Effects of Transcutaneous Electrical Nerve Stimulation Versus Acupressure in the Treatment of Primary Dysmenorrhea

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ABSTRACT

The purpose of this study was to determine the effect of transcutaneous electrical nerve stimulation (TENS) versus acupressure in alleviating primary dysmenorrhea. A random sample of 30 volunteer females, their age ranged from 17 to 23 years, complaining of pain during menstruation were participated in this study: group (A), 15 subjects were treated by TENS, group (B): 15 subjects were treated by acupressure. Treatment and follow up were repeated for three consecutive menstrual cycles, for the two groups. Reevaluations done before and after treatment to evaluate the pain intensity and the degree of pain relief through present pain intensity and pain relief scales. Results showed a highly significant decrease in the severity of pain and a highly significant increases in the degree of pain relief in group (A) compared to group (B). It was concluded that TENS, acupressure are effective in reducing dysmenorrhea pain , but TENS is a more effective modality which can be used as an alternative non-medication method to reduce pain during dysmenorrhea.

Key words: *TENS, acupressure, dysmenorrhea.*

INTRODUCTION

Primary dysmenorrhea is defined as cramping pain in the lower abdomen occurring just before or during menstruation, in the absence of other diseases such as endometriosis, prevalence rates are as high as 90%. Initial presentation of primary dysmenorrhae typically occurs in adolescence. It is a common cause of absentessism and reduced quality of life in women[1,16].

Primary dysmenorrhea is by far the most common gynecologic problem in menstruating women, it is so common that many women fail to report it in medical interviews[2,17].

The etiology of primary dysmenorrhea is not precisely understood, but most symptoms can be explained by the action of uterine prostaglandins, particularly prostaglandin (PGF_2) which stimulates myometrial contractions, ischemia and sensitization of nerve endings. Some studies implicated increased levels of leukotrienes and vasopressin[3,18].

Primary dysmenorrhea usually presents during adolescence, within three years of menarche. It is unusual for symptoms to start within the first six months after menarche. Affected women experience sharp, intermittent spasms of pain, usually centered in the suprapubic area. Pain may radiate to the back of the legs or the lower back. Systemic symptoms of nausea, vomiting, diarrhea, fatigue, fever, headache or light tenderness are fairly common. Pain usually develops within hours of the start of menstruation and peaks as the flow becomes heaviest during the first day or two of the cycle[4,20].

A focused history and physical examination are usually sufficient to make the diagnosis of primary dysmenorrhea. The

history reveals the typical cramping pain with menstruation, and the physical examination is completely normal. Secondary causes of dysmenorrhea must be excluded[5].

The most appropriate first-line choice of therapy in most women with primary dysmenorrheal is an non steroidal anti-inflammatory drug (NSAID). These medications work through the inhibition of the production and release of prostaglandins, prostaglandins are responsible for the painful uterine contractions and associated systemic symptoms of primary dysmenorrhea, such as nausea and diarrhea[6].

Oral contraceptives are the second line of therapy for most patients, unless birth controls is also desired. The necessity of daily medication to prevent symptoms for one or two days a month makes them to cumbersome as a first-line choice compared with the highly effective NSAIDs. Oral contraceptives prevent menstrual pain through a different mechanism than NSAIDs. The action of oral contraceptives is two folk, reduction of menstrual fluid volume and suppression of ovulation[7].

For reasons that are not clear, about 10 percent of women with primary dysmenorrheal do not respond to treatment with NSAIDs or oral contraceptives. In addition, some women have contraindications to these medications. Consequently, researchers have investigated numerous alternative treatment[8,9].

For patients who do not obtain complete relief, who have contraindications to or side effects from the use of NSAIDs, or who don't wish to use medications, a nonpharmacologic method for relieving the pain may be useful such as heat packs, relaxation techniques, acupressure, massage, acupuncture and transcutaneous electrical nerve stimulation[10,11].

Transcutaneous electrical nerve stimulation (TENS) severe as an adjuvant therapy to conventional pharmacological agents in severe cases of dysmenorrhea or can serve as the main treatment for women who cannot or don't wish to use the conservative pharmacological approach, for cases in which medication has no effect, provided only incomplete relief, or resulted in side effects[10].

TENS relieves primary dysmenorrhea through 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 blockage or "gating" effect is established at the dorsal horn level of the spinal cord inhibiting the transmission of pain-related impulses (presynaptic inhibition). TENS also induces release of endorphin from these nerve cells and thereby contributes additionally to the relief of pain[11].

Acupressure is an effective and safe non-pharmacological strategy for the treatment of primary dysmenorrhea. The sites of acupressure include the web of the hand between the thumb and first finger, the lumbosacral area, and 3cm superior to the medial malleolus. With design modification, it could serve as a main treatment modality for women who suffer from primary dysmenorrhea and do not wish to or cannot use the conventional pharmacological agents. In addition, acupressure may serve as adjuvant therapy to medication in more severe cases of dysmenorrhea[16].

Acupressure stimulates the body's integrative regulatory systems and activates a variety of endocrine and neurological mechanisms, which in turn stimulate a variety of physiologic functions toward homeostasis[22].

Energy, Known as (Qi) in Chinese, is considered to be the motive force of life, according to Chinese medical theory, liver-Qi stagnation causes women's blood to stagnate in

the uterus, leading to periods of pain. Applying pressure at the assigned acupuncture meridian can invigorate blood supply and reduce pain[22].

Dysmenorrhea can be relieved by acupressure at combination of acupoints qugu (CV^2), Guanyuan (CV_4) in the suprapubic region sanyinijiao (SP_6) above the ankle.

The purpose of this study was to study the effect of TENS versus acupressure in alleviating primary dysmenorrhea.

SUBJECTS, MATERIALS AND METHODS

Subjects

A random sample of 30 volunteers virgin females, experienced regular menstrual cycles with primary dysmenorrhea, selected from out-patient clinic of gynaecology department of Kasr El-Aini University Hospital. Their ages ranged from 17 to 23 years.

All subjects were screened through ultrasonography to exclude any pelvic pathological problems. Non of the subjects received any anti-inflammatory drugs. Subjects were divided into two groups: group A (TENS): 15 subjects were treated by TENS and group B (Acupressure): 15 subjects were treated by acupressure.

Informed consent form were signed by each subject before starting the treatment.

Material

A commercially available TENS, Model 1202 coated Japan was used in this study. It has two electrically isolated channels which can be used and controlled separately. The stimulator allows modulation and adjustment of both pulse width and rate. The stimulator has a 9-V alkaline battery as its power source. For this study, the stimulator was set to deliver constant current pulses of 180Ms, the pulse frequency was kept at 120Hz, the intensity of the stimulator was adapted to a level immediately below the producing pain.

Ranking scales, present pain intensity (PPi) scale and pain relief scale (PR) were used to assess the pain intensity.

Method

A. Evaluation

Assessment of pain intensity for each subject was done, before and after treatment through:

1- Present pain intensity (PPi) scale (0-4) : 0 = no pain, 1 = mild pain 2 = moderate pain, 3= severe pain, 4= unbearable pain and 5 = excruciating pain.

2- The pain relief (PR) scale (0-4): 0 = no relief, 1= slight relief, 2= good relief, 3= excellent relief and 4= complete relief.

B. Procedures

The first session was carried out when the subjects complained of unbearable pain (few hours or half a day before the beginning of the menstrual blood flow). While, the second and third sessions were carried out, in the other next two consecutive days. Treatment and follow up were repeated for three consecutive menstrual cycles, for each subject of all groups (A and B). For group (A) the subject was positioned in a relaxed crock – lying position. The two negative electrodes were each placed about 4cm lateral to the umbilicus on both sides (level of thoracic 10-11 dermatomes), the positive electrode was positioned in the middle over the supra pubic area (level of thoracic 12 dermatome). This three electrode placement stimulate sensory nerves in the thoracic 10-12 dermatomes which are the same nerve roots sub serving the uterine sensory fibers. The frequency used was 120Hz, medium pulse width 180ms and the patient adjusted the amplitude to produce a comfortable, tingling sensation or to achieve a satisfactory pain relief.

For group (B) before starting the treatment each subject was instructed about the nature of these methods of treatment. The subject was sitting on a relaxed long sitting position with the back supported, then the subject was taught how to locate and apply acupressure at the assigned point. sanyinijiao (SP_6) which is located on the medial side of the lower leg, 3cun above the medial malleolus dorsal to the posterior border of the tibia. This treatment was performed as following the assigned point was pressed with the thumb for 6 seconds and reeased for 2 second without pressure. This was continued for 5 minutes and repeated 4 times t o bring the total treatment time to 20 minutes.

Statistical analysis

Descriptive statistic was presented as mean, standard deviation and percentage for qualitative variable, analytic test included student t-test for comparing of means between before and after treatment. Significant level of 0.05 was used throughout all statistical tests within this study, P value < 0.05 indicated significant results. The smaller the P value obtained the more significant was the result.

RESULTS

In the present study, the present pain intensity was recorded in the two groups before and after treatment for three sessions for three consecutive menstrual cycles. As shown in table (1). In group (A), the pain decreased significantly after application of TENS. Before starting treatment the pain score in the first month was 3.73 ± 0.46 after the third session it was 0.45 ± 0.40 , during the second month it was 3.20 ± 0.41 and after the third session it was0.47 ± 0.83 and in the third month it was 3.13 ± 0.52 and after the third session it was 0.40 ± 0.51. in group (B), the pain decreased significantly after the treatment with a acupressure. In the first month the pain score was 3.80 ± 0.41 before starting treatment and after the third session it was 1.20 ± 0.41, during the second month the pain score was 3.40 ± 0.57 and after the third session it was 0.80 ± 0.69 and in the third month, it was 3.4 ± 0.64 before starting treatment and it was 0.8 ± 0.55 after the third session (Fig.1).

For group (B) there was a decrease in menstrual pain in each session in the three months but as shown in table (2) the percentage of improvement was more in group (A) than group (B) in each session in the three months (table 2, fig. 2).

As shown in table (3), there was a progressive increase in the degree of pain relief in group (A) in each session in the three months and reach to maximum relief in the third session of each month also, in group (B) there was an increase in the degree of pain relief in the three months but, the percentage of increase was less than in group (A) (Fig. 3).

Table (1): Shows the present pain intensity score in the two groups before and after treatment.

		1st Month						2nd Month						3rd Month					
		1st session		2nd		3rd		1st		2nd		3rd		1st		2nd		3rd	
		Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After
Group A	Mean	3.73	2.07	2.80	1.40	1.27	0.45	3.20	2.13	2.40	1.27	1.27	0.47	3.13	2.00	2.07	1.07	1.47	0.40
	SD	0.46	0.26	0.55	0.51	0.45	0.40	0.41	0.35	0.51	0.46	0.59	0.83	0.52	0.38	0.46	`0.26	0.52	0.51
	t	13.22		10.69		10.71		16.00		12.47		2.06		12.47		10.24		5.17	
	P	<0.001		<0.001		<0.001		<0.001		<0.001		<0.001		<0.001		<0.001		<0.001	
Group B	Mean	3.80	2.93	3.13	2.20	2.27	1.20	3.40	2.33	2.53	1.67	1.80	.080	3.4	2.4	2.3	1.2	1.8	0.80
	SD	0.41	0.26	0.64	0.41	0.46	0.41	0.57	0.49	0.52	0.62	0.56	0.69	0.64	0.49	0.41	0.52	0.56	0.55
	t	9.53		7.80		16.00		9.02		9.53		10.24		12.47		16.00		7.80	
	P	<0.040		<0.004		<0.004		<0.024		<0.001		<0.001		<0.003		<0.001		<0.001	

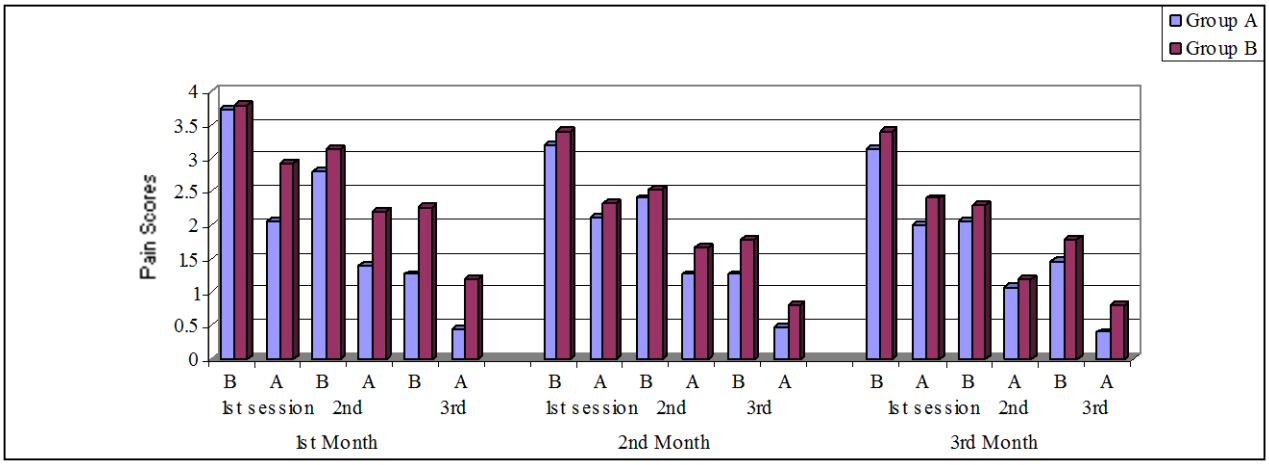

Fig. (1): Shows the present pain intensity score in the two groups before and after treatment.

Table (2): Shows the percentage of improvement of the present pain intensity after the treatment in the two groups.

		1st Month			2nd Month			3rd Months		
		1st session	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
Group A	Mean	43.38	50.00	85.00	33.33	47.77	85.71	36.11	46.66	89.00
	SD	9.16	19.08	0.40	5.45	10.66	23.44	7.49	14.36	44.00
Group B	Mean	22.22	28.33	47.17	31.11	35.50	62.22	28.88	45.88	62.00
	SD	9.27	12.90	8.60	11.55	16.50	23.95	13.31	9.89	23.91
	T	29.50	23.49	5.26	19.37	15.47	29.34	15.44	7.23	14.00
	P	0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

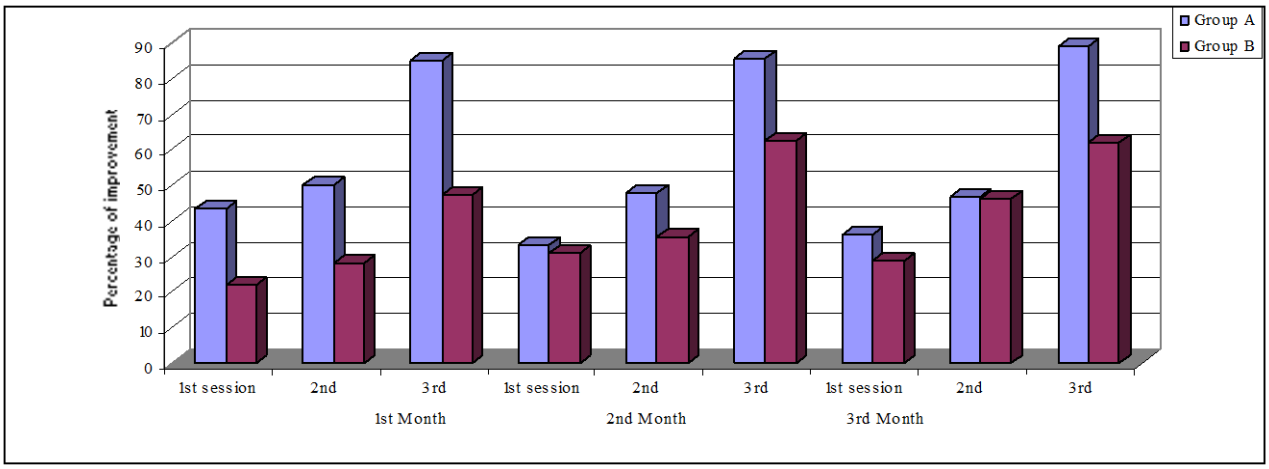

Fig. (2): Shows the percentage of improvement after the treatment in the two groups.

Table (3): Shows the degree of pain relief in both groups A and B after treatment.

		1st Month			2nd Month			3rd Months		
		1st session	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
Group A	Mean	3.07	3.47	3.80	2.73	3.00	3.93	2.80	3.07	3.73
	SD	0.46	0.52	0.41	0.70	0.53	0.26	0.77	0.69	0.46
	T	5.32	6.17	6.65	3.07	4.03	4.49	2.86	3.69	2.95
	P	0.001	0.001	0.001	0.005	0.001	0.001	0.001	0.001	0.005
Group B	Mean	1.87	2.33	2.87	1.87	2.27	3.13	2.00	2.33	3.13
	SD	0.71	0.49	0.35	0.83	0.46	0.64	0.76	0.49	0.64
	T	4.80	1.54	0.92	0.55	0.91	0.71	3.9	2.9	2.7
	P	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

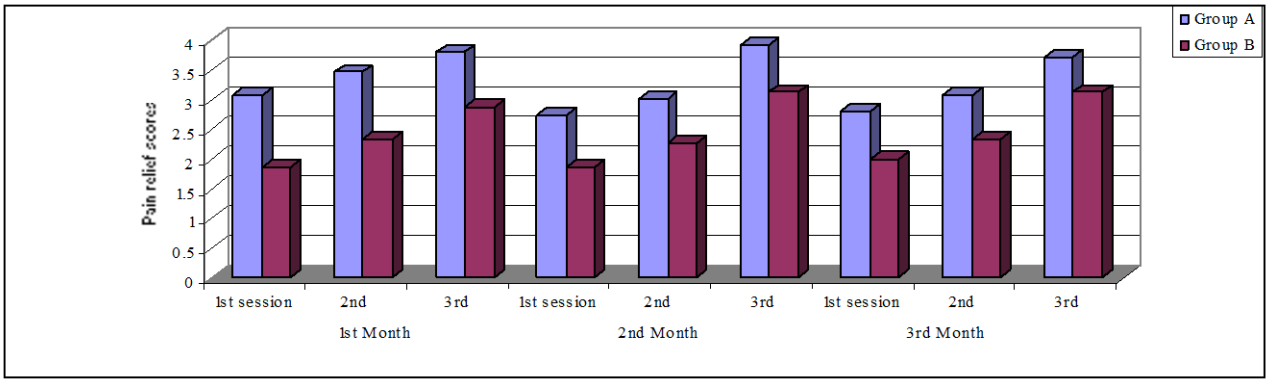

Fig. (3): Shows the degree of pain relief in both groups A and B after treatment.

DISCUSSION

TNES was found to be an effective and safe method for relieving the pain of primary dysmenorrhea. A similar efficacy of TENS for the relief of dysmenorrhea has been reported[12,15]. With TENS therapy in group (A), none of the subjects require any sort of supplemental pain medication. During the study TENS therapy was safe, and allowed the patients to remain ambulatory. The mechanisms of pain relief with TENS is postulated as involving two mechanisms, the gate control theory and endorphin-mediated pain relief[16]. The study also demonstrate that patients treated with acupressure reported decrease in menstrual pain after each session. These results of group (B) how received acupressure appears to justify the opinion regarding the effectiveness described in the study of which demonstrated that steinberger (1998)[19] acupressure is effective in treating dysmenorrhea, he found that 90.9% subjects treated by acupressure reported improvement compared with 36.4% treated by medications. Also, this result agree with those reported by Zhang (1999)[24] using nonsteriodal ant inflammatory drug therapy for dysmenorrhea with acupressure, the range of subjects experiencing pain relief being from 56 to 100%. Also, in (1991)[8] the study of Helms, who studied the effect of acupressure on dysmenorrheal found that, in addition to a decrease in cramping pain, there was also improvement in extra genital symptoms as nausea and headache. Also, back pain reduced after acupressure. Another results of Thomas (1995)[21], reported that acupressure is effective in treating such case with a percent of 77.8%. Symptoms improved include anxiety, insomnia, gastrointestinal disorders. The author suggested that the positive influence of acupressure can be described to its effects on the serotoninergic and opiodergic

neurotransmission that modulates various psychosomatic functions.

The results agree with those reported by Thomas (2002)[21], whose revealed that TENS is effective in managing the pain of primary dysmenorrheal which investigated in a randomized and controlled prospective clinical study, there was a reduction of medication used by the patients after the treatment series. Also Neighbors, et al. (1987)[14], reported that seven out of 10 patients had a significant drop in pain after TENS therapy.

Also, the results agreed with those of Dawood and Ramos (1996)[3], who concluded that TENS is considered as an effective method of treatment of pain during dysmenorrhea in comparison to traditional pain modalities. Also, the results are supported by those of Dawood (1990)[4], who carried out a randomized double blinded placebo – controlled study to investigate the effect of TENS in relieving pain during dysmenorrhea. He found that TENS reduces cramps, nausea, pain and vomiting.

The major finding in this study, which proved that TENS or acupressure are effective in reducing dysmenorrheal pain but, TENS is more effective than acupressure.

Conclusion

As a conclusions, TENS and acupressure appear to be an effective methods of treating patient with primary dysmenorrheal. TENS is most effective and safe nonpharmacologic modality that allows the women to be ambulatory and carry on her normal activities. Also, acupressure can be effective, cost-free intervention for reducing pain during dysmenorrheal and it can be used for self care of primary dysmenorrheal. So, TENS and acupressure can be used as an non-medication alternative treatment for relieving dysmenorrheal pain.

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الملخص العربي

تأثير التنبيه الكهربى للعصب الحسى عبر الجلد مقابل الضغط الوخزى في علاج عسر الطمث الأولى

أجريت هذه الدراسة لتقييم مدى تأثير العلاج بالتنبيه الكهربى للعصب الحسى عبر الجلد والعلاج بالضغط الوخزى فى علاج حالات الألم المصاحب لعسر الطمث الأولى، شملت الدراسة ثلاثون فتاة متطوعات وتم اختيارهن عشوائيًا وتم تقسيمهن إلى مجموعتين : المجموعة (أ) وتضم خمسة عشر فتاة وتم علاجهن بجهاز التبنيه الكهربى للعصب الحسى عبر الجلد، والمجموعة (ب) وتضم خمسة عشر فتاة وتم علاجهن بالضغط الوخزى. وتم تقييم شدة الألم ودرجة تخفيفه للمجموعتين من خلال استخدام مقياس شدة الألم الحالية وقياس درجة تخفيف الألم وقد أجريت القياسات قبل وبعد العلاج لثلاث جلسات متعاقبة لمدة ثلاث شهور متعاقبة وأوضحت النتائج أن هناك نقص ذو دلالة احصائية عالية فى درجة الألم بعد كل جلسة فى المجموعة (أ) عن المجموعة (ب) وكذلك كان هناك زيادة في درجة تخفيف الألم في المجموعة (أ) عن المجموعة (ب) . وقد أثبتت الدراسة أن التنبيه الكهربى للعصب الحسى عبر الجلد له تأثير فعال أكبر من العلاج بالضغط الوخزى وهو بهذا يعتبر علاجًا فعالاً وبديلاً للوسائل العلاجية فى علاج ألم عسر الطمث الأولى.
الكلمات الدالة : التنبيه الكهربي للعصب الحسي عبر الجلد ، الضغط الوخزي ، عسر الطمث الأولي .