

Effect of Tetrapolar Interferential Current on Primary Dysmenorrhea Associated with Low Back Pain: Randomized Clinical Trial

Efeito da Corrente Interferencial Tetrapolar na Dismenorreia Primária Associada à Dor Lombar: Ensaio Clínico Aleatório

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Abstract

Dysmenorrhea is described as pain or weight in the hypogastrium and can radiate to the lumbar region or to the thighs. The use of the vector interferential current (CIV) is based on two sinusoidal currents of medium frequency, modulated at low frequency, and can reach deep tissues in a pleasant way. Despite widespread use of this current under various conditions, there are few studies on its use in primary dysmenorrhea associated with low back pain. The aim of this study was to evaluate the analgesic effect of the Tetrapolar Interferential Current on primary dysmenorrhea associated with low back pain. The study consisted of 20 volunteers, divided into 2 groups: Placebo Group (GP) and Group Treatment (GT), with treatment for 3 days in two menstrual cycles. The variables analyzed were the McGill Pain Questionnaire at the beginning of the first intervention and on the last day after the procedure, and the Visual Analog Pain Scale, applied before and after each therapy. It was observed that for the McGill questionnaire there was reduction only for the treated group, for the Pain scale there were differences again between groups and between evaluations, and the size of the effect showed favorable results in the treated group. The interferential current in the quadrilateral form was shown to be effective in reducing pain in young patients with primary dysmenorrhea.

Keywords: Visual Analog Scale. Transcutaneous Electric Nerve Stimulation. Medição da Dor. Pain Measurement.

Resumo

A dismenorreia é descrita como dor ou peso no hipogástrio, podendo irradiar-se para a região lombar ou até as coxas. O uso da corrente interferencial vetorial (CIV) baseia-se em duas correntes sinusoidais de média frequência, moduladas em baixa frequência, podendo atingir tecidos profundos de forma agradável. Apesar de amplo uso desta corrente em várias condições, há poucos estudos sobre seu uso na dismenorreia primária associada à dor lombar. O objetivo do estudo foi avaliar o efeito analgésico da Corrente Interferencial tetrapolar na dismenorreia primária associada à dor lombar. Este estudo foi composto por 20 voluntárias, divididas em 2 grupos: Grupo Placebo (GP) e Grupo Tratamento (GT), com tratamento por 3 dias em dois ciclos menstruais. As variáveis analisadas foram o Questionário de Dor de McGill no início da primeira intervenção e no último dia após o procedimento, e a Escala Analógica Visual de Dor, aplicada antes e após cada terapia. Observou-se que para a o questionário de McGill houve redução apenas para o grupo tratado, para a escala de Dor houve diferenças novamente entre grupos e entre avaliações, sendo que o tamanho do efeito mostrou resultados favoráveis ao grupo tratado. A corrente interferencial na forma tetrapolar mostrou-se efetiva na redução do quadro de dor em jovens com dismenorreia primária.

Palavras-chave: Escala Visual Analógica. Estimulação Elétrica Nervosa Transcutânea. Medição da Dor.

1 Introduction

Dysmenorrhea is a common problem in adolescents, generating beyond the discomfort by pain, social problems such as missing school activities, etc. It can be divided into primary and secondary, for this some causes are considered: sexually transmitted diseases, endometrioses and congenital anomalies. However, in the vast majority of cases what occurs is the primary dysmenorrhea, they usually have low anterior pelvic pain shortly before or at the beginning of menstruation and lasts 1-3 days, are related to characteristics of the perimenstrual periods as the decrease in the level of circulating estrogen and/or progesterone and may include headache, diarrhea and nausea. The current concept, of pathogenesis of primary dysmenorrhea, is that it is related to the release of

prostaglandins on menstrual fluid, which are involved in the regulation of ovulation and endometrial physiology, including proliferation of endometrial glands and menstruation, high levels are associated with uterine contractions and pain. Vasopressin may also play a role by an increase in uterine contractility and cause ischemic pain by vasoconstriction¹.

The treatment of dysmenorrhea is directed to the relief of symptoms. In the case of clinical treatment regimen, analgesics and non-steroidal anti-inflammatory drugs (NSAIDs) are the first line of management of primary dysmenorrhea, however, are not exempt of side effects^{1,2}. Thus, therapeutic non-medicated methods are advantageous for such patients, such as physical therapy modalities³, with some emphasis to the transcutaneous electrical nerve stimulation (TENS), which

has shown therapeutic efficacy when used with low frequency, although with some contradictions⁴⁻⁸. And, although rare in the literature there is also information about the use of the current vector interferencial (CIV) for such cases⁹.

Created in the decade of 1950, the use of the CIV is based on two sinusoidal currents of medium frequency (2000 or 4000 Hz), modulated in low frequency (0-250 Hz)¹⁰. Its effect is described as similar to that observed in the currents of low frequency, such as the TENS, but causes less discomfort and penetrates more deeply in the tissues¹¹. It is usually used due to its analgesic effect, attributed to the “theory of the floodgates”, blockade of nerve conduction, increase local circulation, central mechanism of suppression of pain and placebo^{12,13}.

Given the widespread use of the CIV in several painful conditions, but few studies about this in primary dysmenorrhea, the objective of this study was to evaluate the analgesic effect of the tetrapolar CIV in young patients with primary dysmenorrhea associated to lumbar pain.

2 Material and Methods

The research was approved by the Committee for Ethics in Research of the State University of Eastern Paraná (UNIOESTE) under the opinion #2.254.477. The study is classified as a randomized, controlled clinical trial, carried out in the period from September to November 2017, in Physical Rehabilitation Center of Unioeste. It was sought to follow the rules CONSORT to trials; however, registration was not carried out at ReBEC. The sample was selected by convenience, comprising twenty women, randomized by lots into 2 groups: The placebo group (GP, n=10, age 22.7±2.9 years, height 1.65±0.03 m, mass 60.6 ± 4.3 kg, BMI 22.2 ± 1.9) and Treatment Group (GT, n=10, age 22.0±3.5 years, height 1.65±0.04 m, mass 61.1 ± 5.7 kg, BMI 22.4 ± 1.8), in a randomized way by draft with the use of opaque envelope. The inclusion criteria were: nulliparous women, aged between 18 and 30 years, with primary dysmenorrhea. The exclusion criteria were: pregnancy, heart problems, implementation of any other type of treatment in the study period and other contraindications to the use of electrostimulation, such as the use of pacemaker, metal surface synthesis and changes in sensitivity at the site.

On the first day of research the volunteers were made aware about the procedures and signed the Informed Consent Form, after the McGill Pain Questionnaire¹⁴ was applied, which was reviewed at the last day after the procedure. Thus, the location of pain intensity and behavior was recorded in sensitive, affective and evaluative dimensions, and used for comparison the final score.

Another form of evaluation was the Visual Analogue Scale (EVE), applied before and after each application of the CIV. A wooden graduated device was used, when the volunteer appeared just for a scaler and markings from 0

to 10, being explained that zero meant “no pain”; the middle scale “moderate pain” and 10 “the worst imaginable pain”, and that the same should indicate what was the momentary intensity of the same. For the evaluator the scaler pointed at a distance of 100 mm, thus showing the degree of pain intensity.

For the application of the current the patient was positioned in the ventral decubitus with the part of the body where the electrodes were positioned nude, it was cleaned with alcohol and cotton 70°, afterwards the tetrapolar CIV was used in the lumbar region with the electrodes positioned between T12 and S2, 3 cm lateral of the vertebral column, so that the two channels were crossed. The equipment used was IBRAMED® brand, with base frequency of 4 KHz, MFA of 100 Hz, with automatic vector, for 25 minutes. The patients were subjected to 3 applications of electrostimulation, being the first one day before the onset of menstruation and the second third applications, held respectively in the two following days, repeated for two menstrual cycles. The placebo group made ratings in similar moments, however, the electrostimulation was not performed, only placement of electrodes.

For analysis of the results regarding the McGill pain questionnaire, the presentation was performed in the form of median, 1st and 3rd quartiles, with the comparisons using the Wilcoxon test and the Mann-Whitney test for intra and inter comparison, respectively. The analysis of results for the Visual Analogue Scale of pain, the data were presented as mean and standard deviation, and the comparisons were performed using ANOVA factorial 2x2. In all cases the significance level was 5%.

3 Results and Discussion

In relation to the McGill pain questionnaire, in the intergroups comparison can be noted that the GP in the first evaluation showed lower values than the GT (p=0.0113), but after the application of the chain, in the second evaluation, no significant difference was observed (p=0.162). The intra-group comparison showed differences only for GT (p=0.0051) (for GC, p=0.6465) (Table 1).

Table 1 - Presentation of values, median and quartiles, obtained by the McGill Pain Questionnaire for the placebo group (GP) and group treated with interferencial (GT).

		GP	GT	p-value
Av1	Median 1st and 3rd Q	39 37 – 41,8	47.5 42 – 58.8	0.006
Av2	Median 1st and 3rd Q	40.5 34.8 – 43,8	34.5 31 – 37,8	0.081
p-value		0.323	0.003	

Legend: Av1 - First assessment was made on the first day of treatment before the application of the chain; Av2 - Second evaluation was made on the last day of treatment after the application of the chain. * statistically significant difference.

Source: Research Data.

In relation to EVA there was a significant difference of GT in relation to GP ($p=0.0007$), among the evaluations (regardless of the group ($p<0.0001$), and there was interaction between treatment and time of evaluation ($p=0.0003$), being that the size of the effect was widely favorable for the treatment after the 2nd therapy, both in the first and in the second month (Table 2).

Table 2 - Presentation of the data as mean and standard deviation for the different groups (GP and GT), in different moments of evaluation for the Visual Analogue Scale of pain, with presentation of the size of the effect (TE).

		GP	GT	TE
1st month	Av1	54±11	47±18	-0.47
	Av2	52±19	59±11	0.45
	Av3	42±20	48±29	0.24
	Av4	44±13	8±10	-3.10
	Av5	33±18	13±12	-1.31
	Av6	26±19	8±13	-1.11
2nd month	Av1	46±19	38±17	-0.44
	Av2	43±17	49±15	0.37
	Av3	28±19	35±23	0.33
	Av4	17±12	5±7	-1.22
	Av5	14±14	2±4	-1.17
	Av6	3±7	2±6	-0.15

Legend: Av1 - First assessment, first day of treatment before the application of the chain; Av2 - Second assessment, the first day of treatment after the application of the chain; Av3 - Third Assessment, second day of treatment before the application of the chain; Av4 - Fourth Assessment, second day of treatment after the application of the chain; Av5 - Fifth assessment, third day of treatment before the application of the chain; Av6 - Friday assessment, third day of treatment after the application of the chain.

Source: Research Data.

The objective of this study was to evaluate the analgesic effects of the interferential current applied in young patients with primary dysmenorrhea, obtaining as result analgesic effects, both by the McGill pain questionnaire and by EVA, noting an important effect of therapy from the 2nd application of current, in two months evaluated.

The primary dysmenorrhea is the most common gynecological complication among young people after the onset of menarche and these are often accompanied by symptom until menopause; because of its cyclical repetition and painful expectation, exposes them to the use of anti-inflammatory drugs for a long period¹⁵, fact already known as dangerous due to several effects that can arise¹⁶. Still, Unsal et al.¹⁷ have reported negative effects regarding o the quality of life in university students who have dysmenorrhea.

Thus, the primary dysmenorrhea is a health problem that deserves attention and seeks non-medicated ways of therapy, such as the use of physical therapy modalities, such as exercises, heat and transcutaneous electrical nerve stimulation of low frequency¹⁸. But, a widely used analgesic modality in the physiotherapeutic field is the currents of medium frequency, in the CIV stands out, with interesting results not

only in cases of pain, but also with functional improvements and quality of life, when used in isolation¹⁹⁻²² or associated to ultrasound²³.

Similar to what was observed in the present study, Tugay et al.⁹ tetrapolar CIV therapy used for 20 minutes, in patients with primary dysmenorrhea, however used variation in the MFA between 0-100 Hz during the first 10 minutes and then variations between 90-100 Hz. They reported that there was a reduction in the EVE in both the lumbar region and ventral and lower limb, soon after, 8 and 24 hours of treatment. Whereas Khadygasayedabdulaziz et al.²⁴ used the interferential in a bipolar way, did not report the base frequency, just a variation of MFA between 90-130 Hz for 20 minutes. The volunteers showed a reduction of pain and of cortisol levels after two days of application of current, repeated in two menstrual cycles, however, the authors do not mention comparison with the use of a control group or placebo.

In the present study it was opted for the use of tetrapolar CIV, applied in the lumbar region, aiming at an application in large area and depth by the action of the stream of medium frequency¹¹, thus it is believed that there might be stimulation in the uterine innervation²⁵ region, facilitating the analgesia mediated by the chain. Since previous studies that showed no effects on the current accommodation, the variation of MFA i.e. the $\Delta f^{6,27}$ was noted used. Concordant with Tugay et al.⁹, side effects were not observed with the use of therapy, being thus indicated for such patients. It should be emphasized as limiting the use only of subjective evaluations concerning pain, being indicated for future evaluative studies to broaden the spectrum.

4 Conclusion

The results of this study showed that women who were treated with the Tetrapolar Interferencial Current obtained a significant reduction of pain.

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