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TENS TREATMENT IN CERVICOGENIC HEADACHE

SERVİKOJENİK BAŞAĞRISINDA TENS TEDAVİSİ

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SUMMARY

The therapeutic effect of TENS (Transcutaneous Electrical Nerve Stimulation) has been investigated in cervicogenic headache patients.Thirty-three patients who were attended to the Ankara Hospital Headache Clinic between l994 and 1995 were evaluated. These patients were diagnosed as cervicogenic headache cases according to the current (1990) criteria. The patients were subdivided into two groups. Patients in the first group (treatment group; n:20) were given TENS during 10 sessions, every session lasting 30 minutes; the duration of the pulse was 50 µsec, and the frequency was 100 Hz. The stimulator was applied on the suboccipital, paravertebral region bilaterally. The remainder were allocated to a placebo group , in this group, the stimulator was placed similarly, but no current was given.

Visual Analog Scale (VAS) values and headache frequency were recorded before and after the treatment and after 1., 2., and 3. months.

A statistically significant decrease in VAS and headache frequency values were found in the treatment group with TENS (p<0.001), but not in the placebo group (p>0.05).

Key words : Cervicogenic Headache, TENS

ÖZET

Bu çalışmada servikojenik başağrılı hastalarda TENS (Transkutanöz Elektriksel Sinir Stimülasyonu)'in tedavi etkinliğini araştırdık. Çalışmamıza 1994-1995 yılları arasında Ankara Hastabanesi Başağrısı Polikliniğine baş vuran ve Sjaastad ve arkadaşlarının 1990'da yayımladıkları kriterlere göre servikojenik başağrısı tanısı alan 33 hasta katıldı. Hastalar tedavi ve kontrol grubu olarak ikiye ayrıldı. Tedavi grubuna uyarım süresi 50msn, frekansı 100Hz olmak üzere 10 seans TENS tedavisi uygulandı. Her seans 30 dakika sürdü. Stimülatör, suboksipital paravertebral bölgeye paravertebral olarak uygulandı. 2. Gruba (plasebo grup) ise cihaz aynı şekilde yerleştirildi, ancak akım verilmedi.

Vizüel Analog Skala (VAS) ve Başağrısı Sıklığı (BS) değerleri, tedavi öncesi, tedavi bitimi, ve tedavi sonrasındaki 1., 2., ve 3. aylarda kaydedildi.

TENS tedavi grubunda hem VAS hem de BS'da istatistiksel olarak anlamlı bir düşme bulunurken (p<0.001); plasebo grubunda istatistiksel olarak anlamlı bir değişiklik kaydedilmedi (p>0.05).

Anahtar sözcükler : Servikojenik Başağrısı, TENS

INTRODUCTION

Cervicogenic headache, that is a headache stemming from the neck or related structure is unilateral, without sideshift and characteristically begins in the neck or the occipital region of the head and from there spreads to the anterior (1). The current criteria for cervicogenic headache were first published in 1990 (Sjaastad et al) (2). This term is being increasingly used by headache centers. Headache of this type is included in the IASP (International Association Study of Pain) classification. No invariably satisfactory treatment has so far been found (1). TENS, was first used by Norman Sheal as Dorsal Colon Stimulator according to Wall and Melzack's Gate Control Theory. Later it is improved as transcutaneous electrical stimulator and it is used very commonly for pain relief in last 30 years. The duration of pulses and frequencies can be revised and it is possible to stimulate different type fibres by chosen stimulation types. It is possible to stimulate selectively $A\alpha$, β, and γ carrying touch and position sensation and it is possible to block pain in medulla spinalis level, or to stimulate $A\delta$ and C fibres carrying pain and it blocks the pain in upper levels. In this study we have intended to test whether as a useful, nondest-

ructive and inexpensive method, TENS might be an appropriate choice for the management of cervicogenic headache. TENS has proven to be useful in many painful syndromes.

MATERIALS AND METHODS

A total of 33 patients, diagnosed as cervicogenic headache according to the current criteria (2) were included in the study . The criteria are shown in Table I Twenty patients (17 females and 3 males, " treatment group") were treated with TENS , the remaining 13 patients (11 females and 2 males) being placed in the control group; placebo TENS was applied in these cases. Mean ages were 36.3±10.02 (17-53) and 39.3±9.2 (29-58) in treatment and control groups respectively. Main clinical characteristics of the patients are summarized on Table II.

Physical and neurological examinations were unremarkable in all patients. Blood counts, biochemical analyse were normal.

Informed consent and ethical consent have been obtained before the study.

Portable TENS instrument called as -Transcutaneous Electrical Nerve Stimulator System 2000-two channeled were used. It has 2-200 Hz frequency range, 10-250 msec wave duration range and 0-100 mA power range. The daily treatment session lasted 30 minutes, the number of sessions were totally 10. Current frequency was 100 Hz, and the wave duration was 50 msec. The power was adjusted to cause a tingling sensation. The stimulator was placed on paravertebral, suboccipital region bilaterally. In the control group, electrodes were placed as described above, but no electric current was given.

Table I: Main Diagnostic Criteria For Cervicogenic Headache

For the complete criteria, see Sjaastad et al 1990

Major symptoms and signs
- Unilateral headache
- Symptoms / signs of neck involvement
  Pain precipitated by mechanical pressure to the ipsilateral upper posterior neck region or by awkward head positioning.

Ipsilateral neck / shoulder / arm pain.

Reduced range of motion in the cervical spine.

Pain characteristics
- Non - clustering pain episodes of varying duration. (or fluctuating, continuous pain)
- Moderate, usually non - throbbing pain, starting in the neck and spreading forward.

Other important criteria
- Anesthetic blockades of GON and / or the C2 nerve the symptomatic side abolish pain transiently
- Female sex
- History of head and / or neck trauma

Table II: Characteristics of Cervicogenic Headache Patients

	TENS treated group n=20	Control group n=13
Female/male ratio	17/3	11/2
Age range	36,3±10.02 (17-53)	39,31±9.29 (29-58)
Headache duration (year)	3,06 ±2.86 (0.12 -10)	2,08 ± 2.05 (0.08 - 7)
Strict unilaterality	20	13
Involved side (R/L)	14/6	9/4
Signs and symptoms showing neck involvement	20	13
Precipitation or increase of headache by neck movement or awkward neck position	19	13
Tenderness of occipital and upper posterior neck area	18	11
Decrease of cervical ROM	18	12
Whiplash trauma by history	5	3
Pulsating pain characteristics	3	1
Nausea / vomiting	2	1
Phono / photophobia	8	4

Pain severity was assessed by "Visual Analog Scale (VAS) (3). Prior to study headache frequency and severity were recorded, and after the treatment they were assessed with two week intervals for three months (4). Two weeks mean values are accepted as monthly mean value. At the end of the study treatment and control group data were analyzed by Mann Whitney-U, Friedman nonparametric repeated measurement and Dunn's multiple comparisons tests.

RESULTS

As seen in Table III there was a significant decrease in VAS values after therapy (Table III; $p<0.001$, see also Figure 1). There was not significant difference between treatment and placebo groups in VAS's before the treatment. ($P>0.05$)

We found a statistically significant decrease between pretreatment VAS's and posttreatment, 1st, 2nd and 3rd controls VAS's in the patients who received TENS. ($p<0.001$)

On the other hand we couldn't find a statistically significant change in the placebo group with the same comparison ($p>0.05$).

Half monthly headache frequency values can be seen in Table IV before and immediately after treatment and during 1st,

Table III: Vas Values

Cervicogenic Headache	Prior to treatment	Immediately posttreatment	1 months posttreatment	2 months posttreatment	3 months posttreatment
Treatment group n=20	6.6±1.73	2.1±2.02	2.5±2.39	2.35±1.96	2.25±1.92
Placebo group n=13	5.46±1.2	4.62±1.05	5±1.41	5.23±1.24	4.77±1.31

P value < 0.001 when compared to pretreatment value for all the corresponding comparisons in the placebo group: p > 0.05

Table IV: Headache Frequency Values

Cervicogenic Headache	Prior to treatment	Immediately posttreatment	1 months posttreatment	2 months posttreatment	3 months posttreatment
Treatment group n=20	1.78±0.82	0.8±1.15	0.83±0.89	0.78±0.73	0.68±0.67
Placebo group n=13	1.62±0.36	1.07±0.27	1.73±0.6	1.77±0.48	1.80±0.52

P value < 0.001 when compared to pretreatment value. (For 1 months posttreament, p<0.0001).
For all the corresponding comparisons in the placebo group: p > 0.05

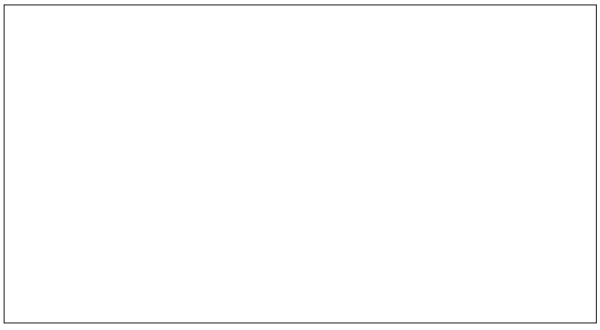

Figure 1. VAS values of patients with cervicogenic headache.

Figure 2. Headache frequency values of cervicogenic headache patients. (1st, 2nd, and 3rd control values were the means of two comings).

2nd and 3rd controls. (The 1st, 2nd and 3rd control values were the means of two comings)

Prior to treatment, there was no significant difference between two groups in 15 days headache frequency values ($p>0.05$).

A statistically significant decrease was found between pretreatment and posttreatment headache frequency values (Table IV), whereas no difference was found in the placebo group (It can be seen also in Figure 1 and 2).

DISCUSSION

Transcutaneous electrical nerve stimulation (TENS) has long been used in lots of painful syndromes (5) It has also been used extensively in several types of headache. The long term course of noninvasively treated chronic headache was investigated in 1989 by Reich B.A (13) Relaxation training (stepwise relaxation / hypnosis / autogenic training / cognitive behavior therapy), biofeedback (thermal / photopletysmograph / EMG), microelectrical therapy (TENS / neurotransmitter modulation) or combination of any of these choices were used as treatment program. Clear decline in headache frequency and intensity after all these modulations was found. It has also been used extensively in several types of headache recently and there are many studies about this matter in literature. (4, 6-12)

In present study, we found a very clear decrease in VAS and headache frequency values after TENS treatment. There was no corresponding statistically significant change in the placebo group.

Value of placebo effect of TENS is found similar in many studies. This ratio was 32% and which equals that of an analgesic drug(4). Conventional TENS in tension headache caused a 35% decrease in headache frequency whereas placebo caused a decrease approximately 18% in a cross-over design (12). They considered that TENS was an alternative method to chronic analgesic use in this type of headache.

In another study, patients with chronic daily headaches who had palpable muscle spasm in the neck and shoulder regions were treated by medication detoxification, amytriptyline, biofeedback, physical therapy including TENS and TENS without other modalities of physical therapy (6). They assessed these patients with a Headache Index and found the excellent relief through a six month follow up period in the patients who received TENS. They thought that this result might be related to measurable increase in serotonin levels that attends TENS.

In cervicogenic headache the ideal treatment method is not known yet and has to be found. Bovim et al have applied neurolysis of the greater occipital nerve in 58 patients (14) with initial beneficial effects, but 48 of 58 patients experienced recurrence. On the other hand repeated blockades of peripheral nerves or nerve roots have also been given as treatment (15). In many cases combination of local anesthesia and corticosteroids has been tried with the aim of breaking a “vicious circle”.

Blume et al have recommended radiofrequency denervation of the external periosteum of the occipital bone (16), a relativiely new approach that has to be further evaluated. A careful initial assessment is mandatory in every cervicogenic headache patient, before the choice of therapy is decided. In cervicogenic headache generally invasive procedures are preferably not the first choice .

Our results in cervicogenic headache seem encouraging. When introducing a treatment in a recently defined pain category, a cost and benefit analysis is obligatory. This treatment is inexpensive, TENS might be an alternative or adjunctive method in cervicogenic headache at least in the early stages. Studies with a different design should be conducted in order to evaluate the long term effect.

CONCLUSION

To evaluate therapeutic effect of TENS and to compare it with placebo in patients with cervicogenic headache were our purposes in this study.

At the end of the study we found a statistically significant decrease in VAS and headache frequency values between before and after the treatments in the group that received TENS. Such statistically significant change on VAS and headache frequency values were not obtained in the placebo group.

TENS, as a safe and useful analgesic, physical therapy remedy may seem to be an effective therapeutic choice in cervicogenic headache. Further studies will be necessary to make for finding out the optimal mode and application of TENS.

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