and significance was defined as $p<0.05$.

Results

The age of the patients were ranged from 16 to 47 years (Mean = 33.6 years). The mean duration of pelvic pain was 6.11 years (ranged from 6 months to 26 years). 6% of patients had a history of diagnostic laparoscopy without any pathological findings to explain cause of the CPP.

The efficacy of each treatment phase on CPP was measured by decrease in the rate of the VAS and the OAS values. While the 30% or more decrease in VAS compared with pretreatment values was accepted as improvement of pain, the oral expression of pain relief by patients was recorded as pain improvement by means of OAS. When pretreatment values of VAS and OAS were compared with placebo TENS, TENS and NSAID given phases, we detected statistically significant decrease in pain intensity of patients (Figure 1-2) ($p<0.05$). According to VAS, 30% or more decrease in pain intensity was provided in 36% of patients with TENS treatment and 12% of patients with placebo TENS treatment. Also the OAS values of these patients were found in correlation with VAS. NSAID was administered to 52% of patients who had no pain relief after placebo TENS and TENS treatment, and only 19% of these patients had pain rescue with this medication. 42% of patients had no significant reduction of pain intensity from neither of these treatment phases.

Discussion

The mechanism of pain relief with TENS is postulated as involving two possible mechanisms, the gate-control theory and endorphin mediated pain relief. According to the gate-control theory, by stimulating large diameter 'A' sensory nerve fibers in a dermatomal segment, a blockade or 'gating' effects is established at the dorsal horn level of spinal cord inhibiting transmission of pain-related impulses (Presynaptic inhibition) (7). Golding et al. (8) showed that TENS decreased early and late somato-sensory evoked potential amplitudes and stimulus intensity ratings and elevated the sensory detection threshold. These authors indicated that the effects could have been due to changes at the spinal, sub-cortical, or cortical levels or to a combination of changes at serial levels of neural organization, not at the peripheral level. Increased release of en-

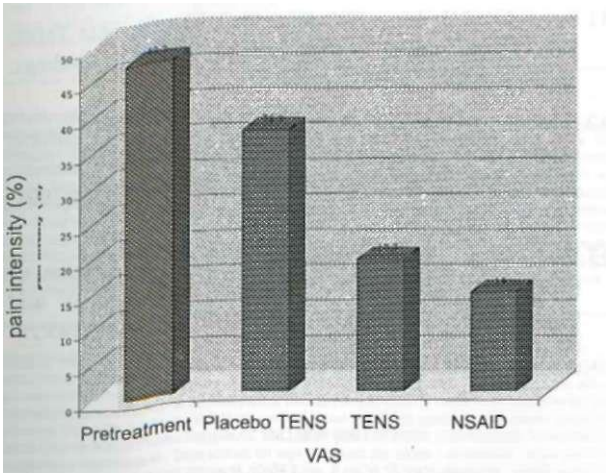

Figure 1. The reduction rate of pain intensity according to VAS.

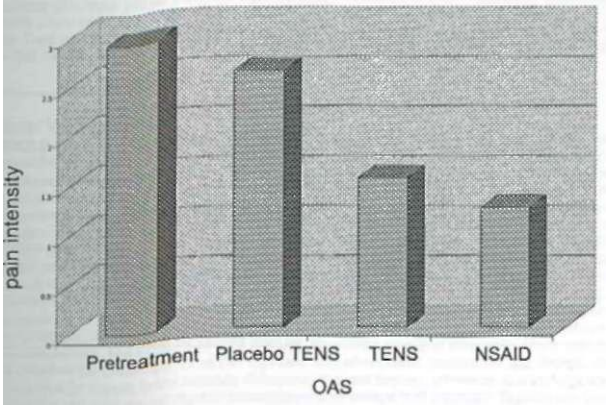

Figure 2. Oral expression of pain intensity by patients at each treatment phase- *Of* OAS, the scores of 1, 2, 3 and 4 corresponded to no pain, mild, moderate and severe pain in intensity, respectively.

oogenous endorphins, resulting in potent analgesic effects, has been demonstrated with low-frequency electrical stimulation (9).

The management of chronic pain different from that of acute pain. Acute pain is a useful physiologic response to tissue damage or noxious stimuli. Complete pain relief is expected with healing of damaged tissue or removal of the noxious stimuli. Chronic nerve pain is not a physiologic response and doesn't serve a useful purpose. It is a pathologic state that probably requires different treatments and may submit to a different set of treatment goals and outcome expectations. Thus, a reasonable set of goals for management of the patients with chronic pain with the use of TENS might include following: (a) Pain relief, (b) Improved restful sleep, (c) Discontinued use of narcotic analgesics, and (d) Improvement in quality of life (10).

Numerous studies have shown that women with CPP tend to be a psychiatrically distressed group (11-13). There is little evidence, however, that pelvic pain is unique in that patients who suffer from chronic pain, be it pelvic or elsewhere, are an emotionally distressed population. In part, certain personality traits and developmental experiences seem to predispose the women toward the emergence of chronic pain syndrome. In a previous report (14), we were able to demonstrate that patients with non-organic physical findings biased the overall results of the study. Relief of pain in patients, whether originating from physiological mechanisms of TENS or psychogenic effect cannot be discriminated clearly.

Conclusion

In conclusion, TENS is an effective modality without any side-effects for the treatment of CPP and may be used as an adjunct to medication to obtain maximum pain relief. We suggested that in our study the successful results with the application of TENS was also attributed to psychogenic relief of women because of regional characters.

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